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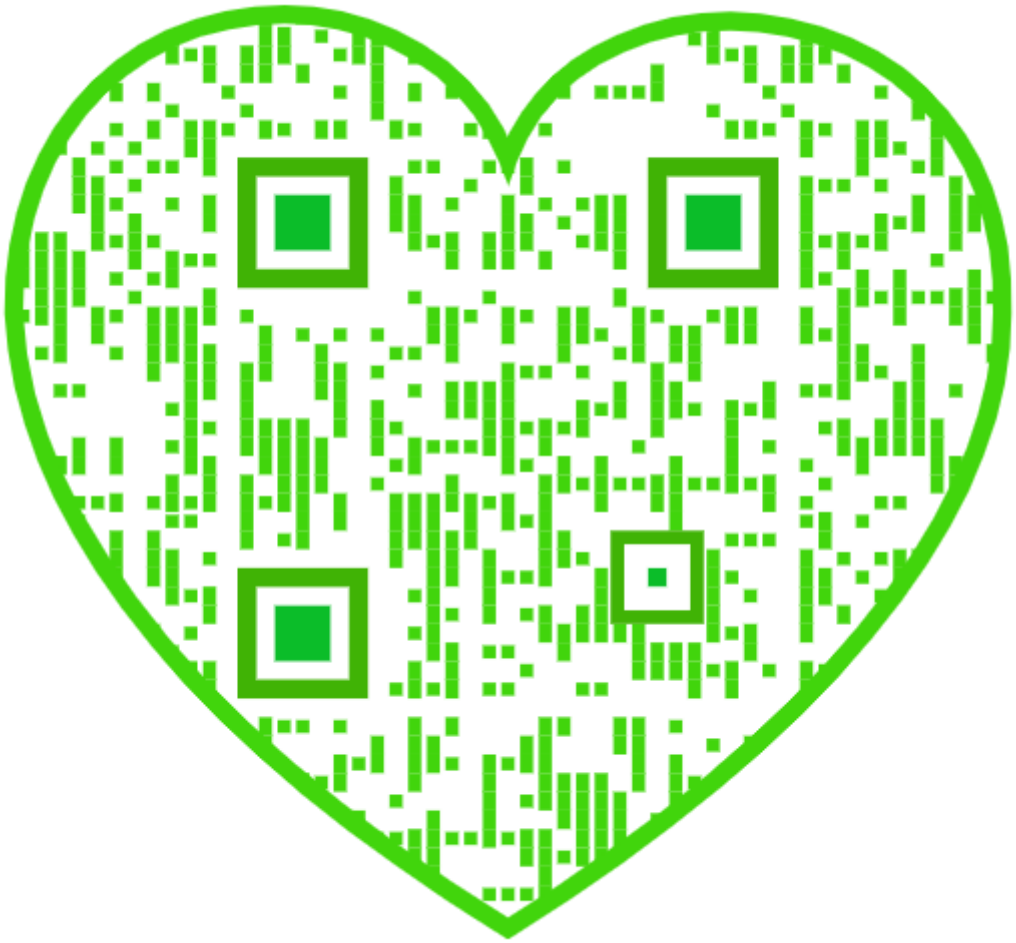

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THE

ENCYCLOPÆDIA BRITANNICA

A

DICTIONARY

OF

ARTS, SCIENCES, LITERATURE AND GENERAL INFORMATION

ELEVENTH EDITION

VOLUME V

CALHOUN to CHATELAINE

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L. J. S.	LEONARD JAMES SPENCER, M.A. Assistant in the Department of Mineralogy, British Museum. Formerly Scholar of Sidney Sussex College, Cambridge, and Harkness Scholar. Editor of the *Mineralogical Magazine.*	**Cerargyrite; Cerussite; Chabazite; Chalybite.**
L. S.	SIR LESLIE STEPHEN, K.C.B., LITT. D. See the biographical article: STEPHEN, SIR LESLIE.	**Carlyle.**
L. V.*	LUIGI VILLARI. Italian Foreign Office (Emigration Dept.). Formerly Newspaper Correspondent in east of Europe. Italian Vice-Consul in New Orleans, 1906, Philadelphia, 1907, and Boston, U.S.A., 1907–1910. Author of *Italian Life in Town and Country*; &c.	**Cantu; Cappello; Capponi, G. and P.; Caracciolo; Carbonari; Carmagnola; Carrara; Cavour.**
M. Br.	MARGARET BRYANT.	**Chapman, George** (*part*); **Charlemagne:** *Legends.*
M. G.	MOSES GASTER, PH.D. (Leipzig). Chief Rabbi of the Sephardic Communities of England. Vice-President, Zionist Congress, 1898, 1899, 1900. Ilchester Lecturer at Oxford on Slavonic and Byzantine Literature, 1886 and 1891. President, Folklore Society of England. Vice-President Anglo-Jewish Association. Author of *History of Rumanian Popular Literature*; &c.	**Cantacuzino; Cantemir.**
M. H. S.	MARION H. SPIELMANN, F.S.A. Formerly Editor of the *Magazine of Art.* Member of Fine Art Committee of International Exhibitions of Brussels, Paris, Buenos Aires, Rome, and the Franco-British Exhibition, London. Author of *History of "Punch"*; *British Portrait Painting to the Opening of the 19th Century*; *Works of G. F. Watts, R.A.*; *British Sculpture and Sculptors of To-day*; *Henriette Ronner*; &c.	**Caricature; Cartoon.**
M. J. de G.	MICHAEL JAN DE GOEJE. See the biographical article: GOEJE, MICHAEL JAN DE.	**Caliphate.**
M. P.	REV. MARK PATTISON. See the biographical article: PATTISON, MARK.	**Casaubon, Isaac.**
N. E. D.	NARCISSE EUTROPE DIONNE, M.D., LL.D., F.R.S. (Canada). Librarian of the Legislature of the Province of Quebec. Chief Editor of *Le Courrier du Canada*, 1880–1884. Chief Inspector of Federal Licences, 1884–1886. Chief Editor of *Le Journal de Quebec*, 1886. Author of *Life of Samuel Champlain, Founder of Quebec*; *Life of Jacques Cartier, discoverer of Canada*; *La Nouvelle France, 1540–1603*; *Quebec et Nouvelle France*; &c.	**Champlain, Samuel de.**
N. W. T.	NORTHCOTE WHITBRIDGE THOMAS, M.A. Government Anthropologist to Southern Nigeria. Corresponding Member of the Société d'Anthropologie de Paris. Author of *Thought Transference*; *Kinship and Marriage in Australia*; &c.	**Cannibalism.**
O. Ba.	OSWALD BARRON, F.S.A. Editor of *The Ancestor*, 1902–1905.	**Cecil.**
O. Br.	OSCAR BRILIANT.	**Carpathian Mountains** (*in part*).
O. M. D.	ORMONDE MADDOCK DALTON, M.A., F.S.A. Assistant Keeper, Department of British and Medieval Antiquities, British Museum. Corresponding Member of the Imperial Russian Archaeological Society. Author of *Guide to the Early Christian and Byzantine Antiquities*; &c.	**Catacomb** (*in part*).
P. A.	PAUL DANIEL ALPHANDÉRY. Professor of the History of Dogma, École Pratique des Hautes Études, Sorbonne, Paris. Author of *Les Idées morales chez les hétérodoxes latines au début du XIIIe siècle.*	**Capistrano.**
P. A. K.	PRINCE PETER ALEXEIVITCH KROPOTKIN. See the biographical article: KROPOTKIN, P. A.	**Caspian Sea** (*in part*); **Caucasus** (*in part*).
P. C. Y.	PHILIP CHESNEY YORKE, M.A. Magdalen College, Oxford.	**Catherine of Aragon; Charles I.; Charles II.**
P. La.	PHILIP LAKE, M.A., F.G.S. Lecturer on Physical and Regional Geography in Cambridge University. Formerly of the Geological Survey of India. Author of *Monograph of British Cambrian Trilobites.* Translator and Editor of Kayser's *Comparative Geology.*	**Carpathian Mountains** (*in part*); **Caucasus:** *Geology.*
P. Vn.	PERCIVAL SYLVANUS VIVIAN. Author of *Poems of Marriage.* Editor of the *Poetical Works of Thomas Campion.*	**Campion, Thomas.**
P. A. M.	PERCY ALEXANDER MACMAHON, F.R.S., D.Sc. Late Major R.A. Deputy Warden of the Standards, Board of Trade. Joint-General Secretary of the British Association. Formerly Professor of Physics, Ordnance College, and President of London Mathematical Society.	**Cayley.**

R.	THE RT. HON. LORD RAYLEIGH. See the biographical article: RAYLEIGH, 3rd Baron.	**Capillary Action** (*in part*).
R. A.*	ROBERT ANCHEL. Archivist to the Department de l'Eure.	**Cambon, Pierre Joseph; Cathelineau.**
R. Ad.	ROBERT ADAMSON. See the biographical article: ADAMSON, R.	**Category** (*in part*).
R. A. S. M.	ROBERT ALEXANDER STEWART MACALISTER, M.A., F.S.A. Director of Excavations for the Palestine Exploration Fund.	**Capernaum; Carmel.**
R. G.	RICHARD GARNETT. See the biographical article: GARNETT, RICHARD.	**Cardan.**
R. I. P.	R. I. POCOCK, F.Z.S. Superintendent of the Zoological Gardens, London.	**Centipede.**
R. K. D.	SIR ROBERT KENNAWAY DOUGLAS. Formerly Keeper of Oriental Printed Books and MSS. at the British Museum, and Professor of Chinese, King's College, London. Author of *The Language and Literature of China*; &c.	**Canton.**
R. L.*	RICHARD LYDEKKER, F.R.S., F.G.S., F.Z.S. Member of the Staff of the Geological Survey of India, 1874–1882. Author of *Catalogues of Fossil Mammals, Reptiles and Birds in British Museum*; *The Deer of all Lands*; *The Game Animals of Africa*; &c.	**Camel; Capuchin Monkey; Carnivora; Cat; Cavy; Cetacea; Chamois.**
R. L. H.	ROBERT LOCKHART HOBSON. Assistant in the Department of British and Medieval Antiquities, British Museum. Author of *Porcelain: Oriental, Continental and British*; *Marks on Pottery and Porcelain* (with W. Burton); and *Catalogue and Guide of English Pottery and Porcelain in British Museum.*	**Ceramics:** *Medieval and Later Italian*; *Persian, Syrian, Egyptian and Turkish.*
R. N. B.	ROBERT NISBET BAIN (d. 1909). Assistant Librarian, British Museum, 1883–1909. Author of *Scandinavia, the Political History of Denmark, Norway and Sweden, 1513–1900*; *The First Romanovs, 1613–1725*; *Slavonic Europe, the Political History of Poland and Russia from 1469 to 1796*; &c.	**Canute; Canute VI.; Casimir III.; Casimir IV.; Catherine I.; Charles I.** (*Hungary*); **Charles IX., X., XI., XII.** (*Sweden*). **Charles XIII., XIV., XV.** (*Sweden and Norway*).
R. Po.	RENÉ POUPARDIN, D. ÈS L. Secretary of the École des Chartes. Honorary Librarian at the Bibliothèque Nationale, Paris. Author of *Le Royaume de Provence sous les Carolingiens*; *Recueil des chartes de Saint-Germain*; &c.	**Charles the Bold.**
R. P. S.	R. PHENÉ SPIERS, F.S.A., F.R.I.B.A. Master of the Architectural School and Surveyor, Royal Academy, London. Past President of Architectural Association. Associate and Fellow of King's College, London. Corresponding Member of the Institute of France. Edited Fergusson's *History of Architecture*. Author of *Architecture East and West*; &c.	**Campanile; Capital;** *Arch.*; **Cathedral:** *Arch.*; **Ceiling.**
R. S. C.	ROBERT SEYMOUR CONWAY, M.A., D.LITT. (Cantab.). Professor of Latin in the University of Manchester. Formerly Professor of Latin in University College, Cardiff; and Fellow of Gonville and Caius College, Cambridge. Author of *The Italic Dialects.*	**Campania** (*in part*).
R. W.	ROBERT WALLACE, F.R.S. (Edin.), F.L.S. Professor of Agriculture and Rural Economy at Edinburgh University, and Garton Lecturer on Colonial and Indian Agriculture. Professor of Agriculture, R.A.C., Cirencester, 1882–1885. Author of *Farm Live Stock of Great Britain*; *Indian Agriculture*; *The Agriculture and Rural Economy of Australia and New Zealand*; *Farming Industries of Cape Colony*; &c.	**Cattle** (*in part*).
R. We.	RICHARD WEBSTER, A.M. Editor of *Elegies of Maximianus.*	**Channing, William E.**
ST C.	VISCOUNT ST CYRES. See the biographical article: IDDESLEIGH, 1ST EARL OF.	**Casuistry.**
S. D.	SAMUEL DAVIDSON, D.D. See the biographical article: DAVIDSON, SAMUEL.	**Canon:** *Scriptures.*
T. As.	THOMAS ASHBY, M.A., D.LITT., F.S.A. Director of the British School of Archaeology at Rome. Corresponding Member of the Imperial German Archaeological Institute. Formerly Scholar of Christ Church, Oxford. Craven Fellow, Oxford, 1897. Author of *The Classical Topography of the Roman Campagna*; &c.	**Camerino; Campania** (*in part*); **Canosa; Canusium; Capena; Capri; Capua; Carales; Carsioli; Casilinum; Casinum; Cassia, Via; Catania; Caudine Forks; Cefalu; Centuripe; Cesena.**
T. A. H.	CAPTAIN THOMAS A. HULL, R.N. Formerly Superintendent of Admiralty Charts.	**Chart.**
T. Ba.	SIR THOMAS BARCLAY, M.P. Member of the Institute of International Law. Member of the Supreme Council of the Congo Free State. Officer of the Legion of Honour. Author of *Problems of International Practice and Diplomacy*; &c. M.P. for Blackburn, 1910.	**Capture.**
T. F. C.	THEODORE FREYLINGHUYSEN COLLIER, PH.D. Assistant Professor of History, Williams College, Williamstown, Mass., U.S.A.	**Carthage, Synods of; Chalcedon, Council of.**

T. K. C.	Rev. Thomas Kelly Cheyne. D.Litt., D.D. See the biographical article: Cheyne, T. K.	**Canaan, Canaanites.**
T. M. F.	Thomas Macall Fallow, M.A., F.S.A. Formerly editor of *The Antiquary*, 1895–1899. Author of *Memorials of Old Yorkshire*; *The Cathedral Churches of Ireland.*	**Cathedral.**
T. W. F.	Thomas William Fox. Professor of Textiles in the University of Manchester. Author of *Mechanics of Weaving.*	**Carding.**
W. A. B. C.	Rev. William Augustus Brevoort Coolidge, M.A., F.R.G.S. Fellow of Magdalen College, Oxford. Professor of English History, St David's College, Lampeter, 1880–1881. Author of *Guide to Switzerland*; *The Alps in Nature and in History*; &c. Editor of *The Alpine Journal*, 1880–1889.	**Cannes;** **Chamonix;** **Chartreuse, La Grande.**
W. A. P.	Walter Alison Phillips, M.A. Formerly Exhibitioner of Merton College and Senior Scholar of St John's College, Oxford. Author of *Modern Europe*; &c.	**Canon:** *Church Dignitary*; **Capo d'Istria;** **Carlsbad Decrees; Chasuble.**
W. B.*	William Burton, Hon. M.A. (Vict.), F.C.S. Chairman, Joint-Committee of Pottery Manufacturers of Great Britain. Examiner for Board of Education in Pottery Design and for Technological Examinations in Pottery Manufacture. Author of *English Stoneware and Earthenware*; *Porcelain*; &c.	**Ceramics** (*in part*).
W. B. D.	William Boyd Dawkins, F.R.S., D.Sc. See the biographical article: Dawkins, William Boyd.	**Cave.**
W. B. Du.	William Bartlett Duffield, M.A. Barrister at Law, Inner Temple. Secretary to the Royal Commission on Canals, 1906–1910.	**Chartered Companies.**
W. F. C.	William Feilden Craies, M.A. Barrister-at-Law, Inner Temple. Lecturer on Criminal Law at King's College, London. Editor of *Archbold's Criminal Pleading* (23rd edition).	**Capital Punishment.**
W. F. W.	Walter Francis Willcox, LL.B., Ph.D. Dean of, and Professor of Political Economy and Statistics at, Cornell University. Formerly Chief Statistician and now Special Agent of the U.S. Census Bureau. Author of *The Divorce Problem—a Study in Statistics*; *Social Statistics of the United States*; &c.	**Census:** *U.S.A.*
W. Fr.	William Fream (d. 1907), LL.D., F.G.S., F.L.S., F.S.S. Author of *Handbook of Agriculture.* Formerly Agricultural Correspondent of *The Times.*	**Cattle** (*in part*).
W. G.*	Walcot Gibson, D.Sc., F.G.S. Geologist on H.M. Geological Survey. Author of *The Gold-bearing Rocks of the S. Transvaal*; *Mineral Wealth of Africa*; *The Geology of Coal and Coal Mining*; &c.	**Cape Colony:** *Geology.*
W. G. F. P.	Sir Walter George Frank Phillimore, Bart., D.C.L., LL.D. Judge of the King's Bench Division. President of International Law Association, 1905. Author of *Book of Church Law.* Editor of 2nd ed. of *Phillimore's Ecclesiastical Law*; 3rd ed. of vol. iv. of *Phillimore's International Law*; &c.	**Canon Law:** *Anglican.*
W. G. M.	Walter G. M'Millan, F.C.S., M.I.M.E. (d. 1904). Formerly Secretary of the Institute of Electrical Engineers. Lecturer on Metallurgy, Mason College, Birmingham. Author of *A Treatise on Electro-Metallurgy.*	**Carborundum.**
W. Ha.	Rev. William Hanna, LL.D., D.D. (1802–1882). Minister of St John's Free Church, Edinburgh, 1850–1866. Author of *Life of Dr Chalmers*; *Wycliffe and the Huguenots*; *Martyrs of the Scottish Reformation.*	**Chalmers, Thomas** (*in part*).
W. J. G.	William John Gruffydd, M.A. Lecturer in Celtic, University College, Cardiff. Examiner in Welsh to the Central Welsh Board for Intermediate Education. Author of *Caneuon a Cherddi: An Anthology of Medieval Welsh Poetry.*	**Celt:** *Literature, Welsh.*
W. L.*	Walter Lehmann, M.D. Directorial Assistant of the Royal Ethnographical Museum, Munich. Conducted Exploring Expedition in Mexico and Central America, 1907–1909. Author of many publications on Mexican and Central American Archaeology.	**Central America:** *Archaeology.*
W. L. A.	Rev. William Lindsay Alexander, D.D., LL.D., F.R.S. (Edin.) (1808–1884). Classical Tutor, Lancashire Independent College. Pastor of Independent Chapel, N. College Street, Edinburgh. One of the Old Testament Revisers. Author of *A Moral Philosophy.*	**Calvin** (*in part*).
W. L. G.	William Lawson Grant, M.A. Professor at Queen's University, Kingston, Canada. Formerly Beit Lecturer in Colonial History at Oxford University. Editor of *Acts of the Privy Council*, Colonial series; *Canadian Constitutional Development* (in collaboration).	**Canada:** *Statistics*; **Cartier, Sir Georges Etienne.**
W. M. R.	William Michael Rossetti. See the biographical article: Rossetti, Dante Gabriel.	**Canova; Caracci; Cartoon;** **Cellini, Benvenuto** (*in part*); **Charlet.**
W. Ri.	William Ridgeway, M.A., D.Sc., LL.D. (Aberdeen), D.Litt. Fellow of the British Academy. Disney Professor of Archaeology at Cambridge University. Professor of Greek, Queen's College, Cork, 1883. Ex-President of Cambridge Philological, Antiquarian and Classical Societies. Author of *The Oldest Irish Epic*; *Origin of Metallic Currency and Weight Standards*; *The Early Age of Greece*; &c.	**Celt.**

W. R. B.	Rt. Rev. William Robert Brownlow, M.A., D.D. (d. 1901). Roman Catholic Bishop of Clifton. Provost and Domestic Prelate to Pope Leo XIII. Co-editor of *English Roma Sotterranea*. Author of *Early Christian Symbolism*; *Lectures on Sacerdotalism, on the Catacombs and other Archaeological Subjects*. Translator of *Cur Deus Homo* and *Vitis mystica*.	**Catacomb** (*in part*).
W. R. S.	William Robertson Smith. See the biographical article: Smith, William Robertson.	**Canticles** (*in part*).
W. Wo.	William Wood, D.C.L., F.R.S. (Canada). Lieut.-Col., Canadian Militia. Formerly President of the English Section of the Royal Society of Canada and of the Historic Landmarks Association. Author of *The Fight for Canada*; *The Logs of the Conquest of Canada*, &c.	**Canada**: *Literature*, *French-Canadian*.
W. W. R.*	William Walker Rockwell, Lic. Theol. Assistant Professor of Church History, Union Theological Seminary, New York.	**Celestine III. and V.**
W. Y. S.	William Young Sellar. See the biographical article: Sellar, William Young.	**Catullus** (*in part*).

PRINCIPAL UNSIGNED ARTICLES

California.
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Cambridge, Earls and Dukes of.
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Campbell, Thomas.
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Canning, George.
Canterbury.
Cape Town.
Cape Verde Islands.
Capital (*Economics*).
Capitulations.
Carbolic Acid.
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Chambers, Robert.
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Chantrey, Sir Francis.
Charles V., VI., VII. of France.
Charles, Archduke of Austria.
Charles Albert, king of Sardinia.
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ENCYCLOPÆDIA BRITANNICA

ELEVENTH EDITION

VOLUME V

CALHOUN, JOHN CALDWELL (1782–1850), American statesman and parliamentarian, was born, of Scottish-Irish descent, in Abbeville District, South Carolina, on the 18th of March 1782. His father, Patrick Calhoun, is said to have been born in Donegal, in North Ireland, but to have left Ireland when a mere child. The family seems to have emigrated first to Pennsylvania, whence they removed, after Braddock's defeat, to Western Virginia. From Virginia they removed in 1756 to South Carolina and settled on Long Cane Creek, in Granville (now Abbeville) county. Patrick Calhoun attained some prominence in the colony, serving in the colonial legislature, and afterwards in the state legislature, and taking part in the War of Independence. In 1770 he had married Martha Caldwell, the daughter of another Scottish-Irish settler.

The opportunities for obtaining a liberal education in the remote districts of South Carolina at that time were scanty. Fortunately, young Calhoun had the opportunity, although late, of studying under his brother-in-law, the Rev. Moses Waddell (1770–1840), a Presbyterian minister, who afterwards, from 1819 to 1829, was president of the University of Georgia. In 1802 Calhoun entered the junior class in Yale College, and graduated with distinction in 1804. He then studied first at the famous law school in Litchfield, Conn., and afterwards in a law office in Charleston, S.C., and in 1807 was admitted to the bar. He began practice in his native Abbeville district, and soon took a leading place in his profession. In 1808 and 1809 he was a member of the South Carolina legislature, and from 1811 to 1817 was a member of the national House of Representatives.

When he entered the latter body the strained relations between Great Britain and the United States formed the most important question for the deliberation of Congress. Henry Clay, the speaker of the house, being eager for war and knowing Calhoun's hostility to Great Britain, gave him the second place on the committee of foreign affairs, of which he soon became the actual head. In less than three weeks the committee reported resolutions, evidently written by Calhoun, recommending preparations for a struggle with Great Britain; and in the following June Calhoun submitted a second report urging a formal declaration of war. Both sets of resolutions the House adopted. Clay and Calhoun did more, probably, than any other two men in Congress to force the reluctant president into beginning hostilities.

In 1816 Calhoun delivered in favour of a protective tariff a speech that was ever held up by his opponents as evidence of his inconsistency in the tariff controversy. The embargo and the war had crippled American commerce, but had stimulated manufactures. With the end of the Napoleonic wars in Europe the industries of the old world revived, and Americans began to feel their competition. In the consequent distress in the new industrial centres there arose a cry for protection. Calhoun, believing that there was a natural tendency in the United States towards the development of manufactures, supported the Tariff Bill of 1816, which laid on certain foreign commodities duties higher than were necessary for the purposes of revenue. He believed that the South would share in the general industrial development, not having perceived as yet that slavery was an insuperable obstacle. His opposition to protection in later years resulted from an honest change of convictions. He always denied that in supporting this bill he had been inconsistent, and insisted that it was one for revenue.

From 1817 to 1825 Calhoun was secretary of war under President Monroe. To him is due the fostering and the reformation of the National Military Academy at West Point, which he found in disorder, but left in a most efficient state. Calhoun was vice-president of the United States from 1825 to 1832, during the administration of John Quincy Adams, and during most of the first administration of Andrew Jackson. This period was for Calhoun a time of reflection. His faith in a strong nationalistic policy was gradually undermined, and he finally became the foremost champion of particularism and the recognized leader of what is generally known as the "States Rights" or "Strict Construction" party.

In 1824 there was a very large increase in protective duties. In 1828 a still higher tariff act, the so-called "Bill of Abominations," was passed, avowedly for the purpose of protection. The passage of these acts caused great discontent, especially among the Southern states, which were strictly agricultural. They felt that the great burden of this increased tariff fell on them, as they consumed, but did not produce, manufactured articles. Under such conditions the Southern states questioned the constitutionality of the imposition. Calhoun himself now perceived that the North and the South represented diverse tendencies. The North was outstripping the South in population and wealth, and already by the tariff acts was, as he believed, selfishly levying taxes for its sole benefit. The minority must, he insisted, be protected from "the tyranny of the majority." In his first important political essay, "The South Carolina Exposition," prepared by him in the summer of 1828, he showed how this should be done. To him it was clear that the Federal Constitution was a limited instrument, by which the sovereign states had delegated to the Federal government certain general powers. The states could not, without violating the constitutional compact, interfere with the activities of the Federal government so long as the government confined itself to its proper sphere; but the attempt of Congress, or any other

department of the Federal government, to exercise any power which might alter the nature of the instrument would be an act of usurpation. The right of judging such an infraction belonged to the state, being an attribute of sovereignty of which the state could not be deprived without being reduced to a wholly subordinate condition. As a remedy for such a breach of compact the state might resort to nullification (*q.v.*), or, as a last resort, to secession from the Union. Such doctrines were not original with Calhoun, but had been held in various parts of the Union from time to time. It remained for him, however, to submit them to a rigid analysis and reduce them to a logical form.

Meantime the friendship between Calhoun and Jackson had come to an end. While a member of President Monroe's cabinet, Calhoun had favoured the reprimanding of General Jackson (*q.v.*) for his high-handed course in Florida in 1818, during the first Seminole War. In 1831 W. H. Crawford, who had been a member of this cabinet, desiring to ruin Calhoun politically by turning Jackson's hostility against him, revealed to Jackson what had taken place thirteen years before. Jackson could brook no criticism from one whom he had considered a friend; Calhoun, moreover, angered the president still further by his evident sanction of the social proscription of Mrs Eaton (*q.v.*); the political views of the two men, furthermore, were becoming more and more divergent, and the rupture between the two became complete.

The failure of the Jackson administration to reduce the Tariff of 1828 drew from Calhoun his "Address to the People of South Carolina" in 1831, in which he elaborated his views of the nature of the Union as given in the "Exposition." In 1832 a new tariff act was passed, which removed the "abominations" of 1828 but left the principle of protection intact. The people of South Carolina were not satisfied, and Calhoun in a third political tract, in the form of a letter to Governor James Hamilton (1786–1857) of South Carolina, gave his doctrines their final form, but without altering the fundamental principles that have already been stated.

In 1832 South Carolina, acting in substantial accordance with Calhoun's theories, "nullified" the tariff acts passed by Congress in 1828 and 1832 (see NULLIFICATION; SOUTH CAROLINA; and UNITED STATES). On the 28th of December 1832 Calhoun resigned as vice-president, and on the 3rd of January 1833 took his seat in the Senate. President Jackson had, in a special message, taken strong ground against the action of South Carolina, and a bill was introduced to extend the jurisdiction of the courts of the United States and clothe the president with additional powers, with the avowed object of meeting the situation in South Carolina. Calhoun, in turn, introduced resolutions upholding the doctrine held by South Carolina, and it was in the debate on the first-named measure, termed the "Force Bill," and on these resolutions, that the first intellectual duel took place between Daniel Webster and Calhoun. Webster declared that the Federal government through the Supreme Court was the ultimate expounder and interpreter of its own powers, while Calhoun championed the rights of the individual state under a written contract which reserved to each state its sovereignty.

The practical result of the conflict over the tariff was a compromise. Congress passed an act gradually reducing the duties to a revenue basis, and South Carolina repealed her nullification measures. As the result of the conflict, Calhoun was greatly strengthened in his position as the leader of his party in the South. Southern leaders generally were now beginning to perceive, as Calhoun had already seen, that there was a permanent conflict between the North and the South, not only a divergence of interests between manufacturing and agricultural sections, but an inevitable struggle between free and slave labour. Should enough free states be admitted into the Union to destroy the balance of power, the North would naturally gain a preponderance in the Senate, as it had in the House, and might, within constitutional limits, legislate as it pleased. The Southern minority recognized, therefore, that they must henceforth direct the policy of the government in all questions affecting their peculiar interests, or their section would undergo a social and economic revolution. The Constitution, if strictly interpreted according to Calhoun's views, would secure this control to the minority, and prevent an industrial upheaval.

An element of bitterness was now injected into the struggle. The Northern Abolitionists, to whom no contract or agreement was sacred that involved the continuance of slavery, regarded the clauses in the Federal Constitution which maintained the property rights of the slave-owners as treaties with evil, binding on no one, and bitterly attacked the slave-holders and the South generally. Their attacks may be said to have destroyed the moderate party in that section. Any criticism of their peculiar institution now came to be highly offensive to Southern leaders, and Calhoun, who always took the most advanced stand in behalf of Southern rights urged (but in vain) that the Senate refuse to receive abolitionist petitions. He also advocated the exclusion of abolitionist literature from the mails.

Indeed from 1832 until his death Calhoun may be said to have devoted his life to the protection of Southern interests. He became the exponent, the very embodiment, of an idea. It is a mistake, however, to characterize him as an enemy to the Union. His contention was that its preservation depended on the recognition of the rights guaranteed to the states by the Constitution, and that aggression by one section could only end in disruption. Secession, he contended, was the only final remedy left to the weaker. Calhoun was re-elected to the Senate in 1834 and in 1840, serving until 1843. From 1832 to 1837 he was a man without a party. He attacked the "spoils system" inaugurated by President Jackson, opposed the removal of the government deposits from the Bank of the United States, and in general was a severe critic of Jackson's administration. In this period he usually voted with the Whigs, but in 1837 he went over to the Democrats and supported the "independent treasury" scheme of President Van Buren. He was spoken of for the presidency in 1844, but declined to become a candidate, and was appointed as secretary of state in the cabinet of President Tyler, serving from the 1st of April 1844, throughout the remainder of the term, until the 10th of March 1845. While holding this office he devoted his energies chiefly to the acquisitions of Texas, in order to preserve the equilibrium between the South and the constantly growing North. One of his last acts as secretary of state was to send a despatch, on the 3rd of March 1845, inviting Texas to accept the terms proposed by Congress. Calhoun was once more elected to the Senate in 1845. The period of his subsequent service covered the settlement of the Oregon dispute with Great Britain and the Mexican War. On the 19th of February 1847 he introduced in the Senate a series of resolutions concerning the territory about to be acquired from Mexico, which marked the most advanced stand as yet taken by the pro-slavery party. The purport of these resolutions was to deny to Congress the power to prohibit slavery in the territories and to declare all previous enactments to this effect unconstitutional.

In 1850 the Union seemed in imminent danger of dissolution. California was applying for admission to the Union as a state under a constitution which did not permit slavery. Her admission with two Senators would have placed the slave-holding states in the minority. In the midst of the debate on this application Calhoun died, on the 31st of March 1850, in Washington.

Calhoun is most often compared with Webster and Clay. The three constitute the trio upon whom the attention of students at this period naturally rests. Calhoun possessed neither Webster's brilliant rhetoric nor his easy versatility, but he surpassed him in the ordered method and logical sequence of his mind. He never equalled Clay in the latter's magnetism of impulse and inspiration of affection, but he far surpassed him in clearness and directness and in tenacity of will. He surpassed them both in the distinctness with which he saw results, and in the boldness with which he formulated and followed his conclusions.

Calhoun in person was tall and slender, and in his later years was emaciated. His features were angular and somewhat harsh, but with a striking face and very fine eyes of a brilliant dark blue. To his slaves he was just and kind. He lived the modest, unassuming life of a country planter when at his home, and at Washington lived as unostentatiously as possible, consistent with

his public duties and position. His character in other respects was always of stainless integrity.

BIBLIOGRAPHY.—A collected edition of Calhoun's *Works* (6 vols., New York, 1853–1855) has been edited by Richard K. Crallé. The most important speeches and papers are:—*The South Carolina Exposition* (1828); *Speech on the Force Bill* (1833); *Reply to Webster* (1833); *Speech on the Reception of Abolitionist Petitions* (1836), *and on the Veto Power* (1842); a *Disquisition on Government*, and a *Discourse on the Constitution and Government of the United States* (1849–1850)—the last two, written a short time before his death, defend with great ability the rights of a minority under a government such as that of the United States. Calhoun's *Correspondence*, edited by J. Franklin Jameson, has been published by the American Historical Association (see *Report* for 1899, vol. ii.). The biography of Calhoun by Dr Hermann von Holst in the "American Statesmen Series" (Boston, 1882) is a condensed study of the political questions of Calhoun's time. Gustavus M. Pinckney's *Life of John C. Calhoun* (Charleston, 1903) gives a sympathetic Southern view. Gaillard Hunt's *John C. Calhoun* (Philadelphia, 1908) is a valuable work. (H. A. M. S.)

CALI, an inland town of the department of Cauca, Colombia, South America, about 180 m. S.W. of Bogotá and 50 m. S.E. of the port of Buenaventura, on the Rio Cali, a small branch of the Cauca. Pop. (1906 estimate) 16,000. Cali stands 3327 ft. above sea-level on the western side of the Cauca valley, one of the healthiest regions of Colombia. The land-locked character of this region greatly restricts the city's trade and development; but it is considered the most important town in the department. It has a bridge across the Cali, and a number of religious and public edifices. A railway from Buenaventura will give Cali and the valley behind it, with which it is connected by over 200 m. of river navigation, a good outlet on the Pacific coast. Coal deposits exist in the immediate vicinity of the town.

CALIBRATION, a term primarily signifying the determination of the "calibre" or bore of a gun. The word *calibre* was introduced through the French from the Italian *calibro*, together with other terms of gunnery and warfare, about the 16th century. The origin of the Italian equivalent appears to be uncertain. It will readily be understood that the calibre of a gun requires accurate adjustment to the standard size, and further, that the bore must be straight and of uniform diameter throughout. The term was subsequently applied to the accurate measurement and testing of the bore of any kind of tube, especially those of thermometers.

In modern scientific language, by a natural process of transition, the term "calibration" has come to denote the accurate comparison of any measuring instrument with a standard, and more particularly the determination of the errors of its scale. It is seldom possible in the process of manufacture to make an instrument so perfect that no error can be discovered by the most delicate tests, and it would rarely be worth while to attempt to do so even if it were possible. The cost of manufacture would in many cases be greatly increased without adding materially to the utility of the apparatus. The scientific method, in all cases which admit of the subsequent determination and correction of errors, is to economize time and labour in production by taking pains in the subsequent verification or calibration. This process of calibration is particularly important in laboratory research, where the observer has frequently to make his own apparatus, and cannot afford the time or outlay required to make special tools for fine work, but is already provided with apparatus and methods of accurate testing. For non-scientific purposes it is generally possible to construct instruments to measure with sufficient precision without further correction. The present article will therefore be restricted to the scientific use and application of methods of accurate testing.

General Methods and Principles.—The process of calibration of any measuring instrument is frequently divisible into two parts, which differ greatly in importance in different cases, and of which one or the other may often be omitted. (1) The determination of the value of the unit to which the measurements are referred by comparison with a standard unit of the same kind. This is often described as the *Standardization* of the instrument, or the determination of the *Reduction factor*. (2) The verification of the accuracy of the subdivision of the scale of the instrument. This may be termed calibration of the scale, and does not necessarily involve the comparison of the instrument with any independent standard, but merely the verification of the accuracy of the relative values of its indications. In many cases the process of calibration adopted consists in the comparison of the instrument to be tested with a standard over the whole range of its indications, the relative values of the subdivisions of the standard itself having been previously tested. In this case the distinction of two parts in the process is unnecessary, and the term calibration is for this reason frequently employed to include both. In some cases it is employed to denote the first part only, but for greater clearness and convenience of description we shall restrict the term as far as possible to the second meaning.

The methods of standardization or calibration employed have much in common even in the cases that appear most diverse. They are all founded on the axiom that "things which are equal to the same thing are equal to one another." Whether it is a question of comparing a scale with a standard, or of testing the equality of two parts of the same scale, the process is essentially one of interchanging or substituting one for the other, the two things to be compared. In addition to the things to be tested there is usually required some form of balance, or comparator, or gauge, by which the equality may be tested. The simplest of such comparators is the instrument known as the *callipers*, from the same root as calibre, which is in constant use in the workshop for testing equality of linear dimensions, or uniformity of diameter of tubes or rods. The more complicated forms of optical comparators or measuring machines with scales and screw adjustments are essentially similar in principle, being finely adjustable gauges to which the things to be compared can be successively fitted. A still simpler and more accurate comparison is that of volume or capacity, using a given mass of liquid as the gauge or test of equality, which is the basis of many of the most accurate and most important methods of calibration. The common balance for testing equality of mass or weight is so delicate and so easily tested that the process of calibration may frequently with advantage be reduced to a series of weighings, as for instance in the calibration of a burette or measure-glass by weighing the quantities of mercury required to fill it to different marks. The balance may, however, be regarded more broadly as the type of a general method capable of the widest application in accurate testing. It is possible, for instance, to balance two electromotive forces or two electrical resistances against each other, or to measure the refractivity of a gas by balancing it against a column of air adjusted to produce the same retardation in a beam of light. These "equilibrium," or "null," or "balance" methods of comparison afford the most accurate measurements, and are generally selected if possible as the basis of any process of calibration. In spite of the great diversity in the nature of things to be compared, the fundamental principles of the methods employed are so essentially similar that it is possible, for instance, to describe the testing of a set of weights, or the calibration of an electrical resistance-box, in almost the same terms, and to represent the calibration correction of a mercury thermometer or of an ammeter by precisely similar curves.

Method of Substitution.—In comparing two units of the same kind and of nearly equal magnitude, some variety of the general method of substitution is invariably adopted. The same method in a more elaborate form is employed in the calibration of a series of multiples or submultiples of any unit. The details of the method depend on the system of subdivision adopted, which is to some extent a matter of taste. The simplest method of subdivision is that on the binary scale, proceeding by multiples of 2. With a pair of submultiples of the smallest denomination and one of each of the rest, thus 1, 1, 2, 4, 8, 16, &c., each weight or multiple is equal to the sum of all the smaller weights, which may be substituted for it, and the small difference, if any, observed. If we call the weights A, B, C, &c., where each is approximately double the following weight, and if we write a for observed excess of A over the rest of the weights, b for that of B over $C+D+$&c., and so on, the observations by the method of substitution give the series of equations,

$$A-\text{rest}=a,\ B-\text{rest}=b,\ C-\text{rest}=c,\ \&c. \quad . \quad . \quad (1)$$

Subtracting the second from the first, the third from the second, and so on, we obtain at once the value of each weight in terms of the preceding, so that all may be expressed in terms of the largest, which is most conveniently taken as the standard

$$B=A/2+(b-a)/2,\ C=B/2+(c-b)2,\ \&c. \quad . \quad . \quad (2)$$

The advantages of this method of subdivision and comparison, in addition to its extreme simplicity, are (1) that there is only one possible combination to represent any given weight within the range of the series; (2) that the least possible number of weights is required to cover any given range; (3) that the smallest number of substitutions is required for the complete calibration. These advantages are important in cases where the accuracy of calibration is limited by the constancy of the conditions of observation, as in the case of an electrical resistance-box, but the reverse may be the case when it is a question of accuracy of estimation by an observer.

In the majority of cases the ease of numeration afforded by familiarity with the decimal system is the most important

consideration. The most convenient arrangement on the decimal system for purposes of calibration is to have the units, tens, hundreds, &c., arranged in groups of four adjusted in the proportion of the numbers 1, 2, 3, 4. The relative values of the weights in each group of four can then be determined by substitution independently of the others, and the total of each group of four, making ten times the unit of the group, can be compared with the smallest weight in the group above. This gives a sufficient number of equations to determine the errors of all the weights by the method of substitution in a very simple manner. A number of other equations can be obtained by combining the different groups in other ways, and the whole system of equations may then be solved by the method of least squares; but the equations so obtained are not all of equal value, and it may be doubted whether any real advantage is gained in many cases by the multiplication of comparisons, since it is not possible in this manner to eliminate constant errors or personal equation, which are generally aggravated by prolonging the observations. A common arrangement of the weights in each group on the decimal system is 5, 2, 1, 1, or 5, 2, 2, 1. These do not admit of the independent calibration of each group by substitution. The arrangement 5, 2, 1, 1, 1, or 5, 2, 2, 1, 1, permits independent calibration, but involves a larger number of weights and observations than the 1, 2, 3, 4, grouping. The arrangement of ten equal weights in each group, which is adopted in " dial " resistance-boxes, and in some forms of chemical balances where the weights are mechanically applied by turning a handle, presents great advantages in point of quickness of manipulation and ease of numeration, but the complete calibration of such an arrangement is tedious, and in the case of a resistance-box it is difficult to make the necessary connexions. In all cases where the same total can be made up in a variety of ways, it is necessary in accurate work to make sure that the same weights are always used for a given combination, or else to record the actual weights used on each occasion. In many investigations where time enters as one of the factors, this is a serious drawback, and it is better to avoid the more complicated arrangements. The accurate adjustment of a set of weights is so simple a matter that it is often possible to neglect the errors of a well-made set, and no calibration is of any value without the most scrupulous attention to details of manipulation, and particularly to the correction for the air displaced in comparing weights of different materials. Electrical resistances are much more difficult to adjust owing to the change of resistance with temperature, and the calibration of a resistance-box can seldom be neglected on account of the changes of resistance which are liable to occur after adjustment from imperfect annealing. It is also necessary to remember that the order of accuracy required, and the actual values of the smaller resistances, depend to some extent on the method of connexion, and that the box must be calibrated with due regard to the conditions under which it is to be used. Otherwise the method of procedure is much the same as in the case of a box of weights, but it is necessary to pay more attention to the constancy and uniformity of the temperature conditions of the observing-room.

Method of Equal Steps.—In calibrating a continuous scale divided into a number of divisions of equal length, such as a metre scale divided in millimetres, or a thermometer tube divided in degrees of temperature, or an electrical slide-wire, it is usual to proceed by a method of equal steps. The simplest method is that known as the method of Gay Lussac in the calibration of mercurial thermometers or tubes of small bore. It is essentially a method of substitution employing a column of mercury of constant volume as the gauge for comparing the capacities of different parts of the tube. A precisely similar method, employing a pair of microscopes at a fixed distance apart as a standard of length, is applicable to the calibration of a divided scale. The interval to be calibrated is divided into a whole number of equal steps or sections, the points of division at which the corrections are to be determined are called *points of calibration.*

Calibration of a Mercury Thermometer.—To facilitate description, we will take the case of a fine-bore tube, such as that of a thermometer, to be calibrated with a thread of mercury. The bore of such a tube will generally vary considerably even in the best standard instruments, the tubes of which have been specially drawn and selected. The correction for inequality of bore may amount to a quarter or half a degree, and is seldom less than a tenth. In ordinary chemical thermometers it is usual to make allowance for variations of bore in graduating the scale, but such instruments present discontinuities of division, and cannot be used for accurate work, in which a finely-divided scale of equal parts is essential. The calibration of a mercury thermometer intended for work of precision is best effected after it has been sealed. A thread of mercury of the desired length is separated from the column. The exact adjustment of the length of the thread requires a little manipulation. The thermometer is inverted and tapped to make the mercury run down to the top of the tube, thus collecting a trace of residual gas at the end of the bulb. By quickly reversing the thermometer the bubble passes to the neck of the bulb. If the instrument is again inverted and tapped, the thread will probably break off at the neck of the bulb, which should be previously cooled or warmed so as to obtain in this manner, if possible, a thread of the desired length. If the thread so obtained is too long or not accurate enough, it is removed to the other end of the tube, and the bulb further warmed till the mercury reaches some easily recognized division. At this point the broken thread is rejoined to the mercury column from the bulb, and a microscopic bubble of gas is condensed which generally suffices to determine the subsequent breaking of the mercury column at the same point of the tube. The bulb is then allowed to cool till the length of the thread above the point of separation is equal to the desired length, when a slight tap suffices to separate the thread. This method is difficult to work with short threads owing to deficient inertia, especially if the tube is very perfectly evacuated. A thread can always be separated by local heating with a small flame, but this is dangerous to the thermometer, it is difficult to adjust the thread exactly to the required length, and the mercury does not run easily past a point of the tube which has been locally heated in this manner.

Having separated a thread of the required length, the thermometer is mounted in a horizontal position on a suitable support, preferably with a screw adjustment in the direction of its length. By tilting or tapping the instrument the thread is brought into position corresponding to the steps of the calibration successively, and its length in each position is carefully observed with a pair of reading microscopes fixed at a suitable distance apart. Assuming that the temperature remains constant, the variations of length of the thread are inversely as the variations of cross-section of the tube. If the length of the thread is very nearly equal to one step, and if the tube is nearly uniform, the average of the observed lengths of the thread, taking all the steps throughout the interval, is equal to the length which the thread should have occupied in each position had the bore been uniform throughout and all the divisions equal.

TABLE I.—*Calibration by Method of Gay Lussac.*

No. of Step.	1	2	3	4	5	6	7	8	9	10
Ends of thread.	+·010	−·016	−·020	−·031	+·016	+·008	+·013	+·017	+·004	−·088
	+·038	+·017	−·003	−·022	+·010	+·005	+·033	+·018	+·013	−·003
Excess-length.	−·028	−·033	−·017	−·009	+·006	−·003	−·020	−·001	−·004	+·005
Error of step.	−17·6	−22·6	− 6·6	+ 1·4	+16·4	+ 7·4	− 9·6	+ 9·4	+ 6·4	+15·4
Correction.	+17·6	+40·2	+46·8	+45·4	+29·0	+21·6	+31·2	+21·8	+15·4	0

The error of each step is therefore found by subtracting the average length from the observed length in each position. Assuming that the ends of the interval itself are correct, the correction to be applied at any point of calibration to reduce the readings to a uniform tube and scale, is found by taking the sum of the errors of the steps up to the point considered with the sign reversed.

In the preceding example of the method an interval of ten degrees is taken, divided into ten steps of 1° each. The distances of the ends of the thread from the nearest degree divisions are estimated by the aid of micrometers to the thousandth of a degree. The error of any one of these readings probably does not exceed half a thousandth, but they are given to the nearest thousandth only. The excess length of the thread in each position over the corresponding degree is obtained by subtracting the second reading from the first. Taking the average of the numbers in this line, the mean excess-length is −10·4 thousandths. The error of each step is found by subtracting this mean from each of the numbers in the previous line. Finally, the corrections at each degree are obtained by adding up the errors of the steps and changing the sign. The errors and corrections are given in thousandths of 1°.

Complete Calibration.—The simple method of Gay Lussac does very well for short intervals when the number of steps is not excessive, but it would not be satisfactory for a large range owing to the accumulation of small errors of estimation, and the variation of the personal equation. The observer might, for instance, consistently over-estimate the length of the thread in one half of the tube, and under-estimate it in the other. The errors near the middle of the range would probably be large. It is evident that the correction at the middle point of the interval could be much more accurately determined by using a thread equal to half the length of the interval. To minimize the effect of these errors of estimation, it is usual to employ threads of different lengths in calibrating the same interval, and to divide up the fundamental interval of the thermometer into a number of subsidiary sections for the purpose of calibration, each of these sections being treated as a step in the calibration of the fundamental interval. The most symmetrical method of calibrating a section, called by C. E. Guillaume a " Complete Calibration," is to use threads of all possible lengths which are

integral multiples of the calibration step. In the example already given nine different threads were used, and the length of each was observed in as many positions as possible. Proceeding in this manner the following numbers were obtained for the excess-length of each thread in thousandths of a degree in different positions, starting in each case with the beginning of the thread at 0°, and moving it on by steps of 1°. The observations in the first column are the excess-lengths of the thread of 1° already given in illustration of the method of Gay Lussac. The other columns give the corresponding observations with the longer threads. The simplest and most symmetrical method of solving these observations, so as to find the errors of each step in terms of the whole interval, is to obtain the differences of the steps in pairs by subtracting each observation from the one above it. This method eliminates the unknown lengths of the threads, and gives each observation approximately its due weight. Subtracting the observations in the second line from those in the first, we obtain a series of numbers, entered in column 1 of the next table, representing the excess of step (1) over each of the other steps. The sum of these differences is ten times the error of the first step, since by hypothesis the sum of the errors of all the steps is zero in terms of the whole interval. The numbers in the second column of Table III. are similarly obtained by subtracting the third line from the second in Table II., each difference being inserted in its appropriate place in the table. Proceeding in this way we find the excess of each interval over those which follow it. The table is completed by a diagonal row of zeros representing the difference of each step from itself, and by repeating the numbers already found in symmetrical positions with their signs changed, since the excess of any step, say 6 over 3, is evidently equal to that of 3 over 6 with the sign changed. The errors of each step having been found by adding the columns, and dividing by 10, the corrections at each point of the calibration are deduced as before.

TABLE II.—*Complete Calibration of Interval of 10° in 10 Steps.*

Lengths of Threads.	1°	2°	3°	4°	5°	6°	7°	8°	9°
Observed excess-lengths of threads, in various positions, the beginning of the thread being set near the points. 0°	−28	−32	−67	−62	−11	−15	−48	− 2	− 8
1°	−33	−21	−47	−28	+14	− 8	−22	+21	+24
2°	−17	+ 2	− 8	+ 1	+26	+23	+ 6	+58	
3°	− 9	+26	+ 5	− 3	+41	+36	+28		
4°	+ 6	+31	− 7	+ 4	+45	+49			
5°	− 3	+ 5	−15	− 6	+43				
6°	−20	+ 7	−16	+ 2					
7°	− 1	+23	+10						
8°	− 4	+29							
9°	+ 5								

TABLE III.—*Solution of Complete Calibration.*

Step No.	1	2	3	4	5	6	7	8	9	10
1	0	− 5	+11	+20	+34	+25	+ 7	+26	+23	+32
2	+ 5	0	+16	+23	+39	+29	+12	+31	+28	+37
3	−11	−16	0	+ 8	+24	+13	− 4	+15	+13	+22
4	−20	−23	− 8	0	+15	+ 5	−12	+ 7	+ 4	+13
5	−34	−39	−24	−15	0	− 9	−26	− 8	−10	− 2
6	−25	−29	−13	− 5	+ 9	0	−17	+ 2	− 1	+ 8
7	− 7	−12	+ 4	+12	+26	+17	0	+19	+16	+26
8	−26	−31	−15	− 7	+ 8	− 2	−19	0	− 3	+ 6
9	−23	−28	−13	− 4	+10	+ 1	−16	+ 3	0	+ 9
10	−32	−37	−22	−13	+ 2	− 8	−26	− 6	− 9	0
Error of step.	−17·3	−22·0	− 6·4	+ 1·9	+16·7	+ 7·1	−10·1	+ 8·9	+ 6·1	+15·1
Corrections.	+17·3	+39·3	+45·7	+43·8	+27·1	+20·0	+30·1	+21·2	+15·1	0

The advantages of this method are the simplicity and symmetry of the work of reduction, and the accuracy of the result, which exceeds that of the Gay Lussac method in consequence of the much larger number of independent observations. It may be noticed, for instance, that the correction at point 5 is 27·1 thousandths by the complete calibration, which is 2 thousandths less than the value 29 obtained by the Gay Lussac method, but agrees well with the value 27 thousandths obtained by taking only the first and last observations with the thread of 5°. The disadvantage of the method lies in the great number of observations required, and in the labour of adjusting so many different threads to suitable lengths. It is probable that sufficiently good results may be obtained with much less trouble by using fewer threads, especially if more care is taken in the micrometric determination of their errors.

The method adopted for dividing up the fundamental interval of any thermometer into sections and steps for calibration may be widely varied, and is necessarily modified in cases where auxiliary bulbs or "ampoules" are employed. The Paris mercury-standards, which read continuously from 0° to 100° C., without intermediate ampoules, were calibrated by Chappuis in five sections of 20° each, to determine the corrections at the points 20°, 40°, 60°, 80°, which may be called the "principal points" of the calibration, in terms of the fundamental interval. Each section of 20° was subsequently calibrated in steps of 2°, the corrections being at first referred, as in the example already given, to the mean degree of the section itself, and being afterwards expressed, by a simple transformation, in terms of the fundamental interval, by means of the corrections already found for the ends of the section. Supposing, for instance, that the corrections at the points 0° and 10° of Table III. are not zero, but C^0 and C' respectively, the correction C_n at any intermediate point n will evidently be given by the formula,

$$C_n = C^0 + c_n + (C' - C^0)n/10 \quad . \quad . \quad . \quad (3)$$

where c_n is the correction already given in the table.

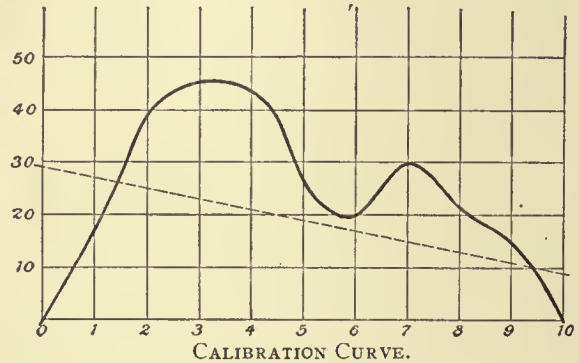
If the corrections are required to the thousandth of a degree, it is necessary to tabulate the results of the calibration at much more frequent intervals than 2°, since the correction, even of a good thermometer, may change by as much as 20 or 30 thousandths in 2°. To save the labour and difficulty of calibrating with shorter threads, the corrections at intermediate points are usually calculated by a formula of interpolation. This leaves much to be desired, as the section of a tube often changes very suddenly and capriciously. It is probable that the graphic method gives equally good results with less labour.

Slide-Wire.—The calibration of an electrical slide-wire into parts of equal resistance is precisely analogous to that of a capillary tube into parts of equal volume. The Carey Foster method, employing short steps of equal resistance, effected by transferring a suitable small resistance from one side of the slide-wire to the other, is exactly analogous to the Gay Lussac method, and suffers from the same defect of the accumulation of small errors unless steps of several different lengths are used. The calibration of a slide-wire, however, is much less troublesome than that of a thermometer tube for several reasons. It is easy to obtain a wire uniform to one part in 500 or even less, and the section is not liable to capricious variations. In all work of precision the slide-wire is supplemented by auxiliary resistances by which the scale may be indefinitely extended. In accurate electrical thermometry, for example, the slide-wire itself would correspond to only 1°, or less, of the whole scale, which is less than a single step in the calibration of a mercury thermometer, so that an accuracy of a thousandth of a degree can generally be obtained without any calibration of the slide-wire. In the rare cases in which it is necessary to employ a long slide-wire, such as the cylinder potentiometer of Latimer Clark, the calibration is best effected by comparison with a standard, such as a Thomson-Varley slide-box.

Graphic Representation of Results.—The results of a calibration are often best represented by means of a correction curve, such as that illustrated in the diagram, which is plotted to represent the corrections found in Table III. The abscissa of such a curve is the reading of the instrument to be corrected. The ordinate is the correction to be added to the observed reading to reduce to a uniform scale. The corrections are plotted in the figure in terms of the whole section, taking the correction to be zero at the beginning and end. As a matter of fact the corrections at these points in terms of the fundamental interval were found to be −29 and −9 thousandths respectively. The correction curve is transformed to give corrections in terms of the fundamental interval by ruling a straight line joining the points +29 and +9 respectively, and reckoning the ordinates from this line instead of from the base-line. Or the curve may be replotted with the new ordinates thus obtained. In drawing the curve from the corrections obtained at the points of calibration, the exact form of the curve is to some extent a matter of taste, but the curve should generally be drawn as smoothly as possible on the assumption that the changes are gradual and continuous.

The ruling of the straight line across the curve to express the corrections in terms of the fundamental interval, corresponds to the first part of the process of calibration mentioned above under the term "Standardization." It effects the reduction of the

readings to a common standard, and may be neglected if relative values only are required. A precisely analogous correction occurs in the case of electrical instruments. A potentiometer, for instance, if correctly graduated or calibrated in parts of equal resistance, will give correct relative values of any differences of



CALIBRATION CURVE.

potential within its range if connected to a constant cell to supply the steady current through the slide-wire. But to determine at any time the actual value of its readings in volts, it is necessary to standardize it, or determine its scale-value or reduction-factor, by comparison with a standard cell.

A very neat use of the calibration curve has been made by Professor W. A. Rogers in the automatic correction of screws of dividing machines or lathes. It is possible by the process of grinding, as applied by Rowland, to make a screw which is practically perfect in point of uniformity, but even in this case errors may be introduced by the method of mounting. In the production of divided scales, and more particularly in the case of optical gratings, it is most important that the errors should be as small as possible, and should be automatically corrected during the process of ruling. With this object a scale is ruled on the machine, and the errors of the uncorrected screw are determined by calibrating the scale. A metal template may then be cut out in the form of the calibration-correction curve on a suitable scale. A lever projecting from the nut which feeds the carriage or the slide-rest is made to follow the contour of the template, and to apply the appropriate correction at each point of the travel, by turning the nut through a small angle on the screw. A small periodic error of the screw, recurring regularly at each revolution, may be similarly corrected by means of a suitable cam or eccentric revolving with the screw and actuating the template. This kind of error is important in optical gratings, but is difficult to determine and correct.

Calibration by Comparison with a Standard.—The commonest and most generally useful process of calibration is the direct comparison of the instrument with a standard over the whole range of its scale. It is necessary that the standard itself should have been already calibrated, or else that the law of its indications should be known. A continuous current ammeter, for instance, can be calibrated, so far as the relative values of its readings are concerned, by comparison with a tangent galvanometer, since it is known that the current in this instrument is proportional to the tangent of the angle of deflection. Similarly an alternating current ammeter can be calibrated by comparison with an electrodynamometer, the reading of which varies as the square of the current. But in either case it is neccessary, in order to obtain the readings in amperes, to standardize the instrument for some particular value of the current by comparison with a voltameter, or in some equivalent manner. Whenever possible, ammeters and voltmeters are calibrated by comparison of their readings with those of a potentiometer, the calibration of which can be reduced to the comparison and adjustment of resistances, which is the most accurate of electrical measurements. The commoner kinds of mercury thermometers are generally calibrated and graduated by comparison with a standard. In many cases this is the most convenient or even the only possible method. A mercury thermometer of limited scale reading between 250° and 400° C., with gas under high pressure to prevent the separation of the mercury column, cannot be calibrated on itself, or by comparison with a mercury standard possessing a fundamental interval, on account of difficulties of stem exposure and scale. The only practical method is to compare its readings every few degrees with those of a platinum thermometer under the conditions for which it is to be used. This method has the advantage of combining all the corrections for fundamental interval, &c., with the calibration correction in a single curve, except the correction for variation of zero which must be tested occasionally at some point of the scale.

AUTHORITIES.—Mercurial Thermometers: Guillaume, *Thermométrie de Précision* (Paris, 1889), gives several examples and references to original memoirs. The best examples of comparison and testing of standards are generally to be found in publications of Standards Offices, such as those of the Bureau International des Poids et Mésures at Paris. Dial Resistance-Box: Griffiths, *Phil. Trans.* A, 1893; Platinum Thermometry-Box: J. A. Harker and P. Chappuis, *Phil. Trans.* A, 1900; Thomson-Varley Potentiometer and Binary Scale Box: Callendar and Barnes, *Phil. Trans.* A, 1901. (H. L. C.)

CALICO, a general name given to plain cotton cloth. The word was spelt in various forms, including "calicut," which shows its derivation from the Indian city of Calicut or Kolikod, a seaport in the presidency of Madras, and one of the chief ports of intercourse with Europe in the 16th century, where cotton cloths were made. The name seems to have been applied to all kinds of cotton cloths imported from the East. In England it is now applied particularly to grey or bleached cotton cloth used for domestic purposes, and, generally, to any fairly heavy cotton cloth without a pattern. In the United States there is a special application to printed cloth "of a coarser quality than muslin." In England "printed calico" is a comprehensive term.

CALICUT, a city of British India, in the Malabar district of Madras; on the coast, 6 m. N. of Beypur. In 1901 the population was 76,981, showing an increase of 14% in the decade. The weaving of cotton, for which the place was at one time so famous that its name became identified with its *calico*, is no longer of any importance. Calicut is of considerable antiquity; and about the 7th century it had its population largely increased by the immigration of the Moplahs, a fanatical race of Mahommedans from Arabia, who entered enthusiastically into commercial life. The Portuguese traveller Pero de Covilham (*q.v.*) visited Calicut in 1487 and described its possibilities for European trade; and in May 1498 Vasco da Gama, the first European navigator to reach India, arrived at Calicut. At that time it was a very flourishing city, and contained several stately buildings, among which was especially mentioned a Brahminical temple, not inferior to the largest monastery in Portugal. Vasco da Gama tried to establish a factory, but he met with persistent hostility from the local chief (*zamorin*), and a similar attempt made by Cabral two years later ended in the destruction of the factory by the Moplahs. In revenge the Portuguese bombarded the town, but no further attempt was made for some years to establish a trading settlement there. In 1509 the marshal Don Fernando Coutinho made an unsuccessful attack on the city; and in the following year it was again assailed by Albuquerque with 3000 troops. On this occasion the palace was plundered and the town burnt; but the Portuguese were finally repulsed, and fled to their ships after heavy loss. In the following year they concluded a peace with the zamorin and were allowed to build a fortified factory on the north bank of the Kallayi river, which was however again, and finally, abandoned in 1525. In 1615 the town was visited by an English expedition under Captain Keeling, who concluded a treaty with the zamorin; but it was not until 1664 that an English trading settlement was established by the East India Company. The French settlement, which still exists, was founded in 1698. The town was taken in 1765 by Hyder Ali, who expelled all the merchants and factors, and destroyed the cocoa-nut trees, sandal-wood and pepper vines, that the country reduced to ruin might present no temptation to the cupidity of Europeans. In 1782 the troops of Hyder were driven from Calicut by the British; but in 1788 it was taken and destroyed by his son Tippoo, who carried off the inhabitants to Beypur and treated them with great cruelty. In the latter part of 1790 the country was occupied by the British; and under the treaty concluded in 1792, whereby Tippoo was deprived of half his dominions, Calicut fell to the British. After this event the

inhabitants returned and rebuilt the town, which in 1800 consisted of 5000 houses.

As the administrative headquarters of the district, Calicut maintains its historical importance. It is served by the Madras railway, and is the chief seaport on the Malabar coast, and the principal exports are coffee, timber and coco-nut products. There are factories for coffee-cleaning, employing several hundred hands; for coir-pressing and timber-cutting. The town has a cotton-mill, a saw-mill, and tile, coffee and oil works. A detachment of European troops is generally stationed here to overawe the fanatical Moplahs.

CALIFORNIA, one of the Pacific Coast states of the United States of America, physically one of the most remarkable, economically one of the more independent, and in history and social life one of the most interesting of the Union. It is bounded N. by Oregon, E. by Nevada and Arizona, from which last it is separated by the Colorado river, and S. by the Mexican province of Lower California. The length of its medial line N. and S. is about 780 m., its breadth varies from 150 to 350 m., and its total area is 158,297 sq. m., of which 2205 are water surface. In size it ranks second among the states of the Union. The coast is bold and rugged and with very few good harbours; San Diego and San Francisco bays being exceptions. The coast line is more than 1000 m. long. There are eight coast islands, all of inconsiderable size, and none of them as yet in any way important.

Physiography.—The physiography of the state is simple; its main features are few and bold: a mountain fringe along the ocean, another mountain system along the east border, between them—closed in at both ends by their junction—a splendid valley of imperial extent, and outside all this a great area of barren, arid lands, belonging partly to the Great Basin and partly to the Open Basin region.

Along the Pacific, and some 20–40 m. in width, runs the mass of the Coast Range, made up of numerous indistinct chains—most of which have localized individual names—that are broken down into innumerable ridges and spurs, and small valleys drained by short streams of rapid fall. The range is cut by numerous fault lines, some of which betray evidence of recent activity; it is probable that movements along these faults cause the earthquake tremors to which the region is subject, all of which seem to be tectonic. The altitudes of the Coast Range vary from about 2000 to 8000 ft.; in the neighbourhood of San Francisco Bay the culminating peaks are about 4000 ft. in height (Mount Diablo, 3856 ft.; Mount St Helena, 4343 ft.), and to the north and south the elevation of the ranges increases. In the east part of the state is the magnificent Sierra Nevada, a great block of the earth's crust, faulted along its eastern side and tilted up so as to have a gentle back slope to the west and a steep fault escarpment facing east, the finest mountain system of the United States. The Sierra proper, from Lassen's Peak to Tehachapi Pass in Kern county, is about 430 m. long (from Mt. Shasta in Siskiyou county to Mt. San Jacinto in Riverside county, more than 600 m.). It narrows to the north and the altitude declines in the same direction. Far higher and grander than the Coast Range, the Sierra is much less complicated, being indeed essentially one chain of great simplicity of structure. It is only here and there that a double line of principal summits exists. The slope is everywhere long and gradual on the west, averaging about 200 ft. to the mile. Precipitous gorges or canyons often from 2000 to 5000 ft. in depth become a more and more marked feature of the range as one proceeds northward; over great portions of it they average probably not more than 20 m. apart. Where the volcanic formations were spread uniformly over the flanks of the mountains, the contrast between the canyons and the plain-like region of gentle slope in which they have been excavated is especially marked and characteristic. The eastern slope is very precipitous, due to a great fault which drops the rocks of the Great Basin region abruptly downward several thousand feet. Rare passes cross the chain, opening at the foot of the mountains on east and on the west high on their flanks, 7000–10,000 ft. above the sea. Between 36° 20′ and 38° the lowest gap of any kind is above 9000 ft., and the average height of those actually used is probably not less than 11,000 ft. The Kearsarge, most used of all, is still higher. Very few in the entire Sierra are passable by vehicles. Some forty peaks are catalogued between 5000 and 8000 ft., and there are eleven above 14,000. The highest portion of the system is between the parallels of 36° 30′ and 37° 30′; here the passes are about 12,000 ft. in elevation, and the peaks range from 13,000 ft. upward, Mount Whitney, 14,502 ft., being the highest summit of the United States, excluding Alaska. From this peak northward there is a gradual decline, until at the point where the Central Pacific crosses in lat. 39° 20′ the elevation is only 7000 ft.

Of the mountain scenery the granite pinnacles and domes of the highest Sierra opposite Owen's Lake—where there is a drop eastward into the valley of about 10,000 ft. in 10 m. the snowy volcanic cone of Mt Shasta, rising 10,000 ft. above the adjacent plains; and the lovely valleys of the Coast Range, and the south fork of the King river—all these have their charms; but most beautiful of all is the unique scenery of the Yosemite Valley (*q.v.*). Much of the ruggedness and beauty of the mountains is due to the erosive action of many alpine glaciers that once existed on the higher summits, and which have left behind their evidences in valleys and amphitheatres with towering walls, polished rock-expanses, glacial lakes and meadows and tumbling waterfalls. Remnants of these glaciers are still to be seen,—as notably on Mt. Shasta,—though shrunk to small dimensions. Glacial action may be studied well as far south as 36°. The canyons are largely the work of rivers, modified by glaciers that ran through them after the rivers had formed them. All of the Sierra lakes and ponds are of glacial origin and there are some thousands of them. The lower lake line is about 8000 ft.; it is lower to the north than to the south, owing to the different climate, and the different period of glacial retrogression. Of these lakes some are fresh, and some—as those of the north-east counties—alkali. The finest of all is Tahoe, 6225 ft. above the sea, lying between the true Sierras and the Basin Ranges, with peaks on several sides rising 4000-5000 ft. above it. It is 1500 ft. deep and its waters are of extraordinary purity (containing only three grains of solid matter to the gallon). Clear Lake, in the Coast Range, is another beautiful sheet of water. It is estimated by John Muir that on an average "perhaps more than a mile" of degradation took place in the last glacial period; but with regard to the whole subject of glacial action in California as in other fields, there is considerable difference of opinion. The same authority counted 65 small residual glaciers between 36° 30′ and 39°; two-thirds of them lie between 37° and 38°, on some of the highest peaks in the district of the San Joaquin, Merced, Tuolumne and Owen's rivers. They do not descend, on an average, below 11,000 ft.; the largest of all, on Mt. Shasta, descends to 9500 ft. above the sea.

Volcanic action has likewise left abundant traces, especially in the northern half of the range, whereas the evidences of glacial action are most perfect (though not most abundant) in the south. Lava covers most of the northern half of the range, and there are many craters and ash-cones, some recent and of perfect form. Of these the most remarkable is Mt. Shasta. In Owen's Valley is a fine group of extinct or dormant volcanoes.

Among the other indications of great geological disturbances on the Pacific Coast may also be mentioned the earthquakes to which California like the rest of the coast is liable. From 1850 to 1887 almost 800 were catalogued by Professor E. H. Holden for California, Oregon and Washington. They occur in all seasons, scores of slight tremors being recorded every year by the Weather Bureau; but they are of no importance, and even of these the number affecting any particular locality is small. From 1769 to 1887 there were 10 "destructive" and 24 other "extremely severe" shocks according to the Rossi Forel nomenclatural scale of intensity. In 1812 great destruction was wrought by an earthquake that affected all the southern part of the state; in 1865 the region about San Francisco was violently disturbed; in 1872 the whole Sierra and the state of Nevada were violently shaken; and in 1906 San Francisco (*q.v.*) was in

large part destroyed by a shock that caused great damage elsewhere in the state.

North of 40° N. lat. the Coast Range and Sierra systems unite, forming a country extremely rough. The eastern half of this area is covered chiefly with volcanic plains, very dry and barren, lying between precipitous, although not very lofty, ranges; the western half is magnificently timbered, and toward the coast excessively wet. Between 35° and 36° N. lat. the Sierra at its southern end turns westward toward the coast as the Tehachapi Range. The valley is thus closed to the north and south, and is surrounded by a mountain wall, which is broken down in but a single place, the gap behind the Golden Gate at San Francisco. Through this passes the entire drainage of the interior. The length of the valley is about 450 m., its breadth averages about 40 m. if the lower foothills be included, so that the entire area is about 18,000 sq. m. The drainage basin measured from the water-partings of the enclosing mountains is some three times as great. From the mouth of the Sacramento to Redding, at the northern head of the valley, the rise is 552 ft. in 192 m., and from the mouth of the San Joaquin southward to Kern lake it is 282 ft. in 260 m.

Two great rivers drain this central basin,—the San Joaquin, whose valley comprises more than three-fifths of the entire basin, and the Sacramento, whose valley comprises the remainder. The San Joaquin is a very crooked stream flowing through a low mud-plain, with tule banks; the Sacramento is much less meandering, and its immediate basin, which is of sandy loam, is higher and more attractive than that of the San Joaquin. The eastward flanks of the Coast Range are very scantily forested, and they furnish not a single stream permanent enough to reach either the Sacramento or San Joaquin throughout the dry season. On the eastern side of both rivers are various important tributaries, fed by the more abundant rains and melting snows of the western flank of the Sierra; but these streams also shrink greatly in the dry season. The Feather, emptying into the Sacramento river about 20 m. N. of the city of Sacramento, is the most important tributary of the Sacramento river. A striking feature of the Sacramento system is that for 200 m. north of the Feather it does not receive a single tributary of any importance, though walled in by high mountains. Another peculiar and very general feature of the drainage system of the state is the presence of numerous so-called river "sinks," where the waters disappear, either directly by evaporation or (as in Death Valley) after flowing for a time beneath the surface. These "sinks" are therefore not the true sinks of limestone regions. The popular name is applied to Owen's lake, at the end of Owen's river; to Mono lake, into which flow various streams rising in the Sierra between Mount Dana and Castle Peak; and to Death Valley, which contains the "sink" of the Amargosa river, and evidently was once an extensive lake, although now only a mud-flat in ordinary winters, and a dry, alkaline, desert plain in summer. All these lakes, and the other mountain lakes before referred to, show by the terraces about them that the water stood during the glacial period much higher than it does now. Tulare lake, which with Buena Vista lake and Kern lake receives the drainage of the southern Sierra, shows extreme local variations of shore-line, and is generally believed to have shrunk extremely since 1850, though of this no adequate proof yet exists. In 1900 it was about 200 sq. m. in area. In wet seasons it overflows its banks and becomes greatly extended in area, discharging its surplus waters into the San Joaquin; but in dry seasons the evaporation is so great that there is no such discharge. The drainage of Lassen, Siskiyou and Modoc counties has no outlet to the sea and is collected in a number of great alkaline lakes.

Finally along the sea below Pt. Conception are fertile coastal plains of considerable extent, separated from the interior deserts by various mountain ranges from 5000 to 7000 ft. high, and with peaks much higher (San Bernardino, 11,600; San Jacinto, 10,800; San Antonio, 10,140). Unlike the northern Sierra, the ranges of Southern California are broken down in a number of places. It is over these passes—Soledad, 2822 ft., Cajon, San Gorgonio, 2560 ft.—that the railways cross to the coast. That part of California which lies to the south and east of the southern inosculation of the Coast Range and the Sierra comprises an area of fully 50,000 sq. m., and belongs to the Basin Range region. For the most part it is excessively dry and barren. The Mohave desert—embracing Kern, Los Angeles and San Bernardino—as also a large part of San Diego, Imperial and Riverside counties, belong to the "Great Basin," while a narrow strip along the Colorado river is in the "Open Basin Region." They have no drainage to the sea, save fitfully for slight areas through the Colorado river. The Mohave desert is about 2000 ft. above the sea in general altitude. The southern part of the Great Basin region is vaguely designated the Colorado desert. In San Diego, Imperial and Riverside counties a number of creeks or so-called rivers, with beds that are normally dry, flow centrally toward the desert of Salton Sink or "Sea"; this is the lowest part of a large area that is depressed below the level of the sea,—at Salton 263 ft., and 275 ft. at the lowest point. In 1900 the Colorado river (*q.v.*) was tapped south of the Mexican boundary for water wherewith to irrigate land in the Imperial Valley along the Southern Pacific railway, adjoining Salton Sea. The river enlarged the canal, and finding a steeper gradient than that to its mouth, was diverted into the Colorado desert, flooding Salton Sea;[1] and when the break in this river was closed for the second time in February 1907, though much of its water still escaped through minor channels and by seepage, a lake more than 400 sq. m. in area was left. A permanent 60 ft. masonry dam was completed in July 1907. The region to the east of the Sierra, likewise in the Great Basin province, between the crest of that range and the Nevada boundary, is very mountainous. Owen's river runs through it from north to south for some 180 m. Near Owen's lake the scenery is extremely grand. The valley here is very narrow, and on either side the mountains rise from 7000 to 10,000 ft. above the lake and river. The Inyo range, on the east, is quite bare of timber, and its summits are only occasionally whitened with snow for a few days during the winter, as almost all precipitation is cut off by the higher ranges to the westward. Still further to the east some 40 m. from the lake is Death Valley (including Lost or Mesquite Valley)—the name a reminder of the fate of a party of "forty-niners" who perished here, by thirst or by starvation and exposure. Death Valley, some 50 m. long and on an average 20–25 m. broad from the crests of the inclosing mountain ranges (or 5–10 m. at their base), constitutes an independent drainage basin. It is below sea level,—in one place supposedly (1902) 480 ft.—and altogether is one of the most remarkable physical features of California. The mountains about it are high and bare and brilliant with varied colours. The Amargosa river, entering the valley from Nevada, disappears in the salty basin. Enormous quantities of borax, already exploited, and of nitrate of soda, are known to be present in the surrounding country, the former as almost pure borate of lime in Tertiary lake sediments.

The physiography of the state is the evident determinant of its climate, fauna and flora. California has the highest land and the lowest land of the United States, the greatest variety of temperature and rainfall, and of products of the soil.

Climate.—The climate is very different from that of the Atlantic coast; and indeed very different from that of any part of the country save that bordering California. Amid great variations of local weather there are some peculiar features that obtain all over the state. In the first place, the climate of the entire Pacific Coast is milder and more uniform in temperature than that of the states in corresponding latitude east of the mountains. Thus we have to go north as far as Sitka in 57° N. lat. to find the same mean yearly temperature as that of Halifax, Nova Scotia, in latitude 44° 39′. And going south along the coast, we find the mean temperature of San Diego 6° or 7° less than that of Vicksburg, Miss., or Charleston, S.C. The quantity of total annual heat supply at Puget Sound exceeds that at Philadelphia, Pittsburg, Cleveland or Omaha, all more than

[1] In December 1904 Salton Sea was dry; in February 1906 it was occupied by a lake 60 m. long.

A
B
C
D
E
F
124°
122°
120°
118°
116°
42°
40°
38°
OREGON
IDAHO
NEVADA
CALIFORNIA
UTAH
Grants Pass
Jacksonville
Klamath Falls
Lakeview
Alvord L.
Guano L.
Duck Valley Indian Reservation
Mc Dermitt
Crescent City
Yreka
Weaverville
Redding
Red Bluff
Susanville
Alturas
Cedarville
Eureka
Fortuna
Ferndale
Arcata
Trinidad
Pt. Arena
Mendocino
Ukiah
Lakeport
Willits
Fort Bragg
Point Arena
Gualala
Bodega Head
Tomales Pt.
Point Reyes
Pt. Reyes
Farallones
San Francisco
S. San Francisco
Pt. San Pedro
Pt. Montara
Half Moon Bay
Pt. Pillar
Golden Gate
Gulf of the Farallones
Pacific Ocean
Oroville
Chico
Marysville
Yuba City
Colusa
Woodland
Sacramento
Placerville
Auburn
Roseville
Folsom
Stockton
Modesto
Merced
Mariposa
Oakdale
Sonora
Jackson
Angels Camp
Jamestown
Columbia
Milton
Martinez
Antioch
Benicia
Napa
Santa Rosa
Petaluma
Sebastopol
Healdsburg
Cloverdale
Ukiah
Willits
Fort Bragg
Mendocino
Eureka
Arcata
Trinidad
Crescent City
Klamath
Requa
Orleans
Weitchpec
Hoopa
Willow Creek
Blue Lake
Arcata
Eureka
Fortuna
Ferndale
Rio Dell
Scotia
Garberville
Redway
Piercy
Laytonville
Covelo
Round Valley
Willits
Ukiah
Hopland
Cloverdale
Geyserville
Healdsburg
Windsor
Santa Rosa
Sebastopol
Petaluma
Novato
San Rafael
Sausalito
Golden Gate
San Francisco
Daly City
San Mateo
Redwood City
Palo Alto
Mountain View
Sunnyvale
Santa Clara
San Jose
Gilroy
Hollister
Watsonville
Santa Cruz
Monterey
Salinas
Pacific Grove
Carmel
Pt. Lobos
Pt. Sur
Big Sur
Pfeiffer Beach
Lucia
Pt. Piedras Blancas
San Simeon
Cambria
Morro
Cayucos
Pt. Estero
Pt. Cayucos
Pt. Montara
Pt. Pillar
Pt. Arena
Pt. Reyes
Bodega Head
Tomales Pt.
Point Reyes
Drakes Bay
Gulf of the Farallones
Farallones
Golden Gate
San Francisco
S. San Francisco
Pt. San Pedro
Pt. Montara
Half Moon Bay
Pt. Pillar
Pacific Ocean
Shasta L.
Lake Shasta
Mt. Shasta
Mt. Lassen
Lassen Pk.
Mt. Hebron
Mt. Hoffman
Mt. Dome
Mt. Eddy
Mt. Shasta
Mt. Lassen
Mt. Harkness
Mt. Diablo
Mt. Tamalpais
Mt. Hamilton
Mt. Madonna
Mt. Pinos
Mt. Whitney
Mt. Dana
Mt. Gibbs
Mt. Conness
Mt. Lyell
Mt. Ritter
Mt. Humphreys
Mt. Morrison
Mt. Tom
Mt. Warren
Mt. Abbot
Mt. Dade
Mt. Goddard
Mt. Darwin
Mt. Mills
Mt. Starr King
Mt. Clarence King
Mt. Gardiner
Mt. Brewer
Mt. Stanford
Mt. Whitney
Mt. Langley
Mt. Muir
Mt. Tyndall
Mt. Williamson
Mt. Russell
Mt. Carruthers

CALIFORNIA
and
NEVADA
Scale, 1:3,500,000
English Miles
0 10 20 30 40 50 100
Indian Reserves
National Parks
Railways
Canals
County Seats
County Boundaries
PACIFIC OCEAN
International Boundary
Gulf of California
Emery Walker sc.

500 m. farther south; Cape Flattery, exposed the year round to cold ocean fogs, receives more heat than Eastport, Maine, which is 3° farther south and has a warmer summer. In the second place, the means of winter and summer are much nearer the mean of the year in California than in the east. This condition of things is not so marked as one goes inward from the coast; yet everywhere save in the high mountains the winters are comparatively mild. In the third place, the division of the year into two seasons—a wet one and a dry (and extremely dusty) one—marks this portion of the Pacific Coast in the most decided manner, and this natural climatic area coincides almost exactly in its extension with that of California; being truly characteristic neither of Lower California nor of the greater part of Oregon, though more so of Nevada and Arizona. And finally, in the fourth place, except on the coast the disagreeableness of the heat of summer is greatly lessened by the dryness of the air and the consequent rapidity of evaporation. Among the peculiarities of Californian climate it is not one of the least striking that as one leaves the Sacramento or San Joaquin plains and travels into the mountains it becomes warmer, at least for the first 2000 or 3000 ft. of ascent.

Along both the Coast Range and the Sierra considerable rainfall is certain, although, owing to the slight snow accumulations of the former, its streams are decidedly variable. A heavy rain-belt, with a normal fall of more than 40 in., covers all the northern half of the Sierra and the north-west counties; shading off from this is the region of 10–20 in. fall, which covers all the rest of the state save Inyo, Kern and San Bernardino counties, Imperial county and the eastern portion of Riverside county; the precipitation of this belt is from 0 to 10 in. In excessively dry years the limits of this last division may include all of the state below Fresno and the entire Central Valley as well. In the mountains the precipitation increases with the altitude; above 6000 or 7000 ft. it is almost wholly in the form of snow; and this snow, melting in summer, is of immense importance to the state, supplying water once for placer mining and now for irrigation. The north-west counties are extremely wet; many localities here have normal rainfalls of 60–70 in. and even higher annually, while in extreme seasons as much as 125 in. falls. Along the entire Pacific Coast, but particularly N. of San Francisco, there is a night fog from May to September. It extends but a few miles inland, but within this belt is virtually a prolongation of the rainy season and has a marked effect on vegetation. Below San Francisco the precipitation decreases along the coast, until at San Diego it is only about 10 in. The south-east counties are the driest portions of the United States. At Ogilby, Volcano, Indio and other stations on the Southern Pacific line the normal annual precipitation is from 1·5 to 2·5 in.; and there are localities near Owen's lake, even on its very edge, that are almost dry. For days in succession when it storms along the Southern California coasts and dense rain clouds blow landwards to the mountains, leaving snow or rain on their summits, it has been observed that within a few miles beyond the ridge the contact of the desert air dissipates the remaining moisture of the clouds into light misty masses, like a steam escape in cold air. The extreme heat of the south-east is tempered by the extremely low humidity characteristic of the Great Basin, which in the interior of the two southernmost counties is very low. The humidity of places such as Fresno, Sacramento and Red Bluff in the valley varies from 48 to 58. Many places in northern, southern, central, mountain and southern coastal California normally have more than 200 perfectly clear days in a year; and many in the mountains and in the south, even on the coast, have more than 250. The extreme variability in the amount of rainfall is remarkable.[1] The effects of a season of drought on the dry portions of the state need not be adverted to; and as there is no rain or snow of any consequence on the mountains during summer, a succession of dry seasons may almost bare the ranges of the accumulated stock of previous winter snows, thus making worse what is already bad.

The Colorado desert (together with the lower Gila Valley of Arizona) is the hottest part of the United States. Along the line of the Southern Pacific the yearly extreme is frequently from 124° to 129° F. (*i.e.* in the shade, which is almost if not quite the greatest heat ever actually recorded in any part of the world). At the other extreme, temperatures of −20° to −36° are recorded yearly on the Central (Southern) Pacific line near Lake Tahoe. The normal annual means of the coldest localities of the state are from 37° to 44° F.; the monthly means from 20° to 65° F. The normal annual means on Indio, Mammoth Tanks, Salton and Volcano Springs are from 73·9° to 78·4 F.; the monthly means from 52·8° to 101·3° (frequently 95° to 98°). The normal trend of the annual isotherms of the state is very simple: a low line of about 40° circles the angle in the Nevada boundary line; 50° normally follows the northern Sierra across the Oregon border; lines of higher temperature enclose the Great Valley; and lines of still higher temperature—usually 60° to 70°, in hotter years 60° to 75°—run transversely across the southern quarter of the state.

Another weather factor is the winds, which are extremely regular in their movements. There are brisk diurnal sea-breezes, and seasonal trades and counter-trades. Along the coast an on-shore breeze blows every summer day; in the evening it is replaced by a night-fog, and the cooler air draws down the mountain sides in opposition to its movement during the day. In the upper air a dry off-shore wind from the Rocky Mountain plateau prevails throughout the summer; and in winter an on-shore rain wind. The last is the counter-trade, the all-year wind of Alaska and Oregon; it prevails in winter even off Southern California.

There is the widest and most startling variety of local climates. At Truckee, for example, lying about 5800 ft. above the sea near Lake Tahoe, the lowest temperature of the year may be −25° F. or colder, when 70 m. westward at Rocklin, which lies in the foothills about 250 ft. above the sea, the mercury does not fall below 28°. Snow never falls at Rocklin, but falls in large quantity at Truckee; ice is the crop of the one, oranges of the other, at the same time. There are points in Southern California where one may actually look from sea to desert and from snow to orange groves. Distance from the ocean, situation with reference to the mountain ranges, and altitude are all important determinants of these climatic differences; but of these the last seems to be most important. At any rate it may be said that generally speaking the maximum, minimum and mean temperatures of points of approximately equal altitude are respectively but slightly different in northern or southern California.[2]

Death Valley surpasses for combined heat and aridity any meteorological stations on earth where regular observations are taken, although for extremes of heat it is exceeded by places in the Colorado desert. The minimum daily temperature in summer is rarely below 70° F. and often above 90° F. (in the shade), while the maximum may for days in succession be as high as 120° F. A record of 6 months (1891) showed an average daily relative humidity of 30·6 in the morning and 15·6 in the evening, and the humidity sometimes falls to 5. Yet the surrounding country is not devoid of vegetation. The hills are very fertile when irrigated, and the wet season develops a variety of perennial herbs, shrubs and annuals.

Fauna.—California embraces areas of every life-zone of North America: of the boreal, the Hudsonian and Canadian subzones; of the transition, the humid Pacific subzone; of the upper austral, the arid or upper Sonoran subzone; of the lower austral, the arid or lower Sonoran; of the tropical, the "dilute arid" subzone. As will be inferred from the above

[1] During the interval from 1850 to 1872 the yearly rainfall at San Francisco ranged from 11·37 to 49·27 in.; from 1850 to 1904 the average was 22·74, and the probable annual variation 4 in.

[2] The means for Los Angeles and Red Bluff, of Redding and Fresno, of San Diego and Sacramento, of San Francisco or Monterey and Independence, are respectively about the same; and all of them lie between 56° and 63° F. The places mentioned are scattered over 3½° of longitude and 6½° of latitude.

account of temperature, summer is longer in the north, and localities in the Valley have more hours of heat than do those of south California. Hence that climatic characteristic of the entire Pacific Coast—already referred to and which is of extreme importance in determining the life-zones of California—the great amount of total annual heat supply at comparatively high latitudes. A low summer temperature enables northern species to push far southward, while the high heat total of the year enables southern species to push far north. The resultant intermingling of forms is very marked and characteristic of the Pacific Coast states. The distribution of life-zones is primarily a matter of altitude and corresponds to that of the isotherms. The mountain goat and mountain sheep live in the Sierran upper-land, though long ago well-nigh exterminated. The Douglas red squirrel is ubiquitous in the Sierran forests and their most conspicuous inhabitant. White-tailed deer and especially black-tails are found on the high Sierra; the mule deer, too, although its habitat is now mainly east of the range, on the plateau, is also met with. Grizzly, black, cinnamon and brown bears are all Californian species once common and to-day rare. When Americans began to rule in California elk and antelope herded in great numbers in the Great Valley; the former may to-day sometimes be seen, possibly, in the northern forests, and the latter occasionally cross into the state from Nevada. The sage-hen is abundant on the eastern flank of the Sierra. Grouse, quail, crows and woodpeckers (*Melanerpes formicivorus*) furnish species characteristic of the state. There are various species of ground-squirrels and gophers, which are very abundant. Noteworthy in the animal life of the lower Sonoran and tropic region are a variety of snakes and lizards, desert rats and mice; and, among birds, the cactus wren, desert thrasher, desert sparrow, Texas night-hawk, mocking-bird and ground cuckoo or road runner (*Geococcyx Californianus*). The California vulture, the largest flying bird in North America and fully as large as the Andean condor, is not limited to California but is fairly common there. In the zoology and botany of California as of the rest of the Pacific Coast, the distinctions between the upper austral and humid transition zones are largely obliterated; and as one passes southward into the arid lands, life forms of both these zones intermingle with those of the arid transition.

Fish are abundant. The United States fish commission, and an active state commission established in 1869, have done much to preserve and increase this source of food. In 1890 it was estimated that the yield of the 7000 m. of coast of the three Pacific states was about two-thirds that of New England's 500 m.,—about $10,000,000 annually, or 23,000,000 lb in 1890. Since then the output has greatly increased in all three Pacific states. Of the total, California in 1904 yielded between a quarter and a third. A third of her fish comes from the Sacramento river. Some 230—more or less—marine food fishes are to be found in the market at San Francisco. The exports of fish from that port from 1892–1899 were valued at from $2,000,000 to $2,500,000 annually. Native oysters are small and of peculiar flavour; eastern varieties also are fattened, but not bred in California waters. Shrimp are abundant; the shrimp fishers are Chinese and four-fifths of the catch is exported to China. Sturgeon were once the cheapest fish after salmon; to-day, despite all efforts to increase the supply, they are the dearest. Salmon, once threatened with extinction, have been saved, maintained in good supply, and indeed have probably regained their pristine abundance. Shad and striped bass are both very abundant and cheap. Black bass, flounders, terrapin, sea-turtles, perch, turbot, sole and catfish are also common. Great herds of seals once lay like toll-gatherers off the Golden Gate and other bays of the coast, taking a large share of the salmon and other fish; but they are no longer common. The sea-lions sometimes raid the rivers for 100 m. inland. They have greatly increased since hunting them for their hides and oil ceased to be profitable, and thousands sometimes gather on the Farallones, off the Golden Gate.

Flora.—Inclusiveness of range in the distribution of vegetable life is perhaps more suggestive than the distribution of animal species. The variation is from dwarf mountain pine to giant cactus and dates. The humid transition belt is the habitat of California's magnificent forests. Nut pine, juniper and true sage-brush (*Artemisia tridentata*) characterize the upper Sonoran, —although the latter grows equally in the transition zone. Cereals, orchard fruits and alfalfa are of primary importance in the upper and of secondary importance in the lower Sonoran. In the arid portions of this and the tropic areas the indigenous plants are creosote, mesquite and alfileria bushes, desert acacias, paloverdes, alkali-heath, salt grass, agaves, yuccas (especially the Spanish-bayonet and Joshua tree) and cactuses. Among exotics the Australian saltbush spreads successfully over the worst alkali land. The introduction of other exotics into these zones,—made humid by irrigation, which converts them, the one into true austro-riparian the other into true humid tropical,—has revolutionized the agricultural, and indeed the whole, economy of California. At the two ends of Cajon Pass, only four or five kilometres apart, are the two utterly distinct floras of the Mohave desert and the San Bernardino valley. Despite the presence of the pass, plants do not spread, so great is the difference of climatic conditions. On the desert the same plant will vary in different years from 4 in. to 10 ft. in height when equally mature, according to the rainfall and other conditions of growth. Many mature plants are not taller than 0·4 to 0·8 in. The tree yucca often attains a height of 20 to 25 ft., and a diameter of 1·5 ft. About 600 species of plants were catalogued in desert California in 1891 by a government botanical party. The flora of the coast islands of California is very interesting. On Santa Cruz Professor Joseph Le Conte found 248 species, nearly all of which are distinctively Californian, 48 being peculiar to the surrounding islands and 28 peculiar to Southern California. Various other things indicate a separation of the islands from the mainland in quaternary times; since which, owing to the later southward movement on the continent of northern forms in glacial times, there has been a struggle for existence on the mainland from which the islands have largely escaped.

Forests.—The forests and agricultural crops of the state demand particular notice. In 1900 the woodland was estimated by the United States census at 22% of the state's area, and the total stand at 200,000 million ft. of timber. The variety of forest trees is not great, but some of the California trees are unique, and the forests of the state are, with those of Oregon and Washington, perhaps the most magnificent of the world. At least the coniferous forests which make up nine-tenths of California's woodland surpass all others known in number of species and in the size and beauty of the trees. Forty-six species occur, namely, 32 species of pitch trees (18 pines), 12 species of the cypresses and their allies (2 sequoia), and 2 species of yews or their allies. Peculiar to California are the two species of sequoia (*q.v.*),—the redwood (*S. sempervirens*), and the big-tree (*S. gigantea*), remnants of an earlier age when they were common in other parts of the world. The redwood grows only in a narrow strip on the Coast Range from Southern Oregon (where there are not more than 1000 acres) down nearly to the Golden Gate, in a habitat of heavy rains and heavy fogs. They cover an area of about 2000 sq. m. almost unmixed with other species. One fine grove stands S. of San Francisco near Santa Cruz. These noble trees attain very often a height of more than 300 ft., frequently of 350 and even more, and a butt diameter of more than 15 to 20 ft., with clean, straight fluted trunks rising 200 ft. below the lowest branches. They grow in the densest timber stand known. Single acres have yielded 1,500,000 ft. B.M. of lumber, and single trees have cut as high as 100,000 ft. The total stand in 1900 was estimated by the United States census as 75,000,000,000 ft., and the ordinary stand per acre varies from 25,000 to 150,000 ft., averaging probably 60,000 ft. The redwood is being rapidly used for lumber. There is nowhere any considerable young growth from seed, although this mode of reproduction is not (as often stated) unknown; the tree will reproduce itself more than once from the stump (hence its name). In thirty years a tree has been known to grow to a height of 80 ft. and a diameter of 16 in. The wood contains no pitch and much water, and in a green condition will not burn. To this fact

it owes its immunity from the forest fires which wreak frightful havoc among the surrounding forests. As the redwood is limited to the Coast Range, so the big tree is limited wholly to the Sierra Nevada. Unlike the redwood the big tree occurs in scattered groves (ten in all) among other species. Its habitat extends some 200 m., from latitude 36° to 39°, nowhere descending much below an altitude of 5000 ft., nor rising above 8000 ft. The most northerly grove and the nearest to San Francisco is the Calaveras Grove near Stockton; the Mariposa Grove just south of the Yosemite National Park, is a state reservation and easily accessible to tourists. The noblest groves are near Visalia, and are held as a national park. The average height is about 275 ft., and the diameter near the ground 20 ft.; various individuals stand over 300 ft., and a diameter of 25 ft. is not rare. One tree measures 35·7 ft. inside the bark 4 ft. above the ground, 10 ft. at 200 ft. above the ground, and is 325 ft. tall. Specimens have been cut down that were estimated to be 1300 and even 2200 years old; many trees standing are presumably 2500 years old. It is the opinion of John Muir that the big tree would normally live 5000 years or more; that the California groves are still in their prime; that, contrary to general ideas, the big tree was never more widely distributed than now, at least not within the past 8000 or 10,000 years; that it is not a decaying species, but that on the contrary "no tree of all the forest is more enduringly established in concord with climate and soil," growing like the mountain pine even on granite, and in little danger save from the greed of the lumberman; but other excellent authorities consider it as hardly holding its own, especially in the north. Three main wood belts cover the flanks of the Sierra: the lower or main pine belt, the silver fir belt, and the upper pine belt. The sugar pine, the yellow or silver pine and the Douglas spruce (considerably smaller than in Oregon and Washington), are rivals in stature and nobility, all attaining 200 ft. or more when full grown; and the incense cedar reaches a height of 150 ft. In this belt and the following one of firs the big tree also grows. The white silver fir (*abies coucola*) and the silver or red fir (*ab. magnifica*), standing 200 to 250 ft., make up almost wholly the main forest belt from 5000 to 9000 ft. for some 450 m. Above the firs come the tamarack, constituting the bulk of the lower Alpine forest; the hardy long-lived mountain pine; the red cedar or juniper, growing even on the baldest rocks; the beautiful hemlock spruce; the still higher white pine, nut pine, needle pine; and finally, at 10,000 to 12,000 ft., the dwarf pine, which grows in a tangle on the earth over which one walks, and may not show for a century's growth more than a foot of height or an inch of girth. The Nevada slope of the mountains below 7500 ft. is covered with the nut pine down to the sage plains. Its nuts are gathered in enormous amounts by the Indians for food; and it is estimated that the yearly harvest of these nuts exceeds in bulk that of all the cereals of California (John Muir). On the Sierra the underbrush is characterized by the pungent manzanita, the California buckeye and the chamiso; the last two growing equally abundantly on the Coast Range. The chamiso and the manzanita, with a variety of shrubby oaks and thorny plants, often grow together in a dense and sometimes quite impenetrable undergrowth, forming what is known as "chaparral"; if the chamiso occurs alone the thicket is a "chamisal." The elm, the hickory, the beech, the chestnut, and many others of the most characteristic and useful trees of the eastern states were originally entirely wanting in California. Oaks are abundant; they are especially characteristic of the Great Valley, where they grow in magnificent groves. Up to May 1908 national forest reserves amounted to 25,605,700 acres. The redwoods are almost wholly unprotected by law, and the big trees very inadequately protected. One of the noblest redwood areas (that of Santa Cruz county) is a state reservation (created in 1901). Even within reservations almost all the merchantable timber is owned by private individuals. In addition to native trees many others—especially ornamental species—have been successfully introduced from various parts of the world.

Soil.—Sand and loams in great variety, grading from mere sand to adobe, make up the soils of the state. The plains of the north-east counties are volcanic, and those of the south-east sandy. It is impossible to say with accuracy what part of the state may properly be classed as tillable. The total farm acreage in 1900 was 28,828,951 acres, of which 41·5% were improved; since 1880 the absolute amount of improved land has remained practically constant, despite the extraordinary progress of the state in these years. Much land is too rough, too elevated or too arid ever to be made agriculturally available; but irrigation, and the work of the state and national agricultural bureaus in introducing new plants and promoting scientific farming, have accomplished much that once seemed impossible. The peculiarities of the climate, especially its division into two seasons, make Californian (and Southern Arizona) agriculture very different from that of the rest of the country. During the winter no shelter is necessary for live-stock, nor, during summer, for the grains that are harvested in June and July, and may lie for weeks or months in the field. The mild, wet winter is the season of planting and growth, and so throughout the year there is a succession of crops. The dangers of drought in the long dry seasons particularly increase the uncertainties of agriculture in regions naturally arid. Irrigation was introduced in Southern California before 1780, but its use was desultory and its spread slow till after 1850. In 1900 almost 1,500,000 acres were irrigated—an increase of 46% since 1890. About half of this total was in San Joaquin Valley. California has the greatest area of irrigated land of any state in the Union, and offers the most complete utilization of resources. In the south artesian wells, and in the Great Valley the rivers of the Sierra slope, are the main source of water-supply. On nearly all lands irrigated some crops will grow in ordinary seasons without irrigation, but it is this that makes possible selection of crops; practically indispensable for all field and orchard culture in the south, save for a few moist coastal areas, it everywhere increases the yield of all crops and is practised generally all over the state. Of the acreage devoted to alfalfa in 1899, 76·2% was irrigated; of that devoted to subtropical fruits, 71·7%. Small fruits, orchard fruits, hay, garden products and grains are decreasingly dependent on irrigation; wheat, which was once California's great staple, is (for good, but not for best results) comparatively independent of it,—hence its early predominance in Californian agriculture, due to this success on arid lands since taken over for more remunerative irrigated crops.

Agriculture.—The spread of irrigation and of intensive cultivation, and the increase of small farms during the last quarter of the 19th century, have made California what it is to-day. Agriculture had its beginning in wheat-raising on great ranches, from 50,000 even to several hundred thousand acres in extent. A few of these, particularly in the Great Valley, are still worked, but only a few. The average size of farms in 1850 (when the large Mexican grants were almost the only farms, and these unbroken) was 4466 acres; in 1860 it was 466·4, and in 1900 only 397·4 acres. Stock ranches, tobacco plantations, and hay and grain farms, average from 800 to 530 acres, and counteract the tendency of dairy farms, beet plantations, orchards, vegetable gardens and nurseries to lower the size of the farm unit still further. The renting of large holdings prevails to a greater extent than in any other state except Texas. From 1880 to 1900 the number of farms above 500 and below 1000 acres doubled; half of the total in 1900 were smaller than 100 acres. The most remunerative and most characteristic farming to-day is diversified and intensive and on small holdings. The essential character of California's economic life has been determined by the successive predominance of grass, gold, grain and fruits. Omitting the second it may be truly said that the order of agricultural development has been mainly one of blind experiment or fortuitous circumstances. Staple products have changed with increasing knowledge of climatic conditions, of life-zones and of the fitness of crops; first hides and tallow, then wool, wheat, grapes (which in the early eighteen-nineties were the leading fruit), deciduous orchard fruits, and semi-tropical citrus fruits successively. Prunes were introduced in 1854, but their possibilities were only slightly appreciated for some thirty years. Of various other crops much the same is true. Of late years

progress has been very intelligent; in earlier years it was gained through a multitude of experiments and failures, and great pecuniary loss, and progress was a testimonial chiefly to courage and perseverance. The possibilities of the lower Sonoran and tropical areas are still imperfectly known. Nature has been niggard of rain but lavish in soil and sun. Irrigation has shown that with water, arid and barren plains, veritable deserts, may be made to bloom with immense wealth of semi-tropical fruits; and irrigation in the tropical area along the Colorado river, which is so arid that it naturally bears only desert vegetation, has made it a true humid-tropical region like Southern Florida, growing true tropical fruits.

In 1899 California ranked eleventh among the states in total value of farm property ($796,527,955) and fourteenth in the total value of farm products ($131,690,606). The growth of the former from 1890 to 1900 was only 2·5%, one of the smallest increases among all the states.

The pastoral period extended from 1769 to 1848. The live-stock industry was introduced by the Franciscans and flourished exceedingly. In 1834, when the missions had already passed their best days, there were some 486,000 cattle, horses, mules and asses on the ranges, and 325,000 small animals, principally sheep. Throughout the pre-American period stock-raising was the leading industry; it built up the prosperity of the missions, largely supported the government and almost exclusively sustained foreign commerce. Hides and tallow were the sum and substance of Californian economy. Horses were slaughtered wholesale at times to make way for cattle on the ranges. There was almost no dairying; olive oil took the place of butter, and wine of milk, at the missions; and in general indeed the Mexicans were content with water. In the development of the state under the American régime the live-stock industry has been subordinate. A fearful drought in 1862–1864 greatly depressed it, and especially discouraged cattle ranching. Sheep then became of primary importance, until the increase of the flocks threatened ranges and forests with destruction. As late as 1876 there were some 7,000,000 sheep, in 1900 only 2,581,000, and in 1906 only 1,750,000. In the total value of all live stock (5,402,297 head) in 1900 ($65,000,000) the rank of the state was 15th in the Union, and in value of dairy products in 1899 (12·84 million dollars) 12th. The live-stock industry showed a tendency to decline after 1890, and the dairy industry also, despite various things—notably irrigation and alfalfa culture—that have favoured them.

Cereals replaced hides and tallow in importance after 1848. Wheat was long California's greatest crop. Its production steadily increased till about 1884, the production in 1880, the banner year, being more than 54 million bushels (32,537,360 centals). Since 1884 its production has markedly fallen off; in 1905 the wheat crop was 17,542,013 bushels, and in 1906, 26,883,662 bushels (valued at $20,162,746). There has been a general parallelism between the amount of rain and the amount of wheat produced; but as yet irrigation is little used for this crop. In the eighth decade of the 19th century, the value of the wheat product had come to exceed that of the annual output of gold. Barley has always been very important. The acreage given to it in 1899 was one-fourth the total cereal acreage, and San Francisco in 1902–1904 was the shipping point of the larger part of American exported barley, of (roughly) three-quarters in 1902, seven-eighths in 1903 and four-fifths in 1904. In 1906 California produced 38,760,000 bushels of barley, valued at $20,930,400. The great increase in the acreage of barley, which was 22·5% of the country's barley acreage in 1906, and 24·2% in 1905, is one reason for the decreased production of wheat. The level nature of the great grain farms of the valley led to the utilization of machinery of remarkable character. Combined harvesters (which enter a field of standing grain and leave this grain piled in sacks ready for shipment), steam gang-ploughs, and other farm machinery are of truly extraordinary size and efficiency. In 1899 cereals represented more than a third of the total crop acreage and crop product ($93,641,334) of the state. Wheat and other cereals are in part cut for hay, and the hay crop of 1906 was 1,133,465 tons, valued at $12,751,481. California is one of the leading hop-producing states of the Union, the average annual production since 1901 being more than 10,000,000 lb. The product of sugar beets increased between 1888 and 1902 from 1910 to 73,761 tons (according to the state board of trade), and in 1906–1907 (according to the department of agriculture) it was 671,571 tons, from which 185,480,000 lb of sugar was manufactured. In this industry California is much ahead of all other states. Truck gardening for export is an assured industry, especially in the north. Great quantities of vegetables, fresh and canned, are shipped yearly, and the same is true on a far larger scale of fruit. Vegetable exports more than doubled between 1894 and 1903. In 1899 hay and grain represented slightly more than a third of the farm acreage and capital and also of the value of all farm products; live-stock and dairy farms represented slightly more than half the acreage, and slightly under 30% of the capital and produce; fruit farms absorbed 6·2% of the acreage and 27% of the capital, and returned 22·5% of the value of farm produce.

Fruit-growing.—Horticulture is now the principal industry, and in this field California has no rival in the United States, although ranking after Florida in the growth of some tropical or semi-tropical fruits,—pineapples, guava, limes, pomeloes or grape-fruit and Japanese persimmons. In 1899 California's output of fruit was more than a fifth of that of the whole Union. The supremacy of the state is established in the growth of oranges, lemons, citrons, olives, figs, almonds, Persian (or English) walnuts, plums and prunes, grapes and raisins, nectarines, apricots and pomegranates; it also leads in pears and peaches, but here its primacy is not so assured. Southern California by no means monopolizes the warm-zone fruits. Oranges, lemons and walnuts come chiefly from that section, but citrus fruits grow splendidly in the Sierra foothills of the Sacramento Valley, and indeed ripen earlier there than in the southern district. Almonds, as well as peaches, pears, plums, cherries and apricots, come mainly from the north. Over half of the prune crop comes from Santa Clara county, and the bulk of the raisin output from Fresno county. Olives thrive as far north as the head of the Great Valley, growing in all the valleys and foothills up to 1500 or 2000 ft. They were introduced by the Franciscans (as were various other subtropical fruits, pears and grapes), but their scientific betterment and commercial importance date from about 1885. They grow very abundantly and of the finest quality; for many years poor methods of preparation prejudiced the market against the Californian product, but this has ceased to be the case. The modern orange industry practically began with the introduction into Southern California in 1873 of two seedless orange trees from Brazil; from their stock have been developed by budding millions of trees bearing a seedless fruit known as the "Washington navel," which now holds first rank in American markets; other varieties, mainly seedlings, are of great but secondary importance. Shipments continue the year round. There has been more than one horticultural excitement in California, but especially in orange culture, which was for a time almost as epidemic a fever as gold seeking once was. By reason of the co-operative effort demanded for the large problems of irrigation, packing and marketing, the citrus industry has done much for the permanent development of the state, and its extraordinary growth made it, towards the close of the 19th century, the most striking and most potent single influence in the growth of agriculture. State legislation has advanced the fruit interest in all possible ways. Between 1872 and 1903 exports of canned fruits increased from 91 to 94,205 short tons; between 1880 and 1903 the increase of dried fruit exports was from 295 to 149,531 tons; of fresh deciduous fruits, from 2590 to 101,199; of raisins, from 400 to 39,963; of citrus fruits, from 458 to 299,623; of wines and brandies between 1891 and 1903, from 47,651 to 97,332 tons. Of the shipments in 1903 some 44% were from Southern California,—*i.e.* from the seven southernmost counties.

Grape culture has a great future in California. Vines were

first introduced by the Franciscans in 1771 from Spain, and until after 1860 "Mission" grapes were practically the only stock in California. Afterwards many hundreds of European varieties were introduced with great success. "The state has such a variety of soil, slope, elevation, temperature and climatic conditions as to reproduce, somewhere within its borders, any wine now manufactured" (United States Census, 1900); but the experience has not yet divided the state into districts of specialized produce, nor determined just how far indigenous American vines may profitably be used, either as base or graftings, with European varieties. Grapes are grown very largely over the state. Raisins do well as far north as Yolo county, but do best in Madera, Jesus, King, Tulare and San Diego counties. The product is more than sufficient for the markets of the United States. Dry wine grapes do best in the counties around San Francisco Bay, on unirrigated lands; while sweet wine stocks do best in Yolo, San Joaquin and the counties of the raisin grape, and on irrigated lands. In 1899 California produced more than two-thirds in value ($3,937,871) and three-fourths in bulk (19,020,258 gallons) of the total wine output of the United States. The value of product more than sextupled from 1880 to 1900. In quantity the product was more than four times the combined product of all other states. The better California wines are largely sold under French labels. Brandies are an important product. They are made chiefly from grapes, and are used to fortify wines. It was officially estimated that in the spring of 1904 there were some 227,000 acres of vineyards in the state, of which exactly five-tenths were in wine grapes and four-tenths in raisin grapes.

Gold.—Between the pastoral period and the era of wheat was the golden epoch of Californian history. The existence of gold had long been suspected, and possibly known, in California before 1848, and there had been desultory washings in parts where there was very little to reward prospectors. The first perfectly authenticated discovery was made near Los Angeles in 1842. The discovery of real historical importance was made in January 1848 (the 24th is the correct date) at John A. Sutter's mill, on the south fork of the American river near Coloma, by a workman, James W. Marshall (1810–1885). His monument now marks the spot. From 1848 to the 1st of January 1903, according to the state mining bureau, California produced $1,379,275,408 in gold. There were two periods of intense excitement. The first ended in 1854, at which time there was a decided reaction throughout the United States in regard to mining matters. The Californian discoveries had given rise to a general search for metalliferous deposits in the Atlantic states, and this had been followed by wild speculations. At the time of their greatest productiveness, from 1850 to 1853, the highest yield of the washings was probably not less than $65,000,000 a year; according to the state mining bureau the average production from 1851–1854 was $73,570,087 ($81,294,270 in 1852, the banner year), and from 1850–1861 $55,882,861, never falling below $50,000,000. The estimates of other competent authorities differ considerably, and generally are somewhat less generous than these figures.

At first the diggings were chiefly along the rivers. These were "flumed,"—that is, the water was diverted by wooden flumes from the natural channel and the sand and gravel in the bed were washed. All the "gulches" or ravines leading down into the canyons were also worked over, with or without water. These were the richest "placers," but in them the gold was very unequally distributed. Those who first got possession of the rich bars on the American, Yuba, Feather, Stanislaus and the other smaller streams in the heart of the gold region, made sometimes from $1 to $5000 a day; but after one rich spot was worked out it might be days or weeks before another was found. In 1848 $500-$700 a day was not unusual luck; but, on the other hand, the income of the great majority of miners was certainly far less than that of men who seriously devoted themselves to trade or even to common labour. Many extraordinary nuggets were found, varying from $1 to $20,000 in value. The economic stimulus given by such times may be imagined. For several years gold-dust was a regular circulating medium in the cities as well as in the mining districts of the state. An ounce of dust in 1848 frequently went for $4 instead of $17; for a number of years traders in dust were sure of a margin of several dollars, as for example in private coinage, mints for which were common by 1851. From the record of actual exports and a comparison of the most authoritative estimates of total production, it may be said that from 1848 to 1856 the yield was almost certainly not less than $450,000,000, and that about 1870 the billion dollar mark had been passed. Just at this time came the highest point and the sudden fall of the second great mining fever of the state. This was a stock speculation based on the remarkable output ($300,000,000 in 20 years) of the silver "bonanzas" of the Comstock lode at Virginia City, Nevada, which were opened and financed by San Francisco capitalists. The craze pervaded all classes. Shares that at first represented so many dollars per foot in a tangible mine were multiplied and remultiplied until they came to represent paper thicknesses or almost nothing, yet still their prices mounted upward. In April 1872 came the revulsion; there was a shrinkage of $60,000,000 in ten days; then in 1873 a tremendous advance, and in 1875 a final and disastrous collapse; in ten years thereafter the stock of the Comstock lode shrank from $3,000,000 to $2,000,000. This Comstock fever belongs to Californian rather than to Nevadan history, and is one of the most extraordinary in mining annals.

First the "rocker," then the "tom," the "flume," and the hydraulic stream were the tools of the miner. Into the "rocker" and the "tom" the miner shovelled dirt, rocking it as he poured in water, catching the gold on riffles set across the bottom of his box; thus imitating in a wooden box the work of nature in the rivers. The "flume" enabled him to dry the bed of a stream while he worked over its gravels. The hydraulic stream came into use as early as 1852 (or 1853) when prospecting of the higher ground made it certain that the "deep" or "high" gravels—*i.e.* the detrital deposits of tertiary age—contained gold, though in too small quantities to be profitably worked in the ordinary way. The hydraulic process received an immense development through successive improvements of method and machinery. In this method tremendous blasts of powder, sometimes twenty-five or even fifty tons, were used to loosen the gravel, which was then acted on by the jet of water thrown from the "pipes." To give an idea of the force of the agent thus employed it may be stated that when an eight-inch nozzle is used under a heavy head, more than 3000 ft. may be discharged in a minute with a velocity of 150 ft. per second. The water as it thus issues from the nozzle feels to the touch like metal, and the strongest man cannot sensibly affect it with a crowbar. A gravel bank acted on by such tremendous force crumbled rapidly, and the disintegrated material could be run readily through sluices to the "dumps." Hydraulic mining is no longer practised on the scale of early days. The results were wonderful but disastrous, for the "dumps" were usually river-beds. From 1870–1879 the bed of Bear river was raised in places in its lower course 97 ft. by the detritus wash of the hydraulic mines, and that of Sleepy Hollow Creek 136 ft. The total filling up to that time on the streams in this vicinity had been from 100 to 250 ft., and many thousand acres of fine farming land were buried under gravel,—some 16,000 on the lower Yuba alone. For many years the mining interests were supreme, and agriculture, even after it had become of great importance, was invariably worsted when the two clashed; but in 1884 the long and bitter "anti-débris" or "anti-slickins" fight ended in favour of the farmers. In 1893 the United States government created a California Débris Commission, which has acted in unison with the state authorities. Permits for hydraulic mining are granted by the commission only when all gravel is satisfactorily impounded and no harm is done to the streams; and the improvement of these, which was impossible so long as limits were not set to hydraulic mining, can now be effectively advanced. Quartz mining began as early as 1851. In 1906 some three-fourths

of the gold output was from such mines. Quartz veins are very often as good at a depth of 3000 ft. as at the surface. A remarkable feature of recent years (especially since 1900) is gold "dredging." Thousands of acres even of orchard, vineyard and farming land have been thus treated in recent years. Gold was being produced in 1906 in more than thirty counties. The annual output since 1875 has been about $15,000,000 to $17,000,000; in 1905, according to the Mines Report, it was $18,898,545. Colorado now excels California as a gold producer.

Mineral Products.—California produces more than forty mineral substances that are of commercial significance. Gold, petroleum, copper, borax and its products, clays, quicksilver and silver lead, in order of importance, representing some four-fifths of the total. From 1894 to 1902 the aggregate production increased from 20·2 to 35·1 million dollars; in 1905 it was $43,406,258. Metallic products represent about three-fourths of the total, but the feature of recent years has been the rising importance of hydrocarbons and gases, and of structural materials, and indeed of non-metallic products generally. The production of crude petroleum has grown very rapidly since about 1895. Oil is found from north to south over some 600 m., but especially in Southern California. The high cost of coal, which has always been a hindrance to the development of manufactures, makes the petroleum deposits of peculiar value. Their consumption increased from 4,250,000 to 35,671,000 barrels between 1900 and 1905, and the value of the product in 1905 was $8,201,846. The Kern river field is the most important in the state and one of the greatest in the world. Those of Coalinga, Santa Maria and Lompoc, and Los Angeles are next in importance. Both in 1900 and in 1905 California ranked fifth among the states of the United States in the petroleum refining industry. Copper has risen in importance in very recent years; it is mined mainly in Shasta county; the value of the state's total product in 1905 was $2,588,111. Gold mining still centres in the mountainous counties north of Tuolumne. This is the region of quartz mining. In borax (of which California's output in 1904 was 45,647 tons) and structural materials San Bernardino has a long lead. More than nine-tenths of the borax product of the country comes from about Death Valley. San Bernardino marbles have a very high repute. California was the fourth state of the Union in 1899 in the production of granite. It furnishes about two-fifths of the quicksilver of the world. This has been mined since 1824; the output was greatest from 1875–1883, when it averaged about 43,000,000 pounds. The New Almaden mine (opened in 1824) in Santa Clara county produced from 1850 to 1896 some 73,000,000 pounds. The centre of production is north and south of San Francisco Bay. Californian coal is almost wholly inferior brown lignite, together with a small quantity of bituminous coals of poor quality; the state does not produce a tenth part of the coal it consumes. Of growing importance are the gems found in California: a few diamonds in Butte county; rock crystal in Calaveras county; and tourmalines, kunzite, the rare pink beryl and bright blue topazes in San Diego county. Chrysoprase, mined near Porterville and near Visalia (Tulare county), is used partly for gems, but more largely (like the vesuvianite found near Exeter, in the same county) for mosaic work; and there are ledges of fine rose quartz in the Coahuila mountains of Riverside county and near Lemon Cove, Tulare county.

A vivid realization of the industrial revolution in the state is to be gained from the reflection that in 1875 California was pre-eminent only for gold and sheep; that the aggregate mineral output thirty years later was more than a third greater than then, and that nevertheless the value of farm produce at the opening of the 20th century exceeded by more than $100,000,000 the value of mineral produce, and exceeded by $50,000,000 the most generous estimate of the largest annual gold output in the annals of the state.

Manufactures.—Previous to 1860 almost every manufactured article used in the state was imported from the east or from Europe. Dairy products, for example, for whose production good facilities always existed, were long greatly neglected, and not for two decades at least after 1848 was the state independent in this respect. The high cost of coal, the speculative attractions of mining, and the high wages of labour, handicapped the development of manufactures in early years. The first continued to be a drag on such industries, until after 1895 the increasing use of crude petroleum obviated the difficulty. Several remarkable electric power and lighting plants utilize the water power of the mountains.[1] Geographic isolation has somewhat fostered state industries. The value of gross manufactured products increased 41·9% from 1889 to 1899. In the latter year California ranked 12th among the states in the gross value of all manufactures ($302,874,761); the per-capita value of manufactured and agricultural products being $293,—$89 of the latter, $204 of the former. Of the population 61% were engaged in manufacturing. Fourteen industries represented from 41% to 45% of the employees, wages, capital and product of the aggregate manufacturers of the state. The leading ones in order of importance and the value of product in millions of dollars were: the manufacture of railway, foundry, and machine shop products (19·6 million dollars), lumber and timber industries (18·57), sugar and molasses refining (15·91), beef slaughtering (15·72), canning and preserving (13·08), flour and grist milling (13·10), the manufacture of malt, vinous and distilled liquors (9·26), leather industries (7·40), printing and publishing (6·86). In the second, third and fifth of these industries the state ranked respectively fifth, fourth and first in the Union.[2] The canning and preserving of fruits and vegetables is in the main an industry of the northern and central counties. In 1890 the state board of forestry estimated that the redwood forests were in danger of exhaustion by 1930. The redwood is a general utility lumber second only to the common white pine, and the drain on the woods has been continuous since 1850. The wood has a fine, straight and even grain; and though light and soft, is firm and extremely durable, lying, it is authoritatively asserted, for centuries in the forest without appreciable decay. It takes a beautiful polish. The colour varies from cedar colour to mahogany. A small southern belt in San Mateo, Santa Clara and Santa Cruz counties is not being commercially exploited. The annual lumber cut from 1898–1903 averaged more than 663,348,000 ft.; of the 852,638,000 ft. cut in 1903, 465,460,000 were of redwood, and 264,890,000 of yellow pine; fir and sugar pines contributing another 104,600,000, and spruce and cedar 17,670,000 ft. In 1899 California ranked 16th among the states in value of product ($13,764,647, out of a total of $566,852,984). The total cut was under ½ of 1% of the estimated stand. In Humboldt county, in the redwood belt near Eureka, are probably the most modern and remarkable lumber mills of the world. In 1900 it was estimated that lumbermen controlled somewhat less than a fifth of the timber of the state, and the same part of the redwood. After 1890 important shipyards were established near San Francisco. The most important naval station of the United

[1] Small masses of water made to fall great distances and the use of turbines are important features of such plants. One on the North Yuba river at Colgate, where there is a 700 ft. fall, serves Oakland, San Jose and San Francisco, at high pressure yielding in San Francisco (220 m. away) 75% of its power. Other plants are one at Electra (154 m. from San Francisco), and one on the San Joaquin, which delivers to Fresno 62 m. distant.

[2] The 1905 census of manufactures deals only with establishments under the factory system; its figures for 1905 and the figures for 1900 reduced to the same limits are as follows:—total value of products, 1905, $367,218,494; 1900, $257,385,521, an increase of 42·7%; leading industries, with value of product in millions of dollars—canning and preserving, first in 1905 with 23·8 millions, third in 1900 with 13·4 millions; slaughtering and meat-packing, second in 1905 with 21·79 millions, first in 1900 with 15·71 millions; flour and grist mill products, third in 1905 with 20·2 millions, fourth in 1900 with 13·04 millions; lumber and timber, fourth in 1905 with 18·27 millions, second in 1900 with 13·71 millions; printing and publishing, fifth in 1905 with 17·4 millions, sixth in 1900 with 9·6 millions; foundry and machine shop products, sixth in 1905 with 15·7 millions, fifth in 1900 with 12·04 millions; planing mill products, seventh in 1905 with 13·9 millions, twelfth in 1900 with 4·8 millions; bread and other bakery products, eighth in 1905 with 10·6 millions, eleventh in 1900 with 4·87 millions.

States on the Pacific coast is at Mare Island at the northern end of San Francisco Bay, and the private Union Iron Works, on the peninsula near San Francisco, is one of the largest shipyards of the country. The best sugar product was in 1905 exceeded only by that of Colorado and that of Michigan. In 1905 60·3% (by value) of the wine made in the United States was made in California.

The transportation facilities in California increased rapidly after 1870. The building of the Central Pacific and Union Pacific lines are among the romances of American railway history. They joined tracks near Ogden, Utah, in May 1869. The New Orleans line of the Southern Pacific was opened in January 1883; the Atchison, Topeka & Santa Fé completed its line to San Diego in 1885, and to San Francisco Bay in 1900. The San Pedro, Los Angeles & Salt Lake, with trans-continental connexions at the eastern terminus, was chartered in 1901 and fully opened in March 1903. Railway mileage increased 137·3% from 1870 to 1880, and 154·6% from 1880 to 1900. At the close of 1906 the total mileage was 6385·46 m., practically all of which is either owned or controlled by the two great trans-continental systems of the Southern Pacific and the Atchison, Topeka & Santa Fé. From 1869 to 1875 registered mail exchanges were opened with China, Japan, Hawaii and Australia. There are now frequent mail connexions from San Francisco with Hawaii, Australasia, and eastern Asia, as well as with American ports north and south. The commerce of San Francisco amounts to some $80,000,000 or $90,000,000 yearly, about equally divided between imports and exports, until after 1905—in 1907 the imports were valued at $54,207,011, and the exports at $30,378,355 (less than any year since 1896). San Diego has a very good harbour, and those of San Pedro, Port Los Angeles, and Eureka are fairly good and of growing importance. Grains, lumber, fish, fruits and fruit products, petroleum, vegetables and sugar are the leading items in the commerce of San Francisco. Other ports are of very secondary importance. Navigation on the Sacramento and San Joaquin rivers was very important in early days, but is to-day of relatively slight importance in comparison with railway traffic.

Population.—The population of California increased in successive decades from 1850 to 1900 respectively by 310·3, 47·3, 54·3, 40·3, and 22·4%. (Great as was this growth it did not equal that of some states in the Middle West, as for example Iowa). The population in 1900 was 1,485,053, or 9·5 per sq. m. There were 116 incorporated towns and cities. Of the total population 43·3% was urban,—*i.e.* resident in cities (11 in number) of 8000 or more inhabitants. These 11 cities were: San Francisco (pop. 342,782), Los Angeles (102,479), Oakland (66,960), Alameda (16,464), Berkeley (13,214),—the last three being suburbs of San Francisco, and the last the seat of the state university,—Sacramento, the state capital (29,282), San José (21,500), San Diego (17,700), Stockton (17,506), Fresno (12,470), and Pasadena (9117). Eight other cities had populations of more than 5000—Riverside City (7973), Vallejo (7965), Eureka (7327), Santa Rosa (6673), Santa Barbara (6587), San Bernardino (6156), Santa Cruz (5659), and Pomona (5526).

Of the entire population in 1900 persons of foreign birth or parentage (one or both parents being foreign) constituted 54·2 and those of native birth were 75·3%. Of the latter six-tenths were born in California. The foreign element included 45,753 Chinese (a falling off of 25,313 since 1890), and 10,151 Japanese (an increase of 9004 in the same decade). Twenty-two foreign countries contributed more than 1000 residents each, the leading ones being Germany (72,449), China, the United Kingdom (80,222), Canada (29,618; 27,408 being English Canadians), Italy (22,777), Sweden (14,549), France (12,256), Portugal (12,068), Switzerland (10,974), Japan, Denmark, and Mexico, in the order named. Persons of negro descent numbered 11,045. Almost all the Indians of the state are taxed as citizens. In 1890 Roman Catholics constituted more than half the total number of church communicants, Methodists a fifth as many; Presbyterians, Congregationalists, Baptists and Episcopalians being the other strongest sects. A peculiar feature in the population statistics of California is the predominance of males, which in 1900 was 156,009; the Asiatic element accounts for a third of this number. Since 1885 the eight counties south of the Tehachapi Range, which are known collectively and specifically as Southern California, have greatly advanced in population. In 1880 their population was 7·3, in 1890 17·2, and in 1900 20·1% of the total population of the state. The initial impulse to this increase was the beginning of the "fruit epoch" in these counties, combined with a railway "rate-war" following the completion to the coast in 1885 of the Santa Fé, and an extraordinary land boom prevailing from 1886 to 1888. The conjuncture of circumstances, and the immigration it induced, were unusual even for American conditions. The growth of the South, as of the rest of the state, has been continuous and steady since this time.

The Indians were prominent in early Californian history, but their progress toward their present insignificance began far back in the Spanish period. It proceeded much more rapidly after the restraining influence of the missions was removed, leaving them free to revert to savagery; and the downward progress of the race was fearfully accelerated during the mining period, when they were abused, depraved, and in large numbers killed. There have been no Indian wars in California's annals, but many butcheries. The natives have declined exceedingly in number since 1830, in 1900 numbering 15,377. They have always been mild-tempered, low, and unintelligent, and are to-day a poor and miserable race. They are all called "Digger Indians" indiscriminately, although divided by a multiplicity of tongues.

Government and Institutions.—In the matter of constitution-making California has been conservative, having had only two between 1849 and 1905. The first was framed by a convention at Monterey in 1849, and ratified by the people and proclaimed by the United States military governor in the same year. The present constitution, framed by a convention in 1878–1879, came into full effect in 1880, and was subsequently amended. It was the work of the labour party, passed at a time of high discontent, and goes at great length into the details of government, as was demanded by the state of public opinion. The qualifications required for the suffrage are in no way different from those common throughout the Union, except that by a constitutional amendment of 1894 it is necessary for a voter to be able to read the state constitution and write his name. As compared with the earlier constitution it showed many radical advances toward popular control, the power of the legislature being everywhere curtailed. The power of legislation was taken from it by specific inhibition in thirty-one subjects before within its power; its control of the public domain, its powers in taxation, and its use of the state credit were carefully safe-guarded. "Lobbying" was made a felony; provisions were inserted against lotteries and stock-exchange gambling, to tax and control common carriers and great corporations, and to regulate telegraph, telephone, storage and wharfage charges. The powers of the executive department were also somewhat curtailed. For the judiciary, provisions were made for expediting trials and decisions. Notable was the innovation that agreement by three-fourths of a jury should be sufficient in civil cases and that a jury might be waived in minor criminal cases, a provision which of course was based on experience under the Mexican law. All these changes in the organic law reflect bitter experience after 1850; and, read with the history of those years as a commentary, few American constitutions are more instructive. The constitution of 1878 corresponds very closely to the ordinary state constitution of to-day. The incorporation of banks issuing circulating notes is forbidden. Marriage is not only declared a civil contract, but the laws expressly recognize that the mere consent of the parties is adequate to constitute a binding marriage. The union of whites with persons of African descent is forbidden. Felons twice convicted may not be pardoned except on the recommendation of a majority of the judges of the supreme court. Judges and state executive officers are elected for terms longer than is usual in the different states (supreme judges 12 years, executive officers 4 years). These few provisions

are mentioned, not as of particular importance in themselves, but as exceptions of some moment to the usual type of state Constitutions (see UNITED STATES). The Australian ballot was introduced in 1891. In local government there are no deviations from the usual types that demand notice. In the matter of liquor-laws there is local option, and a considerable proportion of the towns and smaller cities, particularly in the south, adopt prohibition. In most of the rest high licence is more or less strictly enforced.

The total assessed valuation of property grew from $666,399,985 in 1880 to $1,217,648,683 in 1900 and $1,879,728,763 in 1907. In 1904, when the U.S. Census Report showed California to be the twenty-first state of the Union in population but the sixth in wealth, the total estimated true value of all property was $4,115,491,106, of which $2,664,472,025 was the value of real property and improvements thereon. The per capita wealth of the state was then reported as $2582.32, being exceeded only by the three sparsely settled states of Montana, Wyoming and Nevada. In 1898 California had the largest savings-bank deposit per depositor ($637.75) of any state in the Union; the *per caput* deposit was $110 in 1902, and about one person in seven was a depositor. The state bonded debt in 1907 amounted to three and a half million dollars, of which all but $767,529.03 was represented by bonds purchased by the state and held for the school and university funds; for the common school fund on the 1st of July 1907 there were held bonds for $4,890,950, and $800,000 in cash available for investment; for the university fund there were held $751,000 in state bonds, and a large amount in other securities. The total bonded county indebtedness was $4,879,600 in 1906 (not including that of San Francisco, a consolidated city and county, which was $4,568,600). A homestead, entered upon record and limited to a value of $5000 if held by the head of a family and to a value of $1000 if held by one not the head of a family, is exempt from liability for debts, except for a mortgage; a lien before it was claimed as a homestead is a lien afterward for improvements. A homestead held by a married man cannot be mortgaged without consent of his wife.

Under an act approved on the 25th of March 1903 a state board of charities and corrections,—consisting of six members, not more than three being of the same political party, appointed by the governor, with the advice and consent of the senate, and holding office for twelve years, two retiring at the end of each quadrennium,—investigates, examines, and makes "reports upon the charitable, correctional and penal institutions of the state," excepting the Veterans' Home at Yountville, Napa county, and the Woman's Relief Corps Home at Evergreen, Santa Clara county. There are state prisons with convicts working under the public account system, at San Quentin, Maria county, and Folsom, Sacramento county. The Preston (Sonoma county) School of Industry, for older boys, and the Whittier (Los Angeles county) State School, for girls and for boys under sixteen, are the state reformatories, each having good industrial and manual training departments. There are state hospitals for the insane at Agnew, Santa Clara county; at Stockton, San Joaquin county; at Napa, Napa county; at Patton, San Bernardino county; and, with a colony of tubercular patients, at Ukiah, Mendocino county. In 1906 the ratio of insane confined to institutions, to the total population, was 1 to every 270. Also under state control are the home for care and training of feeble-minded children, at Eldridge, Sonoma county; the institution for the deaf and the blind at Berkeley, and the home of mechanical trades for the adult blind at Oakland. A Juvenile Court Law was enacted in 1903 and modified in 1905.

The educational system of California is one of the best in the country. The state board of education is composed of the governor of the state, who is its president; the superintendent of public instruction, who is its secretary; the presidents of the five normal schools and of the University of California, and the professor of pedagogy in the university. Sessions are long in primary schools, and attendance was made compulsory in 1874 (and must not be less than two-thirds of all school days). The state controlled the actual preparation and sale of text-books for the common schools from 1885 to 1903, when the Perry amendment to the constitution (ratified by popular vote in 1884) was declared to mean that such text-books must be manufactured within the state, but that the texts need not be prepared in California. The experiment of state-prepared text-books was expensive, and its effect was bad on the public school system, as such text-books were almost without exception poorly written and poorly printed. After 1903 copyrights were leased by the state. Secondary schools are closely affiliated with, and closely inspected by, the state university. All schools are generously supported, salaries are unusually good, and pension funds in all cities are authorized by state laws. The value of school property in 1900 was $19,135,722, and the expenditure for the public schools $6,195,000; in 1906 the value of school property was $29,013,150, and the expenditure for public schools $10,815,857. The average school attendance for all minors of school age (5-20 years) was 59·9%; of those native-born 61·5, of those foreign-born 34·6; of coloured children, including Asiatics and Indians, 35·8, and of white, 60·8%. In 1900, 6·2% of the males of voting age, and 2·4% of the native-born males of voting age, were illiterate (could not write). Some 3% of the total population could not speak English; Chinese and Japanese constituting almost half of the number, foreign-born whites somewhat less, and Indians and native-born whites of foreign parentage together less than a tenth of the total. Of the higher educational institutions of the state the most important are the state university at Berkeley and Leland Stanford Jr. University at Palo Alto. The former is supported with very great liberality by the state; and the latter, the endowment of which is private (the state, however, exempting it from taxation), is one of the richest educational institutions of America. In 1906 there were also five state normal schools (at Chico, Los Angeles, San Diego, San Francisco, and San José), and a considerable number of denominational colleges. There is also a state polytechnic school at San Luis Obispo (1903).

History.—The name "California" was taken from Ordoñez de Montalvo's romance of chivalry *Las Sergas de Esplandian* (Madrid, 1510), in which is told of black Amazons ruling an island of this name "to the right of the Indies, very near the quarter of the terrestrial paradise." The name was given to the unknown north-west before 1540. It does not show that the namers were prophets or wise judges, for the Spaniards really knew California not at all for more than two centuries, and then only as a genial but rather barren land; but it shows that the *conquistadores* mixed poetry with business and illustrates the glamour thrown about the "Northern Mystery." Necessarily the name had for a long time no definite geographical meaning. The lower Colorado river was discovered in 1540, but the explorers did not penetrate California; in 1542–1543 Juan Rodriguez Cabrillo explored at least the southern coast; in 1579 Sir Francis Drake repaired his ships in some Californian port (almost certainly not San Francisco Bay), and named the land New Albion; two Philippine ships visited the coast in 1584 and 1595, and in 1602 and 1603 Sebastian Vizcaino discovered the sites of San Diego and Monterey. There was apparently no increase of knowledge thereafter for 150 years. Most of this time California was generally supposed to be an island or a group of islands. Jesuit missionaries entered Lower California as early as 1697, maintaining themselves there until Charles III.'s expulsion in 1767 of all Jesuits from his dominions; but not until Russian explorations in Alaska from 1745–1765 did the Spanish government show interest in Upper California. Because of these explorations, and also the long-felt need of a refitting point on the California coast for the galleons from Manila, San Diego was occupied in 1769 and Monterey in 1770 as a result of urgent orders from Charles III. San Francisco Bay was discovered in the former year. Meanwhile the Jesuit property in the Peninsula had been turned over to Franciscan monks, but in 1772 the Dominicans took over the missions, and the Franciscans not unwillingly withdrew to Upper California, where they were to thrive remarkably for some fifty years.

This is the mission period—or from an economic standpoint,

the pastoral period—of Californian history. In all, twenty-one missions were established between 1769 and 1823. The leader in this movement was a really remarkable man, Miguel José Serra (known as Junipero Serra, 1713-1784), a friar of very great ability, purest piety, and tireless zeal. He possessed great influence in Mexico and Madrid. "The theory of the mission system," says H. H. Bancroft, "was to make the savages work out their own salvation and that of the priests also." The last phrase scarcely does justice to the truly humane and devout intentions of the missionaries; but in truth the mission system was a complete failure save in the accumulation of material wealth. Economically the missions were the blood and life of the province. At them the neophytes worked up wool, tanned hides, prepared tallow, cultivated hemp and wheat, raised a few oranges, made soap, some iron and leather articles, mission furniture, and a very little wine and olive oil. Such as it was, this was about the only manufacturing or handicraft in California. Besides, the hides and tallow yielded by the great herds of cattle at the missions were the support of foreign trade and did much toward paying the expenses of the government. The Franciscans had no sympathy for profane knowledge, even among the Mexicans,—sometimes publicly burning quantities of books of a scientific or miscellaneous nature; and the reading of Fénelon's *Télémaque* brought excommunications on a layman. As for the intellectual development of the neophytes the mission system accomplished nothing; save the care of their souls they received no instruction, they were virtually slaves, and were trained into a fatal dependence, so that once coercion was removed they relapsed at once into barbarism. It cannot be said, however, that Anglo-Americans have done much better for them.

The rule of the missions.

The political upheavals in Spain and Mexico following 1808 made little stir in this far-off province. Joseph was never recognized, and allegiance was sworn to Ferdinand (1809). When revolution broke out in Mexico (1811), California remained loyal, suffering much by the cessation of supplies from Mexico, the resulting deficits falling as an added burden upon the missions. The occupation of Monterey for a few hours by a Buenos Aires privateer (1818) was the only incident of actual war that California saw in all these years; and it, in truth, was a ridiculous episode, fit introduction to the bloodless play-wars, soon to be inaugurated in Californian politics. In 1820 the Spanish constitution was duly sworn to in California, and in 1822 allegiance was given to Mexico. Under the Mexican Federal constitution of 1824 Upper California, first alone (it was made a distinct province in 1804) and then with Lower California, received representation in the Mexican congress.

The following years before American occupation may be divided into two periods of quite distinct interest. From about 1840 to 1848 foreign relations are the centre of interest. From 1824 to 1840 there is a complicated and not uninteresting movement of local politics and a preparation for the future,—the missions fall, republicanism grows, the sentiment of local patriotism becomes a political force, there is a succession of sectional controversies and personal struggles among provincial chiefs, an increase of foreign commerce, of foreign immigration and of foreign influence.

The Franciscans were mostly Spaniards in blood and in sympathies. They viewed with displeasure and foreboding the fall of Iturbide's empire and the creation of the republic. They were not treasonable, but talked much, refusing allegiance to the new government; and as they controlled the resources of the colony and the good will of the Indians, they felt their strength against the local authority; besides, they were its constant benefactors. But secularization was in harmony with the growth of republican ideas. There was talk in California of the rights of man and neophytes, and of the sins of friars. The missions were never intended to be permanent. The missionaries were only the field workers sent out to convert and civilize the Indians, who were to be turned over then to the regular clergy, the monks pushing further onward into new fields. This was the well-established policy of Spain. In 1813 the Spanish Cortes ordered the secularization of all missions in America that were ten years old, but this decree was not published in California until 1821. After that secularization was the burning question in Californian politics. In 1826 a beginning toward it was made in partially emancipating the neophytes, but active and thorough secularization of the missions did not begin until 1834; by 1835 it was consummated at sixteen missions out of twenty-one, and by 1840 at all. At some of the missions the monks acted later as temporary curates for the civil authorities, until in 1845–1846 all the missions were sold by the government. Unfortunately the manner of carrying it out discredited a policy neither unjust nor bad in itself, increasing its importance in the political struggles of the time. The friars were in no way mistreated: Californians did not share Mexican resentments against Spaniards, and the national laws directed against these were in the main quietly ignored in the province. In 1831 the mission question led to a rising against the reactionary clerical rule of Governor Manuel Victoria. He was driven out of the province.

This was the first of the opéra bouffe wars. The causes underlying them were serious enough. In the first place, there was a growing dissatisfaction with Mexican rule, which accomplished nothing tangible for good in California,—although its plans were as excellent as could be asked had there only been peace and means to realize them; however, it made the mistake of sending convicts as soldiers. Californians were enthusiastic republicans, but found the benefits of republicanism slow in coming. The resentment of the Franciscans, the presence of these and other reactionaries and of Spaniards, the attitude of foreign residents, and the ambitions of leading Californian families united to foment and propagate discontent. The feeling against Mexicans—those "de la otra banda" as they were significantly termed—invaded political and even social life. In the second place, there was growing jealousy between northern towns and southern towns, northern families and southern families. These entered into disputes over the location of the capital and the custom-house, in the Franciscan question also (because the friars came some from a northern and some from a southern college), and in the question of the distribution of commands in the army and offices in the civil government. Then there was the mission question; this became acuter about 1833 when the friars began to destroy, or sell and realize on, the mission property. The next decade was one of plunder and ruin in mission history. Finally there was a real growth of republicanism, and some rulers—notably Victoria—were wholly out of sympathy with anything but personal, military rule. From all these causes sprang much unrest and considerable agitation.

In 1828–1829 there was a revolution of unpaid soldiers aided by natives, against alleged but not serious abuses, that really aimed at the establishment of an independent native government. In 1831 Governor Victoria was deposed; in 1835 Governor Mariano Chico was frightened out of the province; in 1836 Governor Nicolas Gutierrez and in 1844-1845 Governor Manuel Micheltorena were driven out of office. The leading natives headed this last rising. There was talk of independence, but sectional and personal jealousies could not be overcome. In all these wars there was not enough blood shed to discolour a sword. The rising of 1836 against Gutierrez seems to-day most interesting, for it was in part a protest against the growth of federalism in Mexico. California was even deferred to as (declared to be seems much too strong a statement) an Estado Libre y Soberano; and from 1836 to 1838, when the revolutionary governor, Juan B. Alvarado, was recognized by the Mexican government, which had again inclined to federalism and, besides, did not take the matter very seriously, the local government rested simply on local sentiment. The satisfaction of this ended all difficulties.

By this time foreign influence was showing itself of importance. Foreign commerce, which of course was contraband, being contrary to all Spanish laws, was active by the beginning of the 19th century. It was greatly stimulated during the Spanish-American revolutions (the Lima and Panama trade dating from about 1813), for, as the Californian authorities practically ignored the law, smuggling

American immigration.

was unnecessary; this was, indeed, much greater after 1822 under the high duties (in 1836–1840 generally about 100%) of the Mexican tariffs. In the early 'forties some three-fourths of the imports, even at Monterey itself, are said to have paid no duties, being landed by agreement with the officials. Wholesale and retail trade flourished all along the coast in defiance of prohibitory laws. American trade was by far most important. The Boston traders—whose direct trade began in 1882, but the indirect ventures long before that—were men of decided influence in California. The trade supplied almost all the clothing, merchandise and manufactures used in the province; hides and furs were given in exchange. If foreign trade was not to be received, still less were foreign travellers, under the Spanish laws. However, the Russians came in 1805, and in 1812 founded on Bodega Bay a post they held till 1841, whence they traded and hunted (even in San Francisco Bay) for furs. From the day of the earliest foreign commerce sailors and traders of divers nationalities began to settle in the province. In 1826 American hunters first crossed to the coast; in 1830 the Hudson's Bay Company began operations in northern California. By this time the foreign element was considerable in number, and it doubled in the next six years, although the true overland immigration from the United States began only about 1840. As a class foreigners were respected, and they were influential beyond proportion to their numbers. They controlled commerce, and were more energetic, generally, than were the natives; many were naturalized, held generous grants of land, and had married into Californian families, not excluding the most select and influential. Most prominent of Americans in the interior was John A. Sutter (1803–1880), who held a grant of eleven square leagues around the present site of Sacramento, whereon he built a fort. His position as a Mexican official, and the location of his fortified post on the border, commanding the interior country and lying on the route of the overland immigrants, made him of great importance in the years preceding and immediately following American occupation; although he was a man of slight abilities and wasted his great opportunities. Other settlers in the coast towns were also of high standing and importance. In short, Americans were hospitably received and very well treated by the government and the people; despite some formalities and ostensible surveillance there was no oppression whatever. There was, however, some jealousy of the ease with which Americans secured land grants, and an entirely just dislike of "bad" Americans. The sources from which all the immigrants were recruited made inevitable an element of lawlessness and truculence. The Americans happened to predominate. Along with a full share of border individuality and restlessness they had the usual boisterous boastfulness and a racial contempt, which was arrogantly proclaimed, for Mexicans,—often too for Mexican legal formalities. The early comers were a conservative force in politics, but many of the later comers wanted to make California a second Texas. As early as 1805 (at the time of James Monroe's negotiations for Florida), there are traces of Spain's fear of American ambitions even in this far-away province. It was a fear she felt for all her American possessions. Spain's fears passed on to Mexico, the Russians being feared only less than Americans. An offer was made by President Jackson in 1835 to buy the northern part of California, including San Francisco Bay, but was refused. In 1836 and 1844 Americans were prominent in the incidents of revolution; divided in opinion in both years they were neutral in the actual "hostilities" of the latter, but some gave active support to the governor in 1836. From 1836 on, foreign interference was much talked about. Americans supposed that Great Britain wished to exchange Mexican bonds for California; France also was thought to be watching for an opening for gratifying supposed ambitions; and all parties saw that even without overt act by the United States the progress of American settlement seemed likely to gain them the province, whose connexion with Mexico had long been a notoriously loose one. A considerable literature written by travellers of all the countries named had before this discussed all interests. In 1840 for too active interest in politics some Americans and Englishmen were temporarily expelled.

American and European intrigues.

In 1842 Commodore T. A. C. Jones (1789–1858) of the United States navy, believing that war had broken out between his country and Mexico and that a British force was about to seize California, raised the American flag over Monterey (October 21st), but finding that he had acted on misinformation he lowered the flag next day with due ceremony and warm apology. In California this incident served only to open up agreeable personal relations and social courtesies, but it did not tend to clarify the diplomatic atmosphere. It showed the ease of seizing the country, the indifference of the natives, and the resolution of the United States government. Mexico sought to prevent American immigration, but the local authorities would not enforce such orders, however positive. Between 1843 and 1845, Great Britain, the United States, and France opened consulates. By 1845 there was certainly an agreement in opinion among all American residents (then not 700 in number) as regards the future of the country. The policy of France and Great Britain in these years is unknown. That of the United States is fully known. In 1845 the American consul at Monterey, Thomas O. Larkin (1802–1858), was instructed to work for the secession of California from Mexico, without overt aid from the United States, but with their good-will and sympathy. He very soon gained from leading officers assurances of such a movement before 1848. At the same time American naval officers were instructed to occupy the ports in case of war with Mexico, but first and last to work for the good-will of the natives. In 1845 Captain J. C. Frémont,—whose doings in California in the next two years were to be the main assets in a life-long reputation and an unsuccessful presidential campaign,—while engaged in a government surveying expedition, aroused the apprehensions of the Californian authorities by suspicious and very possibly intentionally provocative movements, and there was a show of military force by both parties. Frémont had information beyond that of ordinary men that made him believe early hostilities between the United States and Mexico to be inevitable; he was also officially informed of Larkin's secret task and in no way authorized to hamper it. Resentment, however, incited him to personal revenge on the Californian government, and an ambition that clearly saw the gravity of the crisis prompted him to improve it unscrupulously for his own advancement, leaving his government to support or disavow him according as war should come or not. In violation therefore of international amities, and practically in disobedience of orders, he broke the peace, caused a band of Mexican cavalry mounts to be seized, and prompted some American settlers to occupy Sonoma (14th June 1846). This episode is known as the "Bear Flag War," inasmuch as there was short-lived talk of making California an independent state, and a flag with a bear as an emblem (California is still popularly known as the Bear Flag State) flew for a few days at Sonoma. It was a very small, very disingenuous, inevitably an anomalous, and in the vanity of proclamations and other concomitant incidents rather a ridiculous affair; and fortunately for the dignity of history—and for Frémont—it was quickly merged in a larger question, when Commodore John Drake Sloat (1780–1867) on the 7th of July raised the flag of the United States over Monterey, proclaiming California a part of the United States. The opening hostilities of the Mexican War had occurred on the Rio Grande. The excuses and explanations later given by Frémont—military preparations by the Californian authorities, the imminence of their attack, ripening British schemes for the seizure of the province, etc.—made up the stock account of historians until the whole truth came out in 1886 (in Royce's *California*). Californians had been very friendly to Americans, but Larkin's intimates thought they had been tricked, and the people resented the stealthy and unprovoked breaking of peace, and unfortunately the Americans did not known how to treat them except inconsiderately and somewhat contemptuously. The result was a feeble rising in the south. The country was fully pacified by January 1847. The aftermath of Frémont's filibustering acts, followed as they were

The "Bear Flag."

by wholly needless hostilities and by some injustice then and later in the attitude of Americans toward the natives, was a growing misunderstanding, and estrangement regrettable in Californian history. Thus there was an end to the "lotos-land society" of California. Another society, less hospitable, less happy, less contented, but also less mild, better tempered for building states, and more "progressive," took the place of the old.

California ceded to the United States.

By the treaty of Guadelupe Hidalgo in 1848 Mexico ceded California to the United States. It was just at this time that gold was discovered, and the new territory took on great national importance. The discussion as to what should be done with it began in Congress in 1846, immediately involving the question of slavery. A furious conflict developed, so that nothing was accomplished in two successive sessions; even at the end of a third, in March 1849, the only progress made toward creating a government for the territory was that the national revenue laws had been extended over it and San Francisco had been made a port of entry. Meanwhile conditions grew intolerable for the inhabitants. Before the end of the war Mexican laws not incompatible with United States laws were by international law supposed to be in force; but nobody knew what they were, and the uncertainties of vague and variable alcalde jurisdictions were increased when Americans began to be alcaldes and grafted English common-law principles, like the jury, on Californian practices. Never was a population more in need of clear laws than the motley Californian people of 1848–1849, yet they had none when, with peace, military rule and Mexican law technically ended. There was a curious extra-legal fusion of laws, a half-breed legal system, and no definite basis for either law or government. Even the acts and theories of the officials were very inconsistent. Early in 1849 temporary local governments were set up in various towns, and in September a convention framed a free-state constitution and applied for admission to the Union. On the 7th of September 1850 a bill finally passed Congress admitting California as a free state. This was one of the bargains in the "Compromise Measures of 1850" that were intended to dispose of the question of slavery in the Territories. Meanwhile the gold discoveries culminated and surpassed "three centuries of wild talk about gold in California." For three months there was little excitement, then a wild rush. Settlements were completely deserted; homes, farms and stores abandoned. Ships deserted by their sailors crowded the bay at San Francisco —there were 500 of them in July 1850; soldiers deserted wholesale, churches were emptied, town councils ceased to sit, merchants, clerks, lawyers and judges and criminals, everybody, flocked to the foothills. Soon, from Hawaii, Oregon and Sonora, from the Eastern states, the South Seas, Australia, South America and China came an extraordinary flow of the hopeful and adventurous. In the winter of '48 the rush began from the states to Panama, and in the spring across the plains. It is estimated that 80,000 men reached the coast in 1849, about half of them coming overland; three-fourths were Americans. Rapid settlement, excessive prices, reckless waste of money, and wild commercial ventures that glutted San Francisco with all objects usable and unusable made the following years astounding from an economic point of view; but not less bizarre was the social development, nor less extraordinary the problems of state-building in a society "morally and socially tried as no other American community ever has been tried" (Royce). There was of course no home life in early California. In 1850 women numbered 8% of the population, but only 2% in the mining counties. The miners were an energetic, covetous, wandering, abnormally excitable body of men. Occasionally a kind of frenzy even would seem to seize on them, and lured by the hope of new deposits of unheard-of richness thousands would flock on unfounded rumours to new and perhaps distant localities, where many might perish from disease and starvation, the rest returning in poverty and rags. Such were the Kern River fever of 1855 and the greater "Fraser River rush" of 1858, the latter, which took perhaps 20,000 men out of the state, causing a terrible amount of suffering. Many interior towns lost half their population and some virtually all their population as a result of this emigration; and it precipitated a real estate crash in San Francisco that threatened temporary ruin. Mining times in California brought out some of the most ignoble and some of the best traits of American character. Professor Josiah Royce has pictured the social-moral process by which society finally impressed its "claims on wayward and blind individuals" who "sought wealth and not a social order," and so long as possible shirked all social obligations. Through varied instruments—lynch law, popular courts, vigilance committees—order was, however, enforced, better as times went on, until there was a stable condition of things. In the economic life and social character of California to-day the legacies of 1848 are plain.

The rush for gold.

The slavery question was not settled for California in 1850. Until the Civil War the division between the Whig and Democratic parties, whose organization in California preceded statehood, was essentially based on slavery. The struggle fused with the personal contests of two men, rivals for the United States Senate, William McKendree Gwin (1805–1885, United States senator, 1850–1861), the leader of the pro-slavery party, and David Colbreth Broderick (1819–1859), formerly a leader of Tammany in New York, and after 1857 a member from California of the United States Senate, the champion of free labour, who declared in 1860 for the policy of the Republican party. Broderick's undoing was resolved upon by the slavery party, and he was killed in a duel. The Gwin party hoped to divide California into two states and hand the southern over to slavery; on the eve of the Civil War it considered the scheme of a Pacific coast republic. The decade 1850–1860 was also marked by the activity of filibusters against Sonora and Central America. Two of these—one a French adventurer, Gaston Raoux, comte de Raousset-Boulbon (1817–1854), and William Walker, had very picturesque careers. The state was thoroughly loyal when war came. The later 'fifties are characterized by H.H.Bancroft as a period of "moral, political and financial night." National politics were put first, to the complete ignoring of excessive taxation, financial extravagance, ignorant legislation and corruption in California. The public was exploited for many years with impunity for the benefit of private interests. One legacy that ought to be briefly noted here is that of disputed land grants. Under the Mexican régime such grants were generous and common, and the complicated formalities theoretically essential to their validity were very often, if not usually, only in part attended to. Titles thus gained would never have been questioned under continued Mexican government, but Americans were unaccustomed to such riches in land and to such laxity. From the very first hundreds "squatted" on large claims, contesting the title. Instead of confirming all claims existing when the country passed to the United States, and so ensuring an immediate settlement of the matter, which was really the most important thing for the peace and purse of the community, the United States government undertook through a land commission and courts to sift the valid from the fraudulent. Claims of enormous aggregate value were thus considered and a large part of those dating from the last years of Mexican dominion (many probably artfully concocted and fraudulently antedated after the commission was at work) were finally rejected. This litigation filled the state and federal courts for many years. The high value of realty in San Francisco naturally offered extraordinary inducements to fraud, and the largest part of the city was for years involved in fraudulent claims, and its peace broken by "squatter"-troubles. Twenty or thirty years of the state's life were disturbed by these controversies. Land monopoly is an evil of large proportions in California to-day, but it is due to the laxness of the United States government in enabling speculators to accumulate holdings and not to the original extent of Mexican grants.

Disputed land grants.

In state gubernatorial elections after the Civil War the Democrats won in 1867, 1875, 1882, 1886, 1894; the Republicans in 1871, 1879, 1890, 1898, 1902. The leading features of political life and of legislation after 1876 were a strong labour agitation,

the struggle for the exclusion of the Chinese, for the control of hydraulic mining, irrigation, and the advancement by state-aid of the fruit interests; the last three of which have already been referred to above. Labour conditions were peculiar in the period following 1870. Mining, war times and the building of the Central Pacific had up to then inflated prices and prosperity. Then there came a slump; probably the truth was rather that money was becoming less unnaturally abundant than that there was any over-supply of labour. The turning off of some 15,000 Chinese (principally in 1869–1870) from the Central Pacific lines who flocked to San Francisco, augmented the discontent of incompetents, of disappointed late immigrants, and the reaction from flush times. Labour unions became strong and demonstrative. In 1877–1878 Denis Kearney (1847–1907), an Irish drayman and demagogue of considerable force and daring, headed the discontented. This is called the "sand-lots agitation" from the favourite meeting-place (in San Francisco) of the agitators.

The outcome of these years was the Constitution of 1879, already described, and the exclusion of Chinese by national law. In 1879 California voted against further immigration of Chinese by 154,638 to 883. Congress re-enacted exclusion legislation in 1902. All authorities agree that the Chinese in early years were often abused in the mining country and their rights most unjustly neglected by the law and its officers. Men among the most respected in California (Joaquin Miller, H. H. Bancroft and others) have said most in praise and defence of the Chinaman. From railroad making to cooking he has proved his abilities and trustworthiness. He is found to-day in the mines and fisheries, in various lines of manufacture, in small farming, and in all branches of domestic service. The question of the economic development of the state, and of trade to the Orient, the views of the mercenary labour-contractor and of the philanthropist, the factor of "upper-race" repugnance, the "economic-leech" argument, the "rat-rice-filth-and-opium" argument, have all entered into the problem. Certain it is that though the unprejudiced must admit that exclusion has not been at all an unmixed blessing, yet the consensus of opinion is that a large population, non-citizen and non-assimilable, sending—it is said—most of their earnings to China, living in the main meanly at best, and practically without wives, children or homes, is socially and economically a menace outweighing the undoubted convenience of cheaper (and frequently more trustworthy) menial labour than the other population affords. The exclusion had much to do with making the huge single crop ranches unprofitable and in leading to their replacement by small farms and varied crops. Many of the Chinese now in the state are wealthy. Race feeling against them has become much less marked.

One outcome of early mission history, the "Pious Fund of the Californias," claimed in 1902 the attention of the Hague Tribunal. (See ARBITRATION, INTERNATIONAL, Hague cases section.) In 1906–1907 there was throughout the state a remarkable anti-Japanese agitation, centring in San Francisco (*q.v.*) and affecting international relations and national politics.

GOVERNORS OF CALIFORNIA (State) [1]

I. SPANISH

Gasper de Portolá	served	1767–1770
Filipe de Barri	,,	1771–1774
Felipe de Neve	,,	1774–1782
Pedro Fages	,,	1782–1791
José Antonio Romeu	,,	1791–1792
*José Joaquin de Arillaga	,,	1792–1794
Diego de Borica	,,	1794–1800
*José Joaquin de Arillaga	,,	1800–1804
José Joaquin de Arillaga	,,	1804–1814
*José Diario Arguello	,,	1814–1815
Pablo Vicente de Sola	,,	1815–1822

II. MEXICAN

Pablo Vicente de Sola	served	1822
*Luis Antonio Arguello	,,	1822–1825
José Maria Echeandía	,,	1825–1831
Manuel Victoria	,,	1831
José Maria Echeandía [2]	,,	1831–1832
Pio Pico [3]	,,	1832
José Figueroa	,,	1832–1835
*José Castro	,,	1835–1836
*Nicolas Gutierrez	,,	1836
Mariano Chico	,,	1836
Nicolas Gutierrez	,,	1836
Juan Bautista Alvarado [4]	,,	1836–1842
Carlos Antonio Carrillo [5]	,,	1837–1838
Manuel Micheltorena	,,	1842–1845
Pio Pico	,,	1845–1846

III. AMERICAN

(a) *Military.*

John D. Sloat	appointed	1846
Richard F. Stockton	,,	1846–1847
Stephen W. Kearney	,,	1847
R. B. Mason	,,	1847–1849
Bennett Riley	,,	1849

(b) *State.*

Peter H. Burnett	1849–1851		Democrat
*John H. McDougall	1851–1852		,,
John Bigler	1852–1856		,,
John M. Johnson	1856–1858		Know Nothing
John B. Weller	1858–1860		Lecompton Democrat
Milton S. Latham	1860	(6 days)	,, ,,
*John G. Downey	1860–1862		,, ,,
Leland Stanford	1862–1863		Republican
Frederick G. Law	1863–1867		,,
Henry H. Haight	1867–1871		Democrat
Newton Booth	1871–1875		Republican
*Romualdo Pacheco	1875		,,
William Irwin	1875–1880		Democrat
George G. Perkins	1880–1883		Republican
George C. Stoneman	1883–1887		Democrat
Washington Bartlett	1887		,,
*Robert W. Waterman	1887–1891		Republican
Henry H. Markham	1891–1895		,,
James H. Budd	1895–1899		Democrat
Henry T. Gage	1899–1903		Republican
George C. Pardee	1903–1907		,,
James N. Gillett	1907		,,

The mark * before the name of one of the Spanish governors indicates that he acted only *ad interim*, and, in the case of governors since 1849, that the officer named was elected as lieutenant-governor and succeeded to the office of governor.

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[1] As months and even years often elapsed between the date when early governors were appointed and the beginning of their actual service, the date of commission is disregarded, and the date of service given. Sometimes this is to be regarded as beginning at Monterey, sometimes elsewhere in California, sometimes at Loreto in Lower California. All the Spanish and Mexican governors were appointed by the national government, except in the case of the semi-revolutionary rulers of 1831–1832 and 1836 (Alvarado), whose title rested on revolution, or on local choice under a national statute regarding gubernatorial vacancies.

[2] Acting political chief, revolutionary title.

[3] Briefly recognized in South.

[4] Revolutionary title, 1836–1838.

[5] Appointed 1837, never recognized in the North.

United States Censuses, reports on forests; *United States Biological Survey, North American Fauna*, No. 16, 1899, C. H. Merriam, "Biological Survey of Mt. Shasta"; *United States Department Agriculture, Contributions from United States National Herbarium*, iv., 1893, F. V. Colville, "Botany of Death Valley Expedition"; *State Board of Fish Commissioners, Reports*, from 1887; *United States Fish Commissioners, Annual Reports*, from 1871, and *Bulletins* from 1882; J. le Conte, "Flora of the Coast Islands" (1887), being *Bulletin* No. 8 of California Academy of Sciences; consult also its *Proceedings, Memoirs*, and *Occasional Papers*; G. J. Peirce, *Studies on the Coast Redwood* (publication of Leland Stanford jr. University, 1901).

AGRICULTURE.—*California Agricultural Experiment Station, Bulletins* from 1884; *Reports of the State Dairy Bureau*, from 1898; *State Board of Horticulture, Reports*, 1889–1894; *United States Censuses*, 1890 and 1900, reports on irrigation.

INDUSTRIES.—J. S. Hittell, *Resources of California* (7th ed., San Francisco, 1879); J. S. Hittell, *Commerce and Industries of the Pacific Coast* (San Francisco, 1882); T. F. Cronise, *Natural Wealth of California* (San Francisco, 1868); E. W. Maslin, *Resources of California*, prepared by order of Governor H. H. Markham (Sacramento, 1893); *United States Treasury, Bureau of Statistics*, report by T. J. Vivian on "Commercial, Industrial, Agricultural, Transportation and Other Industries of California" (Washington 1890, valuable for whole period before 1890); *United States Censuses*, 1890 and 1900, reports on agriculture, manufactures, mines and fisheries; *California State Board of Trade* (San Francisco), *Annual Report* from 1890. On Mineral Industries:—J. R. Browne, Report on "Mineral Resources of the States and Territories west of the Rocky Mountains" (*United States Treasury*, 2 vols., Washington, 1867–1868); *United States Geological Survey, Annual Reports, Mineral Resources;* consult also the bibliographies of publications of the *Survey*, issued as *Bulletins; California State Mining Bureau, Bulletins* from 1888, note especially No. 30, 1904, by A. W. Vodges, "Bibliography relating to the Geology, Palaeontology and Mineral Resources of California" (2nd ed., the 1st being *Bulletin* No. 10, 1896); *California Débris Commission, Reports* (in *Annual Reports Chief of Engineers, United States Army*, from 1893).

GOVERNMENT.—E. F. Treadwell, *The Constitution of the State of California . . . Annotated* (San Francisco, 1902); *Johns Hopkins University, Studies in History and Political Science*, xiii., R. D. Hunt, "Genesis of California's First Constitution"; *Annals of the American Academy of Political and Social Science*, xii., R. D. Hunt, "Legal Status of California, 1846–1849"; Reports of the various officers, departments and administrative boards of the state government (Sacramento), and also the *Appendix to the Journals of the Senate and Assembly*, which contains, especially in the earlier decades of the state's history, many of these state official reports along with valuable legislative reports of varied character.

HISTORY.—Accounts of the valuable archives in Bancroft, and by Z. E. Eldridge in *California Genealogical Society* (1901); elaborate bibliographies in Bancroft with analyses and appreciations of many works. Of general scope and fundamental importance is the work of two men, Hubert H. Bancroft and Theodore H. Hittell. The former has published a *History of California, 1542–1890* (7 vols., San Francisco, 1884–1890), also *California Pastoral, 1769–1848* (San Francisco, 1888), *California Inter-Pocula, 1848–1856* (San Francisco, 1888), and *Popular Tribunals* (2 vols., San Francisco, 1887). These volumes were largely written under Mr. Bancroft's direction and control by an office staff, and are of very unequal value; they are a vast storehouse of detailed material which is of great usefulness, although their judgments of men are often inadequate and prejudiced. As regards events the histories are of substantial accuracy and adequacy. Written by one hand and more uniform in treatment and good judgment, is T. H. Hittell's *History of California* (4 vols., San Francisco, 1885–1897). The older historian of the state was Francisco Palou, a Franciscan, the friend and biographer of Serra; his "Noticias de la Nueva California" (Mexico, 1857, in the *Doc. Hist. Mex.*, ser. iv., tom. vi.-viii.; also San Francisco, 1874, 4 vols.) is no longer of importance save for its historical interest. Of the contemporary material on the period of Mexican domination the best is afforded by R. H. Dana's *Two Years Before the Mast* (New York, 1840, many later and foreign editions); also A. Robinson, *Life in California* (New York, 1846); and Alexander Forbes, *California: A History of Upper and Lower California from their First Discovery to the Present Time* (London, 1839); see also F. W. Blackmar, "Spanish Institutions of the Southwest" (*Johns Hopkins University Studies*, 1891). A beautiful, vivid and reputedly very accurate picture of the old society is given in Helen Hunt Jackson's novel, *Ramona* (New York, 1884). There is no really scientific separate account of mission history; there are books by Father Z. Engelhart, *The Franciscans in California* (Harbor Springs, Michigan, 1899), written entirely from a Franciscan standpoint; C. F. Carter, *Missions of Nueva California* (San Francisco, 1900); Bryan J. Clinch, *California and its Missions: Their History to the Treaty of Guadalupe Hidalgo* (2 vols., San Francisco, 1904); Francisco Palou, *Relacion Historica de la Vida . . . del Fray Junipero Serra* (Mexico, 1787), the standard contemporary source; the *Craftsman* (Syracuse, N. Y., vol. v.), a series of articles on "Mission Buildings," by G. W. James. On the case of the Pious Fund of the missions see J. F. Doyle, *History of the Pious Fund* (San Francisco, 1887); *United States Department of State*," United States *v.* Mexico. Report of J. H. Ralston, agent of the United States and of counsel in the matter of the Pious Fund of the Californias" (Washington, 1902). On the "flush" mining years the best books of the time are J. Q. Thornton's *Oregon and California* (2 vols., New York, 1849); Edward Bryant's *What I Saw in California* (New York, 1848); W. Shaw's *Golden Dreams* (London, 1851); Bayard Taylor's *Eldorado* (2 vols., New York, 1850); W. Colton's *Three Years in California* (New York, 1850); E. G. Buffum's *Six Months in the Gold Mines; from a Journal of Three Years' Residence in Upper and Lower California* (London, 1850); J. T. Brooks' *Four Months among the Gold Finders* (London, 1849); G. G. Foster, *Gold Regions of California* (New York, 1884). On this same period consult Bancroft's *Popular Tribunals*; D. Y. Thomas, "A History of Military Government in Newly Acquired Territory of the United States," in vol. xx. No. 2 (New York, 1904) of *Columbia University Studies in History, Economics, and Public Law*; C. H. Shinn's *Mining Camps: A Study in American Frontier Government* (New York, 1885); J. Royce, *California . . . A Study of American Character, 1846–1856* (Boston, 1886); and, for varied pictures of mining and frontier life, the novels and sketches and poems of Bret Harte. See also P. H. Burnet, *Recollections and Opinions of an Old Pioneer* (New York, 1880); S. J. Field, *Personal Reminiscences of Early Days in California* (privately published, copyright 1893).

CALIFORNIA, LOWER (*Baja California*), a long narrow peninsula between the Gulf of California and the Pacific Ocean, forming a territory of the republic of Mexico. Pop. (1895), 42,245; (1900) 47,624. Lower California is a southward extension of the State of California, United States, and is touched by only one of the Mexican states, that of Sonora on the E. The peninsula is about 760 m. long and from 30 to 150 m. wide, and has an area of 58,328 sq m. It is traversed throughout its entire length by an irregular range of barren mountains, which slopes toward the Pacific in a succession of low hills, but breaks down abruptly toward the Gulf. The coast has two or three good sheltered bays, that of La Paz on the Gulf side and of Magdalena on the Pacific side being best known. The coast is bordered by numerous islands, especially on the eastern side. The general appearance of the surface is arid and desolate, partly because of the volcanic remains, and partly because of the scanty rainfall, which is insufficient to support vegetation other than that of the desert except in the deeper mountain valleys. The northern part is hot and dry, like southern California, but the southern part receives more rain and has some fertile tracts, with a mild and pleasant climate. The principal natural product in this region is *orchil*, or Spanish moss, but by means of irrigation the soil produces a considerable variety of products, including sugar cane, cotton, cassava, cereals, tobacco and grapes. Horses, sheep and cattle are raised in the fertile valleys, but only to a limited extent. The territory is rich in minerals, among which are gold, silver, copper, lead, gypsum, coal and salt. The silver mines near La Paz were worked by the Jesuits as early as 1700. There are also extensive pearl fisheries in the Gulf, La Paz being the headquarters of the industry, and whale fisheries on the W. coast in the vicinity of Magdalena Bay. The development of mining and other industries in the territory has led to an extension of the California railway system southward into the peninsula, with the Mexican government's permission, the first section of 37 m. from the northern frontier being completed and opened to traffic in 1907. The territory is divided into two districts, the northern having its capital at the insignificant little village of La Ensenada, on Todos Santos Bay, and the southern having its capital at La Paz, at the head of a deep bay opening into the Gulf. La Paz is a port of call for steamships running between Mazatlan and San Francisco, and had a population of 5056 in 1900. La Ensenada (pop. in 1906, about 1500), 65 m. by sea S. of San Diego, Cal., is the only port for the northern part of the territory, and supplies a district extending 250 m. along the coast and 60 m. inland, including the mining camps of the north; it manufactures and exports flour and leather.

By orders of Cortés the coast of Lower California was explored in 1539 by Francisco de Ulloa, but no settlement resulted. It was called California, the name (according to E. E. Hale) being derived from a popular Spanish romance of that time, entitled *Sergas de Esplandian*, in which an island named California was mentioned and situated "on the right hand of the Indies, very

near the terrestrial paradise." The name must have been given derisively, as the barren coasts of Lower California could not have suggested the proximity of a "terrestrial paradise." The exploration of the coast did not extend above the peninsula until 1842. The name California was at first applied exclusively to the peninsula; later, on the supposition that a strait connected the Pacific with the head of the Gulf of California, the name Islas Californias was frequently used. This erroneous theory was held as late as 1721. The first settlement was made in 1597, but was abandoned. From 1633 to 1683 five unsuccessful attempts were made to establish a settlement at La Paz. Finally the Jesuits succeeded in founding a mission at Loreto on the Gulf course, in about 26° N. lat., in 1697, and at La Paz in 1720. At the time of their expulsion (1767) they had sixteen missions which were either self-supporting or were maintained by funds invested for that special purpose. The settlement of Upper California began in 1769, after which the two provinces were distinguished as California Baja or Antigua, and California Alta, the seat of government remaining in the former for a short time. The two provinces were separated in 1804, were united under one governor residing in California Alta in 1825, and were then reunited in a single department through the political changes of 1836, which lasted no later than 1847. Lower California was only slightly disturbed by the struggle for independence among the Spanish-American colonies, but in 1822 Admiral Lord Cochrane, who was in the service of the Chilean revolutionists, appeared on the coast and plundered San José del Cabo, Todos Santos and Loreto. In the war between Mexico and the United States La Paz and other coast towns were occupied by small detachments from California. In 1853 a filibustering expedition against Sonora under William Walker took possession of La Paz and proclaimed a republic consisting of Sonora and the peninsula. Fearing an attack from the mainland, the filibusters first withdrew to La Ensenada, near the American frontier, and then in the following year broke up altogether during an attempt to invade Sonora by land. A revolution under the leadership of Marquez de Leon in 1879 met with some temporary success, but died for want of material support in 1880. The development of mining and other industries since that time, together with vigorous efforts to found colonies in the more favoured localities, have greatly improved the situation in the territory.

See the two volumes of H. H. Bancroft's *North Mexican States and Texas*, lettered vols. 15 and 16 of his *Works*; also Arthur Walbridge North, *The Mother of California* (San Francisco, 1908).

CALIFORNIA, UNIVERSITY OF, one of the largest and most important of state universities in America, situated at Berkeley, California, on the E. shore of San Francisco Bay. It took the place of the College of California (founded in 1855), received California's portion of the Federal land grant of 1862, was chartered as a state institution by the legislature in 1868, and opened its doors in 1869 at Oakland. In 1873 it was removed to its present site. In the revised state constitution of 1879 provision is made for it as the head of the state's educational system. The grounds at Berkeley cover 270 acres on the lower slopes (299–900 ft.) of the Berkeley Hills, which rise 1000 ft. or more above the university; the view over the bay to San Francisco and the Golden Gate is superb. In recent years new and better buildings have gradually been provided. In 1896 an international architectural competition was opened at the expense of Mrs Phoebe R. Hearst (made a regent of the university in 1898) for plans for a group of buildings harmonizing with the university's beautiful site, and ignoring all 'buildings already existing. The first prize was awarded in 1899 to Emile Bénard, of Paris. The first building begun under the new plans was that for the college of mines (the gift of Mrs Hearst), completed in 1907, providing worthily for the important school of mining, from 1885 directed by Prof. S. B. Christy (b. 1853); California Hall, built by state appropriation, had been completed in 1906. The Greek theatre (1903), an open-air auditorium seating 7500 spectators, on a hill-side in a grove of towering eucalypts, was the gift of William Randolph Hearst; this has been used regularly for concerts by the university's symphony orchestra, under the professor of music, John Frederick Wolle (b. 1863), who originated the Bach Festivals at Bethlehem, Pa.; free public concerts are given on Sunday afternoons; and there have been some remarkable dramatic performances here, notably Sudraka's *Mricchakattika* in English, and Aeschylus's *Eumenides* in Greek, in April 1907. There are no dormitories. Student self-government works through the "Undergraduate Students' Affairs Committee" of the Associated Students. The faculty of the university has its own social club, with a handsome building on the grounds. At Berkeley is carried on the work in the colleges of letters, social sciences, natural sciences, commerce, agriculture, mechanical, mining and civil engineering, and chemistry, and the first two years' course of the college of medicine—the Toland Medical College having been absorbed by the university in 1873; at Mount Hamilton, the work of the Lick astronomical department; and in San Francisco, that of dentistry (1888), pharmacy, law, art, and the concluding (post graduate or clinical) years of the medical course—the San Francisco Polyclinic having become a part of the university in 1892. Three of the San Francisco departments occupy a group of three handsome buildings in the western part of the city, overlooking Golden Gate Park. The Lick astronomical department (Lick Observatory) on Mount Hamilton, near San José, occupies a site covering 2777 acres. It was founded in 1875 by James Lick of San Francisco, and was endowed by him with $700,000, $610,000 of this being used for the original buildings and equipments, which were formally transferred to the university in 1888. The art department (San Francisco Institute of art) was until 1906 housed in the former home of Mark Hopkins, a San Francisco "railroad king"; it dated from 1893, under the name "Mark Hopkins Institute of Art." The building was destroyed in the San Francisco conflagration of 1906; but under its present name the department resumed work in 1907 on the old site. At the university farm, of nearly 750 acres, at Davisville, Yolo county, instruction is given in practical agriculture, horticulture, dairying, &c.; courses in irrigation are given at Berkeley; a laboratory of plant pathology, established in 1907 at Whittier, Riverside county, and an experiment station on 20 acres of land near Riverside, are for the study of plant and tree diseases and pests and of their remedies. A marine biological laboratory is maintained at La Jolla, near San Diego, and another, the Hertzstein Research Laboratory, at New Monterey; the Rudolph Spreckels Physiological Laboratory is in Berkeley. The university has excellent anthropological and archaeological collections, mostly made by university expeditions, endowed by Mrs Hearst, to Peru and to Egypt. In 1907 the university library contained 160,000 volumes, ranking, after the destruction of most of the San Francisco libraries in 1906, as the largest collection in the vicinity. The building of the Doe library (given by the will of Charles Franklin Doe), for the housing of the university library, was begun in 1907. The university has also the valuable Bancroft collection of 50,000 volumes and countless pamphlets and manuscripts, dealing principally with the history of the Pacific Coast from Alaska through Central America, and of the Rocky Mountain region, including Montana, Utah, Wyoming, Colorado, Arizona, New Mexico and Western Texas. This collection (that of the historian Hubert Howe Bancroft) was acquired in 1905 for $250,000 (of which Mr Bancroft contributed $100,000), and was entrusted (1907) to the newly organized Academy of Pacific Coast History. The library of Karl Weinhold (1823–1901) of Berlin, which is especially rich in Germanic linguistics and "culture history," was presented to the university in 1903 by John D. Spreckels. The university publishes *The University of California Chronicle*, an *Official Record*; and there are important departmental publications, especially those in American archaeology and ethnology, edited by Frederic Ward Putnam (b. 1839), including the reports of various expeditions, maintained by Mrs Hearst; in physiology, edited by Jacques Loeb (b. 1859); in botany, edited by William Albert Setchell (b. 1864); in zoology, edited by William Emerson Ritter (b. 1859); and in astronomy, the publications of the Lick Observatory, edited by William Wallace

Campbell (b. 1862). In 1902, under the direction of Henry Morse Stephens (b. 1857), who then became professor of history, a department of university extension was organized; lecture courses, especially on history and literature, were delivered in 1906–1907 at fifteen extension "centres," at most of which classes of study were formed. Annexes to the university, but having no corporate connexion with it, are the Berkeley Bible Seminary (Disciples of Christ), the Pacific Theological Seminary (Congregational), the Pacific Coast Baptist Seminary and a Unitarian school.

The growth of the university has been extremely rapid. From 1890 to 1900 the number of students increased fourfold. In the latter year the university of California was second to Harvard only in the number of academic graduate and undergraduate students, and fifth among the educational institutions of the country in total enrolment. In July 1907 there were 519 officers in the faculties and 2987 students, of whom 226 were in the professional schools in San Francisco. In addition there were 707 students in the 1906 summer session, the total for 1906–1907 thus being 3684; of this number 1506 were women. The university conferred 482 degrees in 1907, 546 in 1906, 470 in 1905. The affairs of the university are administered by a board of twenty-three regents, seven state officials and heads of educational institutions, being members *ex officio*, and sixteen other members being appointed by the governor and senate of the state; its instruction is governed by the faculties of the different colleges, and an academic senate in which these are joined. The gross income from all sources for 1905–1906 was $1,564,190, of which about $800,000 was income from investments, state and government grants, fees, &c., and the remainder was gifts and endowments. There is a permanent endowment of more than $3,000,000, partly from munificent private gifts, especially from Mrs Hearst and from Miss Cora Jean Flood. The financial support of the state has always been generous. No tuition fee is charged in the academic colleges to students resident in the state, and only $10.00 annually to students from without the state. The university maintains about 90 undergraduate scholarships, and 10 graduate scholarships and fellowships. All able-bodied male students are required to take the courses in military science, under instruction by an officer of the United States army detailed for the purpose. Physical culture and hygiene are prescribed for all men and women. A state law forbids the sale of liquor within one mile of the university grounds. To realize the ideal of the university as the head of the educational system of the state, a system of inspection of high schools has been developed, whereby schools reaching the prescribed standard are entitled to recommend their graduates for admission to the university without examination. It was anticipated at one time that the foundation of the Leland Stanford Junior University at Palo Alto would injure the state institution at Berkeley; but in practice this was not found to be the case; on the contrary, the competition resulted in giving new vigour and enterprise to the older university. Joseph Le Conte (professor from 1872 to 1901) and Daniel C. Gilman (president in 1872–1875) deserve mention among those formerly connected with the university. In 1899 Benjamin Ide Wheeler (b. 1854) became president. He had been a graduate (1875) of Brown University, and was professor first of comparative philology and then of Greek at Cornell University; his chief publications are *Der griechische Nominalaccent* (1885); *Analogy, in its Scope of Application in Language* (1887); *Principles of Language Growth* (1891); *The Organization of Higher Education in the United States* (1897); *Dionysos and Immortality* (1899); and *Life of Alexander the Great* (1900).

CALIPASH and **CALIPEE** (possibly connected with *carapace*, the upper shell of a turtle), the gelatinous substances in the upper and lower shells, respectively, of the turtle, the calipash being of a dull greenish and the calipee of a light yellow colour.

CALIPH, Calif, or Khalif (Arab. *khālifa*; the lengthening of the ā is strictly incorrect), literally "successor," "representative," a title borne originally by Abu Bekr, who, on the death of Mahomet, became the civil and religious head of the Mahommedan state. In the same sense the term is used in the Koran of both Adam and David as the vicegerents of God. Abu Bekr and his three (or four) immediate successors are known as the "perfect" caliphs; after them the title was borne by the thirteen Omayyad caliphs of Damascus, and subsequently by the thirty-seven Abbasid caliphs of Bagdad whose dynasty fell before the Turks in 1258. By some rigid Moslems these rulers were regarded as only amirs, not caliphs. There were titular caliphs of Abbasid descent in Egypt from that date till 1517 when the last caliph was captured by Selim I. On the fall of the Omayyad dynasty at Damascus, the title was assumed by the Spanish branch of the family who ruled in Spain at Cordova (755–1031), and the Fatimite rulers of Egypt, who pretended to descent from Ali, and Fatima, Mahomet's daughter, also assumed the name (see Fatimites).

According to the Shi'ite Moslems, who call the office the "imamate" or leadership, no caliph is legitimate unless he is a lineal descendant of the Prophet. The Sunnites insist that the office belongs to the tribe of Koreish (Quraish) to which Mahomet himself belonged, but this condition would vitiate the claim of the Turkish sultans, who have held the office since its transference by the last caliph to Selim I. According to a tradition falsely ascribed to Mahomet, there can be but one caliph at a time; should a second be set up, he must be killed, for he "is a rebel." (See Mahommedan Institutions.)

CALIPHATE.[1] The history of the Mahommedan rulers in the East who bore the title of caliph (*q.v.*) falls naturally into three main divisions:—(*a*) The first four caliphs, the immediate successors of Mahomet; (*b*) The Omayyad caliphs; (*c*) The Abbasid caliphs. To these three groups the present article is confined; for the Western caliphs, see Spain: *History* (and minor articles such as Almohades, Almoravides); for the Egyptian caliphs see Egypt: *History* (§ Mahommedan) and Fatimites. The history of Arabia proper will be found under Arabia: *History*.

A.—The First Four Caliphs

After the death of Mahomet the question arose who was to be his "representative." The choice lay with the community of Medina; so much was understood; but whom were they to choose? The natives of Medina believed themselves to be now once more masters in their own house, and wished to promote one of themselves. But the Emigrants (see Mahomet) asserted their opposing claims, and with success, having brought into the town a considerable number of outside Moslems, so as to terrorize the men of Medina, who besides were still divided into two parties. The Emigrants' leading spirit was Omar; he did not, however, cause homage to be paid to himself, but to Abu Bekr, the friend and father-in-law of the Prophet.

The affair would not have gone on so smoothly, had not the opportune defection of the Arabians put a stop to the inward schism which threatened. Islam suddenly found itself once more limited to the community of Medina; only Mecca and Ṭāif (Ṭāyef) remained true. The Bedouins were willing enough to pray, indeed, but less willing to pay taxes; their defection, as might have been expected, was a political movement.[2] None the less was it a revolt from Islam, for here the political society and the religious are identical. A peculiar compliment to Mahomet was involved in the fact that the leaders of the rebellion in the various districts did not pose as princes and kings, but as prophets; in this appeared to lie the secret of Islam's success.

1. *Reign of Abu Bekr.*—Abu Bekr proved himself quite equal to the perilous situation. In the first place, he allowed the expedition against the Greeks, already arranged by Mahomet, quietly to set out, limiting himself for the time to the defence of Medina. On the return of the army he proceeded to attack

[1] Throughout this article, well-known names of persons and places appear in their most familiar forms, generally without accents or other diacritical signs. For the sake of homogeneity the articles on these persons or places are also given under these forms, but in such cases, the exact forms, according to the system of transliteration adopted, are there given in addition.

[2] See Nöldeke, *Beiträge zur Kenntniss der Poesie der alten Araber* (1864), pp. 89 seq.

the rebels. The holy spirit of Islam kept the men of Medina together, and inspired in them an all-absorbing zeal for the faith; the Arabs as a whole had no other bond of union and no better source of inspiration than individual interest. As was to be expected, they were worsted; eleven small flying columns of the Moslems, sent out in various directions, sufficed to quell the revolt. Those who submitted were forthwith received back into favour; those who persevered in rebellion were punished with death. The majority accordingly converted, the obstinate were extirpated. In Yamama (Yemama) only was there a severe struggle; the Banū Ḥanīfa under their prophet Mosailima fought bravely, but here also Islam triumphed.

The internal consolidation of Islam in Arabia was, strange to say, brought about by its diffusion abroad. The holy war against the border countries which Mahomet had already inaugurated, was the best means for making the new religion popular among the Arabs, for opportunity was at the same time afforded for gaining rich booty. The movement was organized by Islam, but the masses were induced to join it by quite other than religious motives. Nor was this by any means the first occasion on which the Arabian cauldron had overflowed; once and again in former times emigrant swarms of Bedouins had settled on the borders of the wilderness. This had last happened in consequence of the events which destroyed the prosperity of the old Sabaean kingdom. At that time the small Arabian kingdoms of Ghassān and Hira had arisen in the western and eastern borderlands of cultivation; these now presented to Moslem conquest its nearest and natural goal. But inasmuch as Hira was subject to the Persians, and Eastern Palestine to the Greeks, the annexation of the Arabians involved the extension of the war beyond the limits of Arabia to a struggle with the two great powers (see further ARABIA: *History*).

After the subjugation of middle and north-eastern Arabia, Khālid b. al-Walīd proceeded by order of the caliph to the conquest of the districts on the lower Euphrates. Thence he was summoned to Syria, where hostilities had also broken out. Damascus fell late in the summer of 635, and on the 20th of August 636 was fought the great decisive battle on the Hieromax (Yarmuk), which caused the emperor Heraclius (*q.v.*) finally to abandon Syria.[1] Left to themselves, the Christians henceforward defended themselves only in isolated cases in the fortified cities; for the most part they witnessed the disappearance of the Byzantine power without regret. Meanwhile the war was also carried on against the Persians in Irak, unsuccessfully at first, until the tide turned at the battle of Kadisiya (Kadessia, Qādisīya) (end of 637). In consequence of the defeat which they here sustained, the Persians were forced to abandon the western portion of their empire and limit themselves to Iran proper. The Moslems made themselves masters of Ctesiphon (Madāin), the residence of the Sassanids on the Tigris, and conquered in the immediately following years the country of the two rivers. In 639 the armies of Syria and Irak were face to face in Mesopotamia. In a short time they had taken from the Aryans all the principal old Semitic lands—Palestine, Syria, Mesopotamia, Assyria and Babylonia. To these was soon added Egypt, which was overrun with little difficulty by ʿAmr ibn-el-Ass (*q.v.*) in 640. (See EGYPT: *History*, § Mahommedan.) This completed the circle of the lands bordering on the wilderness of Arabia; within these limits annexation was practicable and natural, a repetition indeed of what had often previously occurred. The kingdoms of Ghassan and Hira, advanced posts hitherto, now became the headquarters of the Arabs; the new empire had its centres on the one hand at Damascus, on the other hand at Kufa and Baṣra, the two newly-founded cities in the region of old Babylonia. The capital of Islam continued indeed for a while to be Medina, but soon the Hejaz (Hijaz) and the whole of Arabia proper lay quite on the outskirt of affairs.

The ease with which the native populations of the conquered districts, exclusively or prevailingly Christian, adapted themselves to the new rule is very striking. Their nationality had been broken long ago, but intrinsically it was more closely allied to the Arabian than to the Greek or Persian. Their religious sympathy with the West was seriously impaired by dogmatic controversies; from Islam they might at any rate hope for toleration, even though their views were not in accordance with the theology of the emperor of the day. The lapse of the masses from Christianity to Islam, however, which took place during the first century after the conquest, is to be accounted for only by the fact that in reality they had no inward relation to the gospel at all. They changed their creed merely to acquire the rights and privileges of Moslem citizens. In no case were they compelled to do so; indeed the Omayyad caliphs saw with displeasure the diminishing proceeds of the poll-tax derived from their Christian subjects (see MAHOMMEDAN INSTITUTIONS).

It would have been a great advantage for the solidity of the Arabian empire if it had confined itself within the limits of those old Semitic lands, with perhaps the addition of Egypt. But the Persians were not so ready as the Greeks to give up the contest; they did not rest until the Moslems had subjugated the whole of the Sassanid empire. The most important event in the protracted war which led to the conquest of Iran, was the battle of Nehāwend in 641;[2] the most obstinate resistance was offered by Persis proper, and especially by the capital, Istakhr (Persepolis). In the end, all the numerous and partly autonomous provinces of the Sassanid empire fell, one after the other, into the hands of the Moslems, and the young king, Yazdegerd III. (*q.v.*), was compelled to retire to the farthest corner of his realm, where he came to a miserable end.[3] But it was long before the Iranians learned to accept the situation. Unlike the Christians of western Asia, they had a vigorous feeling of national pride, based upon glorious memories and especially upon a church having a connexion of the closest kind with the state. Internal disturbances of a religious and political character and external disasters had long ago shattered the empire of the Sassanids indeed, but the Iranians had not yet lost their patriotism. They were fighting, in fact, against the despised and hated Arabs, in defence of their holiest possessions, their nationality and their faith. Their subjection was only external, nor did Islam ever succeed in assimilating them as the Syrian Christians were assimilated. Even when in process of time they did accept the religion of the prophet, they leavened it thoroughly with their own peculiar leaven, and, especially, deprived it of the practical political and national character which it had assumed after the flight to Medina. To the Arabian state they were always a thorn in the flesh; it was they who helped most to break up its internal order, and it was from them also that it at last received its outward death-blow. The fall of the Omayyads was their work, and with the Omayyads fell the Arabian empire.

2. *Reign of Omar.*—Abu Bekr died after a short reign on the 22nd of August 634, and as a matter of course was succeeded by Omar. To Omar's ten years' Caliphate belong for the most part the great conquests. He himself did not take the field, but remained in Medina with the exception of his visit to Syria in 638; he never, however, suffered the reins to slip from his grasp, so powerful was the influence of his personality and the Moslem community of feeling. His political insight is shown by the fact that he endeavoured to limit the indefinite extension of Moslem conquest, to maintain and strengthen the national Arabian character of the commonwealth of Islam,[4] and especially to promote law and order in its internal affairs. The saying with which he began his reign will never grow antiquated: "by Allah, he that is weakest among you shall be in my sight the strongest, until I have vindicated for him his rights; but him that is strongest will I treat as the weakest, until he complies

[1] De Goeje, *Mémoires d'hist. et de géog. orient.* No. 2 (2nd ed., Leiden, 1864); Nöldeke, *D.M.Z.*, 1875, p. 76 sqq.; Balādhurī 137.

[2] The accounts differ; see Balādhurī 305. The chronology of the conquests is in many points uncertain.

[3] Balādhurī 315 sq.; Tabarī i. 1068.

[4] He sought to make the whole nation a great host of God; the Arabs were to be soldiers and nothing else. They were forbidden to acquire landed estates in the conquered countries; all land was either made state property or was restored to the old owners subject to a perpetual tribute which provided pay on a splendid scale for the army.

with the laws." After the administration of justice he directed his organizing activity, as the circumstances demanded, chiefly towards financial questions—the incidence of taxation in the conquered territories,[1] and the application of the vast resources which poured into the treasury at Medina. It must not be brought against him as a personal reproach, that in dealing with these he acted on the principle that the Moslems were the chartered plunderers of all the rest of the world. But he had to atone by his death for the fault of his system. In the mosque at Medina he was stabbed by a Kufan workman and died in November 644.

3. *Reign of Othman.*—Before his death Omar had nominated six of the leading Mohajir (Emigrants) who should choose the caliph from among themselves—Othman, Ali, Zobair, Ṭalḥa, Sa'd b. Abi Waqqāṣ, and Abdarraḥmān b. Auf. The last-named declined to be a candidate, and decided the election in favour of Othman. Under this weak sovereign the government of Islam fell entirely into the hands of the Koreish nobility. We have already seen that Mahomet himself prepared the way for this transference; Abu Bekr and Omar likewise helped it; the Emigrants were unanimous among themselves in thinking that the precedence and leadership belonged to them as of right. Thanks to the energy of Omar, they were successful in appropriating to themselves the succession to the Prophet. They indeed rested their claims on the undeniable priority of their services to the faith, but they also appealed to their blood relationship with the Prophet as a corroboration of their right to the inheritance; and the ties of blood connected them with the Koreish in general. In point of fact they felt a closer connexion with these than, for example, with the natives of Medina; nature had not been expelled by faith.[2] The supremacy of the Emigrants naturally furnished the means of transition to the supremacy of the Meccan aristocracy. Othman did all in his power to press forward this development of affairs. He belonged to the foremost family of Mecca, the Omayyads, and that he should favour his relations and the Koreish as a whole, in every possible way, seemed to him a matter of course. Every position of influence and emolument was assigned to them; they themselves boastingly called the important province of Irak the garden of Koreish. In truth, the entire empire had become that garden. Nor was it unreasonable that from the secularization of Islam the chief advantage should be reaped by those who best knew the world. Such were beyond all doubt the patricians of Mecca, and after them those of Tāif, people like Khālid b. al-Walīd, Amr-ibn-el-Ass, 'Abdallāh b. abī Sarḥ, Moghīra b. Sho'ba, and, above all, old Abu Sofiān with his son Moawiya.

Against the rising tide of worldliness an opposition, however, now began to appear. It was led by what may be called the spiritual noblesse of Islam, which, as distinguished from the hereditary nobility of Mecca, might also be designated as the nobility of merit, consisting of the "Defenders" (*Ansar*), and especially of the Emigrants who had lent themselves to the elevation of the Koreish, but by no means with the intention of allowing themselves thereby to be effaced. The opposition was headed by Ali, Zobair, Ṭalḥa, both as leading men among the Emigrants and as disappointed candidates for the Caliphate. Their motives were purely selfish; not God's cause but their own, not religion but power and preferment, were what they sought.[3] Their party was a mixed one. To it belonged the men of real piety, who saw with displeasure the promotion to the first places in the commonwealth of the great lords who had actually done nothing for Islam, and had joined themselves to it only at the last moment. But the majority were merely a band of men without views, whose aim was a change not of system, but of persons in their own interest. Everywhere in the provinces there was agitation against the caliph and his governors, except in Syria, where Othman's cousin, Moawiya, son of Abu Sofiān (see below), carried on a wise and strong administration. The movement was most energetic in Irak and in Egypt. Its ultimate aim was the deposition of Othman in favour of Ali, whose own services as well as his close relationship to the Prophet seemed to give him the best claim to the Caliphate. Even then there were enthusiasts who held him to be a sort of Messiah.

The malcontents sought to gain their end by force. In bands they came from the provinces to Medina to wring concessions from Othman, who, though his armies were spreading terror from the Indus and Oxus to the Atlantic, had no troops at hand in Medina. He propitiated the mutineers by concessions, but as soon as they had gone, he let matters resume their old course. Thus things went on from bad to worse. In the following year (656) the leaders of the rebels came once more from Egypt and Irak to Medina with a more numerous following; and the caliph again tried the plan of making promises which he did not intend to keep. But the rebels caught him in a flagrant breach of his word,[4] and now demanded his abdication, besieging him in his own house, where he was defended by a few faithful subjects. As he would not yield, they at last took the building by storm and put him to death, an old man of eighty. His death in the act of maintaining his rights was of the greatest service to his house and of corresponding disadvantage to the enemy.

4. *Reign of Ali.*—Controversy as to the inheritance at once arose among the leaders of the opposition. The mass of the mutineers summoned Ali to the Caliphate, and compelled even Ṭalḥa and Zobair to do him homage. But soon these two, along with Ayesha, the mother of the faithful, who had an old grudge against Ali, succeeded in making their escape to Irak, where at Baṣra they raised the standard of rebellion. Ali in point of fact had no real right to the succession, and moreover was apparently actuated not by piety but by ambition and the desire of power, so that men of penetration, even although they condemned Othman's method of government, yet refused to recognize his successor. The new caliph, however, found means of disposing of their opposition, and at the battle of the Camel, fought at Baṣra in November 656, Ṭalḥa and Zobair were slain, and Ayesha was taken prisoner.

But even so Ali had not secured peace. With the murder of Othman the dynastic principle gained the twofold advantage of a legitimate cry—that of vengeance for the blood of the grey-haired caliph and a distinguished champion, the governor Moawiya, whose position in Syria was impregnable. The kernel of his subjects consisted of genuine Arabs, not only recent immigrants along with Islam, but also old settlers who, through contact with the Roman empire and the Christian church, had become to some extent civilized. Through the Ghassanids these latter had become habituated to monarchical government and loyal obedience, and for a long time much better order had prevailed amongst them than elsewhere in Arabia. Syria was the proper soil for the rise of an Arabian kingdom, and Moawiya was just the man to make use of the situation. He exhibited Othman's blood-stained garment in the mosque at Damascus, and incited his Syrians to vengeance.

Ali's position in Kufa was much less advantageous. The population of Irak was already mixed up with Persian elements; it fluctuated greatly, and was largely composed of fresh immigrants. Islam had its headquarters here; Kufa and Baṣra were the home of the pious and of the adventurer, the centres of religious and political movement. This movement it was that had raised Ali to the Caliphate, but yet it did not really take any personal interest in him. Religion proved for him a less trustworthy and more dangerous support than did the conservative and secular feeling of Syria for the Omayyads. Moawiya could either act or refrain from acting as he chose, secure in either case

[1] Nöldeke, *Tabari*, 246. To Omar is due also the establishment of the Era of the Flight (Hegira).

[2] Even in the list of the slain at the battle of Honain the Emigrants are enumerated along with the Meccans and Koreish, and distinguished from the men of Medina.

[3] It was the same opposition of the spiritual to the secular nobility that afterwards showed itself in the revolt of the sacred cities against the Omayyads. The movement triumphed with the elevation of the Abbasids to the throne. But, that the spiritual nobility was fighting not for principle but for personal advantage was as apparent in Ali's hostilities against Zobair and Ṭalḥa as in that of the Abbasids against the followers of Ali.

[4] Or, at least, so they thought. The history of the letter to 'Abdallah b. abī Sarḥ seems to have been a trick played on the caliph, who suspected Ali of having had a hand in it.

of the obedience of his subjects. Ali, on the other hand, was unable to convert enthusiasm for the principle inscribed on his banner into enthusiasm for his person. It was necessary that he should accommodate himself to the wishes of his supporters, which, however, were inconsistent. They compelled him suddenly to break off the battle of Siffin, which he was apparently on the point of gaining over Moawiya, because the Syrians fastened copies of the Koran to their lances to denote that not the sword, but the word of God should decide the contest (see further below, B. 1; also Ali). But in yielding to the will of the majority he excited the displeasure of the minority, the genuine zealots, who in Moawiya were opposing the enemy of Islam, and regarded Ali's entering into negotiations with him as a denial of the faith. When the negotiations failed and war was resumed, the Kharijites refused to follow Ali's army, and he had to turn his armies in the first instance against them. He succeeded in disposing of them without difficulty at the battle of Nahrawān, but in his success he lost the soul of his following. For they were the true champions of the theocratic principle; through their elimination it became clear that the struggle had in no sense anything to do with the cause of God. Ali's defeat was a foregone conclusion, once religious enthusiasm had failed him; the secular resources at the disposal of his adversaries were far superior. Fortunately for him he was murdered (end of January 661), thereby posthumously attaining an importance in the eyes of a large part of the Mahommedan world (Shī'a) which he had never possessed during his life.

B.—The Omayyad Dynasty

Summary of Preceding Movements.—The conquest of Mecca had been of the greatest importance to the Prophet, not only because Islam thus obtained possession of this important city with its famous sanctuary, but above all because his late adversaries were at last compelled to acknowledge him as the Envoy of God. Among these there were many men of great ability and influence, and he was so eager to conciliate them or, as the Arabic expression has it, "to mellow their hearts" by concessions and gifts, that his loyal helpers (*Ansar*) at Medina became dissatisfied and could only with difficulty be brought to acquiesce in it. Mahomet was a practical man; he realized that the growing state needed skilful administrators, and that such were found in much greater number among the antagonists of yesterday than among the honest citizens of Medina. The most important positions, such as the governorships of Mecca and Yemen, were entrusted to men of the Omayyad house, or that of the Makhzūm and other Koreishite families. Abu Bekr followed the Prophet's example. In the great revolt of the Arabic tribes after the death of Mahomet, and in the invasion of Irak and Syria by the Moslems, the principal generals belonged to them. Omar did not deviate from that line of conduct. It was he who appointed Yazīd, the son of Abu Sofiān, and after his death, his brother Moawiya as governor of Syria, and assigned the province of Egypt to Amr-ibn-el-Ass ('Amr b. Āṣ). It is even surprising to find among the leading men so few of the house of Hāshim, the nearest family of the Prophet. The puzzled Moslem doctors explain this fact on the ground that the Hashimites were regarded as too noble to hold ordinary administrative offices, and that they could not be spared at Medina, where their counsel was required in all important affairs. There is, however, a tradition in which Ali himself calls the Omayyads born rulers. As long as Omar lived opposition was silent. But Othman had not the strong personality of his predecessor, and, although he practically adhered to the policy of Omar, he was accused of favouring the members of his own family—the caliph belonged himself to the house of Omayya—at the expense of the Hashimites and the Ansar. The jealousy of the latter two was prompted by the fact that the governorship and military commands had become not only much more important, but also much more lucrative, while power and money again procured many adherents. The truly devout Moslems on the other hand were scandalized by the growing luxury which relaxed the austere morals of the first Moslems, and this also was imputed to Othman.

We thus see how the power of the house of Omayya developed itself, and how there arose against it an opposition, which led in the first place to the murder of Othman and the Caliphate of Ali, and furthermore, during the whole period of the Omayyad caliphs, repeatedly to dangerous outbreaks, culminating in the great catastrophe which placed the Abbasids on the throne. The elements of this opposition were of very various kinds:—(1) The old-fashioned Moslems, sons of the *Ansar* and *Mohājir*, who had been Mahomet's first companions and supporters, and could not bear the thought that the sons of the old enemies of the Prophet in Mecca, whom they nicknamed *ṭolaqā* (freedmen), should be in control of the imamate, which carried with it the management of affairs both civil and religious. This party was in the foreground, chiefly in the first period. (2) The partisans of Ali, the Shi'a (Shi'ites), who in proportion as their influence with the Arabs declined, contrived to strengthen it by obtaining the support of the non-Arabic Moslems, aided thereto, especially in the latter period, by the Abbasids, who at the decisive moment succeeded in seizing the supreme power for themselves. (3) The Kharijites, who, in spite of the heavy losses they sustained at the hands of Ali, maintained their power by gaining new adherents from among those austere Moslems, who held both Omayyads and Alids as usurpers, and have often been called, not unjustly, the Puritans of Islam. (4) The non-Arabic Moslems, who on their conversion to Islam, had put themselves under the patronage of Arabic families, and were therefore called maula's (clients). These were not only the most numerous, but also, in virtue of the persistency of their hostility, the most dangerous. The largest and strongest group of these were the Persians, who, before the conquest of Irak by the Moslems, were the ruling class of that country, so that Persian was the dominant language. With them all malcontents, in particular the Shi'ites, found support; by them the dynasty of the Omayyads and the supremacy of the Arabs was finally overthrown. To these elements of discord we must add:—(1) That the Arabs, notwithstanding the bond of Islam that united them, maintained their old tribal institutions, and therewith their old feuds and factions; (2) that the old antagonism between Ma'adites[1] (original northern tribes) and Yemenites (original southern tribes), accentuated by the jealousy between the Meccans, who belonged to the former, and the Medinians, who belonged to the latter division, gave rise to perpetual conflicts; (3) that more than one dangerous pretender—some of them of the reigning family itself—contended with the caliph for the sovereignty, and must be crushed *coûte que coûte*. It is only by the detailed enumeration of these opposing forces that we can form an idea of the heavy task that lay before the Prince of the Believers, and of the amount of tact and ability which his position demanded.

The description of the reign of the Omayyads is extremely difficult. Never perhaps has the system of undermining authority by continual slandering been applied on such a scale as by the Alids and the Abbasids. The Omayyads were accused by their numerous missionaries of every imaginable vice; in their hands Islam was not safe; it would be a godly work to extirpate them from the earth. When the Abbasids had occupied the throne, they pursued this policy to its logical conclusion. But not content with having exterminated the hated rulers themselves, they carried their hostility to a further point. The official history of the Omayyads, as it has been handed down to us, is coloured by Abbasid feeling to such an extent that we can scarcely distinguish the true from the false. An example of this occurs at the outset in the assertion that Moawiya deliberately refrained from marching to the help of Othman, and indeed that it was with secret joy that he heard of the fatal result of the plot. The facts seem to contradict this view. When, ten weeks before the murder, some hundreds of men came to Medina from Egypt and Irak, pretending that they were on their pilgrimage to Mecca, but wanted to bring before the caliph their complaints against his vicegerents, nobody could have the slightest suspicion that the life of the caliph was in danger; indeed it was only during

[1] Ma'ad is in the genealogical system the father of the Moḍar and the Rab'ia tribes. Qais is the principal branch of the Moḍar.

the few days that Othman was besieged in his house that the danger became obvious. If the caliph then, as the chroniclers tell, sent a message to Moawiya for help, his messenger could not have accomplished half the journey to Damascus when the catastrophe took place. There is no real reason to doubt that the painful news fell on Moawiya unexpectedly, and that he, as mightiest representative of the Omayyad house, regarded as his own the duty of avenging the crime. He could not but view Ali in the light of an accomplice, because if, as he protested, he did not abet the murderers, yet he took them under his protection. An acknowledgment of Ali as caliph by Moawiya before he had cleared himself from suspicion was therefore quite impossible.

1. *The Reign of Moawiya.*—Moawiya, son of the well-known Meccan chief Abu Sofiān, embraced Islam together with his father and his brother Yazid, when the Prophet conquered Mecca, and was, like them, treated with the greatest distinction. He was even chosen to be one of the secretaries of Mahomet. When Abu Bekr sent his troops for the conquest of Syria, Yazid, the eldest son of Abu Sofiān, held one of the chief commands, with Moawiya as his lieutenant. In the year 639 Omar named him governor of Damascus and Palestine; Othman added to this province the north of Syria and Mesopotamia. To him was committed the conduct of the war against the Byzantine emperor, which he continued with energy, at first only on land, but later, when the caliph had at last given in to his urgent representations, at sea also. In the year 34 (A.D. 655) was fought off the coast of Lycia the great naval battle, which because of the great number of masts has been called "the mast fight," in which the Greek[1] fleet, commanded by the emperor Constans II. in person, was utterly defeated. Moawiya himself was not present, as he was conducting an attack (the result of which we do not know) on Caesarea in Cappadocia. The Arabic historians are so entirely preoccupied with the internal events that they have no eye for the war at the frontier. The contention which Moawiya had with Ali checked his progress in the north.

Moawiya was a born ruler, and Syria was, as we have seen, the best administered province of the whole empire. He was so loved and honoured by his Syrians that, when he invited them to avenge the blood of Othman, they replied unanimously, "It is your part to command, ours to obey." Ali was a valiant man, but had no great talent as a ruler. His army numbered a great many enthusiastic partisans, but among them not a few wiseacres; there were also others of doubtful loyalty. The battle at Siffin (657), near the Euphrates, which lasted two months and consisted principally in, sometimes bloody, skirmishes, with alternate success, ended by the well-known appeal to the decision of the Koran on the part of Moawiya. This appeal has been called by a European scholar "one of the unworthiest comedies of the whole world's history," accepting the report of very partial Arabic writers that it happened when the Syrians were on the point of losing the battle. He forgot that Ali himself, before the Battle of the Camel, appealed likewise to the decision of the Koran, and began the fight only when this had been rejected. There is in reality no room for suspecting Moawiya of not having been in earnest when making this appeal; he might well regret that internecine strife should drain the forces which were so much wanted for the spread of Islam. That the Book of God could give a solution, even of this arduous case, was doubtless the firm belief of both parties. But even if the appeal to the Koran had been a stratagem, as Ali himself thought, it would have been perfectly legitimate, according to the general views of that time, which had been also those of the Prophet. It is not unlikely that the chief leader of the Yemenites in Ali's army, Ash'ath b. Qais, knew beforehand that this appeal would be made. Certainty is not to be obtained in the whole matter.

On each side an umpire was appointed, Abu Mūsā al-Ash'arī, the candidate of Ash'ath, on that of Ali, Amr-ibn-el-Ass (*q.v.*) on that of Moawiya. The arbitrators met in the year 37 (A.D. 658) at Adhroḥ, in the south-east of Syria, where are the ruins of the Roman Castra described by Brünnow and Domaszewsky (*Die Provincia Arabia*, i. 433-463). Instead of this place, the historians generally put Dūmat-al-Jandal, the biblical Duma, now called Jauf, but this rests on feeble authority. The various accounts about what happened in this interview are without exception untrustworthy. J. Wellhausen, in his excellent book *Das arabische Reich und sein Sturz*, has made it very probable that the decision of the umpires was that the choice of Ali as caliph should be cancelled, and that the task of nominating a successor to Othman should be referred to the council of notable men (*shūrā*), as representing the whole community. Ali refusing to submit to this decision, Moawiya became the champion of the law, and thereby gained at once considerable support for the conquest of Egypt, to which above all he directed his efforts. As soon as Amr returned from Adhroḥ, Moawiya sent him with an army of four or five thousand men against Egypt. About the same time the constitutional party rose against Ali's vicegerent Mahommed, son of Abu Bekr, who had been the leader of the murderous attack on Othman. Mahommed was beaten, taken in his flight, and, according to some reports, sewn in the skin of an ass and burned.

Moawiya, realizing that Ali would take all possible means to crush him, took his measures accordingly. He concluded with the Greeks a treaty, by which he pledged himself to pay a large sum of money annually on condition that the emperor should give him hostages as a pledge for the maintenance of peace. Ali, however, had first to deal with the insurrection of the Kharijites, who condemned the arbitration which followed the battle of Siffin as a deed of infidelity, and demanded that Ali should break the compact (see above, A. 4). Freed from this difficulty, Ali prepared to direct his march against Moawiya, but his soldiers declined to move. One of his men, Khirrīt b. Rāshid, renounced him altogether, because he had not submitted to the decision of the umpires, and persuaded many others to refuse the payment of the poor-rate. Ali was obliged to subdue him, a task which he effected not without difficulty. Not a few of his former partisans went over to Moawiya, as already had happened before the days of Siffin, amongst others Ali's own brother 'Aqīl. Lastly, there were in Kufa, and still more in Basra, many Othmaniya or legitimists, on whose co-operation he could not rely. Moawiya from his side made incessant raids into Ali's dominion, and by his agents caused a very serious revolt in Basra. The statement that a treaty was concluded between Moawiya and Ali to maintain the *status quo*, in the beginning of the year 40 (A.D. 660), is not very probable, for it is pretty certain that just then Ali had raised an army of 40,000 men against the Syrians, and also that in the second or third month of that year Moawiya was proclaimed caliph at Jerusalem. At the same time Bosr b. Abi Artāt made his expedition against Medina and Mecca, whose inhabitants were compelled to acknowledge the caliphate of Moawiya. On the murder of Ali in 661, his son Hasan was chosen caliph, but he recoiled before the prospect of a war with Moawiya, having neither the ambition nor the energy of Ali. Moawiya stood then with a large army in Maskin, a rich district lying to the north of the later West Bagdad, watered by the Dojail, or Little Tigris, a channel from the Euphrates to the Tigris. The army of Trak was near Madāin, the ancient Ctesiphon. The reports about what occurred are confused and contradictory; but it seems probable that Abdallah b. Abbas, the vicegerent of Ali at Basra and ancestor of the future Abbasid dynasty, was in command. No battle was fought. Hasan and Ibn Abbas opened, each for himself, negotiations with Moawiya. The latter made it a condition of surrender that he should have the free disposal of the funds in the treasury of Basra. Some say that he had already before the death of Ali rendered himself master of it. Notwithstanding the protest of the Basrians, he transported this booty safely to Mecca. When his descendants had ascended the throne and he had become a demi-saint, the historians did their best to excuse his conduct. Hasan demanded, in exchange for the power which he resigned, the contents of the treasury at Kufa, which amounted to five millions of dirhems, together with the revenues of the Persian province of Darābjird (Darab). When these negotiations became known, a mutiny broke out in Hasan's camp. Hasan himself was wounded and retired to Medina, where he

[1] The Arabs always call them Rūm, *i.e.* Romans.

died eight or nine years afterwards. The legend that he was poisoned by order of Moawiya is without the least foundation. It seems that he never received the revenues of Darābjird, the Basrians to whom they belonged refusing to cede them.

Moawiya now made his entry into Kufa in the summer of A.H. 41 (A.D. 661) and received the oath of allegiance as Prince of the Believers. This year is called the year of union (*jamā'a*). Moghīra b. Sho'ba was appointed governor of Kufa. Ḥomrān b. Abān had previously assumed the government of Basra. This is represented commonly as a revolt, but as Ḥomran was a client of Othman, and remained in favour with the Omayyads, it is almost certain that he took the management of affairs only to maintain order.

One strong antagonist to Moawiya remained, in the person of Ziyād. This remarkable man was said to be a bastard of Abu Sofiān, the father of Moawiya, and was, by his mother, the brother of Abu Bakra, a man of great wealth and position at Basra. He thus belonged to the tribe of Thaqīf at Ṭāif, which produced many very prominent men. At the age of fourteen years Ziyād was charged with the financial administration of the Basrian army. He had won the affection of Omar, by his knowledge of the Koran and the Sunna of the Prophet, and by the fact that he had employed the first money he earned to purchase the freedom of his mother Somayya. He was a faithful servant of Ali and put down for him the revolt excited by Moawiya's partisans in Basra. Thence he marched into Fārs and Kirman, where he maintained peace and kept the inhabitants in their allegiance to Ali. After Ali's death he fortified himself in his castle near Istakhr and refused to submit. Moawiya, therefore, sent Bosr b. Abi Artāt to Basra, with orders to capture Ziyād's three sons, and to force Ziyād into submission by threatening to kill them. Ziyād was obdurate, and it was due to his brother Abu Bakra, who persuaded Moawiya to cancel the order, that the threat was not executed. On his return to Damascus, Moawiya charged Moghīra b. Sho'ba to bring his countryman to reason. Abdallah b. 'Āmir was made governor of Basra.

As soon as Moawiya had his hands free, he directed all his forces against the Greeks. Immediately after the submission of Irak, he had denounced the existing treaty, and as early as 662 had sent his troops against the Alans and the Greeks. Since then, no year passed without a campaign. Twice he made a serious effort to conquer Constantinople, in 669 when he besieged it for three months, and in 674. On the second occasion his fleet occupied Cyzicus, which it held till shortly after his death in 680, when a treaty was signed. In Africa also the extension of Mahommedan power was pursued energetically. In 670 took place the famous march of 'Okba ('Oqba) b. Nāfi' and the foundation of Kairawan, where the great mosque still bears his name. Our information about these events, though very full, is untrustworthy, while of the events in Asia Minor the accounts are scarce and short. The Arabic historians are still absorbed by the events in Irak and Khorasan.

The talented prefect of Kufa, Moghīra b. Sho'ba, eventually broke down the resistance of Ziyād, who came to Damascus to render an account of his administration, which the caliph ratified. Moawiya seems also to have acknowledged him as the son of Abu Sofiān, and thus as his brother; in 664 this recognition was openly declared.[1] In the next year Ziyād was appointed governor of Basra and the eastern provinces belonging to it. As the austere champion of the precepts of Islam, he soon restored order in the whole district. Outwardly, this was the case in Kufa also. A rising of Kharijites in the year 663 had ended in the death of their chief. But the Shi'ites were dissatisfied and even dared to give public utterance to their hostility. Moghīra contented himself with a warning. He was already aged and had no mind to enter on a conflict. He died about the year 670, and his province also was entrusted to Ziyād, who appointed 'Amr b. Horaith as his vicegerent. At a Friday service in the great mosque 'Amr was insulted and pelted with pebbles. Ziyād then came himself, arrested the leader of the Shi'ites, and sent fourteen rebels to Damascus, among them several men of consideration. Seven of them who refused to pledge themselves to obedience were put to death; the Shi'ites considered them as martyrs and accused Moawiya of committing a great crime. But in Kufa peace was restored, and this not by military force, but by the headmen of the tribes. We must not forget that Kufa and Basra were military colonies, and that each tribe had its own quarter of the city. A wholesome diversion was provided by the serious resumption of the policy of eastern expansion, which had been interrupted by the civil war. For this purpose Irak had to furnish the largest contingent. The first army sent by Ziyād into Khorasan recaptured Merv, Herat and Balkh, conquered Tokhāristān and advanced as far as the Oxus. In 673 'Obaidallah, the son of Ziyād, crossed the river, occupied Bokhara, and returned laden with booty taken from the wandering Turkish tribes of Transoxiana. He brought 2000 Turkish archers with him to Basra, the first Turkish slaves to enter the Moslem empire. Sa'īd, son of the caliph Othman, whom Moawiya made governor of Khorasan, in 674 marched against Samarkand. Other generals penetrated as far as the Indus and conquered Kabul, Sijistan, Makrān and Kandahar.

Ziyād governed Irak with the greatest vigour, but as long as discontent did not issue in action, he let men alone. At his death (672–673), order was so generally restored that "nobody had any more to fear for life or estate, and even the unprotected woman was safe in her house without having her door bolted."

Moawiya was a typical Arab *sayyid* (gentleman). He governed, not by force, but by his superior intelligence, his self-control, his mildness and magnanimity. The following anecdote may illustrate this. One of Moawiya's estates bordered on that of Abdallah b. Zobair, who complained in a somewhat truculent letter that Moawiya's slaves had been guilty of trespassing. Moawiya, disregarding his son Yazid's advice that he should exact condign punishment for Zobair's disrespect, replied in flattering terms, regretting the trespass and resigning both slaves and estate to Zobair. In reply Zobair protested his loyalty to Moawiya, who thereupon pointed a moral for the instruction of Yazid.

Moawiya has been accused of having poisoned more than one of his adversaries, among them Malik Ashtar, Abdarrahmān the son of the great captain Khālid b. Walīd, and Hasan b. Ali. As for the latter, European scholars have long been agreed that the imputation is groundless. As to Abdarrahmān the story is in the highest degree improbable. Madāinī says that Moawiya was prompted to it, because when he consulted the Syrians about the choice of his son Yazid as his successor, they had proposed Abdarrahmān. The absurdity of this is obvious, for Abdarrahmān died in the year 666.[1] Others say[2] that Moawiya was afraid lest Abdarrahmān should become too popular. Now, Abdarrahmān had not only been a faithful ally of Moawiya in the wars with Ali, but after the peace devoted all his energy to the Greek war. It is almost incredible that Moawiya out of petty jealousy would have deprived himself of one of his best men. The probability is that Abdarrahmān was ill when returning from the frontier, that Moawiya sent him his own medical man, the Christian doctor Ibn Othāl, and that the rumour arose that the doctor had poisoned him. It is remarkable withal that this rumour circulated, not in Homs (Emesa), where Abdarrahmān died, but in Medina. There a young relation of Abdarrahmān was so roused by the taunt that the death of his kinsman was unavenged, that he killed Ibn Othāl near the mosque of Damascus. Moawiya imprisoned him and let him pay a high ransom, the law not permitting the talio against a Moslem for having killed a Christian. The story that

[1] A single genealogist, Abu Yaqaẓān, says that he was a legitimate son of Abu Sofiān, and that his mother was Asmā, daughter of A'war. But all others call his mother Somayya, who is said to have been a slave-girl of Hind, the wife of Abu Sofiān, and who became later also the mother of Abu Bakra. We cannot make out whether Abu Sofiān acknowledged him as his son or not. At a later period, the Abbasid caliph Mahdi had the names of Ziyād and his descendants struck off the rolls of the Koreish; but, after his death, the persons concerned gained over the chief of the rolls office, and had their names replaced in the lists (see Tabari iii. 479).

[1] Aghāni xx. p. 13, Ibn abi Osaibia i. p. 118.
[2] Tabari ii. p. 82.

this relative was Khālid, the son of Abdarrahmān, is absurd inasmuch as Moawiya made this Khālid commander against the Greeks in succession to his father. In the third case—that of Malik Ashtar—the evidence is equally inadequate. In fact, since Moawiya did not turn the weapon of assassination against such men as Abdallah b. Zobair and Hosain b. Ali, it is unlikely that he used it against less dangerous persons. These two men were the chief obstacles to Moawiya's plan for securing the Caliphate for his son Yazid. The leadership with the Arabic tribes was as a rule hereditary, the son succeeding his father, but only if he was personally fit for the position, and was acknowledged as such by the principal men of the tribe. The hereditary principle had not been recognized by Islam in the cases of Abu Bekr, Omar and Othman; it had had some influence upon the choice of Ali, the husband of Fatima and the cousin of the Prophet. But it had been adopted entirely for the election of Hasan. The example of Abu Bekr proved that the caliph had the right to appoint his successor. But this appointment must be sanctioned by the principal men, as representing the community. Moawiya seems to have done his best to gain that approbation, but the details given by the historians are altogether unconvincing. This only seems to be certain, that the succession of Yazid was generally acknowledged before the death of his father, except in Medina. (See MAHOMMEDAN INSTITUTIONS.)

Moawiya died in the month of Rajab 60 (A.D. 680). His last words are said to have been: "Fear ye God, the Elevated and Mighty, for God, Praise be to Him, protects the man that fears Him; he who does not fear God, has no protection." Moawiya was, in fact, a religious man and a strict disciple of the precepts of Islam. We can scarcely, therefore, credit the charges made by the adversaries of his chosen successor Yazid, that he was a drinker of wine, fond of pleasure, careless about religion. All the evidence shows that, during the reign of the Omayyads, life in Damascus and the rest of Syria was austere and in striking contrast to the dissolute manners which prevailed in Medina.

2. *Rule of Yazid.*—When Moawiya died, the opposition had already been organized. On his accession Yazid sent a circular to all his prefects, officially announcing his father's death, and ordering them to administer the oath of allegiance to their subjects. In that sent to Walīd b. 'Otba, the governor of Medina, he enclosed a private note charging him in particular to administer the oath to Hosain, Abdallah b. Omar and Abdallah b. Zobair, if necessary, by force. Walīd sent a messenger inviting them to a conference, thus giving them time to assemble their followers and to escape to Mecca, where the prefect Omar b. Sa'īd could do nothing against them. In the month Ramadan this Omar was made governor of Medina and sent an army against Ibn Zobair. This army was defeated, and from that time Ibn Zobair was supreme at Mecca.

On the news of Yazid's accession, the numerous partisans of the family of Ali in Kufa sent addresses to Hosain, inviting him to take refuge with them, and promising to have him proclaimed caliph in Irak. Hosain, having learned that the majority of the inhabitants were apparently ready to support him strenuously, prepared to take action. Meanwhile Yazid, having been informed of the riotous behaviour of the Shi'ites in Kufa, sent Obaidallah, son of the famous Ziyād and governor of Basra, to restore order. Using the same tactics as his father had used before, Obaidallah summoned the chiefs of the tribes and made them responsible for the conduct of their men. On the 8th of Dhu'l-Hijja Hosain set out from Mecca with all his family, expecting to be received with enthusiasm by the citizens of Kufa, but on his arrival at Kerbela west of the Euphrates, he was confronted by an army sent by Obaidallah under the command of Omar, son of the famous Sa'd b. Abi Waqqās, the founder of Kufa. Hosain gave battle, vainly relying on the promised aid from Kufa, and fell with almost all his followers on the 10th of Muharram 61 (10th of October 680).

No other issue of this rash expedition could have been expected. But, as it involved the grandson of the Prophet, the son of Ali, and so many members of his family, Hosain's devout partisans at Kufa, who by their overtures had been the principal cause of the disaster, regarded it as a tragedy, and the facts gradually acquired a wholly romantic colouring. Omar b. Sa'd and his officers, Obaidallah and even Yazid came to be regarded as murderers, and their names have ever since been held accursed by all Shi'ites. They observe the 10th of Muharram, the day of 'Ashūra, as a day of public mourning. Among the Persians, stages are erected on that day in public places, and plays are acted, representing the misfortunes of the family of Ali.[1] "Revenge for Hosain" became the watchword of all Shi'ites, and the Meshed Hosain (Tomb of the martyr Hosain) at Kerbela is to them the holiest place in the world (see KERBELA). Obaidallah sent the head of Hosain to Damascus, together with the women and children and Ali b. Hosain, who, being ill, had not taken part in the fight. Yazid was very sorry for the issue, and sent the prisoners under safe-conduct to Medina. Ali remained faithful to the caliph, taking no share in the revolt of the Medinians, and openly condemning the risings of the Shi'ites.

Ibn Zobair profited greatly by the distress caused by Hosain's death. Though he named himself publicly a refugee of the House of God, he had himself secretly addressed as caliph, and many of the citizens of Medina acknowledged him as such. Yazid, when informed of this, swore in his anger to have him imprisoned. But remembering the wisdom of his father, he sent messengers with a chain made of silver coins, and bearing honourable proposals. At the same time he received a number of the chief men of Medina, sent by the prefect, with great honour and loaded them with gifts and presents. But Ibn Zobair refused, and the Medinians, of whom the majority probably had never before seen a prince's court, however simple, were only confirmed in their rancour against Yazid, and told many horrible tales about his profligacy, that he hunted and held wild orgies with Bedouin sheikhs, and had no religion. A characteristically Arabic ceremony took place in the mosque of Medina. "I cast off the oath of allegiance to Yazid, as I cast off my turban," exclaimed the first, and all others followed, casting off one of their garments, till a heap of turbans and sandals lay on the floor. Ibn Ḥanẓala was made commander. The Omayyads, though they with their clients counted more than 1000 men, were not able to maintain themselves, and were allowed to depart only on condition of strict neutrality.

At last the patience of Yazid was exhausted. An army—the accounts about the number vary from 4000 to 20,000—was equipped in all haste and put under the command of Moslim b. 'Oqba, with orders first to exact submission from the Medinians, if necessary by force, and then to march against Ibn Zobair. Moslim, having met the expelled Omayyads at Wādi 'l-Qorā, encamped near the city (August 683) and gave the inhabitants three days in which to return to obedience, wishing to spare the city of the Prophet and to prevent the shedding of blood. When, however, after the lapse of three days, a final earnest appeal had been answered insultingly, he began the battle. The Medinians fought valiantly, but could not hold out against the well-disciplined Syrians. Moreover, they were betrayed by the Medinian family of the Banū Ḥāritha, who introduced Syrian soldiers into the town. Medina lies between two volcanic hills, called *harra*. After one of these the battle has been named "The Day of Harra." For three days the city was given up to plunder. It is said that a thousand bastards (the "children of the Harra") were born in consequence of these days. The remaining citizens were compelled to take the oath of allegiance to Yazid in a humiliating form; the few who refused were killed. Ali b. Hosain, who had refused to have anything to do with the revolt, was treated with all honour. Mahommed b. al-Hanafiya, the son of Ali, and Abdallah b. Omar had likewise abstained, but they had left Medina for Mecca.

Moslim then proceeded towards Mecca. He was already ill, and died about midway between the two cities, after having given the command, according to the orders of the caliph, to Hosain b. Nomair. It is quite natural that the man who delivered up the city of the Prophet to plunder, and at whose hands so many prominent Moslems fell, should have been an object of detestation

[1] See Chodzko, *Théâtre persan* (Paris, 1878).

to the devout. Even some European scholars have drawn a false picture of his personality, as has been clearly shown by Wellhausen. About Medina also false statements have been made. The city recovered very soon from the disaster, and remained the seat not only of holy tradition and jurisdiction, but also of the Arabic aristocracy. In no city of the empire, during the reign of the Omayyads, lived more singers and musicians than in Medina.

Hosain b. Nomair arrived before Mecca in September 683 and found Ibn Zobair ready to defend it. A number of the citizens of Medina had come to the aid of the Holy City, as well as many Kharijites from Yamāma under Najda b. ʿĀmir. The siege had lasted 65—others say 40—days, when the news came of the death of Yazid, which took place presumably on the 14th of Rabia I, 64 (12th November 683). Eleven days before a fire, caused by imprudence, had consumed all the woodwork of the Kaʿba and burst the black stone in three places. The evidence is quite conclusive; yet the fire has been imputed to the Syrians, and a tale was invented about ballistas which hurled against the House of God enormous stones and vessels full of bitumen. In fact, the siege had been confined to enclosure and skirmishes. It is said that on the news of the death of Yazid a conference took place between Hosain and Ibn Zobair, and that the former offered to proclaim the latter as caliph provided he would accompany him to Syria and proclaim a general amnesty. Ibn Zobair refused haughtily, and Hosain, with a contemptuous criticism of his folly, ordered his army to break up for Syria.

Hitherto Ibn Zobair had confined himself to an appeal to the Moslems to renounce Yazid and to have a caliph elected by the council (*shūrā*) of the principal leading men. He now openly assumed the title of caliph and invited men to take the oath of allegiance. He was soon acknowledged throughout Arabia, in Egypt and in Irak. The Omayyads, who had returned to Medina, were again expelled.

Yazid is described in the *Continuatio Isidori Byz.* §27, as "iucundissimus et cunctis nationibus regni eius subditis vir gratissime habitus, qui nullam unquam, ut omnibus moris est, sibi regalis fastigii causa gloriam appetivit, sed communis[1] cum omnibus civiliter vixit." This is confirmed by the fact that Moawiya II. is said to have been a mild ruler, like his father, and goes far to outweigh the prejudiced account given by his opponents and coloured still further by tradition. Against the accusation of being a drinker of wine he himself protested in verses which he recited when he sent the army against Ibn Zobair. Decisive is also the testimony of Ibn al-Hanafiya, who declared that all the accusations brought by the Medinians were false. It may be true that he was fond of hunting, but he was a peace-loving, generous prince. It is uncertain at what age he died. Accounts vary between 33 and 39. The latter finds confirmation in the statement that he was born in A.H. 25, though another account places his birth in 22. As his son Moawiya who succeeded him was certainly adult (the accounts vary between 17 and 23), the latter date seems to be preferable.

3. Moawiya II. had reigned a very short time—how long is again wholly uncertain—when he fell sick and died. Then commenced a period of the greatest confusion. The mother of Yazid, Maisūn, belonged to the most powerful tribe in Syria, the Kalb, and it seems that this and the cognate tribes of Qodāʿa (Yemenites) had enjoyed certain prerogatives, which had aroused the jealousy of the Qais and the cognate tribes of Modar. Immediately after the death of Yazid, Zofar b. Ḥārith, who had already fought with Ibn Zobair against Yazid, had induced northern Syria and Mesopotamia to declare for Ibn Zobair. In Homs (Emesa) the governor Noʿmān b. Bashīr had pledged himself to the same cause. The prefect of Damascus, Ḍaḥḥāk b. Qais, seemed to be wavering in his loyalty. Khālid, the brother of Moawiya II., was still a youth and appears to have had no strength of character. There was, however, a much more dangerous candidate, viz. Merwān b. Ḥakam, of another branch of the Omayyads, who had been Othman's right-hand man. He had pledged himself after some hesitation to Yazid, but now his turn had come. The amir of the Kalb, Ibn Baḥdal, persuaded probably by Obaidallah b. Ziyād, conceived that only a man of distinction could win the contest, and proclaimed Merwan caliph, on condition that his successor should be Khālid b. Yazid, and after him ʿAmr b. Saʿīd al-Ashdaq, who belonged to the third branch of the Omayyads. Meanwhile Ḍaḥḥāk had declared himself openly for Ibn Zobair. A furious battle (A.D. 684) ensued at Merj Rāhiṭ, near Damascus, in which Ḍaḥḥāk and Zofar, though they had the majority of troops, were utterly defeated. This battle became the subject of a great many poems and had pernicious consequences, especially as regards the antagonism between the Qais-Moḍar and Kalb-Yemenite tribes.

4. *Reign of Merwan I.*—Merwan strengthened his position according to the old oriental fashion by marrying the widow of Yazid, and soon felt himself strong enough to substitute his own son Abdalmalik for Khālid b. Yazid as successor-designate. Khālid contented himself with protesting; he was neither a politician nor a soldier, but a student of alchemy and astronomy; translations of Greek books have been ascribed to him (Jāḥiz, *Bayān*, i. p. 126). In the year A.H. 435 there was still in Egypt a brazen globe attributed to Ptolemy which had belonged to Khālid (Ibn Qiftī, p. 440, 1.15). He was also consulted about future events. There were, however, not a few who deplored the fact that the throne had passed from the descendants of Abu Sofiān. This feeling gave rise to the prophecy that there should appear later a Sofianī on the throne, who would reign with might and wisdom. ʿAmr Ashdaq made no opposition till the death of Merwan. After the victory at Merj Rāhiṭ, Merwan conquered Egypt, and installed as governor his second son Abdalazīz. An army sent to the rescue by Ibn Zobair under the command of his brother Muṣʿab was beaten in Palestine by ʿAmr Ashdaq. But a division sent by Merwan to the Hejaz was cut to pieces. Obaidallah b. Ziyād set out with the purpose of subduing Mesopotamia and marching thence against Irak. But he was detained a whole year in the former country, by a rising of the Shiʿites in Kufa, who were still in mourning for Hosain and had formed an army which called itself "the army of the penitent." They were routed at Ras ʿAin, but Obaidallah had still to fight Zofar.

Meanwhile Mokhtār (son of that Abu ʿObaid the Thaqifite who had commanded the Arabs against the Persians in the unfortunate battle of the Bridge), a man of great talents and still greater ambition, after having supported Ibn Zobair in the siege of Mecca, had gone to Kufa, where he joined the Shiʿites, mostly Persians, and acquired great power. He claimed that he was commissioned by Ali's son, Mahommed ibn al-Hanafiya, who after the death of Hosain was recognized by the Shiʿites as their Mahdi. A vague message from Mahommed, that it was the duty of every good Moslem to take part with the family of the Prophet, was interpreted in favour of Mokhtār, and thenceforward all the Shiʿites, among them the powerful Ibrāhīm, son of Ali's right hand Malik Ashtar, followed him blindly as their chief. Afterwards Ibn al-Hanafiya seems to have acknowledged him distinctly as his vicegerent. Ibn Zobair's representative in Kufa was compelled to flee, and all those who had participated in the battle of Kerbela were put to death. An army despatched against Obaidallah under Ibrāhīm routed the Syrians near Mosul (battle of Khāzir); Obaidallah and Hosain b. Nomair were slain. Mokhtār was now at the zenith of power, but Ibn Zobair, determined to get rid at all costs of so dangerous an enemy, named his brother Muṣʿab governor of Basra and ordered him to march against Kufa. Basra was at that time full of fugitives from Kufa, Arabian chiefs who resented the arrogance of Mokhtār's adherents, and desired eagerly to regain their former position in Kufa. The troops of Basra had been, since the death of Yazid, at war with the Kharijites, who had supported Ibn Zobair during the siege of Mecca, but had deserted him later. Their caliph, Nāfiʿ b. Azraq, after whom they were called also Azraqites, threatened even the city itself, when Mohallab b. Abi Ṣofra, a very able general, compelled them to retire. Mohallab then marched with Muṣʿab against Kufa. Mokhtār fell, and with

[1] Dozy took *communis* for a gloss to *civiliter*.

him the ephemeral dominion of the Persian Shi'ites. This had been their first attempt to dispute the authority of their Arabian conquerors, but it was not to be the last. Ibrāhīm b. Ashtar, Mokhtar's governor of Mesopotamia, submitted and acknowledged the Caliphate of Ibn Zobair.

5. *Reign of Abdalmalik.*—Merwan died on the 27th of Ramadan 65 (7th May 685); according to tradition, he was suffocated by his wife, because he had insulted her son Khālid and herself. The accession of Abdalmalik was attended with no difficulty, but the first years of his reign were occupied by troubles in northern Syria, where, instigated by the Greeks, the Mardaites of the Amanus, called Jarājima by the Arabs, penetrated into the Lebanon. He was obliged to conclude an unfavourable treaty first with them, later with the emperor of Constantinople. Moreover, in the year 68 (A.D. 687–688) Syria was afflicted by a serious famine. Ibn Zobair, however, was occupied at Mecca with the rebuilding of the Ka'ba, and Muṣ'ab was harassed not only by the Kharijites, but also by a noble freebooter, Obaidallah b. Ḥorr, who had created for himself a principality in the vicinity of Madāin (Ctesiphon).

The period of the pilgrimage caused a momentary truce to all these struggles, and in Dhu 'l-hijja, A.H. 68 (January 688), was seen the curious spectacle of four different standards planted near Mecca, belonging respectively to four chiefs, each of whom was a pretender to the empire; the standard of Abdallah b. Zobair, caliph of Mecca; that of the caliph of Damascus, Abdalmalik; that of Ali's son Mahommed b. al-Hanafiya, Mahdi of the Shi'ites; and that of the Kharijites, who were at that time under the command of Najda b. 'Āmir. Such, however, was the respect inspired by the holy places, that no disorders resulted.

When, in the year (69 A.H.) 689 Abdalmalik had at last encamped at Boṭnān Ḥabīb in the vicinity of Kinnesrin (Qinnasrīn),[1] with the purpose of marching against Muṣ'ab, his cousin 'Amr Ashdaq, to whom by the treaty of Jābia, before the battle of Merj Rāhit, the succession to Merwan had been promised, took advantage of his absence to lay claim to the supreme power, and to have himself proclaimed caliph by his partisans. Abdalmalik was obliged to retrace his steps and to lay siege to his own capital. The garrison of Damascus took fright, and deserted their posts, so that 'Amr Ashdaq was compelled to surrender. The caliph Abdalmalik summoned him to his palace and slew him with his own hand. Abdalmalik has every claim to our esteem as one of the ablest monarchs that ever reigned, but this murder remains a lasting blot on his career.

Abdalmalik could now give his whole attention to the projected expedition against Irak. Muṣ'ab was encamped at Bājomairā in the neighbourhood of Takrīt. But Abdalmalik's first task was to subdue Zofar and his Qaisites at Kerkesia (Qarqīsia), and the rest of the partisans of Mokhtār at Nisibis. Meanwhile, Muṣ'ab had to curb a violent revolt in Basra, brought about by agents of Abdalmalik, and called after a place in the city the revolt of the Jofrites. About the middle of A.D. 691 Abdalmalik at last encamped at Dair al-Jathalīq (the monastery of the Catholicus) between Maskin, not far from the site of Bagdad, and Bājomairā. Muṣ'ab's best troops were fighting under Mohallab against the Kharijites; many Basrians were secretly favourable to the Omayyads, nor were the Kufian soldiers to be trusted. The people of Irak had never been accustomed to discipline, and no improvement had taken place during the troubles of the last years. Abdalmalik, therefore, wrote secretly to the chiefs of Muṣ'ab's army, and persuaded them to desert to him, with the exception of Ibrāhīm b. Ashtar, the brave son of a brave father, who, after the fall of Mokhtār, had become a faithful supporter of Ibn Zobair. His death, in the beginning of the battle, decided the fate of Muṣ'ab, who was slain sword in hand by a Shi'ite of Kufa.

This victory opened the gates of Kufa to Abdalmalik, and all Irak received him with acclamation. Thence, a few days later, he sent Hajjāj b. Yusuf at the head of 2000 Syrians against Ibn Zobair in Mecca, and despatched a messenger to Tāriq b. 'Amr, who was encamped at Wādi 'l-Qorā with 5000 men, to make himself master of Medina and thence to rejoin Hajjāj. Before the arrival of this reinforcement, Hajjāj confined himself to skirmishes, in which his soldiers always had the advantage. Then, in Dhu 'l Qa'da 72 (March 25th, 692) Mecca was invested. The blockade lasted more than six months, during which the city was a prey to all the horrors of siege and famine. Hajjāj had set up a balista on the hill of Abu Qobais, whence he poured on the city a hail of stones, which was suspended only in the days of the pilgrimage. Ibn Zobair employed against him Abyssinians armed with Greek-fire-tubes, who, however, quitted him soon under the pressure of famine. This at length triumphed over his last adherents. Ten thousand fighting men, and even two of the sons of the pretender (it is said, on his own advice), left the city and surrendered. Mecca being thus left without defenders, Ibn Zobair saw that ruin was inevitable. Hajjāj having promised him amnesty if he would surrender, he went to his mother Asmā, the daughter of Abu Bekr, who had reached the age of a hundred years, and asked her counsel. She answered that, if he was confident in the justice of his cause, he must die sword in hand. In embracing him for the last time, she felt the cuirass he wore and exclaimed that such a precaution was unworthy of a man resolved to die. He, therefore, took off the cuirass, and, when the Omayyad troops made their way into the city, attacked them furiously, notwithstanding his advanced age, and was slain. His head was cut off, and sent by Hajjāj to Damascus.

With Ibn Zobair perished the influence which the early companions of Mahomet had exercised over Islam. Medina and Mecca, though they continued to be the holy cities, had no longer their old political importance, which had already been shaken to its foundations by the murder of Othman and the subsequent troubles. Henceforward we shall find temporal interests, represented by Damascus, predominating over those of religion, and the centre of Islam, now permanently removed beyond the limits of Arabia, more susceptible to foreign influence, and assimilating more readily their civilizing elements. Damascus, Kufa and Basra will attract the flower of all the Moslem provinces, and thus that great intellectual, literary and scientific movement, which reached its apogee under the first Abbasid Caliphs at Bagdad, steadily becomes more marked.

After the burning of the Ka'ba during the siege of Mecca by Hosain b. Nomair, Ibn Zobair had rebuilt and enlarged the house of God. It is said that he thus carried out a design of the Prophet, which he had not ventured to undertake for fear of offending the newly converted Koreishites. Hajjāj pulled down the enlargements and restored the Ka'ba to its old state. Meanwhile, the caliph committed to him the government of the Hejaz. The Medinians, whose loyalty was suspected, were treated by him with severity; not a few *maulas* (clients) were obliged to wear a leaden badge on their neck (Tabarī, ii. p. 854 seq.).

Thus the protracted war against Ibn Zobair was brought to an end; hence this year (71) also is called the "year of union" (*jamā'a*). But the storms in Irak and Mesopotamia had not yet altogether subsided. The Qais could not leave unavenged the blood shed at Merj Rāhit. For about ten years the Syrian and Mesopotamian deserts were the scene of a series of raids, often marked by great cruelty, and which have been the subject of a great many poems. Abdalmalik had need of all his tact and energy to pacify ultimately the zealous sectaries, but the antagonism between Yemenites (Kalb and Azd) and Moḍarites (Qais and Tamīm) had been increased by these struggles, and even in the far east and the far west had fatal consequences.

When Abdalmalik, after a stay of forty days, returned from Irak to Syria, he left two Omayyad princes as his vicegerents in Kufa and Basra. Mohallab, who at the time of the battle of Bājomairā was in the field against the Azraqites (Kharijites), and had put himself at the disposal of the caliph, had orders to carry on the war. But the two princes proved unequal to their task and did not support Mohallab sufficiently, so that the Kharijites gained more than one victory. Abdalmalik in alarm made Hajjāj governor of Irak with the most extensive powers. The troops of Kufa, who accompanied Mohallab in an expedition against the

[1] Formerly the capital of the homonymous province of Syria; it lies a day's march west from Haleb (Aleppo).

Kharijites, had abandoned their general and dispersed to their homes, and nothing could induce them to return to their duty. Then, in the year 75 (A.D. 694), at the moment when the people were assembled in the mosque for morning prayers, an unknown young man of insignificant appearance, with a veil over his face, ascended the pulpit. It seemed at first that he could not find his words. One of the audience, with a contemptuous remark, took a handful of pebbles to pelt him with. But he let them fall when Hajjāj lifted his veil and began to speak.

"Men of Kufa," he said, "I see before me heads ripe for the sickle, and the reaper—I am he. It seems to me, as if I saw already the blood between your turbans and your shoulders. I am not one of those who can be frightened by inflated bags of skin, nor need any one think to squeeze me like a fig. The Prince of the Believers has spread before him the arrows of his quiver, and has tried every one of them by biting its wood. It is my wood that he has found the hardest and strongest, and I am the arrow which he shoots against you."

At the end of this address he ordered his clerk to read the letter of the caliph. He began: "From the servant of God, Abdalmalik, Prince of the Believers, to the Moslems that are in Kufa, peace be with you." As nobody uttered a word in reply, Hajjāj said: "Stop, boy," and exclaimed: "The Prince of the Believers salutes you, and you do not answer his greeting! You have been but poorly taught. I will teach you afresh, unless you behave better. Read again the letter of the Prince of the Believers." Then, as soon as he had read: "peace upon ye," there remained not a single man in the mosque who did not respond, "and upon the Prince of the Believers be peace." Thereupon Hajjāj ordered that every man capable of bearing arms should immediately join Mohallab in Khūzistān (Susiana), and swore that all who should be found in the town after the third day should be beheaded. This threat had its effect, and Hajjāj proceeded to Baṣra, where his presence was followed by the same results. Mohallab, reinforced by the army of Irak, at last succeeded, after a struggle of eighteen months, in subjugating the Kharijites and their caliph Qatara b. Fojā'a, and was able at the beginning of the year 78 (A.D. 697) to return to Hajjāj at Baṣra. The latter loaded him with honours and made him governor of Khorasan, whence he directed several expeditions into Transoxiana. In the meantime Hajjāj himself had, in 695 and 696, with great difficulty suppressed Shabīb b. Yazīd at the head of the powerful tribe of Shaibān, who, himself a Kharijite, had assumed the title of Prince of the Believers, and had even succeeded in occupying Kufa. In the east the realm of Islam had been very much extended under the reign of Moawiya, when Ziyād was governor of Irak and Khorasan. Balkh and Tokhāristān, Bokhara, Samarkand and Khwarizm (modern Khiva), even Kabul and Kandahar had been subdued; but in the time of the civil war a great deal had been lost again. Now at last the task of recovering the lost districts could be resumed. When, in 697, Hajjāj gave the government of Khorasan to Mohallab, he committed that of Sijistān (Seistan) to Obaidallah b. Abi Bakra, a cousin of Ziyād. This prefect allowed himself to be enticed by Zanbīl, prince of Zabulistan, to penetrate into the country far from his base, and escaped narrowly, not without severe losses. The command over Sijistān was now given to Abdarrahman b. Ash'ath, a descendant of the old royal family of Kinda, and a numerous army was entrusted to him, so magnificently equipped that it was called "the peacock army." Not long after his arrival in Sijistān, Ibn Ash'ath, exasperated by the masterful tone of Hajjāj, the plebeian, towards himself, the high-born, decided to revolt. The soldiers of Irak, who did not love the governor, and disliked the prospect of a long and difficult war far from home, eagerly accepted the proposition of returning to Irak, and even proclaimed the dethronement of Abdalmalik, in favour of Ibn Ash'ath. The new pretender entered Fārs and Ahwāz (Susiana), and it was in this last province near Tostar (Shuster) that Hajjāj came up with him, after receiving from Syria the reinforcements which he had demanded in all haste from the caliph. Ibn Ash'ath drove him back to Baṣra, entered the city, and then turned his arms against Kufa, of which he took possession with aid from within. Hajjāj, afraid lest his communications with Syria should be cut off, pitched his camp at Dair Qorra, eighteen miles west from Kufa towards the desert, where Mahommed, the brother of the caliph, and Abdallah, his son, brought him fresh troops. Ibn Ash'ath encamped not far from him at Dair al-Jamājim with a far more numerous army. In great alarm Abdalmalik endeavoured to stifle the revolt by offering to dismiss Hajjāj from his post. The insurgents rejected this offer, and hostilities recommenced. At the end of three months and a half, in July 702, a decisive action took place. Victory declared for Hajjāj. Ibn Ash'ath fled to Baṣra, where he managed to collect fresh troops; but having been again beaten in a furious battle that took place at Maskin near the Dojail, he took refuge at Ahwāz, from which he was soon driven by the troops of Hajjāj under 'Omāra b. Tamīm. The rebel then retired to Sijistān, and afterwards sought an asylum with the king of Kabul. His partisans fled before 'Omāra's army and penetrated into Khorasan, where they were disarmed by the governor Yazid, son of the celebrated Mohallab, who had died in the year 701. The pretender was betrayed by the king of Kabul and killed himself. His head was sent to Hājjāj and then to Damascus. This happened in the year 703 or 704. Yazid b. Mohallab was soon after deprived of the government of Khorasan, Majjāj accusing him of partiality towards the rebels of Yemenite extraction. He appointed in his stead first his brother Mofaḍḍal b. Mohallab, and nine months after Qotaiba b. Moslim, who was destined in a later period to extend the sway of Islam in the east as far as China.

The struggle of Ibn Ash'ath was primarily a contest for hegemony between Irak and Syria. The proud Arabic lords could not acquiesce in paying to a plebeian like Hajjāj, invested with absolute power by the caliph, the strict obedience he required. They considered it further as an injustice that the Syrian soldiers received higher pay than those of Irak. This is apparent from the fact that one of the conditions of peace proposed by Abdalmalik before the battle of Dair al-Jamājim had been that henceforth the Irakian troops should be paid equally with the Syrian. Moreover, Hajjāj, in order to maintian the regular revenue from taxation, had been obliged to introduce stringent regulations, and had compelled a great many villagers who had migrated to the cities to return to their villages. Several of these were *faqīhs*, students of Koranic science and law, and all these seconded Ibn Ash'ath with all their might. But, as Wellhausen has shown, it is not correct to consider the contest as a reaction of the *maula's* (Persian Moslems) against the Arabic supremacy.

Immediately after the victories of Dair al-Jamājim and Maskin, in 702, Hajjāj, built a new residence on the Tigris, between Baṣra and Kufa, which he called Wāsit ("Middle"). There his Syrian soldiers were not in contact with the turbulent citizens of the two capitals, and were at any moment ready to suppress any fresh outburst.

At the beginning of his reign Abdalmalik had replaced the humble mosque built by Omar on the site of the temple at Jerusalem by a magnificent dome, which was completed in the year 691. Eutychius and others pretend that he desired to substitute Jerusalem for Mecca, because Ibn Zobair had occupied the latter place, and thus the pilgrimage to the Ka'ba had become difficult for the Syrians. This is quite improbable. Abdalmalik was born and educated in Islam, and distinguished himself in his youth by piety and continence. He regarded himself as the champion of Islam and of the communion of the believers, and had among his intimates men of acknowledged devoutness such as Rajā b. Ḥaywa. The idea of interfering with the pilgrimage to the House of God at Mecca, which would have alienated from him all religious men, and thus from a political point of view would have been suicidal, cannot have entered his mind for a moment. But the glorification of Jerusalem, holy alike for Moslems, Christians and Jews, could not but exalt the glory of Islam and its rulers within and without.

As soon as the expedition to Irak against Muṣ'ab had terminated, the holy war against the Greeks was renewed. The

operations in Asia Minor and Armenia were entrusted to Mahommed b. Merwan, the caliph's brother, who was appointed governor of Mesopotamia and Armenia, and in 692 beat the army of Justinian II. near Sebaste in Cilicia. From this time forth the Moslems made yearly raids, the chief advantage of which was that they kept the Syrian and Mesopotamian Arabs in continual military exercise. After the victorious march of Okba (Oqba) b. Nāfi' through north Africa and the foundation of Kairawan, his successor Qais b. Zohair had been obliged to retreat to Barca (Cyrenaica). In the year 696 Abdalmalik sent Hassān b. No'mān into Africa at the head of a numerous army. He retook Kairawan, swept the coast as far as Carthage, which he sacked, expelling the Greek garrisons from all the fortified places; he then turned his arms against the Berbers, who, commanded by the Kāhina (Diviner), as the Arabs called their queen, beat him so completely that he was compelled to retreat to Barca. Five years later he renewed the war, defeated and killed the Kāhina, and subdued the Berbers, who henceforward remained faithful to the Arabs. Hassān continued to be governor of Kairawan till after the death of Abdalmalik.

In the meantime Abdalmalik reconstituted the administration of the empire on Arabic principles. Up to the year 693 the Moslems had no special coinage of their own, and chiefly used Byzantine and Persian money, either imported or struck by themselves. Moawiya, indeed, had struck dinars and dirhems with a Moslem inscription, but his subjects would not accept them as there was no cross upon them. Abdalmalik instituted a purely Islamitic coinage. If we may believe Theophanes, who says that Justinian II. refused to receive these coins in payment of the tribute and therefore declared the treaty at an end, we must put the beginning of the coinage at least two years earlier. Hajjāj coined silver dirhems at Kufa in 694. A still greater innovation was that Arabic became the official language of the state. In the conquered countries till then, not only had the Greek and Persian administration been preserved, but Greek remained the official language in the western, Persian in the eastern provinces. All officials were now compelled to know Arabic and to conduct their administration in that language. To this change was due in great measure the predominance of Arabic throughout the empire. Lastly, a regular post service was instituted from Damascus to the provincial capitals, especially destined for governmental despatches. The postmasters were charged with the task of informing the caliph of all important news in their respective countries.

All the great rivals of Abdalmalik having now disappeared, he was no longer like his predecessors *primus inter pares*, but *dominus*. Under his rule the members of the Omayyad house enjoyed a greater amount of administrative control than had formerly been the case, but high office was given only to competent men. He succeeded in reconciling the sons of 'Amr Ashdaq, and also Khālid b. Yazid, to whom he gave his own daughter in marriage. He himself had married 'Ātika, a daughter of Yazid, a union which was in all respects a happy one. He took great care in the education of his sons, whom he destined as his successors. His brother Abdalazīz, governor of Egypt, whom Merwan had marked out as his successor, died in the year 703 or 704, and Abdalmalik chose as heirs to the empire first his son Walīd, and after him his second son Sulcimān. He himself died on the 14th Shawwāl 86 (9th October 705) at the age of about sixty. His reign was one of the most stormy in the annals of Islam, but also one of the most glorious. Abdalmalik not only brought triumph to the cause of the Omayyads, but also extended and strengthened the Moslem power as a whole. He was well versed in old Arabic tradition and in the doctrine of Islam, and was passionately fond of poetry. His court was crowded with poets, whom he loaded with favours, even if they were Christians like Akhtal. In his reign flourished also the two celebrated rivals of Akhtal, Jarīr and Farazdaq.

6. *Reign of Walid I.*—This is the most glorious epoch in the history of Islam. In Asia Minor and Armenia, Maslama, brother of the caliph, and his generals obtained numerous successes against the Greeks. Tyana was conquered after a long siege, and a great expedition against Constantinople was in preparation. In Armenia Maslama advanced even as far as the Caucasus. In Africa, Mūsā b. Noṣair, who succeeded Hassān b. No'mān as governor, in a short time carried his conquests as far as Fez, Tangier and Ceuta, and one of his captains even made a descent on Sicily and plundered Syracuse. When he returned from the west to Kairawan, he made his client Ṭāriq (or Tarik) governor of Tangier and of the whole western part of Africa. Under him the chiefs who had submitted to the Moslem arms retained their authority. One of them was the Greek exarch of Tangier, Julian, who, supported by the powerful Berber tribe of Ghomēra, had long resisted and even asked for aid from Spain, but had been compelled to surrender and was left governor of Ceuta. Meanwhile in Spain, after the death of the Gothic king Witiza in the year 90 (708–709), anarchy arose, which was terminated by the council of noblemen at Toledo electing Roderic, the powerful duke of Baetica, to be his successor in the fifth year of Walid. The eldest son of Witiza then applied to Julian, and asked the aid of the Arabs for the recovery of his father's throne. Ṭāriq forwarded the embassy to Kairawan, and Mūsā asked the caliph's permission to send an expedition into Spain. Authorized by Mūsā, Ṭāriq now sent, in Ramadan 91 (July 710), 500 Berbers under the command of Ṭārif to reconnoitre the country. This expedition, seconded by partisans of Witiza, was successful. In the beginning of A.D. 711 Roderic had been summoned to the north on account of an invasion of Navarra by the Franks, caused, it is said, by the conspirators. Ṭāriq, thus certain of meeting no serious opposition to his landing, passed into Spain himself with an army composed mainly of Berbers of the Ghomēra tribe under the guidance of Julian. The spot where he landed thence acquired the name of Jebel Ṭāriq, "Mountain of Ṭāriq," afterwards corrupted into Gibraltar. Having made himself master of Algeçiras and thereby secured his communication with Africa, Ṭāriq set out at once in the direction of Cordova. At the news of the invasion Roderic hastened back and led a numerous army against the combined forces of Ṭāriq and the partisans of Witiza. A fierce battle took place in the plain of Barbata on the little river of Guadaleta (north of Medina Sidonia), in which Roderic was completely routed. The spoils of the victors were immense, especially in horses, but the king himself had disappeared. Fearing lest he should have escaped to Toledo and should there fit out another army, the partisans of Witiza insisted that Ṭāriq should march immediately against the capital. Ṭāriq complied with their wishes, notwithstanding the express command of Mūsā b. Nosair that he should not venture too far into the country, and the protests of Julian. Having made himself master of Ecija and having despatched a detachment under Moghīth against Cordova, Ṭāriq took Mentesa (Villanueva de la Fuente) and marched upon Toledo, which he soon conquered. At the same time Moghīth took Cordova. But, notwithstanding these successes, Ṭāriq knew that his situation was most critical. King Roderic, who had escaped to Lusitania, and the noble Goths, who had fled from Toledo, would certainly not be slow in making efforts to regain what they had lost. He therefore sent a message in all haste to Mūsā, entreating him to come speedily. Mūsā, though angered by the disobedience of Ṭāriq, hastened to the rescue and embarked in April 712 with 18,000 men, among them many noble Arabs, and began, advised by Julian, a methodical campaign, with the purpose of establishing and securing a line of communication between the sea and Toledo. After having taken Seville, Carmona and Merida, he marched from the latter place by the Via Romana to Salamanca, after having ordered Ṭāriq to rejoin him in order to encounter king Roderic. Not far from Tamames the king was defeated and killed. King Alphonso the Great found his tombstone at Viseo with the inscription, "Hic requiescit Rodericus rex Gothorum." After this battle Mūsā reconquered Toledo, which, after the departure of Ṭāriq, had recovered its independence, and entered the capital in triumph. Already, before the expedition to Salamanca, he had perceived that the sons of Witiza had neither military nor political ability. He therefore proclaimed the caliph of Damascus as sole ruler of the whole peninsula.

The Gothic princes must content themselves with honours and apanages, in which they readily acquiesced. In the same year 93 (A.D. 712) Mūsā struck Moslem coins with Latin inscriptions. Mūsā then continued the subjugation of Spain, till Walid recalled him to Damascus. He obeyed after having appointed his son Abdalazīz governor of Andalos (Andalusia), as the Arabs named the peninsula, and assigned Seville as his residence. Abdalazīz consolidated his power by marrying the widow of the late king Roderic. Mūsā left Spain about August 714, and reached Damascus shortly before the death of Walid. Notwithstanding the immense booty he brought, he did not receive his due reward. Accused of peculation, he was threatened with imprisonment unless he paid a fine of 100,000 pieces of gold. The old man—he was born in the year 640—was released by Yazid b. Mohallab, the then mighty favourite of the caliph Suleiman, but died in the same year 716 on his way to Mecca. His son Abdalazīz was an excellent ruler, who did much for the consolidation of the new conquests, but he reigned only one year and eleven months, when he was murdered. His death has been falsely imputed by some historians to the caliph Suleiman.[1]

In the East the Moslem armies gained the most astonishing successes. In the course of a few years Qotaiba b. Moslim conquered Paikend, Bokhara, Samarkand, Khwarizm (mod. Khiva), Ferghana and Shāsh (Tashkent), and even Kashgar on the frontiers of China. Meanwhile Mahommed b. Qāsim invaded Makran, took Daibol, passed the Indus, and marched, after having beaten the Indian king Daher, through Sind upon Multān, which he conquered and whence he carried off an immense booty.

Walid was the first caliph, born and trained as prince, who felt the majesty of the imamate and wished it to be felt by his subjects. He desired to augment the splendours of Islam and its sovereign, as Abdalmalik had already done by building the dome of Jerusalem. In the time of the conquest of Damascus, one half of the great church had been made a mosque, while the remaining half had been left to the Christians. Walid annexed this part, indemnifying the Christians elsewhere, and restored the whole building sumptuously and magnificently. In his time many fine palaces and beautiful villas were built in Syria, and Becker's conjecture seems not altogether improbable, that from this period dates the palace of Mashetta, the façade of which is now in the Kaiser Friedrich Museum at Berlin, as perhaps also the country houses discovered by Musil in the land of Moab. Walid also caused the mosque of Medina to be enlarged. For this purpose, the apartments of the Prophet and his wives were demolished, which at first caused much discontent in Medina, some crying out that thereby a verse of the Book of God (S. 49, v. 4) was cancelled. With this exception, the citizens of Medina had nothing to complain of. The vicegerent of Abdalmalik had treated them harshly. Walid immediately on his accession appointed as governor of Hejaz his cousin Omar b. Abdalazīz, who was received there with joy, his devoutness and gentle character being well known. But the reputation of Omar attracted to the two holy cities a great number of the inhabitants of Irak, who had been deeply involved in the rebellion of Ibn Ash'ath. Hajjāj, however, was not the man to allow the formation of a fresh nucleus of sedition, and persuaded the caliph to dismiss Omar in the year 712, and appoint Othman b. Ḥayyān at Medina and Khālid al-Qasrī at Mecca. These two prefects compelled the refugees to return to Irak, where many of them were severely treated and even put to death by Hajjāj.

Few people have been so slandered as this great viceroy of the Orient. In reality he was a man of extraordinary ability, and accomplished the task committed to him with vigour and energy. To his unflagging constancy was due the suppression of the dangerous rebellion of Ibn Ash'ath. After the restoration of peace his capacity for organization was displayed in all directions. The draining and tilling of submerged or uncultivated land on a large scale, the promotion of agriculture in every way, in particular by the digging of channels, and the regulation of the system of taxation, were carried out on his initiative. He showed the utmost wisdom in the selection of his lieutenants. The fear of his name was so great that even in the desert there was security for life and property, and his brilliant military successes were unquestionably due in a great measure to the care which he bestowed on equipment and commissariat. The heavy expenses entailed thereby were largely met by the booty which he won. Hajjāj was a sincere Moslem; this, however, did not prevent him from attacking Ibn Zobair in the Holy City, nor again from punishing rebels, though they bore the name of holy men. He enjoyed the entire confidence of Abdalmalīk with Walid, but Suleiman, the appointed successor, regarded him with disfavour. Yazid b. Mohallab, whom he had recalled from Khorasan, and imprisoned, had escaped and put himself under the protection of Suleiman, who made himself surety for the fine to which Yazid had been condemned. Hajjāj foreboded evil, and prayed eagerly that he might die before Walid. His death took place about the end of Ramadan 95 (June or July 714).

7. *Reign of Suleiman* (*Solaiman*).—Suleiman had early missed the throne. Walid wished to have his son Abdalazīz chosen as his successor, and had offered Suleiman a large sum of money to induce him to surrender his rights. Walid went still further and sent letters to the governors of all the provinces, calling on them to take the oath of allegiance to his son. None, except Hajjāj and his two generals Qotaiba b. Moslim and Mahommed b. Qāsim, consented thus to set at naught the order of succession established by Abdalmalik; and Suleiman succeeded without difficulty on the death of his brother Jomāda II. 96 (February 715). We can easily conceive the hatred felt by Suleiman for Hajjāj and for all that belonged to him. Hajjāj himself was dead; but Suleiman poured out his wrath on his family and his officers. The governors of Medina and Mecca were dismissed; Mahommed b. Qasim, the conqueror of India, cousin of Hajjāj, was dismissed from his post and outlawed. Qotaiba b. Moslim, the powerful governor of Khorasan, tried to anticipate the caliph by a revolt, but a conspiracy was formed against him, which ended in his murder. Some historians say that he was falsely accused of rebellion.

Yazid b. Mohallab, the enemy of Majjāj, was made governor of Irak. His arrival was hailed with joy, especially by the Azd, to whom his family belonged, and the other Yemenite tribes. Yazid discovered soon that the system of taxation as regulated by Hajjāj could not be altered without serious danger to the finances of the empire, and that he could not afford the expenses which his prodigal manner of life involved. He therefore asked the caliph to give him the governorship of Khorasan also, and took his residence in Merv, where he was free from control. On his return to Khorasan he set on foot a series of new expeditions against Jorjān and Tabaristān, with only partial success. He sent, however, to the caliph an exaggerated account of his victories and the booty he had made. He had cause to repent this later.

Walid had, in the last years of his reign, made preparations for a great expedition against Constantinople. Suleiman carried them on with energy, and as early as the autumn of A.D. 715 Maslama invaded Asia Minor at the head of a numerous army, whilst a well-equipped fleet under Omar b. Hobaira sailed out to second him. It is said that Suleiman was firmly persuaded that Constantinople would be conquered during his reign, in accordance with a Sibylline prophecy which said that the city would be subdued by a caliph bearing the name of a prophet, he himself being the first to fulfil this condition.[2] Moreover, the Byzantine empire was in these years disturbed by internal troubles. The first year of the expedition was not unsuccessful. The siege of Amorium in Phrygia was broken up, but Pergamum and Sardis were taken. On the 25th of August 716 the blockade

[1] This account of the conquest is based partly on the researches of Dozy, but mainly on those of Saavedra in his *Estudio sobre la Invasion de los Arabes en España* (Madrid, 1892). Some of the details, however, *e.g.* the battle near Tamames and the part played by the sons of Witiza, are based, not on documentary evidence, but on probable inferences. For other accounts of the deaths of Musa and Abdalaziz see Sir Wm. Muir, *Caliphate* (London, 1891), pp.368-9.

[2] Solaiman is the Arabic form of Solomon. The prophecy is to be found in the *Kitāb al-Oyūn*, p. 24; cf. Tabarī ii. p. 1138.

of Constantinople began from the land side, and two weeks later from the sea side. A few months before, Leo the Isaurian had ascended the throne and prepared the city for the siege. This lasted about a year. The besieged were hard pressed, but the besiegers suffered by the severe winter, and were at last obliged to raise the siege. Maslama brought back the rest of his army in a pitiful state, while the fleet, on its return, was partly destroyed by a violent tempest. The Moslems regard this failure as one of the great evils that have befallen the human race, and one which retarded the progress of the world for ages,[1] the other calamity being the defeat in the battle of Tours by Charles Martel.

Maslama was still on his way back when Suleiman died at Dābiq in northern Syria, which was the base of the expeditions into Asia Minor. He seems not to have had the firmness of character nor the frugality of Walid; but he was very severe against the looseness of manners that reigned at Medina, and was highly religious. Rajā b. Haywa, renowned for his piety, whose influence began under Abdalmalik and increased under Walid, was his constant adviser and even determined him to designate as his successor his devout cousin Omar b. Abdalazīz. Suleiman was kind towards the Alids and was visited by several of them, amongst others by Abu Hāshim, the son of Mahommed b. al Ḥanafīya, who after his father's death had become the secret Imam (head) of the Shi'ites. On his way back to Hejaz this man visited the family of Abdallah b. 'Abbās, which resided at Ḥomaima, a place situated in the vicinity of 'Ammān, and died there, after having imparted to Mahommed b. Ali b. Abdallah b. Abbas the names of the chiefs of the Shi'a in Irak and Khorasan, and disclosed his way of corresponding with them. From that time the Abbasids began their machinations against the Omayyads in the name of the family of the Prophet, avoiding all that could cause suspicion to the Shi'ites, but holding the strings firmly in their own hands.

8. *Reign of Omar II.*—Omar b. Abdalazīz did his best to imitate his grandfather Omar in all things, and especially in maintaining the simple manner of life of the early Moslems. He was, however, born in the midst of wealth; thus frugality became asceticism, and in so far as he demanded the same rigour from his relatives, he grew unjust and caused uneasiness and discontent. By paying the highest regard to integrity in the choice of his officers, and not to ability, he did not advance the interests of his subjects, as he earnestly wished to do. In the matter of taxes, though actuated by the most noble designs, he did harm to the public revenues. The principle of Islam was, that no Moslem, whatever might be his nationality, should pay any tax other than the *zakāt* or poor-rate (see MAHOMMEDAN INSTITUTIONS). In practice, this privilege was confined to the Arabic Moslems. Omar wished to maintain the principle. The original inhabitants had been left on the conquered lands as agriculturists, on condition of paying a fixed sum yearly for each district. If one of these adopted Islam, Omar permitted him to leave his place, which had been strictly forbidden by Ḥajjāj in Irak and the eastern provinces, because by it many hands were withdrawn from the tilling of the ground, and those who remained were unable to pay the allotted amount. Omar's system not only diminished the actual revenue, but largely increased in the cities the numbers of the *maula's* (clients), mainly Persians, who were weary of their dependency on their Arabic lords, and demanded equal rights for themselves. Their short dominion in Kufa under Mokhtār had been suppressed, but the discontent continued. In North Africa particularly, and in Khorasan the effect of Omar's proclamation was that a great multitude embraced Islam. When it became necessary to impose a tribute upon the new converts, great discontent arose, which largely increased the number of those who followed the Shi'ite preachers of revolt. Conversion to Islam was promoted by the severe regulations which Omar introduced for the non-believers, such as Christians and Jews. It was he who issued those humiliating rescripts, which are commonly but unjustly attributed to Omar I. But he forbade extortion and suppressed more than one illegal impost. He endeavoured above all to procure justice for all his subjects. Complaints against oppression found in him a ready listener, and many unlawfully acquired possessions were restored to the legal owners, for instance, to the descendants of Ali and Talha. Even to the Kharijites he contrived to give satisfaction, as far as possible. In all these matters he followed the guidance of divines and devotees, in whose congenial company he delighted. It is, therefore, not to be wondered at that these men saw in Omar the ideal of a prince, and that in Moslem history he has acquired the reputation of a saint.

After the failure of the siege of Constantinople, the advanced posts in Asia Minor were withdrawn, but the raids were continued regularly. It has been said that it was Omar's intention to give up his Spanish conquests, but the facts argue the contrary. The governor, named by Omar, Samḥ b. Abdallah, even crossed the Pyrenees and took possession of Narbonne; but he was beaten and killed at Toulouse in July 720. But Omar did all he could to prevent the degradation of the Holy War, which, instead of being the ultimate expedient for the propagation of Islam, if all other means had failed, had often degenerated into mere pillaging expeditions against peaceful nations.

9. *Reign of Yazid II.*—Omar's reign was as short as that of his predecessor. He died on the 24th of Rajab 101 (A.D. 9th February 720). Yazid II., son of Abdalmalik and, by his mother 'Ātika, grandson of Yazid I., ascended the throne without opposition. He had at once, however, to put down a dangerous rebellion. Yazid b. Mohallab had returned to Irak, after the conquest of Jorjān, when Suleiman was still alive. Shortly after, Adī b. Artāt, whom Omar II. had appointed governor, arrived, arrested Yazid, and sent him to Omar, who called him to account for the money he had mentioned in his letter to Suleiman, and imprisoned him when he pretended not to be able to pay the amount. Yazid II. had personal grounds for ill-will to Yazid b. Mohallab. One of the wives of the new caliph, the same who gave birth to that son of Yazid II. who afterwards reigned as Walid II., was niece to the celebrated Ḥajjāj, whose family had been ill-treated by the son of Mohallab, when he was governor of Irak under Suleiman. Aware that Yazid b. Abdalmalik, on ascending the throne, would spare neither him nor his family, Yazid b. Mohallab had succeeded in escaping to Basra, the home of his family, where his own tribe the Azd was predominant. Meanwhile 'Adī b. Artāt had all the brothers of Yazid and other members of the family of Mohallab arrested, and tried to prevent Yazid from entering the city. But 'Adi was too scrupulous to employ the public money for raising the pay of his soldiers, whilst Yazid promised mountains of gold. Yazid stormed the castle and took 'Adī prisoner, the public treasury fell into his hands, and he employed the money to pay his troops largely and to raise fresh ones. A pardon obtained for him from the caliph came too late; he had already gone too far. He now proclaimed a Holy War against the Syrians, whom he declared to be worse enemies of Islam than even the Turks and the Dailam. Notwithstanding the warnings of the aged Hasan al-Basrī, the friend of Omar II., the religious people, took the part of Yazid, and were followed by the *maulas*. Though the number of his adherents thus increased enormously, their military value was small. Ahwāz (Khūzistān), Fārs and Kirman were easily subdued, but in Khorasan the Azd could not prevail over the Tamīm, who were loyal to the caliph. As the rebellion threatened to spread far and wide, Yazid II. was obliged to appeal to his brother, the celebrated Maslama. With the approach of the Syrians, Yazid b. Mohallab tried to forestall them at Kufa. He took his way over Wāsit, which he mastered—the Syrian garrison seems to have been withdrawn in the days of Omar II.—but, before he could get hold of Kufa, the Syrian troops arrived. The meeting took place at 'Aqr in the vicinity of Babel, and Yazid was completely defeated and fell in the battle. His brothers and sons fled to Basra; thence they went by sea to Kirman and then to Kandabīl in India; but they were pursued relentlessly and slain with only two exceptions by the officers of Maslama. The possessions of the Mohallabites were confiscated.

Maslama was rewarded with the governorship of Irak and

[1] Seyid Ameer Ali, *A Critical Examination of the Life and Teachings of Mahomet*, pp. 341-343.

Khorasan, but was soon replaced by Omar b. Hobaira, who under Omar II. had been governor of Mesopotamia. He belonged to the tribe of Qais, and was very severe against the Azd and other Yemenite tribes, who had more or less favoured the part of Yazid b. Mohallab. In these years the antagonism between Qais (Moḍar) and Yemenites became more and more acute, especially in Khorasan. The real cause of the dismissal of Maslama was, that he did not send the revenue-quota to Damascus. Omar b. Hobaira, to supply the deficiency, ordered the prefect of Khorasan, Sa'īd-al-Ḥarashī, to take tribute from the Sogdians in Transoxiana, who had embraced Islam on the promise of Omar II. The Sogdians raised a revolt in Ferghana, but were subdued by Sa'īd and obliged to pay. A still more questionable measure of Ibn Hobaira was his ordering the successor of Sa'īd Harashī to extort large sums of money from several of the most respectable Khorasanians. The discontent roused thereby became one of the principal causes of the fall of the Omayyads.

In Africa serious troubles arose from the same cause. Yazid b. Abi Moslim, who had been at the head of the financial department in Irak under Ḥajjāj, and had been made governor of Africa by Yazid II., issued orders that the villagers who, having adopted Islam, were freed from tribute according to the promise of Omar II., and had left their villages for the towns, should return to their domiciles and pay the same tribute as before their conversion. The Berbers rose in revolt, slaughtered the unfortunate governor, and put in his place the former governor Mahommed b. Yazid. The caliph at first ratified this choice, but soon after dismissed Mahommed from his post, and replaced him by Bishr b. Ṣafwān, who under Hisham made an expedition against Sicily.

Yazid II. was by natural disposition the opposite of his predecessor. He did not feel that anxiety for the spiritual welfare of his subjects which had animated Omar II. Poetry and music, not beloved by Sulcīman and condemned by Omar, were held by him in great honour. Two court-singers, Sallāma and Ḥabāba, exercised great influence, tempered only by the austerity of manners that prevailed in Syria. He was so deeply affected by the death of Ḥabāba, that Maslama entreated him not to exhibit his sorrow to the eyes of the public. He died a few days later, on the 26th of January 724, according to the chroniclers from grief for her loss. As his successor he had appointed in the first place his brother Hisham, and after him his own son Walid.

10. *Reign of Hisham.*—Hisham was a wise and able prince and an enemy of luxury, not an idealist like Omar II., nor a worldling like Yazid II., but more like his father Abdalmalik, devoting all his energy to the pacification of the interior, and to extending and consolidating the empire of Islam. But the discontent, which had been sown under his predecessors, had now developed to such an extent that he could not suppress it in detail. His first care was to put an end to the tyrannical rule of the Qaisites (Moḍarites) in Irak and Khorasan by dismissing Omar b. Hobaira and appointing in his place Khālid al-Qasrī. This very able man, who under Hajjāj had been prefect of Mecca, belonged properly neither to the Qaisites nor to the Yemenites, but as he took the place of Ibn Hobaira and dismissed his partisans from their posts, the former considered him as their adversary, the latter as their benefactor. After his death, in particular, the Yemenites celebrated him as their chief, and assigned as the reason for their revolt the injuries which he suffered. Khālid himself assuredly did not intend it. He was a loyal servant of the dynasty, and remained such even after receiving very harsh treatment from them. For fifteen years Khālid governed the eastern half of the empire, and continued to maintain peace with only few exceptions throughout. He did much for the reclaiming and improving of lands in Irak, in which the caliph himself and several princes took an active part. The great revenues obtained thereby naturally caused much jealousy. Khālid lived on a very rich scale and was extraordinarily liberal, and he was charged with having carried out all his improvements for his own interests, and upbraided for selling the corn of his estates only when the prices were high. To these charges were added the accusation that he was too tolerant to Christians, Jews and Zoroastrians. As his mother professed the Christian religion, he was accused of infidelity. At last a conspiracy, into which the principal engineer of Khālid, Hassān the Nabataean, had been drawn, succeeded in inciting Hisham against Khālid. They told him that Khālid had used disrespectful terms in speaking of the caliph, and that he had appropriated revenues belonging to the state. The latter imputation especially influenced Hisham, who was very parsimonious. When the dismissal of Khālid had been resolved upon, Yūsuf b. Omar, his appointed successor, was sent secretly to Kufa, where he seized on Khālid unawares. For eighteen months Khālid remained in prison. But when he declined even under torture to confess that he had been guilty of extensive peculation, he was finally released. He settled at Damascus and made a noble return for his injuries by taking an active part in the war against the Greeks. In the summer of A.D. 740, while he was in Asia Minor, a great fire broke out in Damascus, the guilt of which was attributed to Khālid. Though it soon appeared that the imputation was false, Khālid, on his return, was furious, and uttered very offensive words against the caliph. Hisham, however, would not again punish his old servant; on the contrary, he seems to have regarded his indignation as a proof of innocence.

The successor of Khālid in Irak had not long been in office when Zaid b. Ali, grandson of Hosain b. Ali, who had come to Kufa for a lawsuit, was persuaded by the chiefs of the Shi'a to organize a revolt. He succeeded in so far that 15,000 Kufians swore to fight with him for the maintenance of the commandments of the Book of God and the *Sunna* (orthodox tradition) of his Prophet, the discomfiture of the tyrants, the redress of injury, and last, not least, the vindication of the family of the Prophet as the rightful caliphs. The revolt broke out on the 6th of January 740. Unfortunately for Zaid he had to do with the same Kufians whose fickleness had already been fatal to his family. He was deserted by his troops and slain. His body was crucified in Kufa, his head sent to Damascus and thence to Medina. His son Yahyā, still a youth, fled to Balkh in Khorasan, but was discovered at last and hunted down, till he fell sword in hand under Walid II. Abu Moslim, the founder of the Abbasid dynasty, proclaimed himself his avenger, and on that occasion adopted the black garments, which remained the distinctive colour of the dynasty.

In Khorasan also there were very serious disturbances. The Sogdians, though subdued by Sa'īd al Ḥarashī, were not appeased, but implored the assistance of the Turks, who had long been contending earnestly against the Arabs for the dominion of Transoxiana. They found besides a most valuable ally in Ḥārith b. Soraij, a distinguished captain of the Arabic tribe of Tamīm, who, with many pious Moslems, was scandalized by the government's perfidy in regard to the new converts. Ḥārith put himself at the head of all the malcontents, and raised the black flag, in compliance with a Sibylline prophecy, holding that the man with the black flag (the Prophet's flag) would put an end to the tyranny, and be the precursor of the Mahdi.[1] The government troops suffered more than one defeat, but in the last month of the year 118 (A.D. 736) the governor Asad al-Qasrī, the brother of Khālid, after having defeated Ḥārith, gained a brilliant victory over the Turks, which finally caused them to retreat. Asad died almost simultaneously with the dismissal of Khālid. Hisham then separated Khorasan from Irak and chose as governor of the former Naṣr b. Sayyār, a valiant soldier who had grown grey in war, and who, besides all his other capacities, was an excellent poet. Naṣr instituted a system of taxation, which, if it had been introduced earlier, would perhaps have saved the Arabic domination. It was that which later on was generally adopted, viz. that all possessors of conquered lands (*i.e.* nearly the whole empire except Arabia), whether Moslems or not, should pay a fixed tax, the latter in addition to pay a poll-tax, from which they were relieved on conversion to Islam. During the reign of Hisham, Naṣr made a successful expedition against Ḥārith and the Turks. The

[1] Cf. Van Vloten, *Recherches sur la domination arabe, le Chiitisme et les croyances messianiques sous le Khalifat des Omayades* (Amsterdam, 1894), p. 63 seq.

propaganda of the Shi'a by the Abbasids was continued in these years with great zeal.

In India several provinces which had been converted to Islam under the Caliphate of Omar II. declared themselves independent, because the promise of equal rights for all Moslems was not kept under the reign of his successors. This led to the evacuation of the eastern part of India (called Hind by the Arabs, Sind being the name of the western part), and to the founding of the strong cities of Maḥfūẓa and Manṣūra for the purpose of controlling the land.

In the north and north-west of the empire there were no internal disorders, but the Moslems had hard work to maintain themselves against the Alans and the Khazars. In the year 112 (A.D. 730) they suffered a severe defeat, in which the general Jarrāh perished. But the illustrious Maslama b. Abdalmalik, and Merwan b. Mahommed (afterwards caliph), governor of Armenia and Azerbaijan (Adherbaijan), succeeded in repelling the Khazars, imposing peace on the petty princes of the eastern Caucasus, and consolidating the Arab power in that quarter. The war against the Byzantines was continued with energy during the whole of Hisham's reign. Moawiya, the son of Hisham, whose descendants reigned later in Spain, was in command till 118 (A.D. 736), when he met his death accidentally in Asia Minor by a fall from his horse. After his death, Suleiman, another son of the caliph, had the supreme command. Both were eager and valiant warriors. But the hero of all the battles was Abdallah b. Hosain, surnamed al-Battāl (the brave). He has been the subject of many romantic tales. Tabarī tells how he took the emperor Constantine prisoner in the year 114 (A.D. 732; but Constantine V. Copronymus only began to reign in 740 or 741 A.D.); another Arabic author places this event in the year 122, adding that al-Battāl, having defeated the Greeks, was attacked and slain in returning with his captives. The Greek historians say nothing about Constantine having been made prisoner. It is probable that the Arabs took another Greek soldier for the prince.[1] The victories of the Moslems had no lasting results. During the troubles that began in the reign of Walid II., the Greeks reconquered Marash (Germanicia), Malatia (Malatiyeh) and Erzerum (Theodosiopolis).

In Spain the attention of the Moslems was principally turned to avenge the defeat of Samḥ beyond the Pyrenees. As early as the second year of the reign of Hisham, 'Anbasa, the governor of Spain, crossed the Pyrenees, and pushed on military operations vigorously. Carcassonne and Nîmes were taken, Autun sacked. The death of 'Anbasa in A.D. 725 and internal troubles put a stop to further hostilities. The Berbers were the chief contingent of the Moslem troops, but were treated by their Arab masters as inferior people. They began to resent this, and one of their chiefs, Munisa (Munuza), made himself independent in the north and allied himself with Odo, king of Aquitaine, who gave him his daughter in marriage. In the year 113 Abdarrahman b. Abdallah subdued Munisa, crossed the mountains and penetrated into Gascony by the valley of Roncesvalles. The Moslems beat Odo, gained possession of Bordeaux, and overran the whole of southern Gaul nearly as far as the Loire. But in October 732 their march was checked between Tours and Poitiers by Charles Martel and after some days of skirmishing a fierce but indecisive battle was fought. Abdarrahman was among the slain and the Moslems retreated hastily in the night, leaving their camp to the Franks. They were, however, not yet discouraged. In 739 the new governor of Spain, Oqba (Aucupa) b. Hajjāj, a man of high qualities, re-entered Gaul and pushed forward his raids as far as Lyons, but the Franks again drove back the Arabs as far as Narbonne. Thenceforth the continual revolts of the Berbers in Africa, and the internal troubles which disturbed Spain until the reign of Abdarrahman I., effectually checked the ambition of the Moslems.

In Africa the hand of government pressed heavily. The Berbers, though they had pledged themselves to Islam and had furnished the latest contingents for the Holy War, were treated as tributary serfs, notwithstanding the promises given by Omar II. The Kharijites, of whom a great many had emigrated to Africa, found them eager listeners. Still, they could not believe that it was according to the will of the caliph that they here thus treated, until a certain number of their chiefs went as a deputation to Hisham, but failed to obtain an audience. Thereupon a fierce insurrection broke out, against which the governor of Africa was powerless. Hisham at once sent an army of more than 30,000 men, under the command of Kolthum al-Qoshairī, and Balj b. Bishr. Not far from the river Sabu in Algeria,[2] the meeting with the army of the insurgents took place (A.D. 740). Kolthūm was beaten and killed; Balj b. Bishr led the rest of the Syrian army to Ceuta, and thence, near the end of 741, to Spain, where they aided in the suppression of the dangerous revolt of the peninsular Berbers. Balj died in 742. A year later the governor, Abu'l-Khaṭṭār, assigned to his troops for settlement divers countries belonging to the public domain.[3] An effort of the African Berbers to make themselves masters of Kairawan failed, their army being utterly defeated by the governor Ḥanẓala.

Hisham died in February 743, after a reign of twenty years. He had not been wanting in energy and ability, and kept the reins of the government in his own hands. He was a correct Moslem and tolerant towards Christians and Jews. His financial administration was sound and he guarded against any misuse of the revenues of the state. But he was not popular. His residence was at Roṣāfa on the border of the desert, and he rarely admitted visitors into his presence; as a rule they were received by his chamberlain Abrash. Hisham tried to keep himself free from and above the rival parties, but as his vicegerents were inexorable in the exaction of tribute, the Qaisites against the Yemenites, the Yemenites against the Qaisites, both parties alternately had reason to complain, whilst the non-Arabic Moslems suffered under the pressure and were dissatisfied. He caused a large extent of land to be brought into cultivation, and many public works to be executed, and he was accused of overburdening his subjects for these purposes. Therefore, Yazid III. (as also the Abbasids) on taking office undertook to abstain from spending money on building and digging. The principle that a well-filled treasury is the basis of a prosperous government was pushed by him too far. Notwithstanding his activity and his devotion to the management of affairs, the Moslem power declined rather than advanced, and signs of the decay of the Omayyad dynasty began to show themselves. The history of his four successors, Walid II., Yazid III., Ibrahim and Merwan II., is but the history of the fall of the Omayyads.

11. *Reign of Walid II.*—Walid II. was a handsome man, possessed of extraordinary physical strength, and a distinguished poet. But Hisham, to whom he was successor-designate, foolishly kept him in the background, and even made earnest efforts to get his own son Maslama acknowledged as his successor. Walid therefore retired to the country, and passed his time there in hunting, cultivating poetry, music and the like, waiting with impatience for the death of Hisham and planning vengeance on all those whom he suspected of having opposed him. His first public action was to increase the pay of all soldiers by 10 dirhems, that of the Syrians by 20. The Omayyads who came to pay their respects to him received large donations. Many philanthropic institutions were founded. As to the family of his predecessor, he contented himself with confiscating their possessions, with the single exception of Suleiman b. Hisham, whom he had whipped and put in prison. But the Makhzūmites, who were related to Hisham by his mother, he deprived of all their power and had them tortured to death. The vicegerents of Hisham were replaced by Qaisites; Yusuf b. Omar, the governor of Irak, being a Qaisite, was not only confirmed in his office, but received with it the supreme command of Khorasan. He made use of it immediately by ordering Naṣr b. Sayyār to collect a rich present of horses, falcons, musical instruments, golden and silver vessels and to offer it to the caliph in person, but before the present was ready the news came that Walid had been murdered.

[1] Cf. Wellhausen, *Die Kämpfe der Araber mit den Rom. in der Zeit der Umaijiden* (Göttingen, 1901), p. 31.

[2] Bayān i. p. 42; Dozy, *Histoire des musulmans d'Espagne*, i. p. 246, names the place Bacdoura or Nafdoura, the Spanish chronist Nauam.

[3] Dozy i. p. 268.

It is not certain that Walid also suspected Khālid al-Qasrī of having intrigued against him. But Yusuf b. Omar did not rest until he had his old enemy in his power. It is said that he guaranteed Walid a large sum of money, which he hoped to extort from Khālid. This unfortunate man died under torture, which he bore with fortitude, in Muharram 126 (November 743).

Walid designated his two sons as heirs to the Caliphate. These were still under age and were not the children of a free-born, noble mother. Both circumstances, according to the then prevailing notions, made them unfit for the imamate. Moreover, it was an affront, in particular, for the sons of Walid I., who already had considered the nomination of Yazid II. as a slight to themselves. A conspiracy arose, headed by Yazid b. Walid I., and joined by the majority of the Merwanid princes and many Kalbites and other Yemenites who regarded the ill-treatment of Khālid al-Qasrī as an insult to themselves. Various stories were circulated about the looseness of Walid's manner of life; Yazid accused him of irreligion, and, by representing himself as a devout and God-fearing man, won over the pious Moslems. The conspirators met with slight opposition. A great many troops had been detached by Hisham to Africa and other provinces, the caliph himself was in one of his country places; the prefect of Damascus also was absent. Without difficulty, Yazid made himself master of Damascus, and immediately sent his cousin Abdalazīz with 2000 men against Walid, who had not more than 200 fighting men about him. A few men hastened to the rescue, among others 'Abbās b. Walid with his sons and followers. Abdalazīz interrupted his march, took him prisoner and compelled him to take the oath of allegiance to his brother Yazid. Walid's small body of soldiers was soon overpowered. After a valiant combat, the caliph retired to one of his apartments and sat with the Koran on his knee, in order to die just as Othman had died. He was killed on the 17th of April 744. His head was taken to Damascus and carried about the city at the end of a spear.

On the news of the murder of the caliph, the citizens of Ḥoms (Emesa) put at their head Abu Mahommed as-Sofiānī, a grandson of Yazid I., and marched against Damascus. They were beaten by Suleimān b. Hishām at a place called Solaimānīa, 12 m. from the capital. Abu Mahommed was taken prisoner and shut up with several of his brethren and cousins in the Khadrā, the old palace of Moawiya, together with the two sons of Walid II. One or two risings in Palestine were easily suppressed. But the reigning family had committed suicide. Their unity was broken. The holiness of their Caliphate, their legitimate authority, had been trifled with; the hatred of the days of Merj Rāhiṭ had been revived. The orthodox faith also, whose strong representative and defender had hitherto been the caliph, was shaken by the fact that Yazid III. belonged to the sect of the Qadaris who rejected the doctrine of predestination. The disorganization of the empire was at hand.

12. *Reign of Yazid III.*—Yazid III., on his accession, made a fine speech, in which he promised to do all that could be expected from a good and wise ruler, even offering to make place immediately for the man whom his subjects should find better qualified for the Caliphate than himself. He cancelled, however, the increase of the pay granted by Walid and thus earned the nickname of the *Nāqiṣ* (diminisher). As he owed his position to the aid of the Kalbites, he chose his officers from among them. The governorship of Irak was confided to a Kalbite, Manṣūr b. Jomhūr, a hot-headed and unscrupulous man. Yūsuf b. Omar was unable to offer resistance, and was ultimately taken and confined in the Khadrā. Manṣūr had hardly been three months in office when Yazid replaced him by Abdallah, son of Omar II. The distant provinces, with the exception of Sind and Sijistan, renounced the authority of the new caliph. In Africa Abdarrahman b. Habīb, a descendant of the famous 'Oqba b. Nāfi', was almost independent. In Spain every amir tried to free himself from a suzerainty which appeared to him only nominal. Naṣr b. Sayyār, the governor of Khorasan, had not yet decided whether he ought to take the oath of allegiance when Yazid died, after a reign of only five months and a half, on the 12th of Dhu'l-Ḥijja A.H. 126 (25th September A.D. 744).

13. Yazid III. left his brother Ibrāhīm as his successor. He was acknowledged as caliph only in a part of Syria, and reigned no longer than two months, when he was obliged to abdicate and to submit to the authority of Merwan II.

14. Merwan II., the son of Mahommed b. Merwan and cousin of Maslama, was a man of energy, and might have revived the strength of the Omayyad dynasty, but for the general disorder which pervaded the whole empire. In 732 Hisham had entrusted to him the government of Armenia and Azerbaijan, which he held with great success till the death of Walid II. He had great military capacity and introduced important reforms. On the murder of Walid he prepared to dispute the supreme power with the new caliph, and invaded Mesopotamia. Yazid III., in alarm, offered him as the price of peace the government of this province together with Armenia and Azerbaijan. Merwan resolved to accept those conditions, and sent a deputation to Damascus, which, however, had just reached Manbij (Hierapolis) when Yazid died. Leaving his son Abdalmalik with 40,000 men in Rakka, Merwan entered Syria with 80,000 men. Suleimān b. Hishām, at the head of 120,000 men, was defeated at 'Ain al-Jarr, between Baalbek and Damascus. Merwan made many prisoners, whom he treated with the greatest mildness, granting them freedom on condition that they should take the oath of allegiance to the sons of Walid II. He then marched upon Damascus. But Suleimān b. Hishām, Yazid, the son of Khālid al-Qasri, and other chiefs, hastened to the Khadrā and killed the two princes, together with Yūsuf b. Omar. Suleiman then made himself master of the treasury and fled with the caliph Ibrāhīm to Tadmor (Palmyra). Only Abu Mahommed as-Sofiānī escaped the murderers. When Merwan entered Damascus this man testified that the sons of Walid II., who had just become adult, had named Merwan successor to the Caliphate, and was the first to greet him as Prince of the Believers. All the generals and officers followed his example and took the oath of allegiance (7th December A.D. 744). Merwan did all he could to pacify Syria, permitting the Arabs of the four provinces to choose their own prefects, and even acquiescing in the selection as prefect of Palestine of Thābit b. No'aim, who had behaved very treacherously towards him before, but whom he had forgiven. He did not, however, wish to reside in Damascus, but transplanted the seat of government to his own town, Harran in Mesopotamia. Suleiman b. Hisham and Ibrahim tendered their submission and were pardoned.

But the pacification was only on the surface. Many Omayyad princes considered Merwan as an upstart, his mother being a slave-girl; the Damascenes were angry because he had chosen Harran for his residence; the Kalbites felt themselves slighted, as the Qaisites predominated. Thābit b. No'aim revolted in Palestine, Emesa (Homs) and Tadmor were turbulent, Damascus was besieged by Yazid b. Khālid al Qasrī. Merwan, who wanted to march against Irak, was obliged to return to Syria, where he put an end to the troubles. This time Thābit b. No'aim had to pay for his perfidy with his life. After this new pacification, Merwan caused the Syrians to acknowledge his two sons as heirs to the Caliphate, and married them to two daughters of Hishām. All the Omayyad princes were invited to the wedding, Merwan hoping still to conciliate them. He then equipped 10,000 Syrians, and ordered them to rejoin the army of 20,000 men from Kinnesrin (Qinnasrīn) and Mesopotamia, who, under Yazid b. Omar b. Hobaira, were already on the march towards Irak. When these Syrians came to Roṣāfa (Rusafa), Suleimān b. Hishām persuaded them to proclaim himself caliph, and made himself master of Kinnesrin. From all sides Syrians flocked to his aid till he had 70,000 men under his orders. Merwan immediately ordered Ibn Hobaira to stop his march and to wait for him at Dūrīn, and marched with the main force against Suleimān, whom he utterly defeated at Khosāf in the district of Kinnesrin. Suleiman fled to Homs and thence to Tadmor and on to Kufa, leaving his brother Sa'id in Homs. The siege of this place by Merwan lasted nearly five months. After the victory the walls

were demolished, and likewise those of Baalbek, Damascus, Jerusalem and other towns. Syria was utterly crushed, and therewith the bulwark of the dynasty was destroyed. Not until the summer of 128 (A.D. 746) could Merwan resume his campaign against Irak.

The governor of this province, Abdallah, the son of Omar II., was a man of small energy, whose principal care was his personal ease and comfort. An ambitious man, Abdallah b. Moawiya, a great-grandson of Ali's brother Ja'far, put himself at the head of a band of Shi'ites and *maulas*, made himself master of Kufa and marched upon Hira, where, since Yūsuf b. Omar, the governor and the Syrian troops had resided. The rebels were defeated, and Kufa surrendered (October 744) under condition of amnesty for the insurgents and freedom for Abdallah b. Moawiya. This adventurer now went into Media (Jabal), where a great number of *maulas* and Shi'ites, even members of the reigning dynasty and of the Abbasid family, such as the future caliph Mansur, rejoined him. With their help he became master of a vast empire, which, however, lasted scarcely three years.

Ibn Omar did not acknowledge Merwan as caliph. For the moment Merwan could do no more than send a new governor, Ibn Sa'īd al Ḥarashī. This officer was supported only by the Qaisite troops, the Kalbites, who were numerically superior, maintaining Ibn Omar in his residence at Hira. There were many skirmishes between them, but a common danger soon forced them to suspend their hostilities. The general disorder after the death of Hisham had given to the Khawarij an opportunity of asserting their claims such as they had never had before. They belonged for the greater part to the Rabī'a, who always stood more or less aloof from the other Arabs, and had a particular grudge against the Moḍar. Their leading tribe, the Shaibān, possessed the lands on the Tigris in the province of Mosul, and here, after the murder of Walid II., their chief proclaimed himself caliph. Reinforced by many Kharijites out of the northern provinces, he marched against Kufa. Ibn Omar and Ibn Sa'īd al Ḥarashī tried to defend their province, but were completely defeated. Ḥarashī fled to Merwan, Ibn Omar to Hira, which, after a siege of two months, he was obliged to surrender in Shawwāl 127 (August A.D. 745). Manṣūr b. Jomhūr was the first to pass over to the Khawarij; then Ibn Omar himself took the oath of allegiance. That a noble Koreishite, a prince of the reigning house, should pledge himself to follow Ḍaḥḥāk the Shaibānite as his Imam, was an event of which the Khawarij were very proud. Ibn Omar was rewarded with the government of eastern Irak, Khūzistān and Fārs.

Whilst Merwan besieged Homs, Ḍaḥḥāk returned to Mesopotamia and took Mosul, whence he threatened Nisibis, where Abdallah, the son of Merwan, maintained himself with difficulty. Suleimān b. Hishām also had gone over to the Khawarij, who now numbered 120,000 men. Mesopotamia itself was in danger, when Merwan at last was able to march against the enemy. In a furious battle at Kafartūtha (September A.D. 746) the Khawarij were defeated; Ḍaḥḥāk and his successor Khaibarī perished; the survivors were obliged to retire to Mosul, where they crossed the Tigris. Merwan followed them and encamped on the western bank. Immediately after the battle of Kafartūtha, Yazid b. Omar b. Hobaira directed his troops towards Irak. He beat the Kharijites repeatedly and entered Kufa in May or June 747. Ibn Omar was taken prisoner; Manṣūr b. Jomhūr fled to Ibn Moawiya. Ibn Hobaira was at last free to send Ibn Ḍobāra with an army to Mesopotamia. At his approach the Kharijites left their camp and fled to Abdallah b. Moawiya, who was now at the height of his power. But it was not destined to last. The two generals of Ibn Hobaira, Ibn Ḍobāra and Nobāta b. Ḥanẓala defeated his army; Ibn Moawiya fled to Khorasan, where he met his death; the chief of the Kharijites, Shaibān Yashkori went to eastern Arabia; Suleimān b. Hishām and Manṣūr b. Johmūr escaped to India. Thus, at last, the western and south-eastern parts of the empire lay at the feet of Merwan. But in the north-east, in Khorasan, meanwhile a storm had arisen, against which his resources and his wisdom were alike of no avail.

When the news of the murder of Walid II. reached Khorasan, Naṣr b. Sayyār did not at once acknowledge the Caliphate of Yazid III., but induced the Arab chiefs to accept himself as amir of Khorasan, until a caliph should be universally acknowledged. Not many months later (Shawwāl 126) he was confirmed in his post by Yusuf b. Omar, the governor of Irak. But Naṣr had a personal enemy, the chief of the Azd (Yemenites) Jodai' al-Kirmānī, a very ambitious man. A quarrel arose, and in a short time the Azd under Kirmānī, supported by the Rabī'a, who always were ready to join the opposition, were in insurrection, which Naṣr tried in vain to put down by concessions.

So stood matters when Ḥārith b. Soraij, seconded by Yazid III., reappeared on the scene, crossed the Oxus and came to Merv. Naṣr received him with the greatest honour, hoping to get his aid against Kirmānī, but Ḥārith, to whom 3000 men of his tribe, the Tamīm, had gone over, demanded Naṣr's abdication and tried to make himself master of Merv. Having failed in this, he allied himself with Kirmānī. Naṣr could hold Merv no longer, and retired to Nishapur. But the Tamīm of Ḥārith could not endure the supremacy of the Azd. In a moment the allies were divided into two camps; a battle ensued, in which Ḥārith was defeated and killed. Originally, Ḥārith seems to have had the highest aims, but in reality he did more than any one else to weaken the Arabic dominion. He brought the Turks into the field against them; he incited the native population of Transoxiana against their Arab lords, and stirred up discord between the Arabs themselves. Being a Tamīmite, he belonged to the Moḍar, on whom the government in Khorasan depended; but he aided the Yemenites to gain the upper hand of them. Thus he paved the way for Abu Moslim.

Since the days of Ali there had been two tendencies among the Shi'ites. The moderate party distinguished itself from the other Moslems only by their doctrine that the imamate belonged legally to a man of the house of the Prophet. The other party, that of the ultra-Shi'ites, named Hāshimīya after Abu Hāshim the son of Mahommed b. al-Ḥanafīya, preached the equality of all Moslems, Arabs or non-Arabs, and taught that the same divine spirit that had animated the Prophet, incorporated itself again in his heirs (see SHI'ITES). After the death of Hosain, they chose for their Imam Mahommed b. al-Ḥanafīya, and at his decease his son Abu Hāshim, from whom Mahommed b. Ali, the grandson of Abdallah b. Abbas, who resided at Ḥomaima in the south-east of Syria, obtained the secrets of the party and took the lead (A.H. 98, see above). This Mahommed, the father of the two first Abbasid caliphs, was a man of unusual ability and great ambition. He directed his energies primarily to Khorasan. The missionaries were charged with the task of undermining the authority of the Omayyads, by drawing attention to all the injustices that took place under their reign, and to all the luxury and wantonness of the court, as contrasted with the misery of many of their subjects. God would not suffer it any longer. As soon as the time was ripe —and that time could not be far off—He would send a saviour out of the house of the Prophet, the Mahdi, who would restore Islam to its original purity. All who desired to co-operate in this holy purpose must pledge themselves to unlimited obedience to the Imam, and place their lives and property at his disposal. As a proof of their sincerity they were required at once to pay a fixed sum for the Imam. The missionaries had great success, especially among the non-Arabic inhabitants of Khorasan and Transoxiana.

Mahommed b. Ali died A.H. 126 (A.D. 743–744), and his son Ibrahīm, the Imam, took his place. Ibrahīm had a confidant about whose antecedents one fact alone seems certain, that he was a *maula* (client) of Persian origin. This man, Abu Moslim by name, was a man of real ability and devoted to his master's cause. To him, in 745–746, the management of affairs in Khorasan was entrusted, with instructions to consult in all weighty matters the head of the mission, the Arab Suleimān b. Kathīr. At first the chiefs of the mission were by no means prepared to recognize Abu Moslim as the plenipotentiary of the heir of the Prophet. In the year 129 he judged that the time for open manifestation had arrived. His partisans were ordered to assemble from all sides on a fixed day at Sīqadenj in the province of Merv. Then, on the 1st Shawwāl (15th June 747), the first solemn meeting took

place and the black flags were unfolded. On that occasion Suleimān b. Kathīr was still leader, but by the end of the year Abu Moslim, whom the majority believed to belong himself to the family of the Prophet, was the acknowledged head of a strong army. Meantime, Naṣr had moved from Nishapur to Merv, and here the two Arabic armies confronted each other. Then, at last, the true significance of Abu Moslim's work was recognized. Naṣr warned the Arabs against their common enemy, "who preaches a religion that does not come from the Envoy of God, and whose chief aim is the extirpation of the Arabs." In vain he had entreated Merwan and Ibn Hobaira to send him troops before it should be too late. When at last it was possible to them to fulfil his wish, it was in fact too late. For a moment it seemed as though the rival Arab factions, realizing their common peril, would turn their combined forces against the Shi'ites. But Abu Moslim contrived to re-awaken their mutual distrust and jealousy, and, taking advantage of the opportunity, made himself master of Merv, in Rabia II. A.H. 130 (December 747). Naṣr escaped only by a headlong flight to Nishapur. This was the end of the Arabic dominion in the East. Many Arab chiefs were killed, partly by order of Abu Moslim, partly by their clients. The latter, however, was strictly forbidden by Abu Moslim. So severe indeed was the discipline he exercised, that one of the chief missionaries, who by a secret warning had rendered possible the escape of Naṣr from Merv, paid for it with his life.

As soon as Abu Moslim had consolidated his authority, he sent his chief general Qaḥṭaba against Nishapur. Naṣr's son Tamīm was vanquished and killed, and Naṣr retreated to Kumis (Qūmis) on the boundary of Jorjān, whither also advanced from the other side Nobāta at the head of an army sent by Merwan. Qaḥṭaba detached his son Ḥasan against Naṣr and went himself to meet Nobāta, whom he beat on the 1st of Dhu'l-ḥijja 130 (6th August 748). Naṣr could not further resist. He reached Sāwā in the vicinity of Hamadan, where he died quite exhausted, at the age of eighty-five years. Rei and Hamadan were taken without serious difficulty. Near Nehawend, Ibn Ḍobāra, at the head of a large army, encountered Qaḥṭaba, but was defeated and killed. In the month of Dhu'l-qa'da 131 (June 749) Nehawend (Nehavend) surrendered, and thereby the way to Irak lay open to Qaḥṭaba. Ibn Hobaira was overtaken and compelled to retire to Wāsit. Qaḥṭaba himself perished in the combat, but his son Hasan entered Kufa without any resistance on the 2nd of September 749.

Merwan had at last discovered who was the real chief of the movement in Khorasan, and had seized upon Ibrahīm the Imam and imprisoned him at Harran. There he died, probably from the plague, though Merwan was accused of having killed him. When the other Abbasids left Ḥomaima is not certain. But they arrived at Kufa in the latter half of September 749, where in the meantime the head of the propaganda, Abu Salama, called the wazir of the family of Mahomet, had previously undertaken the government. This Abu Salama seems to have had scruples against recognizing Abu'l-Abbas as the successor of his brother Ibrahīm, and to have expected that the Mahdi, whom he looked for from Medina, would not be slow in making his appearance, little thinking that an Abbasid would present himself as such. But Abu Jahm, on the instructions of Abu Moslim, declared to the chief officers of the Khorasanian army that the Mahdi was in their midst, and brought them to Abu'l-Abbas, to whom they swore allegiance. Abu Salama also was constrained to take the oath. On Friday, the 12th Rabia II. A.H. 132 (28th November 749) Abu'l-Abbas was solemnly proclaimed caliph in the principal mosque of Kufa. The trick had been carried out admirably. On the point of gathering the ripe fruit, the Alids were suddenly pushed aside, and the fruit was snatched away by the Abbasids. The latter gained the throne and they took good care never to be deprived of it.

After the conquest of Nehawend, Qaḥṭaba had detached one of his captains, Abu 'Aun, to Shahrazūr, where he defeated the Syrian army which was stationed there. Thereupon Abu 'Aun occupied the land of Mosul, where he obtained reinforcements from Kufa, headed by Abdallah b. Ali, an uncle of Abu'l-Abbas, who was to have the supreme command. Merwan advanced to meet him, and was completely defeated near the Greater Zab, an affluent of the Tigris, in a battle which lasted eleven days. Merwan retreated to Harran, thence to Damascus, and finally to Egypt, where he fell in a last struggle towards the end of 132 (August 750). His head was cut off and sent to Kufa.[1] Abu Aun, who had been the real leader of the campaign against Merwan, remained in Egypt as its governor. Ibn Hobaira, who had been besieged in Wasit for eleven months, then consented to a capitulation, which was sanctioned by Abu'l-Abbas. Immediately after the surrender, Ibn Hobaira and his principal officers were treacherously murdered. In Syria, the Omayyads were persecuted with the utmost rigour. Even their graves were violated, and the bodies crucified and destroyed. In order that no members of the family should escape, Abdallah b. Ali pretended to grant an amnesty to all Omayyads who should come in to him at Abu Fotros (Antipatris) and acknowledge the new caliph, and even promised them the restitution of all their property. Ninety men allowed themselves to be entrapped, and Abdallah invited them to a banquet. When they were all collected, a body of executioners rushed into the hall and slew them with clubs. He then ordered leathern covers to be thrown upon the dying men, and had the banquet served upon them. In Medina and Mecca Da'ud b. Ali, another uncle of Abu'l-Abbas, conducted the persecution; in Baṣra, Sulciman b. Ali. Abu'l-Abbas himself killed those he could lay his hands on in Hira and Kufa, amongst them Suleimān b. Hishām, who had been the bitterest enemy of Merwan. Only a few Omayyads escaped the massacre, several of whom were murdered later. A grandson of Hisham, Abdarrahmān, son of his most beloved son Moawiya, reached Africa and founded in Spain the Omayyad dynasty of Cordova.

With the dynasty of the Omayyads the hegemony passes finally from Syria to Irak. At the same time the supremacy of the Arabs came to an end. Thenceforth it is not the contingents of the Arabic tribes which compose the army, and on whom the government depends; the new dynasty relies on a standing army, consisting for the greater part of non-Arabic soldiers. The barrier that separated the Arabs from the conquered nations begins to crumble away. Only the Arabic religion, the Arabic language and the Arabic civilization maintain themselves, and spread more and more over the whole empire.

C.—The Abbasids

We now enter upon the history of the new dynasty, under which the power of Islam reached its highest point.

1. Abu'l-Abbas inaugurated his Caliphate by a harangue in which he announced the era of concord and happiness which was to begin now that the House of the Prophet had been restored to its right. He asserted that the Abbasids were the real heirs of the Prophet, as the descendants of his oldest uncle Abbas. Addressing the Kufians, he said, "Inhabitants of Kufa, ye are those whose affection towards us has ever been constant and true; ye have never changed your mind, nor swerved from it, notwithstanding all the pressure of the unjust upon you. At last our time has come, and God has brought you the new era. Ye are the happiest of men through us, and the dearest to us. I increase your pensions with 100 dirhems; make now your preparations, for I am the lavish shedder of blood[2] and the avenger of blood."

Notwithstanding these fine words, Abu'l-Abbas did not trust

[1] Merwan has been nicknamed *al-Ja'di* and *al-Ḥimār* (the Ass). As more than one false interpretation of these names has been given, it is not superfluous to cite here Qaisarānī (ed. de Jong, p. 31), who says on good authority that a certain al-Ja'd b. Durham, killed under the reign of Hishām for heretical opinions, had followers in Mesopotamia, and that, when Merwan became caliph, the Khorasanians called him a Ja'd, pretending that all Ja'd had been his teacher. As to al-Ḥimār this was substituted also by the Khorasanians for his usual title, al-Faras, "the race-horse."

[2] The Arabic word for "shedder of blood," *as-Saffāḥ*, which by that speech became a name of the caliph, designates the liberal host who slaughters his camels for his guests. European scholars have taken it unjustly in the sense of the bloodthirsty, and found in it an allusion to the slaughter of the Omayyads and many others. At the same time, it was not without much bloodshed that Abū'l-Abbas finally established his power.

the Kufians. He resided outside the town with the Khorasanian troops, and with them went first to Hira, then to Hāshimīya, which he caused to be built in the neighbourhood of Anbar. For their real sympathies, he knew, were with the house of Ali, and Abu Salama their leader, who had reluctantly taken the oath of allegiance, did not conceal his disappointment. Abu Jahm, the vizier (*q.v.*; also MAHOMMEDAN INSTITUTIONS), or "helper," of Abu Moslim, advised that Abu Ja'far, the caliph's brother, should be sent to Khorasan to consult Abu Moslim. The result was that Abu Salama was assassinated, and at the same time Suleimān b. Kathīr, who had been the head of the propaganda in Khorasan, and had also expected that the Mahdi would belong to the house of Ali. It is said that Abu Ja'far, whilst in Khorasan, was so impressed by the unlimited power of Abu Moslim, and saw so clearly that, though he called his brother and himself his masters, he considered them as his creatures, that he vowed his death at the first opportunity.

The ruin of the Omayyad empire and the rise of the new dynasty did not take place without mighty convulsions. In Bathanīya and the Ḥaurān, in the north of Syria, in Mesopotamia and Irak Khorasan insurrections had to be put down with fire and sword. The new caliph then distributed the provinces among the principal members of his family and his generals. To his brother Abu Ja'far he gave Mesopotamia, Azerbaijan and Armenia; to his uncle Abdallah b. Ali, Syria; to his uncle Da'ud, Hejaz, Yemen and Yamāma (Yemama); to his cousin 'Īsā b. Mūsā, the province of Kufa. Another uncle, Suleimān b. Ali, received the government of Baṣra with Bahrein and Oman; Ismā 'īl b. Ali that of Ahwāz; Abu Moslim, Khorasan and Transoxiana; Mahommed b. Ash'ath, Fārs; Abu 'Aun, Egypt. In Sind the Omayyad governor, Manṣūr b. Jomhūr, had succeeded in maintaining himself, but was defeated by an army sent against him under Mūsā b. Ka'b, and the black standard of the Abbasids was raised over the city of Manṣūra. Africa and Spain are omitted from this catalogue, because the Abbasids never gained any real footing in Spain, while Africa remained, at least in the first years, in only nominal subjection to the new dynasty. In 754 Abu Moslim came to Irak to visit Abu'l-Abbas and to ask his permission to make the pilgrimage to Mecca. He was received with great honour, but the caliph said that he was sorry not to be able to give him the leadership of the pilgrimage, which he had already purposely entrusted to his brother, Abu Ja'far.

Abu'l-Abbas died on the 13th of Dhu'l-ḥijja 136 (5th June 754). He seems to have been a man of limited capacity, and had very little share in the achievements accomplished in his name. He initiated practically nothing without the consent of Abu Jahm, who was thus the real ruler. In the few cases where he had to decide, he acted under the influence of his brother Abu Ja'far.

2. *Reign of Mansur.*—Abu'l-Abbas had designated as his successors first Abu Ja'far, surnamed al-Manṣūr (the victorious), and after him his cousin 'Īsā b. Mūsā. Abu Ja'far was, according to the historians, older than Abu'l-Abbas, but while the mother of the latter belonged to the powerful Yemenite tribe of al-Ḥārith b. Ka'b, the mother of Abu Ja'far was a Berber slave-girl. But he was a son of Mahommed b. Ali, and was therefore preferred by Abu Moslim to his uncles and cousins. Abu'l-Abbas, however, had promised the succession to his uncle Abdallah b. Ali, when he marched against Merwan. When the news of the death of Abu'l-Abbas reached Abdallah, who at the head of a numerous army was on the point of renewing the Byzantine war, he came to Harran, furious at his exclusion, and proclaimed himself caliph. Abu Moslim marched against him, and the two armies met at Nisibis, where, after a number of skirmishes, a decisive engagement took place (28th November 754). Abdallah was defeated and escaped to Baṣra, where he found a refuge with his brother Suleimān. A year later he asked for pardon, and took the oath of allegiance to Mansur. The caliph spared his life for a time, but he did not forget. In 764 Abdallah met his death by the collapse of his house, which had been deliberately undermined.

The first care of Mansur was now to get rid of the powerful Abu Moslim, who had thus by another brilliant service strengthened his great reputation. On pretence of conferring with him on important business of state, Mansur induced him, in spite of the warnings of his best general, Abu Naṣr, to come to Madāin (Ctesiphon), and in the most perfidious manner caused him to be murdered by his guards. Thus miserably perished the real founder of the Abbasid dynasty, the *Ṣāḥib addaula*, as he is commonly called, the *Amīn* (trustee) of the House of the Prophet. A witty man, being asked his opinion about Abu Ja'far (Mansur) and Abu Moslim, said, alluding to the Koran 21, verse 22, "if there were two Gods, the universe would be ruined." The Khorasanian chiefs were bribed into submission, and order was at last re-established by Mansur's general Khāzim b. Khozaima in Mesopotamia, and by Abu Dā'ūd, the governor of Khorasan in the east.

About the same time Africa[1] and Spain escaped from the dominion of the eastern Caliphate; the former for a season, the latter permanently. The cause of the revolt of Africa was as follows. Mansur had written to Abdarrahmān, announcing the death of Abu'l-Abbas, and requiring him to take the oath of allegiance. Abdarrahmān sent in his adhesion, together with a few presents of little value. The caliph replied by a threatening letter which angered Abdarrahmān. He called the people together at the hour of prayer, publicly cursed Mansur from the pulpit and declared him deposed. He next caused a circular letter, commanding all Maghribins to refuse obedience to the caliph, to be read from the pulpit throughout the whole extent of the Maghrib (western North Africa). A brother of Abdarrahmān, Ilyās, saw in this revolt an opportunity of obtaining the government of Africa for himself. Seconded by many of the inhabitants of Kairawan, who had remained faithful to the cause of the Abbasids, he attacked his brother, slew him, and proclaimed himself governor in his stead. This revolution in favour of the Abbasids was, however, not of long duration. Ḥabīb, the eldest son of Abdarrahmān, who had fled in the night of his father's murder, was captured, but the vessel which was to convey him to Spain having been detained by stress of weather, his partisans took arms and rescued him. Ilyās was marching against them, when the idea occurred to Habīb of challenging him to single combat. Ilyās hesitated, but his own soldiers compelled him to accept the challenge. He measured arms with Ḥabīb, and was slain. The party of independence thus triumphed, but in the year 144 (761) Mahommed b. Ash'ath, the Abbasid general, entered Kairawan and regained possession of Africa in the name of the eastern caliph. From the year 800, it must be added, Africa only nominally belonged to the Abbasids; for, under the reign of Harun al-Rashid, Ibrahīm b. al-Aghlab, who was invested with the government of Africa, founded in that province a distinct dynasty, that of the Aghlabites.

At the same time as the revolt in Africa, the independent Caliphate of the western Omayyads was founded in Spain. The long dissensions which had preceded the fall of that dynasty in the East had already prepared the way for the independence of a province so distant from the centre of the empire. Every petty amir then tried to seize sovereign power for himself, and the people groaned under the consequent anarchy. Weary of these commotions, the Arabs of Spain at last came to an understanding among themselves for the election of a caliph, and their choice fell upon one of the last survivors of the Omayyads, Abdarrahmān b. Moawiya, grandson of the caliph Hishām. This prince was wandering in the deserts of Africa, pursued by his implacable enemies, but everywhere protected and concealed by the desert tribes, who pitied his misfortunes and respected his illustrious origin. A deputation from Spain sought him out in Africa and offered him the Caliphate, which he accepted with joy. On the 1st Rabia I. 138 (14th August 755) Abdarrahmān landed in the Iberian peninsula, where he was universally welcomed, and

[1] The rule of the caliphs in Morocco, which had never been firmly established, had already, in 740, given place to that of independent princes (see MOROCCO, *History*).

speedily founded at Cordova the Western Omayyad Caliphate (see SPAIN: *History*).

While Mansur was thus losing Africa and Spain, he was trying to redeem the losses the empire had sustained on the northern frontier by the Byzantines. In 750–751 the emperor Constantine V. (Copronymus) had unsuccessfully blockaded Malatia; but five years later he took it by force and razed its wall to the ground. Mansur now sent in 757 an army of 70,000 men under the command of his cousin Abdalwahhāb, the son of Ibrāhīm the Imam, whom he had made governor of Mesopotamia, the real chief being Hasan b. Qaḥṭaba. They rebuilt all that the emperor had destroyed, and made this key of Asia Minor stronger than ever before. The Moslems then made a raid by the pass of Ḥadath (Adata) and invaded the land of the Byzantines. Two aunts of the caliph took part in this expedition, having made a vow that if the dominion of the Omayyads were ended they would wage war in the path of God. Constantine advanced with a numerous army, but was afraid of attacking the invaders. The Moslems also rebuilt Mopsuestia. But from 758 till 763 Mansur was so occupied with his own affairs that he could not think of further raids.

In 758 (others say in 753 or 754) a body of 600 sectaries, called Rāwendīs (*q.v.*), went to Hāshimīya, the residence of the caliph, not far from Kufa. They believed that the caliph was their lord, to whom they owed their daily bread, and came to pay him divine honours. They began by marching in solemn procession round the palace, as if it had been the Ka'ba. Mansur being told of it said: "I would rather they went to hell in obedience to us, than to heaven in disobedience." But as they grew tumultuous, and he saw that this impious homage gave offence to his men, he caused the principal leaders to be seized and thrown into prison. The Rāwendīs immediately rose in revolt, broke the prison doors, rescued their chiefs, and returned to the palace. The unfortunate fanatics were hunted down and massacred to the last man, and thereby the ties that bound the Abbasids to the ultra-Shi'ites were severed. From that time forward the Abbasid caliphs became the maintainers of orthodox Islam, just as the Omayyads had been. The name of Hāshimīya, which the reigning family still retained, was henceforward derived not from Abu Hāshim, but from Hāshim, the grandfather of Abbas, the great-grandfather of the Prophet.

A much greater danger now threatened Mansur. In the last days of the Omayyads, the Shi'ites had chosen as caliph, Mahommed b. Abdallah b. Hasan, whom they called the Mahdi and the "pure soul," and Mansur had been among those who pledged themselves to him by oath. Not unnaturally, the Alids in Medina were indignant at being supplanted by the Abbasids, and Mansur's chief concern was to get Mahommed into his power. Immediately after his occupying the throne, he named Ziyād b. Obaidallah governor of Medina, with orders to lay hands on Mahommed and his brother Ibrāhīm, who, warned betimes, took refuge in flight. In 758 Mansur, informed that a revolt was in preparation, came himself to Medina and ordered Abdallah to tell him where his sons were. As he could not or would not tell, he together with all his brothers and some other relatives were seized and transported to Irak, where Abdallah and his brother Ali were beheaded and the others imprisoned. Notwithstanding all these precautions, a vast conspiracy was formed. On the same day Mahommed was to raise the standard of revolt in Medina, Ibrāhīm in Baṣra. But the Alids, though not devoid of personal courage, never excelled in politics or in tactics. In A.D. 762 Mahommed took Medina and had himself proclaimed caliph. The governor of Kufa, 'Īsā b. Mūsā, received orders to march against him, entered Arabia, and captured Medina, which, fortified by Mahommed by the same means as the Prophet had employed against the besieging Meccans, could not hold out against the well-trained Khorasanians. Mahommed was defeated and slain. His head was cut off and sent to Mansur. When on the point of death, Mahommed gave the famous sword of the Prophet called Dhu'l-Fiqār to a merchant to whom he owed 400 dinars. It came later into the possession of Harun al-Rashid. In the meanwhile Ibrāhīm had not only gained possession of Baṣra, Ahwāz and Fārs, but had even occupied Wāsit. The empire of the Abbasids was in great jeopardy. For fifty days Mansur stayed in his room, neither changing his clothes nor allowing himself a moment's repose. The greater part of his troops were in Rei with his son al-Mahdi, who had conquered Tabaristan, in Africa, with Mahommed b. Ash'ath, and in Arabia with 'Īsā b. Mūsā. Had Ibrāhīm marched at once against Kufa he might have crushed Mansur, but he let slip the opportunity. A terrible conflict took place at Bā-Khamra, 48 m. from Kufa. Ḥomaid b. Qaḥṭaba, the commander of Mansur's army, was defeated, only a small division under 'Īsā b. Mūsā holding its ground. At that moment Salm, the son of the famous Qotaiba b. Moslim, came to the rescue by attacking the rear of Ibrāhīm. Ḥomaid rallied his troops, and Ibrāhīm was overpowered. At last he fell, pierced by an arrow, and, in spite of the desperate efforts of his followers, his body remained in the hands of the enemy. His head was cut off and brought to Mansur.

Mansur could now give his mind to the founding of the new capital. When the tumult of the Rāwendīs took place he saw clearly that his personal safety was not assured in Hāshimīya,[1] where a riot of the populace could be very dangerous, and his troops were continually exposed to the perverting influence of the fickle and disloyal citizens of Kufa. He had just made choice of the admirable site of the old market-town of Bagdad when the tidings came of the rising of Mahommed in Medina. In those days he saw that he had been very imprudent to denude himself of troops, and decided to keep henceforth always with him a body of 30,000 soldiers. So Bagdad, or properly "the round city" of Mansur, on the western bank of the Tigris, was built as the capital. Strictly it was a huge citadel, in the centre of which was the palace of the caliph and the great mosque. But around this nucleus there soon grew up the great metropolis which was to be the centre of the civilized world as long as the Caliphate lasted.[2] The building lasted three years and was completed in the year 149 (A.D. 766). That year is really the beginning of the new era. "The Omayyads," says the Spanish writer Ibn Ḥazm, "were an Arabic dynasty; they had no fortified residence, nor citadel; each of them dwelt in his villa, where he lived before becoming caliph; they did not desire that the Moslems should speak to them as slaves to their master, nor kiss the ground before them or their feet; they only gave their care to the appointment of able governors in the provinces of the empire. The Abbasids, on the contrary, were a Persian dynasty, under which the Arab tribal system, as regulated by Omar, fell to pieces; the Persians of Khorasan were the real rulers, and the government became despotic as in the days of Chrosroes." The reign of Abu'l-Abbas and the first part of that of Mansur had been almost a continuation of the former period. But now his equals in birth and rank, the Omayyads and the Alids, had been crushed; the principal actors in the great struggle, the leaders of the propaganda and Abu Moslim were out of the way; the caliph stood far above all his subjects; and his only possible antagonists were the members of his own family.

'Īsā b. Mūsā had been designated, as we have seen, by Abu'l-Abbas as successor to Mansur. The latter having vainly tried to compel 'Īsā to renounce his right of succession, in favour of Mansur's son Mahommed al-Mahdi, produced false witnesses who swore that he had done so. However unwillingly, 'Īsā was obliged at last to yield, but it was understood that, in case of Mahommed's death, the succession should return to 'Īsā. One of the false witnesses was, it is asserted, Khālid b. Barmak, the head of that celebrated family the Barmecides (*q.v.*), which played so important a part in the reign of Harun al-Rashid. This Khālid, who was descended from an old sacerdotal family in Balkh, and had been one of the trusty supporters of Abu Moslim, Mansur appointed as minister of finance.

A son of Mahommed the Alid had escaped to India, where,

[1] This Hāshimīya near Kufa is not to be confused with that founded by Abu'l-Abbas near Anbar.

[2] Cf. G. le Strange, *Baghdad during the Abbasid Caliphate* (Oxford, 1900).

with the connivance of the governor Omar b. Ḥafṣ Hazārmerd, he had found refuge with an Indian king. Mansur discovered his abode, and caused him to be killed. His infant son was sent to Medina and delivered to his family. Omar Hazārmerd lost his government and received a command in Africa, where he died in 770.

In A.H. 158 (A.D. 775) Mansur undertook a pilgrimage to Mecca, but succumbed to dysentery at the last station on the route. He was about sixty-five years of age, and had reigned for twenty-two years. He was buried at Mecca. He was a man of rare energy and strength of mind. His ambition was boundless and no means, however perfidious, were despised by him. But he was a great statesman and knew how to choose able officers for all places. He was thrifty and anxious to leave to his son a full treasury. He seems to have cherished the ideal that this son, called Mahommed b. Abdallah, after the Prophet, should fulfil the promises of peace and happiness that had been tendered to the believers, and therefore to have called him al-Mahdi. For that purpose it was necessary that he should have the means not only to meet all state expenses, but also to be bounteous. But from the report of the historian Haitham b. 'Adī [1] about the last discourse which father and son had together, we gather that the former had misgivings in regard to the fulfilment of his wishes.

Khālid b. Barmak took the greatest care of the revenues, but contrived at the same time to consult his own interests. Mansur discovered this in the same year in which he died, and threatened him with death unless he should pay to the treasury three millions of dirhems within three days. Khālid already had so many friends that the sum was brought together with the exception of 30,000 dirhems. At that moment tidings came about a rising in the province of Mosul, and a friend of Khālid said to the caliph that Khālid was the only man capable of putting it down. Thereupon Mansur overlooked the deficiency and gave Khālid the government of Mosul. "And," said a citizen of that town, "we had such an awe and reverence for Khālid, that he appeased the disorders, almost without punishing anybody."

3. *Reign of Mahdi.*—As soon as Mansur was dead, Rabī', his client and chamberlain, induced all the princes and generals who accompanied the caliph, to take the oath of allegiance to his son Mahommed al-Mahdi, who was then at Bagdad. Īsā b. Mūsā hesitated, but was compelled to give in. In 776 Mahdi constrained him for a large bribe to renounce his right of succession in favour of his sons, Mūsā and Hārūn. Mansur wrote in his testament to his son that he had brought together so much money that, even if no revenue should come in for ten years, it would suffice for all the wants of the state. Mahdi, therefore, could afford to be munificent, and in order to make his accession doubly welcome to his subjects, he began by granting a general amnesty to political prisoners. Among these was a certain Ya'qūb b. Dā'ūd, who, having insinuated himself into the confidence of the caliph, especially by discovering the hiding places of certain Alids, was afterwards (in 778) made prime minister. The provincial governors in whom his father had placed confidence, Mahdi superseded by creatures of his own.

In Khorasan many people were discontented. The promises made to them during the war against the Omayyads had not been fulfilled, and the new Mahdi did not answer at all to their ideal. A revolt in 160 under the leadership of a certain Yūsuf b. Ibrāhīm, surnamed al-Barm, was suppressed by Yazid b. Mazyad, who, after a desperate struggle, defeated Yūsuf, took him prisoner and brought him in triumph to Bagdad, where he with several of his officers was killed and crucified. In the following year, Mahdi was menaced by a far more dangerous revolt, led by a sectary, known generally as Mokanna (*q.v.*), or "the veiled one," because he always appeared in public wearing a mask. He took up his abode in the Transoxianian province of Kish and Nakhshab, where he gathered around him a great number of adherents. After some successes, the pretender was ultimately cornered at the castle of Sanām near Kish, and took poison together with all the members of his family. His head was cut off and sent to Mahdi in the year 163.

[1] Tabari iii. p. 443 seq.

Mahdi had been scarcely a year on the throne when he resolved to accomplish the pilgrimage to Mecca. The chroniclers relate that on this occasion for the first time camels loaded with ice for the use of the caliph came to Mecca. Immediately on his arrival in the Holy City he applied himself, at the request of the inhabitants, to the renewal of the curtains which covered the exterior walls of the Ka'ba. For a very long time no care had been taken to remove the old covering when a new one was put on; and the accumulated weight caused uneasiness respecting the stability of the walls. Mahdi caused the house to be entirely stripped and anointed with perfumes, and covered the walls again with a single cloth of great richness. The temple itself was enlarged and restored. On this occasion he distributed considerable largesses among the Meccans. From Mecca Mahdi went to Medina, where he caused the mosque to be enlarged, and where a similar distribution of gifts took place. During his stay in that city he formed for himself a guard of honour, composed of 500 descendants of the Ansār,[2] to whom he assigned a quarter in Bagdad, named after them the Qaṭī'a (Fief) of the Ansār. Struck by the difficulties of every kind which had to be encountered by poor pilgrims to Mecca from Bagdad and its neighbourhood, he ordered Yaqtīn, his freedman, to renew the milestones, to repair the old reservoirs, and to dig wells and construct cisterns at every station of the road where they were missing. He also had new inns built and decayed ones repaired. Yaqtīn remained inspector of the road till 767.

During the reign of Mansur the annual raids against the Byzantines had taken place almost without intermission, but the only feat of importance had been the conquest of Laodicea, called "the burnt" (ἡ κατακεκαυμένη), by Ma'yūf b. Yahyā in the year 770. At first the armies of Mahdi were not successful. The Greeks even conquered Marash (Germanicia) and annihilated the Moslem army sent from Dābiq. In 778, however, Hasan b. Qaḥṭaba made a victorious raid as far as Adhrūliya (Dorylaeum); it was on his proposition that Mahdi resolved on building the frontier town called Ḥadath (Adata), which became an outpost. In 779 the caliph decided on leading his army in person. He assembled his army in the plains of Baradān north of Bagdad and began his march in the early spring of 780, taking with him his second son Hārūn, and leaving his elder son Mūsā as his lieutenant in Bagdad. Traversing Mesopotamia and Syria, he entered Cilicia, and established himself on the banks of the Jihan (Pyramus). Thence he despatched an expeditionary force, nominally under the command of Hārūn, but in reality under that of his tutor, the Barmecide Yahyā b. Khālid. Hārūn captured the fortress Samālu after a siege of thirty-eight days, the inhabitants surrendering on condition that they should not be killed or separated from one another. The caliph kept faith with them, and settled them in Bagdad, where they built a monastery called after their native place. In consequence of this feat, Mahdi made Hārūn governor of the whole western part of the empire, including Azerbaijan and Armenia. Two years later war broke out afresh between the Moslems and the Greeks. Leo IV., the East Roman emperor, had recently died, leaving the crown to Constantine VI. This prince being only ten years old, his mother Irene acted as regent and assumed the title Augusta. By her orders an army of 90,000 men, under the command of Michael Lachanodrakon, entered Asia Minor. The Moslems, on their side, invaded Cilicia under the orders of Abdalkabīr, who, being afraid of encountering the enemy, retired with his troops. Irritated by this failure, the caliph in 781 sent Hārūn, accompanied by his chamberlain Rabī', with an army of nearly 100,000 men, with orders to carry the war to the very gates of Constantinople. The patrician Nicetas, count of Opsikion, who sought to oppose his march, was defeated by Hārūn's general, Yazid b. Mazyad, and put to flight. Hārūn then marched against Nicomedia, where he vanquished the domesticus, the chief commander of the Greek forces, and pitched his camp on the shores of the Bosporus. Irene took alarm, sued for peace, and obtained a truce for three years, but only on the humiliating terms of paying an annual

[2] The first citizens of Medina who embraced Islam were called Anṣār ("helpers").

tribute of 90,000 denarii, and supplying the Moslems with guides and markets on their way home. This brilliant success so increased Mahdi's affection for Hārūn that he appointed him successor-designate after Mūsā and named him *al-Rashīd* (" the follower of the right cause "). Three years later, he resolved even to give to him the precedence in the succession instead of Mūsā, yielding to the importunity of Khaizorān, the mother of the two princes, and to his own predilection. It was necessary first to obtain from Mūsā a renunciation of his rights; and for that purpose he was recalled from Jorjān, where he was engaged on an expedition against the rebels of Tabaristān. Mūsā, informed of his father's intentions, refused to obey this order, and Mahdi determined to march in person against him. But, after his arrival at Māsabadhān, a place in Jabal (Media, the later Persian Irak), he died suddenly, at the age of only forty-three. Some attribute his death to an accident met with in hunting; others believe him to have been poisoned. Some European scholars have suspected Mūsā of having been concerned in it, but of this we have no proof whatever.

The reign of Mahdi was a time of great prosperity. Much was done for the organization of the huge empire; agriculture and commerce flourished; the revenues were increasing, whilst the people fared well. The power of the state was acknowledged even in the far east: the emperor of China, the king of Tibet, and many Indian princes concluded treaties with the caliph. He was an ardent champion of the orthodox faith, repudiating all the extravagant doctrine preached by the Abbasid missionaries and formerly professed by his father. In particular he persecuted mercilessly the Manichaeans and all kinds of freethinkers.

4. *Reign of Hādī.*—On the death of Mahdi, Hārūn, following the advice of Yahyā b. Khālid, sent the insignia of the Caliphate, with letters of condolence and congratulation, to Mūsā in Jorjān, and brought the army which had accompanied Mahdi peacefully back from Media to Bagdad. Mūsā returned in all haste to the capital, and assumed the title of *al-Hādī* (" he who directs "). The accession of a new caliph doubtless appeared to the partisans of the house of Ali a favourable opportunity for a rising. Hosain b. Ali b. Hasan III. raised an insurrection at Medina with the support of numerous adherents, and proclaimed himself caliph. Thence he went to Mecca, where on the promise of freedom many slaves flocked to him, and many pilgrims also acknowledged him. Suleimān b. Mansur, the caliph's representative in the pilgrimage of that year, was entrusted with the command against him. Hosain was attacked at Fakh, 3 m. from Mecca, and perished in the combat with many other Alids. His maternal uncle, Idrīs b. Abdallah, a brother of Mahommed and Ibrāhīm, the rivals of Mansur, succeeded in escaping, and fled to Egypt, whence by the help of the postmaster, himself a secret partisan of the Shi'ites, he passed into West Africa, where at a later period his son founded the Idrisite dynasty in Fez (see MOROCCO).

Hādī, who had never been able to forget that he had narrowly escaped being supplanted by his brother, formed a plan for excluding him from the Caliphate and transmitting the succession to his own son Ja'far. To this he obtained the assent of his ministers and the principal chiefs of his army, with the exception of Yahyā b. Khālid, Hārūn's former tutor, who showed such firmness and boldness that Hādī cast him into prison and resolved on his death. Some historians say that he had already given orders for his execution, when he himself was killed (September 14th, 786) by his mother Khaizorān, who had systematically and successfully intrigued against him with the object of gaining the real power for herself. Hādī, indignant at the fact that she was generally regarded as the real source of authority, had attempted to poison her, and Khaizorān, hoping to find a more submissive instrument of her will in her second and favourite son, caused Hādī to be smothered with cushions by two young slaves whom she had presented to him. She herself died three years later.

5. *Reign of Hārūn al-Rashīd.*—We have now reached the most celebrated name among the Arabian caliphs, celebrated not only in the East, but in the West as well, where the stories of the *Thousand and One Nights* have made us familiar with that world which the narrators represent in such brilliant colours. Hārūn ascended the throne without opposition. His first act was to choose as prime minister his former tutor, the faithful Yahyā b. Khālid, and to confide important posts to the two sons of Yahyā, Faḍl and Ja'far, of whom the former was his own foster-brother, the latter his intimate friend. The Barmecide family were endowed in the highest degree with those qualities of generosity and liberality which the Arabs prized so highly, and the chronicles never weary in their praises. Loaded with all the burdens of government, Yahyā brought the most distinguished abilities to the exercise of his office. He put the frontiers in a good state of defence; he filled the public treasury, and carried the splendour of the throne to the highest point. His sons, especially Faḍl, were worthy of their father.

Although the administration of Hārūn's states was committed to skilful hands, yet the first years of his long reign were not free from troubles. Towards the year 176 (A.D. 792–793) a man of the house of Ali, named Yahyā b. Abdallah, another brother of Mahommed and Ibrāhīm, who had taken refuge in the land of Dailam on the south-western shores of the Caspian Sea, succeeded in forming a powerful party, and publicly claimed the Caliphate. Hārūn immediately sent against him an army of 50,000 men, under the command of Faḍl, whom he made governor of all the Caspian provinces. Reluctant, however, to fight against a descendant of the Prophet, Faḍl first attempted to induce him to submit by promising him safety and a brilliant position at the court of Bagdad. Yahyā accepted the proposal, but required that the caliph should send him letters of pardon countersigned by the highest legal authorities and the principal personages of the empire. Hārūn consented and Yahyā went to Bagdad, where he met with a splendid reception. At the end of some months, however, he was calumniously accused of conspiracy, and the caliph, seizing the opportunity of ridding himself of a possible rival, threw him into prison, where he died, according to the majority of the historians, of starvation. Others say that Ja'far b. Yahyā b. Khālid, to whose care he had been entrusted, suffered him to escape, and that this was the real cause of Hārūn's anger against the Barmecides (*q.v.*). Dreading fresh insurrections of the Alids, Hārūn secured the person of another descendant of Ali, Mūsā b. Ja'far, surnamed al-Kāẓim, who enjoyed great consideration at Medina, and had already been arrested and released again by Mahdi. The unfortunate man was brought by the caliph himself to Bagdad, and there died, apparently by poison.

Meanwhile Hārūn did not forget the hereditary enemy of Islam. In the first year of his reign all the strong places of Kinnesrin and Mesopotamia were formed into a special province, which received the name of al-'Awāṣim (" the defending fortresses "), with Manbij (Hierapolis) as its capital. The building of the fortress of Ḥadath having been completed, Hārūn committed to Faraj the Turk the task of rebuilding and fortifying the city of Tarsus. Thanks to these and similar measures, the Moslem armies were able to advance boldly into Asia Minor. Almost every year successful raids were made, in the year 797 under the command of the caliph himself, so that Irene was compelled to sue for peace. An attack by the Khazars called the caliph's attention from his successes in Asia Minor. This people had made an irruption into Armenia, and their attack had been so sudden that the Moslems and Christians were unable to defend themselves, and 100,000 had been reduced to captivity. Two valiant generals, Khozaima b. Khāzīm and Yazīd b. Mazyad, marched against the Khazars and drove them out of Armenia.

In the midst of the cares of war, Hārūn was assiduous in his religious duties, and few years passed without his making the pilgrimage. Having determined to fix the order of succession in so formal a manner as to take away all pretext for future contentions, he executed a deed by which he appointed his eldest son Mahommed his immediate heir, and after him the second, Abdallah, and after Abdallah the third, Qāsim. Mahommed received the surname of *al-Amīn* (" the Sure "), Abdallah that of *al-Ma'mūn* (" he in whom men trust "), and Qāsim that of *al-Mo'tamin billāh* (" he who trusts in God "). Hārūn further

stipulated that Mamun should have as his share during the lifetime of his brother the government of the eastern part of the empire. Each of the parties concerned swore to observe faithfully every part of this deed, which the caliph caused to be hung up in the Ka'ba, imagining that it would be thus guaranteed against all violation on the part of men, a precaution which was to be rendered vain by the perfidy of Amīn.

It was in the beginning of the following year, at the very moment when the Barmecides thought their position most secure, that Hārūn brought sudden ruin upon them. The causes of their disgrace have been differently stated by the annalists (see BARMECIDES). The principal cause appears to have been that they abused the sovereign power which they exercised. Not a few were jealous of their greatness and sought for opportunities of instilling distrust against them into the mind of Hārūn, and of making him feel that he was caliph only in name. The secret dissatisfaction thus aroused was increased, according to some apparently well-informed authorities, by the releasing of the Alid Yahyā b. Abdallah, already mentioned. Finally Hārūn resolved on their destruction, and Ja'far b. Yahyā, who had just taken leave of him after a day's hunting, was arrested, taken to the castle of Hārūn, and beheaded. The following day, his father Yahyā, his brother Faḍl, and all the other Barmecides were arrested and imprisoned; all their property was confiscated. The only Barmecide who remained unmolested with his family was Mahommed the brother of Yahyā, who had been the chamberlain of the caliph till 795, when Faḍl b. Rabi' got his place. This latter had henceforward the greatest influence at court.

In the same year a revolution at Constantinople overthrew the empress Irene. The new emperor Nicephorus, thinking himself strong enough to refuse the payment of tribute, wrote an insulting letter to Hārūn, who contented himself with replying: "Thou shalt not hear, but see, my answer." He entered Asia Minor and took Heraclea, plundering and burning along his whole line of march, till Nicephorus, in alarm, sued for peace. Scarcely had the caliph returned into winter quarters when Nicephorus broke the treaty. When the news came to Rakka, where Hārūn was residing, not one of the ministers ventured to tell him, until at last a poet introduced it in a poem which pleased the monarch. Notwithstanding the rigour of the season, Hārūn retraced his steps, and Nicephorus was compelled to observe his engagements. In 805 the first great ransoming of Moslem prisoners took place on the banks of the little river Lamus in Cilicia. But Nicephorus, profiting by serious disturbances in Khorasan, broke the treaty again, and overran the country as far as Anazarba and Kanīsat as-saudā ("the black church") on the frontier, where he took many prisoners, who were, however, recovered by the garrison of Mopsuestia. Thus Hārūn was obliged to take the field again. He entered Asia Minor with an army of 135,000 regulars, beside volunteers and camp followers. Heraclea was taken, together with many other places, and Tyana was made a military station. At the same time his admiral, Ḥomaid b. Ma'yūf, conquered Cyprus, which had broken the treaty, and took 16,000 of its people captive. Nicephorus was now so completely beaten that he was compelled to submit to very harsh conditions. In the year 808 the second ransoming between the Moslems and the Greeks took place near the river Lamus.

The disturbances in Khorasan were caused by the malversations of the governor of that province, Ali b. 'Īsā b. Māhān. The caliph went in person to Merv, in order to judge of the reality of the complaints which had reached him. Ali b. 'Īsā hastened to meet the caliph on his arrival at Rai (Rhagae), near the modern Teheran, with a great quantity of costly presents, which he distributed with such profusion among the princes and courtiers that no one was anxious to accuse him. Hārūn confirmed him in his post, and, after having received the chiefs of Tabaristān who came to tender their submission, returned through Bagdad to Rakka on the Euphrates, which city was his habitual residence. In the following year Rāfi' b. Laith, a grandson of Nasr b. Sayyār, raised the standard of revolt in Samarkand, and, at the head of a numerous army, defeated the son of Ali b. 'Īsā. Thereupon Ali fled from Balkh, leaving the treasury, which was plundered by the populace after his departure. The caliph on learning that the revolt was due to Ali's tyranny, sent Harthama b. A'yan with stringent orders to seize Ali and confiscate his possessions. This order was carried out, and it is recorded that 1500 camels were required to transport the confiscated treasures. The caliph's hope that Rāfi' would submit on condition of receiving a free pardon was not fulfilled, and he resolved to set out himself to Khorasan, taking with him his second son Mamun. On the journey he was attacked by an internal malady, which carried him off, ten months after his departure from Bagdad, A.H. 193 (March 809), just on his arrival at the city of Tūs. Hārūn was only forty-five years of age. He was far from having the high qualifications of his grandfather Mansur; indeed he did not even possess the qualities of his father and his brother. When the latter asked him to renounce his right of succession, he was willing to consent, saying that a quiet life with his beloved wife, the princess Zobaida, was his highest wish, but he obeyed his mother and Yahyā b. Khālid. As long as the Barmecides were in office, he acted only on their direction. After their disgrace he was led into many impolitic actions by his violent and often cruel propensities. But the empire was, especially in the earlier part of his reign, in a very prosperous state, and was respected widely by foreign powers. Embassies passed between Charlemagne and Hārūn in the years 180 (A.D. 797) and 184 (A.D. 801), by which the former obtained facilities for the pilgrims to the Holy Land, the latter probably concessions for the trade on the Mediterranean ports. The ambassadors brought presents with them; on one of these occasions the first elephant reached the land of the Franks.

Under the reign of Hārūn, Ibrāhīm b. al-Aghlab, the governor of Africa, succeeded in making himself independent of the central government, on condition of paying a fixed annual tribute to his suzerain the caliph. This was, if we do not take Spain into the account, the first instance of dismemberment, later to be followed by many others.

In the days of this caliph the first paper factories were founded in Bagdad.

6. *Reign of Amīn.*—On the death of Hārūn his minister, Faḍl b. Rabī', with the view of gaining the new caliph's confidence, hastened to call together all the troops of the late caliph and to lead them back to Bagdad, in order to place them in the hands of the new sovereign, Amīn. He even, in direct violation of Hārūn's will, led back the corps which was intended to occupy Khorasan under the authority of Mamun. Aware, however, that in thus acting he was making Mamun his irreconcilable enemy, he persuaded Amīn to exclude Mamun from the succession. Mamun, on receiving his brother's invitation to go to Bagdad, was greatly perplexed; but his tutor and later vizier, Faḍl b. Sahl, a Zoroastrian of great influence, who in 806 had adopted Islam, reanimated his courage, and pointed out to him that certain death awaited him at Bagdad. Mamun resolved to hold out, and found pretexts for remaining in Khorasan. Amīn, in anger, caused the will of his father, which, as we have seen, was preserved in the Ka'ba, to be destroyed, declared on his own authority that Mamun's rights of succession were forfeited, and caused the army to swear allegiance to his own son Mūsā, a child of five, on whom he bestowed the title of *an-Nāṭiq bil-Ḥaqq* ("he who speaks according to truth"), A.H. 194 (A.D. 809–810). On hearing the news, Mamun, strong in the rightfulness of his claim, retaliated by suppressing the caliph's name in all public acts. Amīn immediately despatched to Khorasan an army of 40,000 under the command of Ali b. 'Īsā, who had regained his former influence, and told the caliph that, at his coming to Khorasan, all the leading men would come over to his side. Zobaida, the mother of the caliph, entreated Ali to treat Mamun kindly when he should have made him captive. It is said that Faḍl b. Sahl had, through a secret agent, induced Faḍl b. Rabī' to select Ali, knowing that the dislike felt towards him by the Khorasanians would double their strength in fighting against him. Mamun, on his side, sent in all haste an army of less than 4000 men of his faithful Khorasanians, and entrusted

their command to Ṭāhir b. Hosain, who displayed remarkable abilities in the war that ensued. The two armies met under the walls of Rai (Shaaban 195, May 811). By a bold attack, in the manner of the Kharijites of yore, Ṭāhir penetrated into the centre of the hostile army and killed Ali. The frightened army fled, leaving the camp with all its treasures to Ṭāhir, who from that day was named "the man with the two right hands." A courier was despatched immediately to Merv, who performed the journey, a distance of about 750 miles, in three days. On the very day of his arrival, Harthama b. A'yan had left Merv with reinforcements. Mamun now no longer hesitated to take the title of caliph.

When the news of Ali's defeat came to Bagdad, Amīn sent Abdarrahmān b. Jabala to Hamadān with 20,000 men. Ṭāhir defeated him, forced Hamadān to surrender, and occupied all the strong places in Jabal (Media). The year after, Amīn placed in the field two new armies commanded respectively by Ahmad b. Mazyad and Abdallah b. Ḥomaid b. Qaḥṭaba. The skilful Ṭāhir succeeded in creating divisions among the troops of his adversaries, and obtained possession, without striking a blow, of the city of Holwān, an advantage which opened the way to the very gates of Bagdad. He was here reinforced by troops sent from Khorasan under the command of Harthama b. A'yan, who was appointed leader of the war against Amīn, with orders to send Ṭāhir to Ahwāz. Ṭāhir continued his victorious march, conquered Ahwāz, took Wāsit and Madāin, and pitched his camp near one of the gates of the capital, where he was rejoined by Harthama. One after the other the provinces fell away from Amīn, and he soon found himself in possession of Bagdad alone. The city, though blockaded on every side, made a desperate defence for nearly two years. Ultimately the eastern part of the city fell into the hands of Ṭāhir, and Amīn, deserted by his followers, was compelled to surrender. He resolved to treat with Harthama, as he was averse to Ṭāhir; but this step caused his ruin. Ṭāhir succeeded in intercepting him on his way to Harthama, and immediately ordered him to be put to death. His head was sent to Mamun (September 813). It was presented to him by his vizier, Faḍl b. Sahl, surnamed Dhu'l-Riyāsatain, or "the man with two governments," because his master had committed to him both the ministry of war and the general administration. Mamun hid his joy beneath a feigned display of sorrow.

Amīn was only twenty-eight years old. As a ruler he was wholly incompetent. He hardly comprehended the importance of the affairs with which he was called upon to deal. He acted invariably on the advice of those who for the time had his confidence, and occupied himself mainly with the affairs of his harem, with polo, fishing, wine and music. The five years of his reign were disastrous to the empire, and in particular to Bagdad which never entirely recovered its old splendour.

7. *Reign of Mamun.*—On the day following the death of Amīn Ṭāhir caused Mamun to be proclaimed at Bagdad, and promised in his name a general amnesty. The accession of this prince appeared likely to restore to the empire the order necessary for its prosperity. It was not so, however. The reign of Mamun—that reign in which art, science and letters, under the patronage of the caliph, threw so brilliant a lustre—had a very stormy beginning. Mamun was in no haste to remove to Bagdad, but continued to reside at Merv. In his gratitude to Faḍl b. Sahl, to whose service he owed his success, he not only chose him as prime minister of the empire, but also named his brother, Hasan b. Sahl, governor of Media, Fārs, Ahwāz, Arabia and Irak. The two generals to whom he owed still more were not treated as they deserved. Harthama was ordered to return to Khorasan; Ṭāhir was made governor of Mesopotamia and Syria, with the task of subduing Naṣr b. Shabath, who with numerous adherents refused submission to the caliph. The Alids seized on the elevation of Mamun as a pretext for fresh revolts. At Kufa a certain Ibn Ṭabāṭabā placed an army in the field under Abu'l-Sarāyā, who had been a captain in the army of Harthama. An army sent by Hasan b. Sahl was defeated, and Abu'l-Sarāyā, no longer content to play a second part, poisoned his chief, Ibn Ṭabāṭabā, and put in his place another of the family of Ali, Mahommed b. Mahommed, whom, on account of his extreme youth, he hoped to govern at his will. Abu'l-Sarāyā's success continued, and several cities of Irak—Basra, Wāsit and Madāin—fell into his hands. Mecca, Medina and Yemen also were mastered by the Alids, who committed all kinds of atrocities and sacrilege. Abu'l-Sarāyā, who even struck money in Kufa, began to menace the capital, when Hasan b. Sahl hastily sent a messenger to Harthama b. A'yan, who was already at Holwān on his way back to Merv, entreating him to come to his aid. Harthama, who was deeply offended by his dismissal, refused at first, but at last consented, and at once checked the tide of disaster. The troops of the Alids were everywhere driven back, and the whole of Irak fell again into the hands of the Abbasids. Kufa opened its gates; Basra was taken by assault. Abu'l-Sarāyā and Mahommed b. Mahommed fled to Mesopotamia, but were made prisoners. The former was decapitated, the latter was sent to Khorasan, the revolt in Arabia was quickly suppressed, and peace seemed within reach. This, however, was by no means the case. The disorder of civil war had caused a multitude of robbers and vagabonds to emerge from the purlieus of Bagdad. These ruffians proceeded to treat the capital as a conquered city, and it became necessary for all good citizens to organize themselves into a regular militia. Harthama, having vanquished Abu'l-Sarāyā, did not go to Hasan b. Sahl, but proceeded towards Merv with the purpose of telling Mamun that the state of affairs was not as Faḍl b. Sahl represented it to him, and urging him to come to Bagdad, where his presence was necessary. Faḍl, informed of his intentions, filled the caliph's mind with distrust against the old general, so that when Harthama arrived Mamun had him cast into prison, where he died shortly afterwards. When the tidings of his disgrace came to Bagdad, the people expelled the lieutenant of Hasan b. Sahl, called by them the Mājūzī ("the Zoroastrian"), who had chosen Madāin for his residence, and put at their head Mansūr, a son of Mahdi, who refused to assume the title of caliph, but consented to be Mamun's vicegerent instead of Hasan b. Sahl.

Meanwhile, at Merv, Mamun was adopting a decision which fell like a thunderbolt on the Abbasids. In A.H. 201 (A.D. 817), under pretence of putting an end to the continual revolts of the partisans of Ali, and acting on the advice of his prime minister Faḍl, he publicly designated as his successor in the Caliphate Ali ar-Ridā, a son of that Mūsā al-Kāzim who perished in the prison of Mahdi, a direct descendant of Hosain, the son of Ali, and proscribed black, the colour of the Abbasids, in favour of that of the house of Ali, green. This step was well calculated to delight the followers of Ali, but it could not fail to exasperate the Abbasids and their partisans. The people of Bagdad refused to take the oath to Ali b. Mūsā, declared Mamun deposed, and elected his uncle, Ibrāhīm, son of Mahdi, to the Caliphate.[1] It was only indirectly that the news reached the caliph, who then saw that Faḍl had been treating him as a puppet. His anger was great, but he kept it carefully to himself. Faḍl was one day found murdered, and Ali b. Mūsā died suddenly. The historians bring no open accusation against Mamun, but it seems clear that the opportune removal of these men was not due to chance. Mamun affected the profoundest grief, and, in order to disarm suspicion, appointed as his prime minister the brother of Faḍl, Hasan b. Sahl, whose daughter Būrān he afterwards married. Soon after the news came to him that Hasan b. Sahl had become insane. Mamun appointed an officer to act as his lieutenant, and wrote that he was coming to Bagdad in a short time. From that moment the pseudo-caliph Ibrāhīm found himself deserted, and was obliged to seek safety in concealment. His precarious reign had, however, lasted nearly two years. Mamun had found out also that the general uneasiness was largely due to his treatment of Harthama and Ṭāhir, the latter having been put in a rebellious country without the men and the money to maintain his authority. The caliph therefore wrote to Ṭāhir to meet him at Nahrawān, where he was received with the greatest honour.

[1] On this event, see a remarkable essay by Barbier de Meynard in the *Journal Asiatique* for March–April, 1869.

Having taken all precautions, Mamun now made his solemn entry into Bagdad, but, to show that he came as a master, he still displayed for several days the green colours, though at last, at the request of Ṭāhir, he consented to resume the black. From this time, A.H. 204 (August 819), the real reign of Mamun began, freed as he now was from the tutelage of Faḍl.

When welcoming Ṭāhir, Mamun bade him ask for any reward he might desire. Ṭāhir, fearing lest the caliph, not being able to endure the sight of the murderer of his brother, should change his mind towards him, contrived to get himself appointed governor of Khorasan. Like most of the great Moslem generals, Ṭāhir, it is said, had conceived the project of creating an independent kingdom for himself. His death, A.H. 207 (A.D. 822), prevented its realization; but as his descendants succeeded him one after the other in the post of governor, he may be said in reality to have founded a dynasty in Khorasan. His son Abdallah b. Ṭāhir was a special favourite of Mamun. He brought Naṣr b. Shabath to subjection in Mesopotamia, and overcame by great ability a very dangerous rebellion in Egypt. When he returned thence, the caliph gave him the choice between the government of Khorasan and that of the northern provinces, where he would have to combat Bābak the Khorramite. Abdallah chose the former (see below, § 8).

The pseudo-caliph, Ibrāhīm, who, since Mamun's entry into Bagdad, had led a wandering life, was eventually arrested. But Mamun generously pardoned him, as well as Faḍl b. Rabī', the chief promoter of the terrible civil war which had so lately shaken the empire. After that time, Ibrāhīm lived peacefully at the court, cultivating the arts of singing and music.

Tranquillity being now everywhere re-established, Mamun gave himself up to science and literature. He caused works on mathematics, astronomy, medicine and philosophy to be translated from the Greek, and founded in Bagdad a kind of academy, called the "House of Science," with a library and an observatory. It was also by his orders that two learned mathematicians undertook the measurement of a degree of the earth's circumference. Mamun interested himself too in questions of religious dogma. He had embraced the Motazilite doctrine about free will and predestination, and was in particular shocked at the opinion which had spread among the Moslem doctors that the Koran was the uncreated word of God. In the year 212 (A.D. 827) he published an edict by which the Motazilite (Mu'tazilite) doctrine was declared to be the religion of the state, the orthodox faith condemned as heretical. At the same time he ordered all his subjects to honour Ali as the best creature of God after the Prophet, and forbade the praise of Moawiya. In A.H. 218 (A.D. 833) a new edict appeared by which all judges and doctors were summoned to renounce the error of the uncreated word of God. Several distinguished doctors, and, among others, the celebrated Ahmad b. Ḥanbal (*q.v.*), founder of one of the four orthodox Moslem schools, were obliged to appear before an inquisitorial tribunal; and as they persisted in their belief respecting the Koran, they were thrown into prison. Mamun, being at Tarsus, received from the governor of Bagdad the report of the tribunal, and ordered that the culprits should be sent off to him. Happily for these unfortunate doctors, they had scarcely reached Adana, when news of the caliph's death arrived and they were brought back to Bagdad. The two successors of Mamun maintained the edicts—Ahmad b. Ḥanbal, who obstinately refused to yield, was flogged in the year 834—but it seems that Motasim did not himself take much interest in the question, which perhaps he hardly understood, and that the prosecution of the inquisition by him was due in great part to the charge which was left him in Mamun's will. In the reign of Motawakkil the orthodox faith was restored, never to be assailed again.[1]

In spite of these manifold activities Mamun did not forget the hereditary enemy of Islam. In the years 830, 831 and 832 he made expeditions into Asia Minor with such success that Theophilus, the Greek emperor, sued for peace, which Mamun haughtily refused to grant. Accordingly, he decided on marching in the following year against Amorium, and thence to Constantinople itself. Having sent before him his son Abbas to make Tyana a strong fortress, he set out for Asia Minor to put himself at the head of the army, but died of a fever brought on by bathing in the chill river, Pedendon, 40 m. from Tarsus, in Rajab 218 (A.D. August 833), at the age of forty-eight.

Mamun was a man of rare qualities, and one of the best rulers of the whole dynasty after Mansur. By him the ascendancy of the Persian element over the Arabian was completed. Moreover, he began to attract young Turkish noblemen to his court, an example which was followed on a much larger scale by his successor and led to the supremacy of the Turks at a later period.

8. *Reign of Motasim.*—Abu Isḥāk al-Mo'taṣim had for a long time been preparing himself for the succession. Every year he had bought Turkish slaves, and had with him in the last expedition of Mamun a bodyguard of 3000. Backed by this force he seems to have persuaded the ailing caliph to designate him as his successor. The chroniclers content themselves with recording that he himself wrote in the name of the caliph to the chief authorities in Bagdad and elsewhere that he was to be the successor. His accession, however, met at first with active opposition in the army, where a powerful party demanded that Abbas should take the place of his father. Abbas, however, publicly renounced all pretension to the Caliphate, and the whole army accepted Motasim, who immediately had the fortifications of Tyana demolished and hastened back to Bagdad, where he made his public entry on the 20th of September 833.

Motasim wanted officers for his bodyguard. Immediately after his coming to Bagdad, he bought all the Turkish slaves living there who had distinguished themselves. Among them were Ashnās, Itākh, Wasīf, Sīmā, all of whom later became men of great influence. The guard was composed of an undisciplined body of soldiers, who, moreover, held in open contempt the religious precepts of Islam. Tired of the excesses committed by these Turks, the people of Bagdad beat or killed as many of them as they could lay hands on, and Motasim, not daring to act with severity against either his guard or the citizens, took the course of quitting the city. Having bought in 834 territories at Sāmarrā, a small place situated a few leagues above Bagdad, he caused a new residence to be built there, whose name, which could be interpreted "Unhappy is he who sees it," was changed by him into Sorra-man-ra'ā, "Rejoiced is he who sees it." Leaving the government of the capital in the hands of his son Hārūn al-Wāthiq, he established himself at Sāmarrā in 836. This resolution of Motasim was destined to prove fatal to his dynasty; for it placed the caliphs at the mercy of their praetorians. In fact, from the time of Wāthiq, the Caliphate became the plaything of the Turkish guard, and its decline was continuous.

In the time of the civil war the marshlands in Irak between Basra and Wāsit had been occupied by a large population of Indians, called *yat*, or, according to the Arabic pronunciation, *Zoṭṭ*, who infested the roads and levied a heavy tribute from the ships ascending and descending the Tigris. From the year 821 onwards Mamun had tried in vain to bring them to submission. When Motasim came back to Bagdad, after the death of his brother, he found the people in great distress, their supply of dates from Basra having been cut off by the Zoṭṭ, and resolved to put them down with all means. After seven months of vigorous resistance, they at last yielded on condition of safety of life and property. In January 835 the Zoṭṭ in their national costume and with their own music were conducted on a great number of boats through Bagdad. Thence they were transported to Ainzarba (Anazarba) on the frontier of the Greek empire. Twenty years later they entered Asia Minor, whence in a later period they came into Europe, under the name of Athinganoi (Ziganes) and Egyptians (gipsies).[2]

A far more difficult task lay before Motasim, the subjection of Bābak al-Khorramī in Azerbaijan. Though the name Khorramī is often employed by the Moslem writers to designate such

[1] Cf. W. M. Patton, *Ahmed ibn Hanbal and the Mihna* (Leiden, 1897); and article Mahommedan Religion.

[2] See M. J. de Goeje, *Mémoire sur les migrations des Ziganes à travers l'Asie* (Leiden, 1903); also Gipsies.

extravagant Moslem sectaries as the Hāshimīya, the real Khorramī were not Moslems, but Persian Mazdaqites, or communists. The name Khorramī, or Khorramdīnī, "adherent of the pleasant religion," seems to be a nickname. As they bore red colours, they were also called Mohammira, or Redmakers. Their object was to abolish Islam and to restore "the white religion." We find the first mention of them in the year 808, when Harun al-Rashid sent an army against them. During the civil war their power was steadily increasing, and spread not only over Azerbaijan, but also over Media (Jabal) and Khorasan. The numerous efforts of Mamun to put them down had been all in vain, and they were now in alliance with the Byzantine emperor. Therefore, in the year 835, Motasim made Afshīn, a Turkish prince who had distinguished himself already in the days of Mamun, governor of Media, with orders to take the lead of the war against Bābak. After three years' fighting, Bābak was taken prisoner. He was carried to Sāmarrā, led through the city on the back of an elephant, and then delivered to the executioners, who cut off his arms and legs. His head was sent to Khorasan, his body was crucified. For long afterwards the place where this happened bore the name of "Bābak's Cross."

In the hope of creating a diversion in Bābak's favour, Theophilus in 837 fell upon and laid waste the frontier town of Zibatra. There and in several other places he took a great number of prisoners, whom he mutilated. The news arrived just after that of the capture of Bābak, and Motasim swore to take exemplary vengeance. He assembled a formidable army, penetrated into Asia Minor, and took the city of Amorium, where he gained rich plunder. During his return the caliph was informed of a conspiracy in the army in favour of 'Abbās the son of Mamun, of which 'Ojaif b. 'Anbasa was the ringleader. The unfortunate prince was arrested and died soon after in prison. The conspirators were killed, many of them with great cruelty. (For the campaign see Bury in *J.H.S.*, 1909, xxix. pt. i.)

Motasim had just returned to Sāmarrā when a serious revolt broke out in Tabaristan, Māziyār, one of the hereditary chiefs of that country, refusing to acknowledge the authority of Abdallah Ibn Ṭāhir, the governor of Khorasan, of which Tabaristan was a province. The revolt was suppressed with great difficulty, and it came out that it was due to the secret instigation of Afshīn, who hoped thereby to cause the fall of the Ṭāhirids, and to take their place, with the ulterior object of founding an independent kingdom in the East. Afshīn, who stood at that moment in the highest favour of the caliph, was condemned and died in prison. Motasim died a year later, January 842.

9. *Reign of Wāthiq.*—His son Wāthiq, who succeeded, though not in the least to be compared with Mamun, had yet in common with him a thirst for knowledge—perhaps curiosity would be a more appropriate term—which prompted him, as soon as he became caliph, to send the famous astronomer Mahommed b. Mūsā into Asia Minor to find out all about the Seven Sleepers which he discovered in the neighbourhood of Arabissus,[1] and Sallām the Interpreter to explore the situation of the famous wall of Gog and Magog, which he reached at the north-west frontier of China.[2] For these and other personal pursuits he raised money by forcing a number of high functionaries to disgorge their gains. In so vast an empire the governors and administrators had necessarily enjoyed an almost unrestricted power, and this had enabled them to accumulate wealth. Omar had already compelled them to furnish an account of their riches, and, when he found that they had abused their trust, to relinquish half to the state. As time went on, nomination to an office was more and more generally considered a step to wealth. During the reign of the Omayyads a few large fortunes were made thus. But with the increasing luxury after Mansur, the thirst for money became universal, and the number of honest officials lessened fast. Confiscation of property had been employed with success by Hārūn al-Rashid after the disgrace of the Barmecides, and occasionally by his successors, but Wāthiq was the first to imprison high officials and fine them heavily on the specific charge of peculation.

The caliph also shared Mamun's intolerance on the doctrinal question of the uncreated Koran. He carried his zeal to such a point that, on the occasion of an exchange of Greek against Moslem prisoners in 845, he refused to receive those Moslem captives who would not declare their belief that the Koran was created. The orthodox in Bagdad prepared to revolt, but were discovered in time by the governor of the city. The ringleader Ahmad b. Naṣr al-Khozā'ī was seized and brought to Sāmarrā, where Wāthiq beheaded him in person. The only other event of importance in the reign of Wāthiq was a rising of the Arabian tribes in the environs of Medina, which the Turkish general Boghā with difficulty repressed. When he reached Sāmarrā with his prisoners, Wāthiq had just died (August 846). That the predominance of the praetorians was already established is clear from the fact that Wāthiq gave to two Turkish generals, Ashnās and Itākh respectively, the titular but lucrative supreme government of all the western and all the eastern provinces. In his days the soldiery at Sāmarrā was increased by a large division of Africans (Maghribīs).

10. *Reign of Motawakkil.*—As Wāthiq had appointed no successor the vizier Mahommed Zayyāt had cast his eye on his son Mahommed, who was still a child, but the generals Wasīf and Itākh, seconded by the upper cadi Ibn abī Da'ud, refused their consent, and offered the supreme power to Wāthiq's brother Ja'far, who at his installation adopted the name of *al-Motawakkil 'alā 'llāh* ("he who trusts in God"). The new caliph hated the vizier Zayyāt, who had opposed his election, and had him seized and killed with the same atrocious cruelty which the vizier himself had inflicted on others. His possessions, and those of others who had opposed the caliph's election, were confiscated. But the arrogance of Itākh, to whom he owed his Caliphate, became insufferable. So, with the perfidy of his race, the caliph took him off his guard, and had him imprisoned and killed at Bagdad. He was succeeded by Waṣīf.

About this time an impostor named Mahmūd b. Faraj had set himself up as a prophet, claiming to be Dhu'l-Qarnain (Alexander the Great) risen from the dead. Asserting that Gabriel brought him revelations, he had contrived to attract twenty-seven followers. The caliph had him flogged, and compelled each of the twenty-seven to give him ten blows on the head with his fist. The "prophet" expired under the blows (850).

One of the first acts of Motawakkil was the release of all those who had been imprisoned for refusing to admit the dogma of the created Koran, and the strict order to abstain from any litigation about the Book of God. The upper cadi Ibn abī Da'ud, the leader of the movement against orthodoxy, who had stood in great esteem with Mamun and had fulfilled his high office under the reigns of Motasim and Wāthiq, had a stroke of paralysis in the year 848. His son Mahommed was put in his place till 851, when all the members of the family were arrested. They released themselves by paying the enormous sum of 240,000 dināRs and 16,000,000 dirhems, which constituted nearly their whole fortune, and were then sent to Bagdad, where father and son died three years later. An orthodox upper cadi was named instead, and the dogma of the created Koran was declared heresy; therewith began a persecution of all the adherents of that doctrine and other Motazilite tenets. Orthodoxy triumphed, never again to lose its place as the state religion. Hand in hand with these reactionary measures came two others, one against Jews and Christians, one against the Shi'ites. The first caliph who imposed humiliating conditions on the Dhimmīs, or Covenanters, who, on condition of paying a certain not over-heavy tribute, enjoyed the protection of the state and the free exercise of their cult, was Omar II., but this policy was not continued. A proposition by the cadi Abū Yūsuf to Hārūn al-Rashid to renew it had not been adopted. Motawakkil, in 850, formulated an edict by which these sectaries were compelled to wear a distinctive dress and to distinguish their houses by a figure of

[1] See M. J. de Goeje, "De legende der Zevenslapers van Efeze," *Versl. en Meded. der K. Akad. v. Wetensch. Afd. Letterk.* 4e Reeks, iii., 1900.

[2] See M. J. de Goeje, "De muur van Gog en Magog," *Versl. en Meded.* 3e Reeks, v., 1888.

the devil nailed to the door, excluding them at the same time from all public employments, and forbidding them to send their children to Moslem schools. Nevertheless, he kept his Christian medical men, some of whom were high in favour. He showed his hatred for the Shi'ites by causing the mausoleum erected over the tomb of Hosain at Kerbela, together with all the buildings surrounding it, to be levelled to the ground and the site to be ploughed up, and by forbidding any one to visit the spot. A year before, a descendant of Hosain, Yahyā b. Omar, had been arrested and flogged on his orders. He escaped afterwards, rose in rebellion at Kufa in 864, and was killed in battle. It is reported that the caliph even permitted one of his buffoons to turn the person of Ali into mockery.

In the year 848–849 Ibn Ba'ith, who had rendered good service in the war against Bābak, but had for some cause been arrested, fled from Sāmarrā to Marand in Azerbaijan and revolted. Not without great difficulty Boghā, the Turkish general, succeeded in taking the town and making Ibn Ba'ith prisoner. He was brought before Motawakkil and died in prison. In the year 237 (A.D. 851–852) a revolt broke out in Armenia. Notwithstanding a vigorous resistance, Boghā subdued and pacified the province in the following year. In that same year, 852–853, the Byzantines made a descent on Egypt with 300 vessels. 'Anbasa the governor had ordered the garrison of Damietta to parade at the capital Fostāt. The denuded town was taken, plundered and burned. The Greeks then destroyed all the fortifications at the mouth of the Nile near Tinnis, and returned with prisoners and booty. The annual raids of Moslems and Greeks in the border districts of Asia Minor were attended with alternate successes, though on the whole the Greeks had the upper hand. In 856 they penetrated as far as Amid (Diārbekr), and returned with 10,000 prisoners. But in the year 859 the Greeks suffered a heavy defeat with losses of men and cattle, the emperor Michael himself was in danger, whilst the fleet of the Moslems captured and sacked Antalia. This was followed by a truce and an exchange of prisoners in the following year.

In 855 a revolt broke out in Homs (Emesa), where the harsh conditions imposed by the caliph on the Christians and Jews had caused great discontent. It was repressed after a vigorous resistance. A great many leading men were flogged to death, all churches and synagogues were destroyed and all the Christians banished.

In the year 851 the Boja (or Beja), a wild people living between the Red Sea and the Nile of Upper Egypt, the Blemmyes of the ancients, refused to pay the annual tribute, and invaded the land of the gold and emerald mines, so that the working of the mines was stopped. The caliph sent against them Mahommed al-Qommī, who subdued them in 856 and brought their king Ali Bābā to Sāmarrā before Motawakkil, on condition that he should be restored to his kingdom.

About this time Sijistan liberated itself from the supremacy of the Ṭāhirids. Ya'qūb b. Laith ṣl-Saffār proclaimed himself amīr of that province in the year 860, and was soon after confirmed in this dignity by the caliph.

In 858 Motawakkil, hoping to escape from the arrogant patronage of Waṣīf, who had taken the place of Itākh as head of the Turkish guard, transferred his residence to Damascus. But the place did not agree with him, and he returned to Sāmarrā, where he caused a magnificent quarter to be built 3 m. from the city, which he called after his own name Ja'farīya, and on which he spent more than two millions of dinārs (about £900,000). He found the means by following the example of his predecessor in depriving many officials of their ill-gotten gains. He contrived to enrol in his service nearly 12,000 men, for the greater part Arabs, in order to crush the Turks. In the year of his elevation to the Caliphate, he had regulated the succession to the empire in his own family by designating as future caliphs his three sons, *al-Montaṣir billāh* ("he who seeks help in God"), *al-Mo'tazz billāh* ("he whose strength is of God"), and *al-Mowayyad billāh* ("he who is assisted by God"). By and by he conceived an aversion to his eldest son, and wished to supplant him by Motazz, the son of his favourite wife Qabīha. The day had been fixed on which Montasir, Waṣīf and several other Turkish generals were to be assassinated. But Waṣīf and Montasir had been informed, and resolved to anticipate him. In the night before, Shawwāl A.H. 247 (December 861), Motawakkil, after one of his wonted orgies, was murdered, together with his confidant, Fatḥ b. Khāqān. The official report, promulgated by his successor, was that Fatḥ b. Khāqān had murdered his master and had been punished for it by death. For the administrative system in this reign see MAHOMMEDAN INSTITUTIONS.

11. *Reign of Montasir.*—On the very night of his father's assassination Montasir had himself proclaimed caliph. He was a man of very feeble character, and a mere puppet in the hands of his vizier Ahmad b. Khaṣīb and the Turkish generals. He was compelled to send Waṣīf, the personal enemy of Ibn Khaṣīb, to the frontier for a term of four years, and then to deprive his two brothers Motazz and Mowayyad, who were not agreeable to them, of their right of succession. He died six months after, by poison, it is said.

12. *Reign of Mosta'īn.*—The Turkish soldiery, now the chief power in the state, chose, by the advice of Ibn Khaṣīb, in succession to Montasir, his cousin Ahmad, who took the title of *al-Mosta'īn billāh* ("he who looks for help to God"). In the reign of this feeble prince the Greeks inflicted serious losses on the Moslems in Asia Minor. A great many volunteers from all parts, who offered their services, were hunted down as rioters by the Turkish generals, who were wholly absorbed by their own interests. The party which had placed Mosta'īn on the throne, led by Ibn Khaṣīb and Otāmish, were soon overpowered by Waṣīf and Boghā. Ibn Khaṣīb was banished to Crete, Otāmish murdered. The superior party, however, maintained Mosta'īn on the throne, because they feared lest Motazz should take vengeance upon them for the murder of his father Motawakkil. But in the year 865 Waṣīf and Boghā fled with Mosta'īn to Bagdad, and Motazz was proclaimed caliph at Sāmarrā. A terrible war ensued; Mosta'īn was obliged to abdicate, and was killed in the following year.

In 864 a descendant of Ali, named Hasan b. Zaid, gained possession of Tabaristan and occupied the great city of Rai (Rey) near Teheran. A year later the province was reconquered by the Ṭāhirid governor of Khorasan, so that Hasan was obliged to retreat for refuge to the land of the Dailam. But he returned soon, and after many reverses ruled over Tabaristan and Jorjān for many years.

13. *Reign of Motazz.*—Motazz, proclaimed caliph at Bagdad in the first month of 252 (January 866), devoted himself to the object of freeing himself from the omnipotent Turkish generals, especially Waṣīf and Boghā, who had opposed his election. But such a task demanded an ability and energy which he did not possess. He was obliged to grant them amnesty and to recall them to Sāmarrā. He mistrusted also his brothers Mowayyad and Mowaffaq, who had interceded for them. He put the former to death and drove the latter into exile to Bagdad. Some time after he had the satisfaction of seeing Waṣīf killed by his own troops, and succeeded, a year later, in having Boghā assassinated. But a more difficult problem was the payment of the Turkish, Persian and African guards, which was said to have amounted in A.H. 252 to 200,000,000 dirhems[1] (about £6,500,000), or apparently twice the revenue derived from the land tax. As the provincial revenues annually decreased, it became impossible to pay this sum, and Ṣāliḥ the son of Waṣīf, in spite of the remonstrances of the caliph, confiscated the property of state officials. Upon a further demand, Motazz, having failed to procure money from his mother Qabīha, who was enormously rich, was seized upon and tortured, and died of starvation in prison (Shaaban 255, July 868).

The dismemberment of the empire continued fast in these years, and the caliph was compelled to recognize the virtual independence of the governors Ya'qūb the Saffārid (see SAFFĀRIDS and PERSIA, *History*, § B) in Seistan, and Ahmad b. Tūlūn in Egypt.

[1] "Dinars" in the text of Tabari iii. 1685, must be an error for "dirhems."

14. *Reign of Mohtadī.*—Immediately after the seizure of Motazz, the Turks, led by Ṣāliḥ b. Waṣīf, proclaimed as caliph one of the sons of Wāthiq with the title of al-Mohtadī billāh (" the guided by God "), who, however, refused to occupy the throne until his predecessor had solemnly abdicated. Mohtadī, who was a man of noble and generous spirit and had no lack of energy, began by applying the precarious measure of power which was left him to the reform of the court. He banished the musicians and singers, and forbade all kinds of games; he devoted himself to the administration of justice, and gave public audiences to the people for the redress of their grievances. At the same time he contrived to elevate the power of the Abnā, the descendants of those Persian soldiers who had established the dynasty of the Abbasids, in order to break the supremacy of the Turks and other mercenaries. But Mohtadī came too late, and the Turks did not leave him time to finish his work.

On the news of the conspiracy against Motazz, Mūsā, the son of the famous general Boghā,[1] then governor of Media (Jabal), ordered his deputy-general Mofliḥ to return at once from a proposed invasion of Dailam, and moved with his army towards Sāmarrā, notwithstanding the peremptory orders of the caliph. At his approach Ṣāliḥ, who was afraid of Mūsā, hid himself, but was soon discovered and killed. At that moment a Kharijite, named Mosāwir, who in 867 had risen in Mesopotamia and beaten more than one general of the government, took Balad and menaced Mosūl. Mūsā could not refuse to comply with the formal command of the caliph to march against him. During the absence of these troops, Mohtadī seems to have tried to get rid of the principal Turkish leaders. A brother of Mūsā and one of his best generals, Bāyikbeg (Baiekbāk), were killed, but the soldiery he had gained over for himself were not strong enough. Mohtadī was overwhelmed and killed, Rajab 256 (June 870).

15. *Reign of Motamid.*—Whether from weariness or from repentance, the Turkish soldiery discontinued for a time their hateful excesses, and their new leader, Mūsā b. Boghā, was without the greed and ambition of his predecessors. A son of Motawakkil was brought out of prison to succeed his cousin, and reigned for twenty-three years under the name of *al-Mo'tamid 'alā'llāh* (" he whose support is God "). He was a feeble, pleasure-loving monarch, but Mohtadī had regained for the Caliphate some authority, which was exercised by Obaidallah b. Khāqān, the able vizier of Mohtadī, and by Motamid's talented brother Abū Ahmad al-Mowaffaq; Mūsā b. Boghā himself remained till his death a staunch servant of the government. During the reign of Motamid great events took place. The great power long wielded by the Ṭāhirids, not only in the eastern provinces, but also at Bagdad itself, had been gradually diminishing, and came to an end in the year 873, when Ya'qūb the Saffārid occupied Nīshāpur and imprisoned Mahommed b. Ṭāhir with his whole family. The power of Ya'qūb then increased to such an extent that he was not content with the caliph's offer to recognize him as supreme in the provinces he had conquered, and military governor of Bagdad, but marched against Irak. The caliph himself, wearing the mantle and the staff of the Prophet, then went out against him, and after a vigorous resistance he was beaten by Mowaffaq, who had the command of the troops, and fled to Jondisāpūr in Khūzistān, where he died three years later, leaving his empire to his brother 'Amr. This prince maintained himself in power till the year 900, when he was beaten and taken prisoner by Ismā'īl b. Ahmed the Sāmānid. The Sāmānids had been governors of Transoxiana from the time of Mamun, and after the fall of the Ṭāhirids, had been confirmed in this office by the caliph. After 287 (900) they were independent princes, and under their dominion these districts attained to high prosperity.

Motamid had also to deal with a rising of the negro slaves in the province of Basra, led by one Ali b. Mahommed, who called himself a descendant of Ali. It lasted from 869 to 883, and tasked the government to its utmost.[2]

[1] This Boghā was called al-Kabir, or major; the ally of Waṣīf, a man of much inferior consideration, al-Saghir, or minor.

[2] See Nöldeke, *Orientalische Skizzen*, pp. 155 seq.

In the west, Ahmad b. Tūlūn became a mighty prince, whose sway extended over Syria and a part of Mesopotamia. Motamid, who wished to free himself from the guardianship of his brother Mowaffaq, concerted with him a plan to emigrate to Egypt, Ahmad being himself angered against Mowaffaq on personal grounds. Motamid's flight was stopped by his vizier Ibn Makhlad, and the caliph himself was reconducted to Sāmarrā as a prisoner in the year 882. From that time there was war between the Abbasids and the Ṭūlūnids. Ahmad died in 270 (884). His son Khomārūya succeeded him, and maintained himself in power till his death in 896, in which year his daughter was married to the caliph Motadid. Ten years later Egypt was conquered by a general of the caliph Moktafī.

During the reign of Motamid the emperor Basil I. conducted the war against the Moslems with great success, till in the year 270 (A.D. 884) his army suffered a terrible defeat near Tarsus, in which the greater part of the army, the commander Andreas, and many other patricians perished.

Motamid had appointed his son al-Mofawwid as successor to the Caliphate, and after him his brother Mowaffaq. When the latter died in the year 891, his son Abū 'l-'Abbās, *al-Mo'taḍid* (" he who seeks his support in God "), was put in his place. Next year Mofawwid was compelled to abdicate in favour of his cousin. Shortly after Motamid died, Rajab 279 (October 892). Not long before these events, the seat of the Caliphate had been restored to Bagdad.

16. *Reign of Motadid.*—Motadid may be called, after Mansūr, the most able and energetic of all the Abbasid rulers. He took good care of the finances, reformed the administration, was an excellent commander in war, and maintained order as far as possible. The Kharijites in Mesopotamia, who for many years had molested the government, were finally crushed with the aid of their former ally Ḥamdān, who became the founder of the well-known dynasty of the Ḥamdānites. The mighty house of Abū Dolaf in the south-west of Media, which had never ceased to encroach on the Caliphate, was put down. The governor of Azerbaijan and Armenia, belonging to the powerful Turkish house of the Sājids or Sājites, whose loyalty was always doubtful, planned an invasion of Syria and Egypt. Motadid frustrated it by a quick movement. The citizens of Tarsus who were involved in the plot were severely punished. The chief punishment, however, the burning of the fleet, was a very impolitic measure, as it strengthened the hands of the Byzantines.

Almost simultaneously with the rising of the negro slaves in Basra there arose in the province of Kūfa the celebrated sect of the Carmathians (*q.v.*), Fātimites[3] or Ismā'ilites. This powerful sect, which save for a difference of opinion would have joined the negro rising, remained outwardly quiet during Motamid's reign, but under Motadid the government began to have misgivings about them. Abū Sa'īd al-Jannābī, who had founded a Carmathian state in Bahrein, the north-eastern province of Arabia (actually called Laḥsā), which could become dangerous for the pilgrim road as well as for the commerce of Basra, in the year 900 routed an army sent against him by Motadid, and warned the caliph that it would be safer to let the Carmathians alone. In the same year the real chief of the sect, whose abode had been discovered by the caliph, fled from Salamia in Syria, where he lived, to Africa, and hid himself at Sijilmāsa (in Tafilalt) in the far west, whence he reappeared ten years later at Kairawan as the Mahdi, the first caliph of the Fatimites.[4]

Motadid died in Rabia II. A.H. 289 (March 902), leaving the Caliphate to his son *al-Moktāfī billāh* (" he who sufficeth himself in God ").

17. *Reign of Moktafi.*—Moktafi inherited his father's intrepidity, and seems to have had high personal qualities, but his reign of six years was a constant struggle against the Carmathians in Syria, who defeated the Syrian and Egyptian troops, and

[3] For the connexion between Carmathians and Fatimites see under FATIMITES.

[4] M. J. de Goeje, *Mémoire sur les Carmathes du Bahraïn et les Fatimides* (Leiden, 1886).

conquered Damascus and other cities. Moktafi led his troops in person, and his general, Mahommed b. Suleimān, gained a signal victory. Three of their chiefs were taken and put to death. But, to avenge their defeat, they lay in wait for the great pilgrim caravan on its return from Mecca in the first days of 294 (906), and massacred 20,000 pilgrims, making an immense booty. This horrible crime raised the whole Moslem world against them. Zikrūya their chief was defeated at last and perished.

After the defeat of the Syrian Carmathians, Mahommed b. Suleimān was sent by the caliph to Egypt, where he overthrew the dominion of the Tūlūnids. 'Īsā b. Mahommed al-Naushari was made governor in their stead (905).

The war with the Byzantines was conducted with great energy during the reign of Moktafi. In the year 905 the Greek general Andronicus took Marash, and penetrated as far as Haleb (Aleppo), but the Moslems were successful at sea, and in 907 captured Iconium, whilst Andronicus went over to the caliph's side, so that the Byzantine emperor sent an embassy to Bagdad to ask for a truce and an exchange of prisoners.

18. *Reign of Moqtadir.*—The sudden death of Moktafi, Dhu'l-qa'da 295 (August 908), was a fatal blow to the prestige of the Caliphate, which had revived under the successive governments of Mowaffaq, Motadid and himself. The new caliph, *al-Moqtadir billāh* ("the powerful through God"), a brother of Moktafi, was only thirteen years of age when he ascended the throne. Owing to his extreme youth many of the leading men at Bagdad rebelled and swore allegiance to Abdallah, son of the former caliph Motazz, a man of excellent character and of great poetical gifts; but the party of the house of Motadid prevailed, and the rival caliph was put to death. Moqtadir, though not devoid of noble qualities, allowed himself to be governed by his mother and her ladies and eunuchs. He began by squandering the 15,000,000 dinars which were in the treasury when his brother died in largesses to his courtiers, who, however, merely increased their demands. His very able vizier, the noble and disinterested Ali b. 'Īsā, tried to check this foolish expenditure, but his efforts were more than counterbalanced by the vizier Ibn abi'l-Forāt and the court. The most shameless bribery and the robbery of the well-to-do went together with the most extravagant luxury. The twenty-four years of Moqtadir's reign are a period of rapid decay. The most important event in the reign was the foundation of the Fātimite dynasty, which reigned first in the Maghrib and then in Egypt for nearly three centuries (see Fatimites and Egypt: *History*, "Mahommedan").

Far more dangerous, however, for the Caliphate of Bagdad at the time were the Carmathians of Bahrein, then guided by Abu Ṭāhir, the son of Abu Sa'īd Jannābī. In 311 (A.D. 923) they took and ransacked Basra; in the first month of the following year the great pilgrim caravan on its return from Mecca was overpowered; 2500 men perished, while an even larger number were made prisoners and brought to Lahsā, the residence of the Carmathian princes, together with an immense booty. The caravan which left Bagdad towards the end of this year returned in all haste before it had covered a third of the way. Then Kufa underwent the fate that had befallen Basra. In 313 (A.D. 926) the caravan was allowed to pass on payment of a large sum of money. The government of Bagdad resolved to crush the Carmathians, but a large army was utterly defeated by Abu Ṭāhir in 315 (927), and Bagdad was seriously threatened. Next year Mecca was taken and plundered; even the sacred Black Stone was transported to Lahsā, where it remained till 339 (950), when by the express order of the Imām, the Fātimite caliph, it was restored to the Ka'ba.

In 317 (929) a conspiracy was formed to dethrone Moqtadir, to which Mūnis, the chief commander of the army, at first assented, irritated by false reports. Very soon he withdrew, and though he could not prevent the plundering of the palace, and the proclamation as caliph of another son of Motadid with the title *al-Qāhir billāh* ("the victorious through God"), he rescued Moqtadir and his mother, and at the same time his imprisoned friend Ali b. 'Īsā, and brought them to his own house. A few days later, a counter-revolution took place; the leaders of the revolt were killed, and Moqtadir, against his wish, was replaced on the throne. In 320 (A.D. 932) Mūnis, discovering a court intrigue against him, set out for Mosul, expecting that the Hamdānids, who owed to him their power, would join him. Instead of doing this, they opposed him with a numerous army, but were defeated. Mūnis took Mosul, and having received reinforcements from all parts, marched against Bagdad. The caliph, who wished nothing more than to be reconciled to his old faithful servant, was forced to take arms against him, and fell in battle Shawwāl 320 (October 932), at the age of 38 years. His reign, which lasted almost twenty-five years, was in all respects injurious to the empire.

19. *Reign of Qāhir.*—After the victory Mūnis acted with great moderation and proclaimed a general amnesty. His own wish was to call Abu Ahmad, a son of Moktafi, or a son of Moqtadir, to the Caliphate, but the majority of generals preferring Qāhir because he was an adult man and had no mother at his side, he acquiesced, although he had a personal dislike for him, knowing his selfish and cruel character. Qāhir was a drunkard, and derived the money for his excesses from promiscuous confiscation. He ill-treated the sons of Moqtadir and Abu Ahmad, and ultimately assassinated his patrons Mūnis and Yalbak, whose guardianship he resented. In Jomada I. 322 (April 934) he was dethroned and blinded, and died in poverty seven years later.

During the last years of Moqtadir and the reign of Qāhir a new dynasty rose. Būya, the chief of a clan of the Dailam, a warlike people who inhabit the mountainous country south-west of the Caspian Sea, had served under the Sāmānids, and found a footing in the south of Media (Jabal), whence his three sons—well known under the titles they assumed at a later period: 'Imād addaula ("prop of the dynasty"), Rokn addaula ("pillar of the dynasty"), and Mo'izz addaula ("strengthener of the dynasty")—succeeded in subduing the province of Fārs, at the time of Qāhir's dethronement (see Persia: *History*).

20. *Reign of Radi.*—Moqtadir's son, who was then proclaimed caliph under the name of *ar-Rādī billāh* ("the content through God"), was pious and well-meaning, but inherited only the shadow of power. The vizier Ibn Moqla tried to maintain his authority at least in Irak and Mesopotamia, but without success. The treasury was exhausted, the troops asked for pay, the people in Bagdad were riotous. In this extremity the caliph bade Ibn Rāiq, who had made himself master of Basra and Wāsit, and had command of money and men, to come to his help. He created for him the office of Amīr al-Omarā, "Amir of the Amirs," which nearly corresponds to that of Mayor of the Palace among the Franks.[1] Thenceforth the worldly power of the Caliphate was a mere shadow. The empire was by this time practically reduced to the province of Bagdad; Khorasan and Transoxiana were in the hands of the Sāmānids, Fārs in those of the Būyids; Kirman and Media were under independent sovereigns; the Hāmdānids possessed Mesopotamia; the Sājids Armenia and Azerbaijan; the Ikshīdites Egypt; as we have seen, the Fātimites Africa, the Carmathians Arabia. The Amir al-Omarā was obliged to purchase from the latter the freedom of the pilgrimage to Mecca, at the price of a disgraceful treaty.

During the troubles of the Caliphate the Byzantines had made great advances; they had even taken Malatia and Samosata (Samsat). But the great valour of the Hamdānid prince Saif-addaula checked their march. The Greek army suffered two severe defeats and sued for peace.

21. *Reign of Mottaqi.*—Radi died in Rabia I. A.H. 329 (December 940). Another son of Moqtadir was then proclaimed caliph under the name of *al-Mottaqī billāh* ("he who guards himself by God"). At the time of his accession the Amīr al-Omarā was the Turkish general Bajkam, in whose favour Ibn Rāiq had been obliged to retire. Unfortunately Bajkam died soon after, and his death was followed by general anarchy. A certain Barīdī, who had carved out for himself a principality in the province of Basra, marched against Bagdad and made himself master of the capital, but was soon driven out by the Dailamite general

[1] See Defrémery, *Mémoire sur les Emirs al-Omara* (Paris, 1848).

Kūrtakīn. Ibn Rāiq came back and reinstated himself as Amīr al-Omarā. But Barīdī again laid siege to Bagdad, and Mottaqi fled to Nāsir addaula the Hamdānid prince of Mosul, who then marched against Bagdad, and succeeded in repelling Barīdī. In return he obtained the office of Amīr al-Omarā. But the Dailamite and Turkish soldiery did not suffer him to keep this office longer than several months. Tūzūn, a former captain of Bajkam, compelled him to return to Mosul and took his place. Mottaqi fled again to Mosul and thence to Rakka. The Ikshīd, sovereign of Egypt and Syria, offered him a refuge, but Tūzūn, fearing to see the caliph obtain such powerful support, found means to entice him to his tent, and had his eyes put out, Saphar 333 (October 944).

22. *Reign of Mostakfi.*—As successor Tūzūn chose *al-Mostakfī billāh* ("he who finds full sufficiency with God"), a son of Moktafi. This prince, still more than his predecessors, was a mere puppet in the hands of Tūzūn, who died a few months later, and his successor Ibn Shīrzād. Such was the weakness of the caliph that a notorious robber, named Hamdī, obtained immunity for his depredations by a monthly payment of 25,000 dinars. One of the Būyid princes, whose power had been steadily increasing, marched about this time against Bagdad, which he entered in Jomada I. A.H. 334 (December 945), and was acknowledged by the caliph as legal sovereign, under the title of Sultan. He assumed at this time the name of Mo'izz addaula. Mostakfi was soon weary of this new master, and plotted against him. At least Mo'izz addaula suspected him and deprived him of his eyesight, Jomada II. A.H. 334 (January 946). There were thus in Bagdad three caliphs who had been dethroned and blinded, Qāhir, Mottaqi and Mostakfi.

23. *Reign of Moti.*—Mo'izz addaula soon abandoned his original idea of restoring the title of caliph to one of the descendants of Ali, fearing a strong opposition of the people, and also dreading lest this should lead to the recovery by the caliphs of their former supremacy. His choice fell on a son of Moqtadir, who took the title of *al-Motī' billāh* ("he who obeys God"). The sultan, reserving to himself all the powers and revenues of the Caliphate, allowed the caliph merely a secretary and a pension of 5000 dirhems a day. Though in public prayers and on the coins the name of the caliph remained as that of the supreme authority, he had in reality no authority out of the palace, so that the saying became proverbial, "he contents himself with sermon and coin."

The Hamdānid prince of Mosul, who began to think his possessions threatened by Mo'izz addaula, tried without success to wrest Bagdad from him, and was obliged to submit to the payment of tribute. He died in 358 (A.D. 969), and ten years later the power of this branch of the Hamdānids came to an end. The representative of the other branch, Saif addaula, the prince of Haleb (Aleppo), conducted the war against the Byzantines with great valour till his death in 356 (A.D. 967), but could not stop the progress of the enemy. His descendants maintained themselves, but with very limited power, till A.H. 413 (A.D. 1022).

Mo'izz addaula died in the same year as Saif addaula, leaving his power to his son Bakhtiyār 'Izz addaula, who lacked his father's energy and loved pleasure more than business.

While the Abbāsid dynasty was thus dying out in shame and degradation, the Fātimites, in the person of Mo'izz li-dīn-allah (or Mo'izz Abu Tamin Ma'add) ("he who makes God's religion victorious"), were reaching the highest degree of power and glory in spite of the opposition of the Carmathians, who left their old allegiance and entered into negotiations with the court of Bagdad, offering to drive back the Fātimites, on condition of being assisted with money and troops, and of being rewarded with the government of Syria and Egypt. The former condition was granted, but the caliph emphatically refused the latter demand, saying: "Both parties are Carmathians, they profess the same religion and are enemies of Islam." The Carmathians drove the Fātimites out of Syria, and threatened Egypt, but, notwithstanding their intrepidity, they were not able to cope with their powerful rival, who, however, in his turn could not bring them to submission. In 978–979 peace was made on condition that the Carmathians should evacuate Syria for an annual payment of 70,000 dinars. But the losses sustained by the Carmathians during that struggle had been enormous. Their power henceforward declined, and came to an end in A.H. 474 (A.D. 1081).

Mo'izz addaula, as we have seen, professed a great veneration for the house of Ali. He not only caused the mourning for the death of Hosain and other Shi'ite festivals to be celebrated at Bagdad, but also allowed imprecations against Moawiya and even against Mahomet's wife Ayesha and the caliphs Abu Bekr, Omar and Othman, to be posted up at the doors of the mosques. These steps annoyed the people and the Turkish soldiery, who were Sunnites, and led at last to an insurrection. Moti was compelled to abdicate, and Bakhtiyār was driven out of Bagdad Dhu'l-qa'da 363 (August 974).

24. *Reign of Tai.*—Moti left the empty title of caliph to his son *al-Tā'i li-amri'llāh* ("the obedient to the command of God"). The Turks who had placed him on the throne could not maintain themselves, but so insignificant was the person of the caliph that 'Adod addaula, who succeeded his cousin Bakhtiyār in Bagdad, did not think of replacing him by another. Under this prince, or king, as he was called, the power of the Būyids reached its zenith. His empire stretched from the Caspian to the Persian Sea, and in the west to the eastern frontier of Syria. He did his best to remedy the misery caused by the intestine wars, repaired the ruined mosques and other public edifices, founded hospitals and libraries—his library in Shirāz was one of the wonders of the world—and improved irrigation. It was also he who built the mausoleum of Hosain at Kerbela, and that of Ali at Kufa. But after his death in the year 372 (A.D. 983), his sons, instead of following the example of their predecessors, the three sons of Būya, fought one against the other. In 380 (A.D. 990) the youngest of them, Bahā addaula, had the upper hand. This prince, who was as avaricious as he was ambitious, wishing to deprive the caliph Ta'i of his possessions, compelled him to abdicate A.H. 381 (A.D. 991).

25. *Reign of Qādir.*—A grandson of Moqtadir was then made caliph under the name of *al-Qādir billāh* ("the powerful through God"). The only deed of power, however, that is recorded of him, is that he opposed himself to the substitution of a Shi'ite head cadi for the Sunnite, so that Bahā addaula had to content himself with giving to the Shi'ites a special judge, to whom he gave the title of *naqīb* (superintendent). During this caliphate the Būyid princes were in continual war with one another. Meanwhile events were preparing the fall of their dynasty. In 350 (A.D. 961) a Turkish general of the Sāmānids had founded for himself a principality in Ghazni, and at his death in 366 (A.D. 976) his successor Sabuktagin had conquered Bost in Sijistān and Qoṣdār in Baluchistan, beaten the Indian prince Diaya Pala, and been acknowledged as master of the lands west of the Indus. At his death in 387 his son Mahmud conquered the whole of Khorasan and Sijistān, with a great part of India. He then attacked the Būyids, and would have destroyed their dynasty but for his death in the year 421 (A.D. 1030).

In 389 (A.D. 999) Ilek-khān, the prince of Turkistan, took Bokhārā and made an end to the glorious state of the Sāmānids, the last prince of which was murdered in 395 (A.D. 1005). The Sāmānids had long been a rampart of the Caliphate against the Turks, whom they held under firm control. From their fall dates the invasion of the empire by that people. The greatest gainer for the moment was Mahmūd of Ghazni. In Mesopotamia and Irak several petty states arose on the ruins of the dominions of the Hamdānids and of the Abbasids.

Qādir died in the last month of A.H. 422 (November 1031). He is the author of some theological treatises.

26. *Reign of Qāim.*—He was succeeded by his son, who at his accession took the title of *al-Qāim bi-amri'llāh* ("he who maintains the cause of God"). During the first half of his long reign took place the development of the power of the Ghūzz, a great Turkish tribe, who took the name Seljuk from Seljuk their chief in Transoxiana. Already during the reign of Mahmūd large bodies had passed the Oxus and spread over Khorasan and the adjacent

countries. In the time of his successor the bulk of the tribe followed, and in the year 429 (A.D. 1038) Toghrul Beg, their chief, beat the army of the Ghaznevids and made his entry into Nishapur. Thenceforth this progress was rapid (see SELJUKS). The situation in Bagdad had become so desperate that the caliph called Toghrul to his aid. This prince entered Bagdad in the month of Ramadan A.H. 447 (December 1055), and overthrew finally the dynasty of the Būyids.[1] In 449 (A.D. 1058) the caliph gave him the title of "King of the East and West." But in the following year, 450, during his absence, the Shi'ites made themselves masters of the metropolis, and proclaimed the Caliphate of the Fātimite prince Mostansir. They were soon overthrown by Toghrul, who was now supreme, and compelled the caliph to give him his daughter in marriage. Before the marriage, however, he died, and was succeeded by his nephew Alp Arslān, who died in 465 (25th December) (A.D. 1072). Qāim died two years later, Shaaban A.H. 467 (April 1075).

In the year 440 Mo'izz b. Bādīs, the Zeirid ruler of the Maghrib, made himself independent, and substituted in prayer the name of the Abbasid caliph for that of Mostansir. In order to punish him, the latter gave permission to the Arab tribes in Egypt to cross the Nile, and granted them possession of all the lands they should conquer. This happened in 442 (A.D. 1050) and was of the greatest significance for the subsequent fate of Africa.

27. *Reign of Moqtadi.*—In the first year of the Caliphate of *al-Moqtadī bi-amri'llāh* ("he who follows the orders of God"), a grandson of Qāim, the power of the Seljuk empire reached its zenith. All the eastern provinces, a great part of Asia Minor, Syria with the exception of a few towns on the shore, the main part of West Africa acknowledged the caliph of Bagdad as the Imām. Yemen had been subjected, and at Meçca and Medina his name was substituted in the public prayers for that of the Fātimite caliph. But after the death of Malik-Shah a contest for the sultanate took place. The caliph, who had in 1087 married the daughter of Malik-Shah, had been compelled two years after to send her back to her father, as she complained of being neglected by her husband. Just before his death, the Sultan had ordered him to transfer his residence from Bagdad to Basra. After his death he stayed and supported the princess Turkān Khātūn. This lost him his life. The day after Barkiyāroq's triumphant entry into Bagdad, Muharram 487 (February 1094), he died suddenly, apparently by poison.

28. *Reign of Mostazhir.*—*Al-Mostazhir billāh* ("he who seeks to triumph through God"), son of Moqtadi, was only sixteen years old when he was proclaimed caliph. His reign is memorable chiefly for the growing power of the Assassins (*q.v.*) and for the first Crusade (see CRUSADES). The Seljuk princes were too much absorbed by internal strife to concentrate against the new assailants. After the death of Barkiyāroq in November 1104, his brother Mahommed reigned till April 1118. His death was followed about four months later by that of Mostazhir.

29. *Reign of Mostarshid.*—*Al-Mostarshid billāh* ("he who asks guidance from God"), who succeeded his father in Rabia II. 512 (August 1118), distinguished himself by a vain attempt to re-establish the power of the caliph. Towards the end of the year 529 (October 1134) he was compelled to promise that he would confine himself to his palace and never again take the field. Not long after he was assassinated. About the same time Dobais was killed, a prince of the family of the Banu Mazyad, who had founded the Arabian state of Hillah in the vicinity of the ruins of Babel in 1102.

30. *Reign of Rāshid.*—*Al-Rāshid billāh* ("the just through God") tried to follow the steps of his father, with the aid of Zengī, the prince of Mosul. But the sultan Mas'ūd beat the army of the allies, took Bagdad and had Rāshid deposed (August 1136). Rāshid escaped, but was murdered two years later.

31. *Reign of Moqtafi.*—His successor *Al-Moqtafi li-amri'llāh* ("he who follows the orders of God"), son of Mostazhir, had better success. He was real ruler not only of the district of Bagdad, but also of the rest of Irak, which he subdued by force. He died in the month of Rabia II. 555 (March 1160). Under his reign the central power of the Seljuks was rapidly sinking. In the west of Atabeg (prince's guardian) Zengī, the prince of Mosul, had extended his dominion over Mesopotamia and the north of Syria, where he had been the greatest defender of Islam against the Franks. At his death in the year 541 (A.D. 1146), his noble son, the well-known Nūreddīn, who was called "the just king," continued his father's glorious career. Transoxiana was conquered by the heathen hordes of Khatā, who towards the end of 535 (A.D. 1141) under the king Ghurkhān defeated the great army of the Seljuk prince and compelled the Turkish tribes of the Ghuzz to cross the Oxus and to occupy Khorasan.

32. *Reign of Mostanjid.*—*Al-Mostanjid billāh* ("he who invokes help from God"), the son of Moqtafi, enlarged the dominion of the Caliphate by making an end to the state of the Mazyadites in Hillah. His allies were the Arabic tribe of the Montafiq, who thenceforth were powerful in southern Irak. The greatest event towards the end of his Caliphate was the conquest of Egypt by the army of Nūreddīn, the overthrow of the Fātimite dynasty, and the rise of Saladin. He was killed by his major-domo in Rabia II. 566 (December 1170).

33. *Reign of Mostadi.*—His son and successor *al-Mostadī' bi-amri'llāh* ("he who seeks enlightenment by the orders of God"), though in Egypt his name was now substituted in public prayers for that of the Fātimite caliph, was unable to obtain any real authority. By the death of Nūreddīn in 569 (A.D. 1174) Saladin's power became firmly rooted. The dynasty founded by him is called that of the Ayyūbites, after the name of his father Ayyūb. Mostadi died in the month of Dhu'l-qa'da 575 (March 1180).

34. *Reign of Nāsir.*—Quite a different man from his father was his successor *al-Nāsir li-dīni'llāh* ("he who helps the religion of God"). During his reign Jerusalem was reconquered by Saladin, 27 Rajab 583 (October 2nd, 1187). Not long before that event the well-known Spanish traveller Ibn Jubair visited the empire of Saladin, and came to Bagdad in 580, where he saw the caliph himself. Nāsir was very ambitious; he had added Khūzistān to his dominions, and desired to become also master of Media (Jabal, or Persian Irak, as it was called in the time of the Seljuks). Here, however, he came into conflict with the then mighty prince of Khwārizm (Khīva), who, already exasperated because the caliph refused to grant him the honours he asked for, resolved to overthrow the Caliphate of the Abbasids, and to place a descendant of Ali on the throne of Bagdad. In his anxiety, Nāsir took a step which brought the greatest misery upon western Asia, or at least accelerated its arrival.

In the depths of Asia a great conglomeration of east Turkish tribes (Tatars or Mongols), formed by a terrible warrior, known under his honorific title Jenghiz Khān, had conquered the northern provinces of China, and extended its power to the frontiers of the Transoxianian regions. To this heathen chief the Imām of the Moslems sent a messenger, inducing him to attack the prince of Khwārizm, who already had provoked the Mongolian by a disrespectful treatment of his envoys. Neither he nor the caliph had the slightest notion of the imminent danger they conjured up. When Nāsir died, Ramadan 622 (October 1225), the eastern provinces of the empire had been trampled down by the wild hordes, the towns burned, and the inhabitants killed without mercy.

35. *Reign of Zāhir.*—*Al-Zāhir bi-amri'llāh* ("the victorious through the orders of God") died within a year after his father's death, in Rajab 623 (July 1226). He and his son and successor are praised as beneficent and just princes.

36. *Reign of Mostansir.*—*Al-Mostansir billāh* ("he who asks help from God") was caliph till his death in Jomada II. 640 (December 1242). In the year 624 (1227) Jenghiz Khān died, but the Mongol invasion continued to advance with immense strides. The only man who dared, and sometimes with success, to combat them was Jelaleddin, the ex-king of Khwārizm, but after his death in 628 (A.D. 1231) all resistance was paralysed.

37. *Reign of Mostasim.*—*Al-Mosta'ṣim billāh* ("he who clings to God for protection"), son of Mostansir, the last caliph of Bagdad, was a narrow-minded, irresolute man, guided moreover

[1] Henceforward the history of the Caliphate is largely that of the Seljuk princes (see SELJUKS).

by bad counsellors. In the last month of the year 653 (January 1256) Hulaku or Hulagu, the brother of the great khān of the Mongols, crossed the Oxus, and began by destroying all the strongholds of the Ismā'īlīs. Then the turn of Bagdad came. On the 11th of Muharram 656 (January 1258) Hulaku arrived under the walls of the capital. In vain did Mostasim sue for peace. Totally devoid of dignity and heroism, he ended by surrendering and imploring mercy from the barbarian victor. On the 4th of Saphar (February 10th) he came with his retinue into the camp. The city was then given up to plunder and slaughter; many public buildings were burnt; the caliph, after having been compelled to bring forth all the hidden treasures of the family, was killed with two of his sons and many relations. With him expired the eastern Caliphate of the Abbasids, which had lasted 524 years, from the entry of Abu'l-Abbas into Kufa.

In vain, three years later, did Abu'l-Qasim Ahmad, a scion of the race of the Abbasids, who had taken refuge in Egypt with Bibars the Mameluke sultan, and who had been proclaimed caliph under the title *al-Mostanṣir billāh* ("he who seeks help from God"), make an effort to restore a dynasty which was now for ever extinct. At the head of an army he marched against Bagdad, but was defeated and killed before he reached that city. Then another descendant of the Abbasids, who also had found an asylum in Egypt, was proclaimed caliph at Cairo under the name of *al-Hākim bi-amri'llāh* ("he who decides according to the orders of God"). His sons inherited his title, but, like their father, remained in Egypt without power or influence (see EGYPT: *History*, "Mahommedan period"). This shadow of sovereignty continued to exist till the conquest of Egypt by the Turkish sultan Selim I., who compelled the last of them, Motawakkil, to abdicate in his favour (see TURKEY: *History*). He died at Cairo, a pensionary of the Ottoman government, in 1538.

Another scion of the Abbasid family, Mahommed, a great-grandson of the caliph Mostansir, found at a later period a refuge in India, where the sultan of Delhi received him with the greatest respect, named him Makhdumzādeh, "the Master's son," and treated him as a prince. Ibn Batūta saw him when he visited India, and says that he was very avaricious. On his return to Bagdad the traveller found there a young man, son of this prince, who gained a single dirhem daily for serving as imām in a mosque, and did not get the least relief from his rich father. It seems that this Mahommed, or his son, emigrated later to Sumatra, where in the old Samūtra the graves of their descendants have been lately discovered. (M. J. DE G.)

CALIVER, a firearm used in the 16th century. The word is an English corruption of "calibre," and arises from the "arquebus of calibre," that is, of standard bore, which replaced the older arquebus. "Caliver," therefore, is practically synonymous with "arquebus." The heavier musket, fired from a rest, replaced the caliver or arquebus towards the close of the century.

CALIXTUS, or CALLISTUS, the name of three popes.

CALIXTUS I., pope from 217 to 222, was little known before the discovery of the book of the *Philosophumena*. From this work, which is in part a pamphlet directed against him, we learn that Calixtus was originally a slave and engaged in banking. Falling on evil times, he was brought into collision with the Jews, who denounced him as a Christian and procured his exile to Sardinia. On his return from exile he was pensioned by Pope Victor, and, later, was associated by Pope Zephyrinus in the government of the Roman church. On the death of Zephyrinus (217) he was elected in his place and occupied the papal chair for five years. His theological adversary Hippolytus, the author of the *Philosophumena*, accused him of having favoured the modalist or Patripassian doctrines both before and after his election. Calixtus, however, condemned Sabellius, the most prominent champion of that system. Hippolytus accused him also of certain relaxations of discipline. It appears that Calixtus reduced the penitential severities applied until his time to those guilty of adultery and other analogous sins. Under Calixtus and his two immediate successors, Hippolytus was the leader of a schismatic group, organized by way of protest against the election of Calixtus. Calixtus died in 222, in circumstances obscured by legends. In the time of Constantine the Roman church reckoned him officially among the martyr popes. (L. D.*)

CALIXTUS II. (d. 1124), pope from 1119 to 1124, was Guido, a member of a noble Burgundian family, who became archbishop of Vienne about 1088, and belonged to the party which favoured reform in the Church. In September 1112, after Pope Paschal II. had made a surrender to the emperor Henry V., Guido called a council at Vienne, which declared against lay investiture, and excommunicated Henry. In February 1119 he was chosen pope at Cluny in succession to Gelasius II., and in opposition to the anti-pope Gregory VIII., who was in Rome. Soon after his consecration he opened negotiations with the emperor with a view to settling the dispute over investiture. Terms of peace were arranged, but at the last moment difficulties arose and the treaty was abandoned; and in October 1119 both emperor and anti-pope were excommunicated at a synod held at Reims. The journey of Calixtus to Rome early in 1120 was a triumphal march. He was received with great enthusiasm in the city, while Gregory, having fled to Sutri, was delivered into his hands and treated with great ignominy. Through the efforts of some German princes negotiations between pope and emperor were renewed, and the important Concordat of Worms made in September 1122 was the result. This treaty, made possible by concessions on either side, settled the investiture controversy, and was confirmed by the Lateran council of March 1123. During his short reign Calixtus strengthened the authority of the papacy in southern Italy by military expeditions, and restored several buildings within the city of Rome. During preparations for a crusade he died in Rome on the 13th or 14th of December 1124.

See M. Maurer, *Pabst Calixt II.* (Munich, 1889); U. Robert, *Histoire du pape Calixte II.* (Paris, 1891); and A. Hauck's *Realencyklopädie*, Band iii. (Leipzig, 1897).

CALIXTUS III. (*c.* 1378–1458), pope from 1455 to 1458, was a Spaniard named Alphonso de Borgia, or Borja. A native of Xativa, he gained a great reputation as a jurist, becoming professor at Lerida; in 1429 he was made bishop of Valencia, and in 1444 a cardinal, owing his promotion mainly to his close friendship with Alphonso V., king of Aragon and Sicily. Chosen pope in April 1455, he was very anxious to organize a crusade against the Turks, and having sold many of his possessions, succeeded in equipping a fleet. Neither the princes nor the people of Europe, however, were enthusiastic in this cause, and very little result came from the pope's exertions. During his papacy Calixtus became involved in a quarrel with his former friend, Alphonso of Aragon, now also king of Naples, and after the king's death in June 1458 he refused to recognize his illegitimate son, Ferdinand, as king of Naples, asserting that this kingdom was a fief of the Holy See. This pope was notorious for nepotism, and was responsible for introducing his nephew, Rodrigo Borgia, afterwards Pope Alexander VI., to Rome. He died on the 6th of August 1458.

See A. Hauck's *Realencyklopädie*, Band iii. (Leipzig, 1897).

CALIXTUS, GEORG (1586–1656), Lutheran divine, was born at Medelby, a village of Schleswig, in 1586. After studying philology, philosophy and theology at Helmstädt, Jena, Giessen, Tübingen and Heidelberg, he travelled through Holland, France and England, where he became acquainted with the leading Reformers. On his return in 1614 he was appointed professor of theology at Helmstädt by the duke of Brunswick, who had admired the ability he displayed when a young man in a dispute with the Jesuit Augustine Turrianus. In 1613 he published a book, *Disputationes de Praecipuis Religionis Christianae Capitibus*, which provoked the hostile criticism of orthodox scholars; in 1619 he published his *Epitome theologiae*, and some years later his *Theologia Moralis* (1634) and *De Arte Nova Nihusii*. Roman Catholics felt them to be aimed at their own system, but they gave so great offence to Lutherans as to induce Statius Buscher to charge the author with a secret leaning to Romanism. Scarcely had he refused the accusation of Buscher, when, on account of

his intimacy with the Reformed divines at the conference of Thorn (1645), and his desire to effect a reconciliation between them and the Lutherans, a new charge was preferred against him, principally at the instance of Abraham Calovius (1612–1686), of a secret attachment to Calvinism. In fact, the great aim of his life was to reconcile Christendom by removing all unimportant differences. The disputes to which this attitude gave rise, known in the Church as the Syncretistic controversy, lasted during the whole lifetime of Calixtus, and distracted the Lutheran church, till a new controversy arose with P. J. Spener and the Pietists of Halle. Calixtus died in 1656.

There is a monograph on Calixtus by E. L. T. Henke (2 vols., 1853–1856); see also Isaak Dorner, *Gesch. d. protest. Theol.* pp. 606-624; and especially Herzog-Hauck, *Realencyklopädie.*

CALL (from Anglo-Saxon *ceallian*, a common Teutonic word, cf. Dutch *kallen*, to talk or chatter), to speak in a loud voice, and particularly to attract some one's attention by a loud utterance. Hence its use for a visit at a house, where the name of the occupier, to whom the visit was made, was called aloud, in early times, to indicate the presence of the visitor. It is thus transferred to a short stay at a place, but usually with the idea of a specific purpose, as in "port of call," where ships stop in passing. Connected with the idea of summoning by name are such uses as "roll-call" or "call-over," where names are called over and answered by those present; similar uses are the "call to the bar," the summoning at an Inn of Court of those students qualified to practise as barristers, and the "call within the bar" to the appointment of king's counsel. In the first case the "bar" is that which separates the benchers from the rest of the body of members of the Inn, in the other the place in a court of law within which only king's counsel, and formerly serjeants-at-law, are allowed to plead. "Call" is also used with a particular reference to a divine summons, as of the calling of the apostles. It is thus used in nonconformist churches of the invitation to serve as minister a particular congregation or chapel. It is from this sense of a *vocatio* or summons that the word "calling" is used, not only of the divine vocation, but of a man's ordinary profession, occupation or business. In card games "call" is used, in poker, of the demand that the hand of the highest bettor be exposed or seen, exercised by that player who equals his bet; in whist or bridge, of a certain method of play, the "call" for a suit or for trumps on the part of one partner, to which the other is expected to respond; and in many card games for the naming of a card, irregularly exposed, which is laid face up on the table, and may be thus "called" for, at any point the opponent may choose.

"Call" is also a term on the English and American stock exchanges for a contract by which, in consideration of a certain sum, an "option" is given by the person making or signing the agreement to another named therein or his order or to bearer, to "call" for a specified amount of stock at a certain day for a certain price. A "put," which is the reverse of a "call," is the option of selling (putting) stock at a certain day for a certain price. A combined option of either calling or putting is termed a "straddle," and sometimes on the American stock exchange a "spread-eagle." (See further STOCK EXCHANGE.) The word is also used, in connexion with joint-stock companies, to signify a demand for instalments due on shares, when the capital of the company has not been demanded or "called" up at once. (See COMPANY.)

CALLANDER, a police burgh of Perthshire, Scotland, 16 m. north-west of Stirling by the Caledonian railway. Pop. (1901) 1458. Situated on the north bank of the Teith, here crossed by a three-arched bridge, and sheltered by a ridge of wooded hills, it is in growing repute as a health resort. A mile and a half north-east are the Falls of Bracklinn (Gaelic, "white-foaming pool"), formed by the Keltie, which takes a leap of 50 ft. down the red sandstone gorge on its way to the Teith. Two miles north-west of Callander is the Pass of Leny, "the gate of the Highlands," and farther in the same direction is Loch Lubnaig, on the shores of which stand the ruins of St Bride's chapel. Callander owes much of its prosperity to the fact that it is the centre from which the Trossachs is usually visited, the route being that described in Scott's *Lady of the Lake.* The ascent of Ben Ledi is commonly made from the town.

CALLAO, a city, port and coast department of Peru, 8½ m. west of Lima, in 12° 04′ S., 77° 13′ W. Pop. (1905) 31,128, of whom 3349 were foreigners. The department includes the city and its environs, Bellavista and La Punta, and the neighbouring islands, San Lorenzo, Fronton, the Palominos, &c., and covers an area of 14½ sq. m. Callao is the principal port of the republic, its harbour being a large bay sheltered by a tongue of land on the south called La Punta, and by the islands of San Lorenzo and Fronton. The anchorage is good and safe, and the harbour is one of the best on the Pacific coast of South America. The city stands on the south side of the bay, and is built on a flat point of land only 8 ft. above sea-level. The houses are for the most part low and cheaply built, and the streets are narrow, badly paved, irregular and dirty. The climate is good and the coast is swept by cool ocean breezes, the average temperatures ranging from 65° to 77° F., but notwithstanding this, Callao has a bad reputation for fevers and contagious diseases, chiefly because of its insanitary condition. Its noteworthy public buildings are the custom-house and its storehouses which occupy the old quadrangular fortress built by the Spanish government between 1770 and 1775, and cover 15 acres, the prefecture, the military and naval offices and barracks, the post-office, three Catholic churches, a hospital, market, three clubs and some modern commercial houses. The present city is half a mile north of the site of the old town, which was destroyed by an earthquake and tidal wave in 1746. For a short time the commercial interests of the stricken city centred at Bellavista, 1¼ m. east, where wheat granaries were built and still remain, but later the greater convenience of a waterside site drew the merchants and population back to the vicinity of the submerged town. The importance of Callao in colonial times, when it was the only open port south of Panama, did not continue under the new political order, because of the unsettled state of public affairs and the loss of its monopoly. This decline in its prosperity was checked, and the modern development of the port began, when a railway was built from Callao into the heart of the Andes, and Callao is now an important factor in the development of copper-mining. The port is connected with Lima by two railways and an electric tramway, with Oroya by railway 138 m. long, and with Cerro de Pasco by railway 221 m. A short railway also runs from the port to the Bellavista storehouses. The port is provided with modern harbour improvements, consisting of sea-walls of concrete blocks, two fine docks with berthing spaces for 30 large vessels, and a large floating-dock (300 ft. long on the blocks and capable of receiving vessels up to 21 ft. draught and 5000 tons weight), which was built in Glasgow and was sent out to Callao in 1863. The docks are provided with gas and electric lights, 18 steam cranes for loading and discharging vessels, a triple line of railway and a supply of fresh water. Callao was formerly the head-quarters in South America of the Pacific Steam Navigation Co., Ltd. (incorporated 1840), but Valparaiso now occupies that position. There are, owing perhaps to the proximity of Lima, few industrial establishments in the city; among them are a large sugar refinery, some flour-mills, a brewery, a factory for making effervescent drinks, and a number of foundries and repair shops. Being a port of the first class, Callao is an important distributing centre for the coasting trade, in which a large number of small vessels are engaged. The foreign steamship companies making it a regular port of call are the Pacific Steam Navigation Co. (British), the Compañia Sud-America (Chilean), the Kosmos and Roland lines (German), the Merchants line (New York), and a Japanese line from the ports of Japan and China. A subsidized Peruvian line is also contemplated to ply between the Pacific ports of South America with an eventual extension of the service to Europe. The arrivals from and clearances for foreign ports in 1907 were as follows:—

	Steamers.		Sailing Vessels.	
	No.	Tonnage.	No.	Tonnage.
Arrivals . . .	518	937,302	924	174,165
Clearances . . .	517	937,706	931	163,365

The exports from Callao are guano, sugar, cotton, wool, hides, silver, copper, gold and forest products, and the imports include timber and other building materials, cotton and other textiles, general merchandise for personal, household and industrial uses, railway material, coal, kerosene, wheat, flour and other food stuffs. The maintenance of peace and order, and the mining development of the interior, have added to the trade and prosperity of the port.

The history of Callao has been exceptionally eventful. It was founded in 1537, two years after Pizarro had founded Lima. As the port of that capital and the only open port below Panama it grew rapidly in importance and wealth. It was raised to the dignity of a city in 1671. The appearance of Sir Francis Drake in the bay in 1578 led to the fortification of the port, which proved strong enough to repel an attack by the Dutch in 1624. The city was completely destroyed and partly submerged by the great earthquake of the 28th of October 1746, in which about 6000 persons perished. The new city was strongly fortified and figured prominently in the struggle for independence, and also in the various revolutions which have convulsed the republic. Its political autonomy dates from 1836, when it was made a coast department. The Callao fortifications were bombarded by a Spanish fleet under Admiral Mendez Nuñez on the 2nd of May 1866, when there were heavy losses both in lives and material. Again, in 1880, the city was bombarded by the Chileans, though it was almost defenceless, and fell into the possession of the invaders after the capture of Lima in the following year. Before the surrender all the Peruvian naval vessels in the harbour were sunk, to prevent their falling into the possession of the enemy.

CALLCOTT, SIR AUGUSTUS WALL (1779–1844), English landscape painter, was born at Kensington in 1779 and died there in 1844. His first study was music; and he sang for several years in the choir of Westminster Abbey. But at the age of twenty he had determined to give up music, and had exhibited his first painting at the Royal Academy. He gradually rose to distinction, and was elected an associate in 1807 and an academician in 1810. In 1827 he received the honour of knighthood; and, seven years later, was appointed surveyor of the royal pictures. His two principal subject pictures—"Raphael and the Fornarina," and "Milton dictating to his Daughters," are much inferior to his landscapes, which are placed in the highest class by their refined taste and quiet beauty.

His wife, MARIA, Lady Callcott (1786–1844), whom he married in 1827, was a daughter of Admiral Dundas and widow of Captain Thomas Graham, R.N. (d. 1822). With her first husband she travelled in India, South Africa and South America, where she acted for some time as teacher of Donna Maria, who became queen of Portugal in 1826; and in the company of her second husband she spent much time in the south of Europe. She published accounts of her visits to India (1812), and to the environs of Rome (1820); *Memoirs of Poussin* (1820); a *History of France*; a *History of Spain* (1828); *Essays toward a History of Painting* (1836); *Little Arthur's History of England* (1836); and the *Scripture Herbal* (1842).

CALLCOTT, JOHN WALL (1766–1821), English musician, brother of Sir Augustus Callcott, was born at Kensington on the 20th of November 1766. At the age of seven he was sent to a neighbouring day-school, where he continued for five years, studying chiefly Latin and Greek. During this time he frequently went to Kensington church, in the repairs of which his father was employed, and the impression he received on hearing the organ of that church seems to have roused his love for music. The organist at that time was Henry Whitney, from whom Callcott received his first musical instruction. He did not, however, choose music as a profession, as he wished to become a surgeon. But on witnessing a surgical operation he found his nervous system so seriously affected by the sight, that he determined to devote himself to music. His intimacy with Dr Arnold and other leading musicians of the day procured him access to artistic circles; he was deputy organist at St George the Martyr, Queen Square, Bloomsbury, from 1783 to 1785, in which year his successful competition for three out of the four prize medals offered by the "Catch Club" soon spread his reputation as composer of glees, catches, canons and other pieces of concerted vocal music. The compositions with which he won these medals were—the catch "O beauteous fair," the canon "Blessed is he," and the glee "Dull repining sons of care." In these and other similar compositions he displays considerable skill and talent, and some of his glees retain their popularity at the present day. In 1787 Callcott helped Dr Arnold and others to form the "Glee Club." In 1789 he became one of the two organists at St Paul's, Covent Garden, and from 1793 to 1802 he was organist to the Asylum for Female Orphans. As an instrumental composer Callcott never succeeded, not even after he had taken lessons from Haydn. But of far greater importance than his compositions are his theoretical writings. His *Musical Grammar*, published in 1806 (3rd ed., 1817), was long considered the standard English work of musical instruction, and in spite of its being antiquated when compared with modern standards, it remains a scholarly and lucid treatment of the rudiments of the art. Callcott was a much-esteemed teacher of music for many years. In 1800 he took his degree of Mus.D. at Oxford, where fifteen years earlier he had received his degree of bachelor of music, and in 1805 he succeeded Dr Crotch as musical lecturer at the Royal Institution. Towards the end of his life his artistic career was twice interrupted by the failure of his mental powers. He died at Bristol after much suffering on the 15th of May 1821. A posthumous collection of his most favourite vocal pieces was published in 1824 with a memoir of his life by his son-in-law, William Horsley, himself a composer of note.

Callcott's son, WILLIAM HUTCHINS CALLCOTT (1807–1882), inherited to a large extent the musical gifts of his father. His song, "The last man," and his anthem, "Give peace in our time, O Lord," were his best-known compositions.

CALLIAS, tyrant of Chalcis in Euboea. With the assistance of Philip II. of Macedon, which he hoped to obtain, he contemplated the subjugation of the whole island. But finding that Philip was unwilling to help him, Callias had recourse to the Athenians, although he had previously (350 B.C.) been engaged in hostilities with them. With the support of Demosthenes, he was enabled to conclude an alliance with Athens, and the tribute formerly paid by Eretria and Oreus to Athens was handed over to him. But his plan of uniting the whole of Euboea under his rule, with Chalcis as capital, was frustrated by Philip, who set up tyrants chosen by himself at Eretria and Oreus. Subsequently, when Philip's attention was engaged upon Thrace, the Athenians in conjunction with Callias drove out these tyrants, and Callias thus became master of the island (Demosthenes, *De Pace*, p. 58; *Epistola Philippi*, p. 159; Diod. Sic. xvi. 74). At the end of his life he appears to have lived at Athens, and Demosthenes proposed to confer the citizenship upon him (Aeschines, *Contra Ctesiphontem*, 85, 87).

CALLIAS and **HIPPONICUS,** two names borne alternately by the heads of a wealthy and distinguished Athenian family. During the 5th and 4th centuries B.C. the office of *daduchus* or torch-bearer at the Eleusinian mysteries was the hereditary privilege of the family till its extinction. The following members deserve mention.

1. CALLIAS, the second of the name, fought at the battle of Marathon (490) in priestly attire. Some time after the death of Cimon, probably about 445 B.C., he was sent to Susa to conclude with Artaxerxes, king of Persia, a treaty of peace afterwards misnamed the "peace of Cimon." Cimon had nothing to do with it, and he was totally opposed to the idea of peace with Persia (see CIMON). At all events Callias's mission does not seem to have been successful; he was indicted for high treason on his return to Athens and sentenced to a fine of fifty talents.

See Herodotus vii. 151; Diod. Sic. xii. 4; Demosthenes, *De Falsa Legatione*, p. 428; Grote recognizes the treaty as a historical fact, *History of Greece*, ch. xlv., while Curtius, bk. iii.ch. ii., denies the conclusion of any formal treaty; see also Ed. Meyer, *Forschungen*, ii.; J. B. Bury in *Hermathena*, xxiv. (1898).

2. HIPPONICUS, son of the above. Together with Eurymedon he commanded the Athenian forces in the incursion into Bocotian territory (426 B.C.) and was slain at the battle of Delium (424).

His wife, whom he divorced, subsequently became the wife of Pericles; one of his daughters, Hipparete, married Alcibiades; another, the wife of Theodorus, was the mother of the orator Isocrates.

See Thucydides iii. 91; Diod. Sic. xii. 65; Andocides, *Contra Alcibiadem*, 13.

3. CALLIAS, son of the above, the black sheep of the family, was notorious for his profligacy and extravagance, and was ridiculed by the comic poets as an example of a degenerate Athenian (Aristophanes, *Frogs*, 429, *Birds*, 283, and schol. Andocides, *De Mysteriis*, 110-131). The scene of Xenophon's *Symposium* and Plato's *Protagoras* was laid at his house. He was reduced to a state of absolute poverty and, according to Aelian (*Var. Hist.* iv. 23), committed suicide, but there is no confirmation of this. In spite of his dissipated life he played a certain part in public affairs. In 392 he was in command of the Athenian hoplites at Corinth, when the Spartans were defeated by Iphicrates. In 371 he was at the head of the embassy sent to make terms with Sparta. The peace which was the result was called after him the "peace of Callias."

See Xenophon, *Hellenica*, iv. 5, vi. 3; and DELIAN LEAGUE.

CALLIMACHUS, an Athenian sculptor of the second half of the 5th century B.C. Ancient critics associate him with Calamis, whose relative he may have been. He is given credit for two inventions, the Corinthian column and the running borer for drilling marble. The most certain facts in regard to him are that he sculptured some dancing Laconian maidens, and made a golden lamp for the Erechtheum (about 408 B.C.); and that he used to spoil his works by over-refinement and excessive labour.

CALLIMACHUS, Greek poet and grammarian, a native of Cyrene and a descendant of the illustrious house of the Battiadae, flourished about 250 B.C. He opened a school in the suburbs of Alexandria, and some of the most distinguished grammarians and poets were his pupils. He was subsequently appointed by Ptolemy Philadelphus chief librarian of the Alexandrian library, which office he held till his death (about 240). His *Pinakes* (tablets), in 120 books, a critical and chronologically arranged catalogue of the library, laid the foundation of a history of Greek literature. According to Suidas, he wrote about 800 works, in verse and prose; of these only six hymns, sixty-four epigrams and some fragments are extant; a considerable fragment of the *Hecale*, an idyllic epic, has also been discovered in the Rainer papyri (see Kenyon in *Classical Review*, November 1893). His *Coma Berenices* is only known from the celebrated imitation of Catullus. His *Aitia* (causes) was a collection of elegiac poems in four books, dealing with the foundation of cities, religious ceremonies and other customs. According to Quintilian (*Instit.* x. 1. 58) he was the chief of the elegiac poets; his elegies were highly esteemed by the Romans, and imitated by Ovid, Catullus and especially Propertius. The extant hymns are extremely learned, and written in a laboured and artificial style. The epigrams, some of the best specimens of their kind, have been incorporated in the Greek Anthology. Art and learning are his chief characteristics, unrelieved by any real poetic genius; in the words of Ovid (*Amores*, i. 15)—

"Quamvis ingenio non valet, arte valet."

EDITIONS.—Hymns, epigrams and fragments (the last collected by Bentley) by J. A. Ernesti (1761), and O. Schneider (1870–1873) (with elaborate indices and excursuses); hymns and epigrams, by A. Meineke (1861), and U. Wilamowitz-Möllendorff (1897). See *Neue Bruchstücke aus der Hekale des Kallimachus*, by T. Gomperz (1893); also G. Knaack, *Callimachea* (1896); A. Beltrami, *Gl' Inni di Callimacho e il Nomo di Terpandro* (1896); K. Kuiper, *Studia Callimachea* (1896); A. Hamette, *Les Épigrammes de Callimaque: étude critique et littéraire* (Paris, 1907). There are English translations (verse) by W. Dodd (1755) and H. W. Tytler (1793); (prose) by J. Banks (1856). See also Sandys, *Hist. of Class. Schol.* i. (ed. 1906), p. 122.

CALLINUS of Ephesus, the oldest of the Greek elegiac poets and the creator of the political and warlike elegy. He is supposed to have flourished between the invasion of Asia Minor by the Cimmerii and their expulsion by Alyattes (630–560 B.C.). During his lifetime his own countrymen were also engaged in a life-and-death struggle with the Magnesians. These two events give the key to his poetry, in which he endeavours to rouse the indolent Ionians to a sense of patriotism. Only scanty fragments of his poems remain; the longest of these (preserved in Stobaeus, *Florilegium*, li. 19) has even been ascribed to Tyrtaeus.

Edition of the fragments by N. Bach (1831), and in Bergk, *Poetae Lyrici Graeci* (1882). On the date of Callinus, see the histories of Greek literature by Mure and Müller; G. H. Bode, *Geschichte der hellenischen Dichtkunst*, ii. pt. i. (1838); and G. Geiger, *De Callini Aetate* (1877), who places him earlier, about 642.

CALLIOPE, the muse of epic poetry, so named from the sweetness of her voice (Gr. *κάλλος*, beauty; *ὄψ*, voice). In Hesiod she was the last of the nine sisters, but yet enjoyed a supremacy over the others. (See also MUSES, THE.)

CALLIRRHOE, in Greek legend, second daughter of the river-god Achelous and wife of Alcmaeon (*q.v.*). At her earnest request her husband induced Phegeus, king of Psophis in Arcadia, and the father of his first wife Arsinoë (or Alphesiboea), to hand over to him the necklace and peplus (robe) of Harmonia (*q.v.*), that he might dedicate them at Delphi to complete the cure of his madness. When Phegeus discovered that they were really meant for Callirrhoe, he gave orders for Alcmaeon to be waylaid and killed (Apollodorus iii. 7, 2. 5-7; Thucydides ii. 102). Callirrhoe now implored the gods that her two young sons might grow to manhood at once and avenge their father's death. This was granted, and her sons Amphoterus and Acarnan slew Phegeus with his two sons, and returning with the necklace and peplus dedicated them at Delphi (Ovid, *Metam.* ix. 413).

CALLISTHENES (*c.* 360–328 B.C.), of Olynthus, Greek historian, a relative and pupil of Aristotle, through whose recommendation he was appointed to attend Alexander the Great in his Asiatic expedition. He censured Alexander's adoption of oriental customs, inveighing especially against the servile ceremony of adoration. Having thereby greatly offended the king, he was accused of being privy to a treasonable conspiracy and thrown into prison, where he died from torture or disease. His melancholy end was commemorated in a special treatise (*Καλλισθένης ἢ περὶ πένθους*) by his friend Theophrastus, whose acquaintance he made during a visit to Athens. Callisthenes wrote an account of Alexander's expedition, a history of Greece from the peace of Antalcidas (387) to the Phocian war (357), a history of the Phocian war and other works, all of which have perished. The romantic life of Alexander, the basis of all the Alexander legends of the middle ages, originated during the time of the Ptolemies, but in its present form belongs to the 3rd century A.D. Its author is usually known as pseudo-Callisthenes, although in the Latin translation by Julius Valerius Alexander Polemius (beginning of the 4th century) it is ascribed to a certain Aesopus; Aristotle, Antisthenes, Onesicritus and Arrian have also been credited with the authorship. There are also Syrian, Armenian and Slavonic versions, in addition to four Greek versions (two in prose and two in verse) in the middle ages (see Krumbacher, *Geschichte der byzantinischen Litteratur*, 1897, p. 849). Valerius's translation was completely superseded by that of Leo, arch-priest of Naples in the 10th century, the so-called *Historia de Preliis*.

See *Scriptores rerum Alexandri Magni* (by C. W. Müller, in the Didot edition of Arrian, 1846), containing the genuine fragments and the text of the pseudo-Callisthenes, with notes and introduction; A. Westermann, *De Callisthene Olynthio et Pseudo-Callisthene Commentatio* (1838–1842); J. Zacher, *Pseudo-Callisthenes* (1867); W. Christ, *Geschichte der griechischen Litteratur* (1898), pp. 363, 819; article by Edward Meyer in Ersch and Gruber's *Allgemeine Encyklopädie*; A. Ausfeld, *Zur Kritik des griechischen Alexanderromans* (Bruchsal, 1894); Plutarch, *Alexander*, 52-55; Arrian, *Anab.* iv. 10-14; Diog. Laërtius v. 1; Quintus Curtius viii. 5-8; Suidas *s.v.* See also ALEXANDER THE GREAT (*ad fin.*). For the Latin translations see Teuffel-Schwabe, *Hist. of Roman Literature* (Eng. trans.), § 399; and M. Schanz, *Geschichte der römischen Litteratur*, iv. 1., p. 43.

CALLISTO, in Greek mythology, an Arcadian nymph, daughter of Lycaon and companion of Artemis. She was transformed into a bear as a penalty for having borne to Zeus a son, Arcas, the ancestor of the Arcadians. Hera, Zeus and Artemis are all mentioned as the authors of the transformation. Arcas, when hunting, encountered the bear Callisto, and would have shot her, had not Zeus with swift wind carried up both to the skies, where he placed them as a constellation. In another version, she was

slain by Artemis. Callisto was originally only an epithet of the Arcadian Artemis herself.

See Apollodorus iii. 8; Ovid, *Metam.* ii. 381-530; R. Franz, *De Callistus fabula* (1890), which deals exhaustively with the various forms of the legend.

CALLISTRATUS, Alexandrian grammarian, flourished at the beginning of the 2nd century B.C. He was one of the pupils of Aristophanes of Byzantium, who were distinctively called Aristophanei. Callistratus chiefly devoted himself to the elucidation of the Greek poets; a few fragments of his commentaries have been preserved in the various collections of scholia and in Athenaeus. He was also the author of a miscellaneous work called Συμμικτά, used by the later lexicographers, and of a treatise on courtesans (Athenaeus iii. 125 B, xiii. 591 D). He is not to be confused with Callistratus, the pupil and successor of Isocrates and author of a history of Heraclea in Pontus.

See R. Schmidt, *De Callistrato Aristophaneo*, appended to A. Nauck's *Aristophanis Byzantii Fragmenta* (1848); also C. W. Müller, *Fragmenta Historicorum Graecorum*, iv. p. 353 note.

CALLISTRATUS, an Athenian poet, only known as the author of a hymn in honour of Harmodius (*q.v.*) and Aristogeiton. This ode, which is to be found in Athenaeus (p. 695), has been beautifully translated by Thomas Moore.

CALLISTRATUS, Greek sophist and rhetorician, probably flourished in the 3rd century. He wrote Ἐκφράσεις, descriptions of fourteen works of art in stone or brass by distinguished artists. This little work, which is written in a dry and affected style, without any real artistic feeling, is usually edited with the Εἰκόνες of Philostratus.

Edition by Schenkl-Reisch (Teubner series, 1902); see also C. G. Heyne, *Opuscula Academica*, v. pp. 196-221, with commentary on the *Descriptiones*; F. Jacobs, *Animadversiones criticae in Callistrati statuas* (1797).

CALLISTRATUS of Aphidnae, Athenian orator and general in the 4th century B.C. For many years, as *prostales*, he supported Spartan interests at Athens. On account of the refusal of the Thebans to surrender Oropus, which on his advice they had been allowed to occupy temporarily, Callistratus, despite his magnificent defence (which so impressed Demosthenes that he resolved to study oratory), was condemned to death, 361 B.C. He fled to Methone in Macedonia, and on his return to Athens in 355 he was executed.

See Xenophon, *Hellenica*, iii. 3, vi. 2; Lycurgus, *In Leocr.* 93.

CALLOT, JACQUES (1592–1635), French engraver, was born at Nancy in Lorraine, where his father, Jean Callot, was a herald-at-arms. He early discovered a very strong predilection for art, and at the age of twelve quitted home without his father's consent, and set out for Rome where he intended to prosecute his studies. Being utterly destitute of funds he joined a troop of Bohemians, and arrived in their company at Florence. In this city he had the good fortune to attract the notice of a gentleman of the court, who supplied him with the means of study; but he removed in a short time to Rome, where, however, he was recognized by some relatives, who immediately compelled him to return home. Two years after this, and when only fourteen years old, he again left France contrary to the wishes of his friends, and reached Turin before he was overtaken by his elder brother, who had been despatched in quest of him. As his enthusiasm for art remained undiminished after these disappointments, he was at last allowed to accompany the duke of Lorraine's envoy to the papal court. His first care was to study the art of design, of which in a short time he became a perfect master. Philip Thomasin instructed him in the use of the graver, which, however, he ultimately abandoned, substituting the point as better adapted for his purposes. From Rome he went to Florence, where he remained till the death of Cosimo II., the Maecenas of these times. On returning to his native country he was warmly received by the then duke of Lorraine, who admired and encouraged him. As his fame was now spread abroad in various countries of Europe, many distinguished persons gave him commissions to execute. By the Infanta Isabella, sovereign of the Low Countries, he was commissioned to engrave a design of the siege of Breda; and at the request of Louis XIII. he designed the siege of Rochelle and the attack on the Isle of Ré. When, however, in 1631 he was desired by that monarch to execute an engraving of the siege of Nancy, which he had just taken, Callot refused, saying, "I would rather cut off my thumb than do anything against the honour of my prince and of my country"; to which Louis replied that the duke of Lorraine was happy in possessing such subjects as Callot. Shortly after this he returned to his native place, from which the king failed to allure him with the offer of a handsome pension. He engraved in all about 1600 pieces, the best of which are those executed in aquafortis. No one ever possessed in a higher degree the talent for grouping a large number of figures in a small space, and of representing with two or three bold strokes the expression, action and peculiar features of each individual. Freedom, variety and *naïveté* characterize all his pieces. His Fairs, his Miseries of War, his Sieges, his Temptation of St Anthony and his Conversion of St Paul are the best-known of his plates.

See also Edouard Meaume, *Recherches sur la vie de Jacques Callot* (1860).

CALLOVIAN (from *Callovium*, the Latinized form of Kellaways, a village not far from Chippenham in Wiltshire), in geology, the name introduced by d'Orbigny for the strata which constitute the base of the Oxfordian or lowermost stage of the Middle Oolites. The term used by d'Orbigny in 1844 was "Kellovien," subsequently altered to "Callovien" in 1849; William Smith wrote "Kellaways" or "Kelloways Stone" towards the close of the 18th century. In England it is now usual to speak of the Kellaways Beds; these comprise (1) the Kellaways Rock, alternating clays and sands with frequent but irregular concretionary calcareous sandstones, with abundant fossils; and (2) a lower division, the Kellaways Clay, which often contains much selenite but is poor in fossils. The lithological characters are impersistent, and the sandy phase encroaches sometimes more, sometimes less, upon the true Oxford Clay. The rocks may be traced from Wiltshire into Bedfordshire, Lincolnshire and Yorkshire, where they are well exposed in the cliffs at Scarborough and Gristhorpe, at Hackness (90 ft.), Newtondale (80 ft.) and Kepwick (100 ft.). In Yorkshire, however, the Callovian rocks lie upon a somewhat higher palaeontological horizon than in Wiltshire. In England, *Keppleriles calloviensis* is taken as the zone fossil; other common forms are *Cosmoceras modiolare*, *C. gowerianum*, *Belemnites oweni*, *Ancyloceras calloviense*, *Nautilus calloviensis*, *Avicula ovalis*, *Gryphaea bilobata*, &c.

On the European continent the "Callovien" stage is used in a sense that is not exactly synonymous with the English Callovian; it is employed to embrace beds that lie both higher and lower in the time-scale. Thus, the continental Callovien includes the following zones:—

Upper Callovien (Divesien)	Zone of *Peltoceras athleta*, *Cosmoceras Duncani*, *Quenstedtoceras Lamberti* and *Q. mariae*.
Lower Callovien	Zone of *Reineckia anceps*, *Stephanoceras coronatum* and *Cosmoceras jason* and a lower zone of *C. gowerianum* and *Macrocephalites macrocephalus*.

Rocks of Callovian age (according to the continental classification) are widely spread in Europe, which, with the exception of numerous insular masses, was covered by the Callovian Sea. The largest of these land areas lay over Scandinavia and Finland, and extended eastward as far as the 40th meridian. In arctic regions these rocks have been discovered in Spitzbergen, Franz Josef Land, the east coast of Greenland, and Siberia. They occur in the Hebrides and Skye and in England as indicated above. In France they are well exposed on the coast of Calvados between Trouville and Dives, where the marls and clays are 200 ft. thick. In the Ardennes clays bearing pyrites and oolitic limonite are about 30 ft. thick. Around Poitiers the Callovian is 100 ft. thick, but the formation thins in the direction of the Jura.

Clays and shales with ferruginous oolites represent the Callovian of Germany; while in Russia the deposits of this age are mainly argillaceous. In North America Callovian fossils are found in California; in South America in Bolivia. In Africa they have been found in Algeria and Morocco, in Somaliland and Zanzibar, and on the west coast of Madagascar. In India they are

represented by the shales and limestones of the Chari series of Cutch. Callovian rocks are also recorded from New Guinea and the Moluccas.

See JURASSIC; also A. de Lapparent, *Traité de géologie*, vol. ii. (5th ed., 1906), and H. B. Woodward, "The Jurassic Rocks of Britain," *Mem. Geol. Survey*, vol. v. (J. A. H.)

CALM, an adjective meaning peaceful, quiet; particularly used of the weather, free from wind or storm, or of the sea, opposed to rough. The word appears in French *calme*, through which it came into English, in Spanish, Portuguese and Italian *calma*. Most authorities follow Diez (*Etym. Wörterbuch der romanischen Sprachen*) in tracing the origin to the Low Latin *cauma*, an adaptation of Greek καῦμα, burning heat, καίειν, to burn. The Portuguese *calma* has this meaning as well as that of quiet. The connexion would be heat of the day, rest during that period, so quiet, rest, peacefulness. The insertion of the *l*, which in English pronunciation disappears, is probably due to the Latin *calor*, heat, with which the word was associated.

CALMET, ANTOINE AUGUSTIN (1672–1757), French Benedictine, was born at Mesnil-la-Horgne on the 26th of February 1672. At the age of seventeen he joined the Benedictine order, and in 1698 was appointed to teach theology and philosophy at the abbey of Moyen-Moutier. He was successively prior at Lay, abbot at Nancy and of Sénones in Lorraine. He died in Paris on the 25th of October 1757. The erudition of Calmet's exegetical writings won him a reputation that was not confined to the Roman Catholic Church, but they have failed to stand the test of modern scholarship. The most noteworthy are:—*Commentaire de la Bible* (Paris, 23 vols., 1707–1716), and *Dictionnaire historique, géographique, critique, chronologique et littéral de la Bible* (Paris, 2 vols., 1720). These and numerous other works and editions of the Bible are known only to students, but as a pioneer in a branch of Biblical study which received a wide development in the 19th century, Calmet is worthy of remembrance. As a historical writer he is best known by his *Histoire ecclésiastique et civile de la Lorraine* (Nancy, 1728), founded on original research and various useful works on Lorraine, of which a full list is given in Vigouroux's *Dictionnaire de la Bible*.

See A. Digot, *Notice biographique et littéraire sur Dom Augustin Calmet* (Nancy, 1860).

CALNE, a market town and municipal borough in the Chippenham parliamentary division of Wiltshire, England, 99 m. west of London by the Great Western railway. Pop. (1901) 3457. Area, 356 acres. It lies in the valley of the Calne, and is surrounded by the high table-land of Salisbury Plain and the Marlborough Downs. The church of St Mark has a nave with double aisles, and massive late Norman pillars and arches. The tower, which fell in 1628, was perhaps rebuilt by Inigo Jones. Other noteworthy buildings are a grammar school, founded by John Bentley in 1660, and the town-hall. Bacon-curing is the staple industry, and there are flour, flax and paper mills. The manufacture of broadcloth, once of great importance, is almost extinct. Calne is governed by a mayor, four aldermen and twelve councillors.

In the 10th century Calne (*Canna, Kalne*) was the site of a palace of the West-Saxon kings. Calne was the scene of the synod of 978 when, during the discussion of the question of celibacy, the floor suddenly gave way beneath the councillors, leaving Archbishop Dunstan alone standing upon a beam. Here also a witenagemot was summoned in 997. In the Domesday Survey Calne appears as a royal borough; it comprised forty-seven burgesses and was not assessed in hides. In 1565 the borough possessed a gild merchant, at the head of which were two gild stewards. Calne claimed to have received a charter from Stephen and a confirmation of the same from Henry III., but no record of these is extant, and the charter actually issued to the borough by James II. in 1687 apparently never came into force. The borough returned two members to parliament more or less irregularly from the first parliament of Edward I. until the Reform Bill of 1832. From this date the borough returned one member only until, by the Redistribution of Seats Act of 1885, the privilege was annulled. In 1303 Lodovicus de Bello Monte, prebendary of Salisbury, obtained a grant of a Saturday market at the manor of Calne, and a three days' fair at the feast of St Mary Magdalene; the latter was only abandoned in the 19th century. Calne was formerly one of the chief centres of cloth manufacture in the west of England, but the industry is extinct.

CALOMEL, a drug consisting of mercurous chloride, mercury subchloride, Hg_2Cl_2, which occurs in nature as the mineral horn-quicksilver, found as translucent crystals belonging to the tetragonal system, with an adamantine lustre, and a dirty white grey or brownish colour. The chief localities are Idria, Obermoschel, Horowitz in Bavaria and Almaden in Spain. It was used in medicine as early as the 16th century under the names *Draco mitigatus, Manna metallorum, Aquila alba, Mercurius dulcis*; later it became known as calomel, a name probably derived from the Greek καλός, beautiful, and μέλας, black, in allusion to its blackening by ammonia, or from καλός and μέλι, honey, from its sweet taste. It may be obtained by heating mercury in chlorine, or by reducing mercuric chloride (corrosive sublimate) with mercury or sulphurous acid. It is manufactured by heating a mixture of mercurous sulphate and common salt in iron retorts, and condensing the sublimed calomel in brick chambers. In the wet way it is obtained by precipitating a mercurous salt with hydrochloric acid. Calomel is a white powder which sublimes at a low red heat; it is insoluble in water, alcohol and ether. Boiling with stannous chloride solution reduces it to the metal; digestion with potassium iodide gives mercurous iodide. Nitric acid oxidizes it to mercuric nitrate, while potash or soda decomposes it into mercury and oxygen. Long continued boiling with water gives mercury and mercuric chloride; dilute hydrochloric acid or solutions of alkaline chlorides convert it into mercuric chloride on long boiling.

The molecular weight of mercurous chloride has given occasion for much discussion. E. Mitscherlich determined the vapour density to be 8·3 (air = 1), corresponding to HgCl. The supporters of the formula Hg_2Cl_2 pointed out that dissociation into mercury and mercuric chloride would give this value, since mercury is a monatomic element. After contradictory evidence as to whether dissociation did or did not occur, it was finally shown by Victor Meyer and W. Harris (1894) that a rod moistened with potash and inserted in the vapour was coloured yellow, and so conclusively proved dissociation. A. Werner determined the molecular weights of mercurous, cuprous and silver bromides, iodides and chlorides in pyridine solution, and obtained results pointing to the formula HgCl, etc. However, the double formula, Hg_2Cl_2, has been completely established by H. B. Baker (*Journ. Chem. Soc.*, 1900, 77, p. 646) by vapour density determinations of the absolutely dry substance.

Calomel possesses certain special properties and uses in medicine which are dealt with here as a supplement to the general discussion of the pharmacology and therapeutics of mercury (*q.v.*). Calomel exerts remote actions in the form of mercuric chloride. The specific value of mercurous chloride is that it exerts the valuable properties of mercuric chloride in the safest and least irritant manner, as the active salt is continuously and freshly generated in small quantities. Its pharmacopeial preparations are the "Black wash," in which calomel and lime react to form mercurous oxide, a pill still known as "Plummer's pill" and an ointment. Externally the salt has not any particular advantage over other mercurial compounds, despite the existence of the official ointment. Internally the salt is given in doses—for an adult of from one-half to five grains. It is an admirable aperient, acting especially on the upper part of the intestinal canal, and causing a slight increase of intestinal secretion. The stimulant action occurring high up in the canal (duodenum and jejunum), it is well to follow a dose of calomel with a saline purgative a few hours afterwards. The special value of the drug as an aperient depends on its antiseptic power and its stimulation of the liver. The stools are dark green, containing calomel, mercuric sulphide and bile which, owing to the antiseptic action, has not been decomposed. The salt is often used in the treatment of syphilis, but is probably less useful than certain other mercurial compounds. It is also employed for

fumigation; the patient sits naked with a blanket over him, on a cane-bottomed chair, under which twenty grains of calomel are volatilized by a spirit-lamp; in about twenty minutes the calomel is effectually absorbed by the skin.

CALONNE, CHARLES ALEXANDRE DE (1734–1802), French statesman, was born at Douai of a good family. He entered the profession of the law, and became in succession advocate to the general council of Artois, *procureur* to the parlement of Douai, master of requests, then intendant of Metz (1768) and of Lille (1774). He seems to have been a man of great business capacity, gay and careless in temperament, and thoroughly unscrupulous in political action. In the terrible crisis of affairs preceding the French Revolution, when minister after minister tried in vain to replenish the exhausted royal treasury and was dismissed for want of success, Calonne was summoned to take the general control of affairs. He assumed office on the 3rd of November 1783. He owed the position to Vergennes, who for three years and a half continued to support him; but the king was not well disposed towards him, and, according to the testimony of the Austrian ambassador, his reputation with the public was extremely poor. In taking office he found "600 millions to pay and neither money nor credit." At first he attempted to develop the latter, and to carry on the government by means of loans in such a way as to maintain public confidence in its solvency. In October 1785 he recoined the gold coinage, and he developed the *caisse d' escompte*. But these measures failing, he proposed to the king the suppression of internal customs, duties and the taxation of the property of nobles and clergy. Turgot and Necker had attempted these reforms, and Calonne attributed their failure to the malevolent criticism of the parlements. Therefore he had an assembly of "notables" called together in January 1787. Before it he exposed the deficit in the treasury, and proposed the establishment of a *subvention territoriale*, which should be levied on all property without distinction. This suppression of privileges was badly received by the privileged notables. Calonne, angered, printed his reports and so alienated the court. Louis XVI. dismissed him on the 8th of April 1787 and exiled him to Lorraine. The joy was general in Paris, where Calonne, accused of wishing to augment the imposts, was known as "Monsieur Deficit." In reality his audacious plan of reforms, which Necker took up later, might have saved the monarchy had it been firmly seconded by the king. Calonne soon afterwards passed over to England, and during his residence there kept up a polemical correspondence with Necker on the finances. In 1789, when the states-general were about to assemble, he crossed over to Flanders in the hope of being allowed to offer himself for election, but he was sternly forbidden to enter France. In revenge he joined the *émigré* party at Coblenz, wrote in their favour, and expended nearly all the fortune brought him by his wife, a wealthy widow. In 1802, having again taken up his abode in London, he received permission from Napoleon to return to France. He died on the 30th of October 1802, about a month after his arrival in his native country.

See Ch. Gomel, *Les Causes financières de la Révolution* (Paris, 1893); R. Stourm, *Les Finances de l'ancien régime et de la Révolution* (2 vols., Paris, 1885); Susane, *La Tactique financière de Calonne*, with bibliography (Paris, 1902).

CALORESCENCE (from the Lat. *calor*, heat), a term invented by John Tyndall to describe an optical phenomenon, the essential feature of which is the conversion of rays belonging to the dark infra-red portion of the spectrum into the more refrangible visible rays, *i.e.* heat rays into rays of light. Such a transformation had not previously been observed, although the converse phenomenon, *i.e.* the conversion of short waves of light into longer or less refrangible waves, had been shown by Sir G. G. Stokes to occur in fluorescent bodies. Tyndall's experiments, however, were carried out on quite different lines, and have nothing to do with fluorescence (*q.v.*). His method was to sift out the long dark waves which are associated with the short visible waves constituting the light of the sun or of the electric arc and to concentrate the former to a focus. If the eye was placed at the focus, no sensation of light was observed, although small pieces of charcoal or blackened platinum foil were immediately raised to incandescence, thus giving rise to visible rays.

The experiment is more easily carried out with the electric light than with sunlight, as the former contains a smaller proportion of visible rays. According to Tyndall, 90% of the radiation from the electric arc is non-luminous. The arc being struck in the usual way between two carbons, a concave mirror, placed close behind it, caused a large part of the radiation to be directed through an aperture in the camera and concentrated to a focus outside. In front of the aperture were placed a plate of transparent rock-salt, and a flat cell of thin glass containing a solution of iodine in carbon bisulphide. Both rock-salt and carbon bisulphide are extremely transparent to the luminous and also to the infra-red rays The iodine in the solution, however, has the property of absorbing the luminous rays, while transmitting the infra-red rays copiously, so that in sufficient thicknesses the solution appears nearly black. Owing to the inflammable nature of carbon bisulphide, the plate of rock-salt was found to be hardly a sufficient protection, and Tyndall surrounded the iodine cell with an annular vessel through which cold water was made to flow. Any small body which was a good absorber of dark rays was rapidly heated to redness when placed at the focus. Platinized platinum (platinum foil upon which a thin film of platinum had been deposited electrolytically) and charcoal were rendered incandescent, black paper and matches immediately inflamed, ordinary brown paper pierced and burned, while thin white blotting-paper, owing to its transparency to the invisible rays, was scarcely tinged. A simpler arrangement, also employed by Tyndall, is to cause the rays to be reflected outwards parallel to one another, and to concentrate them by means of a small flask, containing the iodine solution and used as a lens, placed some distance from the camera. The rock-salt and cold water circulation can then be dispensed with.

Since the rays used by Tyndall in these experiments are similar to those emitted by a heated body which is not hot enough to be luminous, it might be thought that the radiation, say from a hot kettle, could be concentrated to a focus and employed to render a small body luminous. It would, however, be impossible by such means to raise the receiving body to a higher temperature than the source of radiation. For it is easy to see that if, by means of lenses of rock-salt or mirrors, we focused all or nearly all the rays from a small surface on to another surface of equal area, this would not raise the temperature of the second surface above that of the first; and we could not obtain a greater concentration of rays from a large heated surface, since we could not have all parts of the surface simultaneously in focus. The desired result could be obtained if it were possible, by reflection or otherwise, to cause two different rays to unite without loss and pursue a common path. Such a result must be regarded as impossible of attainment, as it would imply the possibility of heat passing from one body to another at a higher temperature, contrary to the second law of thermodynamics (*q.v.*). Tyndall used the dark rays from a luminous source, which are emitted in a highly concentrated form, so that it was possible to obtain a high temperature, which was, however, much lower than that of the source.

A full account of Tyndall's experiments will be found in his *Heat, a Mode of Motion.* (J. R. C.)

CALORIMETRY, the scientific name for the measurement of quantities of heat (Lat. *calor*), to be distinguished from thermometry, which signifies the measurement of temperature. A calorimeter is any piece of apparatus in which heat is measured. This distinction of meaning is purely a matter of convention, but it is very rigidly observed. Quantities of heat may be measured indirectly in a variety of ways in terms of the different effects of heat on material substances. The most important of these effects are (*a*) rise of temperature, (*b*) change of state, (*c*) transformation of energy.

§ 1. The rise of temperature of a body, when heat is imparted to it, is found to be in general nearly proportional to the quantity of heat added. The *thermal capacity* of a body is measured by the quantity of heat required to raise its temperature one degree, and is necessarily proportional to the mass of the body for bodies

of the same substance under similar conditions. The *specific heat* of a substance is sometimes defined as the thermal capacity of unit mass, but more often as the ratio of the thermal capacity of unit mass of the substance to that of unit mass of water at some standard temperature. The two definitions are identical, provided that the thermal capacity of unit mass of water, at a standard temperature, is taken as the unit of heat. But the specific heat of water is often stated in terms of other units. In any case it is necessary to specify the temperature, and sometimes also the pressure, since the specific heat of a substance generally depends to some extent on the external conditions. The methods of measurement, founded on rise of temperature, may be classed as *thermometric methods*, since they depend on the observation of change of temperature with a thermometer. The most familiar of these are the method of mixture and the method of cooling.

§ 2. The *Method of Mixture* consists in imparting the quantity of heat to be measured to a known mass of water, or some other standard substance, contained in a vessel or calorimeter of known thermal capacity, and in observing the rise of temperature produced, from which data the quantity of heat may be found as explained in all elementary text-books. This method is the most generally convenient and most readily applicable of calorimetric methods, but it is not always the most accurate, for various reasons. Some heat is generally lost in transferring the heated body to the calorimeter; this loss may be minimized by performing the transference rapidly, but it cannot be accurately calculated or eliminated. Some heat is lost when the calorimeter is raised above the temperature of its enclosure, and before the final temperature is reached. This can be roughly estimated by observing the rate of change of temperature before and after the experiment, and assuming that the loss of heat is directly proportional to the duration of the experiment and to the average excess of temperature. It can be minimized by making the mixing as rapid as possible, and by using a large calorimeter, so that the excess of temperature is always small. The latter method was generally adopted by J. P. Joule, but the rise of temperature is then difficult to measure with accuracy, since it is necessarily reduced in nearly the same proportion as the correction. There is, however, the advantage that the correction is rendered much less uncertain by this procedure, since the assumption that the loss of heat is proportional to the temperature-excess is only true for small differences of temperature. Rumford proposed to eliminate this correction by starting with the initial temperature of the calorimeter as much below that of its enclosure as the final temperature was expected to be above the same limit. This method has been very generally recommended, but it is really bad, because, although it diminishes the absolute magnitude of the correction, it greatly increases the uncertainty of it and therefore the probable error of the result. The coefficient of heating of a calorimeter when it is below the temperature of its surroundings is seldom, if ever, the same as the coefficient of cooling at the higher temperature, since the convection currents, which do most of the heating or cooling, are rarely symmetrical in the two cases, and moreover, the duration of the two stages is seldom the same. In any case, it is desirable to diminish the loss of heat as much as possible by polishing the exterior of the calorimeter to diminish radiation, and by suspending it by non-conducting supports, inside a polished case, to protect it from draughts. It is also very important to keep the surrounding conditions as constant as possible throughout the experiment. This may be secured by using a large water-bath to surround the apparatus, but in experiments of long duration it is necessary to use an accurate temperature regulator. The method of lagging the calorimeter with cotton-wool or other non-conductors, which is often recommended, diminishes the loss of heat considerably, but renders it very uncertain and variable, and should never be used in work of precision. The bad conductors take so long to reach a steady state that the rate of loss of heat at any moment depends on the past history more than on the temperature of the calorimeter at the moment. A more serious objection to the use of lagging of this kind is the danger of its absorbing moisture. The least trace of damp in the lagging, or of moisture condensed on the surface of the calorimeter, may produce serious loss of heat by evaporation. This is another objection to Rumford's method of cooling the calorimeter below the surrounding temperature before starting. Among minor difficulties of the method may be mentioned the uncertainty of the thermal capacity of the calorimeter and stirrer, and of the immersed portion of the thermometer. This is generally calculated by assuming values for the specific heats of the materials obtained by experiment between 100° C. and 20° C. Since the specific heats of most metals increase rapidly with rise of temperature, the values so obtained are generally too high. It is best to make this correction as small as possible by using a large calorimeter, so that the mass of water is large in proportion to that of metal. Analogous difficulties arise in the application of other calorimetric methods. The accuracy of the work in each case depends principally on the skill and ingenuity of the experimentalist in devising methods of eliminating the various sources of error.

The form of apparatus usually adopted for the method of mixtures is that of Regnault with slight modifications, and figures and descriptions are given in all the text-books. Among special methods which have been subsequently developed there are two which deserve mention as differing in principle from the common type. These are (1) the constant temperature method, (2) the continuous flow method.

The *constant temperature method of mixtures* was proposed by N. Hesehus (*Jour. Phys.*, 1888, vii. p. 489). Cold water at a known

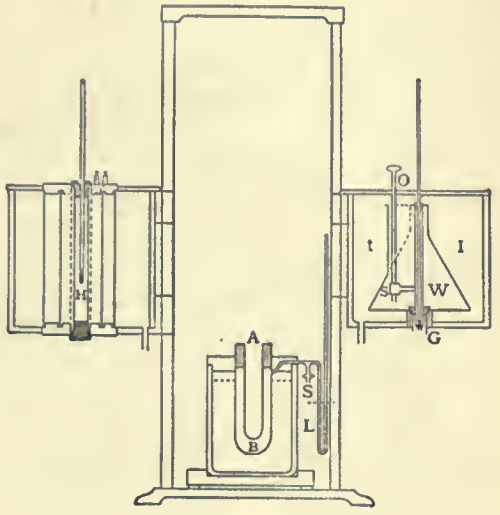


FIG. 1.

temperature is added to the calorimeter, immediately after dropping in the heated substance, at such a rate as to keep the temperature of the calorimeter constant, thus eliminating the corrections for the water equivalent of the calorimeter and the external loss of heat. The calorimeter is surrounded by an air-jacket connected to a petroleum gauge which indicates any small change of temperature in the calorimeter, and enables the manipulator to adjust the supply of cold water to compensate it. The apparatus as arranged by F. A. Waterman is shown in fig. 1 (*Physical Review*, 1896, iv. p. 161). A is the calorimetric tube, B the air-jacket and L the gauge. H is an electric heater for raising the body to a suitable temperature, which can swing into place directly over the calorimeter. W is a conical can containing water cooled by ice I nearly to 0°, which is swung over the calorimeter as soon as the hot body has been introduced and the heater removed. The cold water flow is regulated by a tap S with a long handle O, and its temperature is taken by a delicate thermometer with its bulb at G. The method is interesting, but the manipulations and observations involved are more troublesome than with the ordinary type of calorimeter, and it may be doubted whether any advantage is gained in accuracy.

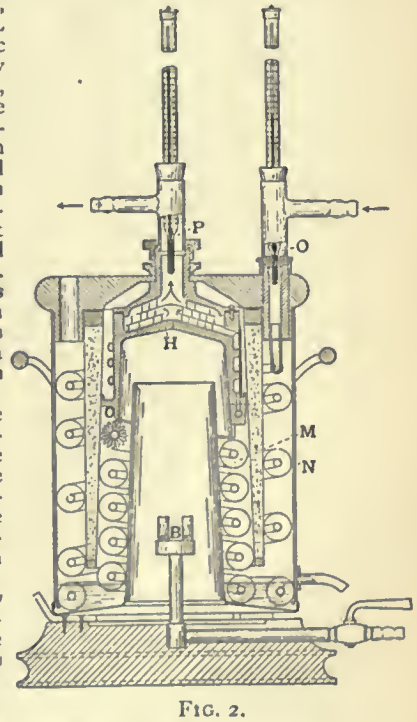


FIG. 2.

The *continuous flow method* is specially applicable to the important case of calorific value of gaseous fuel, where a large quantity of heat is continuously generated at a nearly uniform rate by combustion. Fig. 2 illustrates a recent type of gas calorimeter devised by C. V. Boys (*Proc. R.S.*, 1906, A. 77, p. 122). The heated products of combustion from the burner B impinge on a metal box H, through which water is circulating, and then pass downwards and outwards through a spiral cooler which reduces them practically to the atmospheric temperature. A steady stream of water enters the apparatus by the inflow thermometer O,

flows through the spiral coolers N and M, and finally through the box H, where it is well mixed before passing the outflow thermometer P. As soon as a steady state is reached, the difference of temperature between the outflow and inflow thermometers, multiplied by the current of water in grammes per minute gives the heat per minute supplied by combustion. The gas current is simultaneously observed by a suitable meter, which, with subsidiary corrections for pressure, temperature, &c., gives the necessary data for deducing calorific value.

A continuous flow calorimeter has been used by the writer for measuring quantities of heat conveyed by conduction (see CONDUCTION OF HEAT), and also for determining the variation of the specific heat of water. In the latter case two steady currents of water at different temperatures, say 0° and 100° are passed through an equalizer, and the resulting temperature measured without mixing the currents, which are then separately determined by weighing. This is a very good method of comparing the mean specific heats over two ranges of temperature such as 0-50, and 50-100, or 0-20 and 20-40, but it is not so suitable as the electric method described below for obtaining the actual specific heat at any point of the range.

§ 3. *Method of Cooling.*—A common example of this method is the determination of the specific heat of a liquid by filling a small calorimeter with the liquid, raising it to a convenient temperature, and then setting it to cool in an enclosure at a steady temperature, and observing the time taken to fall through a given range when the conditions have become fairly steady. The same calorimeter is afterwards filled with a known liquid, such as water, and the time of cooling is observed through the same range of temperature, in the same enclosure, under the same conditions. The ratio of the times of cooling is equal to the ratio of the thermal capacities of the calorimeter and its contents in the two cases. The advantage of the method is that there is no transference or mixture; the defect is that the whole measurement depends on the assumption that the rate of loss of heat is the same in the two cases, and that any variation in the conditions, or uncertainty in the rate of loss, produces its full effect in the result, whereas in the previous case it would only affect a small correction. Other sources of uncertainty are, that the rate of loss of heat generally depends to some extent on the rate of fall of temperature, and that it is difficult to take accurate observations on a rapidly falling thermometer. As the method is usually practised, the calorimeter is made very small, and the surface is highly polished to diminish radiation. It is better to use a fairly large calorimeter to diminish the rate of cooling and the uncertainty of the correction for the water equivalent. The surface of the calorimeter and the enclosure should be permanently blackened so as to increase the loss of heat by radiation as much as possible, as compared with the losses by convection and conduction, which are less regular. For accurate work it is essential that the liquid in the calorimeter should be continuously stirred, and also in the enclosure, the lid of which must be water-jacketed, and kept at the same steady temperature as the sides. When all these precautions are taken, the method loses most of the simplicity which is its chief advantage. It cannot be satisfactorily applied to the case of solids or powders, and is much less generally useful than the method of mixture.

§ 4. *Method of Fusion.*—The methods depending on change of state are theoretically the simplest, since they do not necessarily involve any reference to thermometry, and the corrections for external loss of heat and for the thermal capacity of the containing vessels can be completely eliminated. They nevertheless present peculiar difficulties and limitations, which render their practical application more troublesome and more uncertain than is usually supposed. They depend on the experimental fact that the quantity of heat required to produce a given change of state (*e.g.* to convert one gramme of ice at 0° C. into water at 0° C., or one gramme of water at 100° C. into steam at 100° C.) is always the same, and that there need be no change of temperature during the process. The difficulties arise in connexion with the determination of the quantities of ice melted or steam condensed, and in measuring the latent heat of fusion or vaporization in terms of other units for the comparison of observations. The earlier forms of ice-calorimeter, those of Black, and of Laplace and Lavoisier, were useless for work of precision, on account of the impossibility of accurately estimating the quantity of water left adhering to the ice in each case. This difficulty was overcome by the invention of the Bunsen calorimeter, in which the quantity of ice melted is measured by observing the diminution of volume, but the successful employment of this instrument requires considerable skill in manipulation. The sheath of ice surrounding the bulb must be sufficiently continuous to prevent escape of heat, but it must not be so solid as to produce risk of strain. The ideal condition is difficult to secure. In the practical use of the instrument it is not necessary to know both the latent heat of fusion of ice and the change of volume which occurs on melting; it is sufficient to determine the change of volume per calorie, or the quantity of mercury which is drawn into the bulb of the apparatus per unit of heat added. This can be determined by a direct calibration, by inserting a known quantity of water at a known temperature and observing the contraction, or weighing the mercury drawn into the apparatus. In order to be independent of the accuracy of the thermometer employed for observing the initial temperature of the water introduced, it has been usual to employ water at 100° C., adopting as unit of heat the "mean calorie," which is one-hundredth part of the heat given up by one gramme of water in cooling from 100° to 0° C. The weight of mercury corresponding to the mean calorie has been determined with considerable care by a number of observers well skilled in the use of the instrument. The following are some of their results:—Bunsen, 15·41 mgm.; Velten, 15·47 mgm.; Zakrevski, 15·57 mgm.; Staub, 15·26 mgm. The explanation of these discrepancies in the fundamental constant is not at all clear, but they may be taken as an illustration of the difficulties of manipulation attending the use of this instrument, to which reference has already been made. It is not possible to deduce a more satisfactory value from the latent heat and the change of density, because these constants are very difficult to determine. The following are some of the values deduced by well-known experimentalists for the latent heat of fusion:—Regnault, 79·06 to 79·24 calories, corrected by Person to 79·43; Person, 79·99 calories; Hess, 80·34 calories; Bunsen, 80·025 calories. Regnault, Person and Hess employed the method of mixture which is probably the most accurate for the purpose. Person and Hess avoided the error of water sticking to the ice by using dry ice at various temperatures below 0° C., and determining the specific heat of ice as well as the latent heat of fusion. These discrepancies might, no doubt, be partly explained by differences in the units employed, which are somewhat uncertain, as the specific heat of water changes rapidly in the neighbourhood of 0° C; but making all due allowance for this, it remains evident that the method of ice-calorimetry, in spite of its theoretical simplicity, presents grave difficulties in its practical application.

One of the chief difficulties in the practical use of the Bunsen calorimeter is the continued and often irregular movement of the mercury column due to slight differences of temperature, or pressure between the ice in the calorimeter and the ice bath in which it is immersed. C. V. Boys (*Phil. Mag.*, 1887, vol. 24, p. 214) showed that these effects could be very greatly reduced by surrounding the calorimeter with an outer tube, so that the ice inside was separated from the ice outside by an air space which greatly reduces the free passage of heat. The present writer has found that very good results may be obtained by enclosing the calorimeter in a vacuum jacket (as illustrated in fig. 3), which practically eliminates conduction and convection. If the vacuum jacket is silvered inside, radiation also is reduced to such an extent that, if the vacuum is really good, the external ice bath may be dispensed with for the majority of purposes. If the inner bulb is filled with mercury instead of water and ice, the same arrangement answers admirably as a Favre and Silbermann calorimeter, for measuring small quantities of heat by the expansion of the mercury.

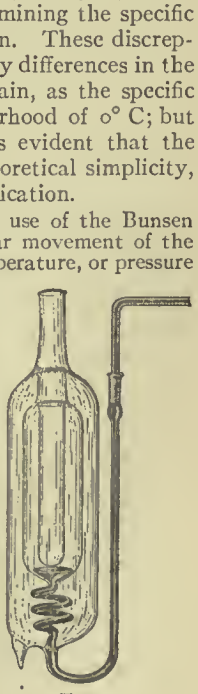


FIG. 3.

The question has been raised by E. L. Nichols (*Phys. Rev.* vol. 8, January 1899) whether there may not be different modifications of ice with different densities, and different values of the latent heat of fusion. He found for natural pond-ice a density 0·9179 and for artificial ice 0·9161. J. Vincent (*Phil. Trans.* A. 198, p. 463) also found a density ·9160 for artificial ice, which is probably very nearly

correct. If such variations of density exist, they may introduce some uncertainty in the absolute values of results obtained with the ice calorimeter, and may account for some of the discrepancies above enumerated.

§ 5. The *Method of Condensation* was first successfully applied by J. Joly in the construction of his steam calorimeter, a full description of which will be found in text-books. The body to be tested is placed in a special scale-pan, suspended by a fine wire from the arm of a balance inside an enclosure which can be filled with steam at atmospheric pressure. The temperature of the enclosure is carefully observed before admitting steam. The weight of steam condensed on the body gives a means of calculating the quantity of heat required to raise it from the atmospheric temperature up to 100° C. in terms of the latent heat of vaporization of steam at 100° C. There can be no appreciable gain or loss of heat by radiation, if the admission of the steam is sufficiently rapid, since the walls of the enclosure are maintained at 100° C., very nearly. The thermal capacity of the scale-pan, &c., can be determined by a separate experiment, or, still better, eliminated by the differential method of counterpoising with an exactly similar arrangement on the other arm of the balance. The method requires very delicate weighing, as one calorie corresponds to less than two milligrammes of steam condensed; but the successful application of the method to the very difficult problem of measuring the specific heat of a gas at constant volume, shows that these and other difficulties have been very skilfully overcome. The application of the method appears to be practically limited to the measurements of specific heat between the atmospheric temperature and 100° C. The results depend on the value assumed for the latent heat of steam, which Joly takes as 536.7 calories, following Regnault. Joly has himself determined the mean specific heat of water between 12° and 100° C. by this method, in terms of the latent heat of steam as above given, and finds the result ·9952. Assuming that the mean specific heat of water between 12° and 100° is really 1·0011 in terms of the calorie at 20° C. (see table, p. 638), the value of the latent heat of steam at 100° C., as determined by Joly, would be 540·2 in terms of the same unit. The calorie employed by Regnault is to some extent uncertain, but the difference is hardly beyond the probable errors of experiment, since it appears from the results of recent experiments that Regnault made an error of the same order in his determination of the specific heat of water at 100° C.

§ 6. *Energy Methods.*—The third general method of calorimetry, that based on the transformation of some other kind of energy into the form of heat, rests on the general principle of the conservation of energy, and on the experimental fact that all other forms of energy are readily and completely convertible into the form of heat. It is therefore often possible to measure quantities of heat indirectly, by measuring the energy in some other form and then converting it into heat. In addition to its great theoretical interest, this method possesses the advantage of being frequently the most accurate in practical application, since energy can be more accurately measured in other forms than in that of heat. The two most important varieties of the method are (*a*) mechanical, and (*b*) electrical. These methods have reached their highest development in connexion with the determination of the mechanical equivalent of heat, but they may be applied with great advantage in connexion with other problems, such as the measurement of the variation of specific heat, or of latent heats of fusion or vaporization.

§ 7. *Mechanical Equivalent of Heat.*—The phrase "mechanical equivalent of heat" is somewhat vague, but has been sanctioned by long usage. It is generally employed to denote the number of units of mechanical work or energy which, when completely converted into heat without loss, would be required to produce one heat unit. The numerical value of the mechanical equivalent necessarily depends on the particular units of heat and work employed in the comparison. The British engineer prefers to state results in terms of foot-pounds of work in any convenient latitude per pound-degree-Fahrenheit of heat. The continental engineer prefers kilogrammetres per kilogramme-degree-centigrade. For scientific use the C.G.S. system of expression in ergs per gramme-degree-centigrade, or "calorie," is the most appropriate, as being independent of the value of gravity. A more convenient unit of work or energy, in practice, on account of the smallness of the erg, is the *joule*, which is equal to 10·7 ergs, or one *watt-second* of electrical energy. On account of its practical convenience, and its close relation to the international electrical units, the *joule* has been recommended by the British Association for adoption as the absolute unit of heat. Other convenient practical units of the same kind would be the *watt-hour*, 3600 joules, which is of the same order of magnitude as the kilocalorie, and the *kilowatt-hour*, which is the ordinary commercial unit of electrical energy.

§ 8. *Joule.*—The earlier work of Joule is now chiefly of historical interest, but his later measurements in 1878, which were undertaken on a larger scale, adopting G. A. Hirn's method of measuring the work expended in terms of the torque and the number of revolutions, still possess value as experimental evidence. In these experiments (see fig. 4) the paddles were revolved by hand at such a speed as to produce a constant torque on the calorimeter *h*, which was supported on a float *w* in a vessel of water *v*, but was kept at rest by the couple due to a pair of equal weights *k* suspended from fine strings passing round the circumference of a horizontal wheel attached to the calorimeter. Each experiment lasted about forty minutes, and the rise of temperature produced was nearly 3° C. The calorimeter contained about 5 kilogrammes of water, so that the rate of heat-supply was about 6 calories per second. Joule's final result was 772·55 foot-pounds at Manchester per pound-degree-Fahrenheit at a temperature of 62° F., but individual experiments differed by as much as 1 %. This result in C.G.S. measure is equivalent to 4·177 joules per calorie at 16·5° C., on the scale of Joule's mercury thermometer. His thermometers were subsequently corrected to the Paris scale by A. Schuster in 1895, which had the effect of reducing the above figure to 4·173.

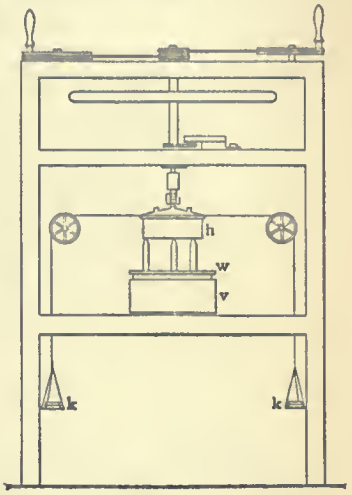


FIG. 4.

§ 9. *Rowland.*—About the same time H. A. Rowland (*Proc. Amer. Acad.* xv. p. 75, 1880) repeated the experiment, employing the same method, but using a larger calorimeter (about 8400 grammes) and a petroleum motor, so as to obtain a greater rate of heating (about 84 calories per second), and to reduce the importance of the uncertain correction for external loss of heat. Rowland's apparatus is shown in fig. 5. The calorimeter was suspended by a steel wire, the torsion of which made the equilibrium stable. The torque was measured by weights O and P suspended by silk ribbons passing over the pulleys *n* and round the disk *kl*. The power was transmitted to the paddles by bevel wheels *f*, *g*, rotating a spindle passing through a stuffing box in the bottom of the calorimeter. The number of revolutions and the rise of temperature were recorded on a chronograph drum. He paid greater attention to the important question of thermometry, and extended his researches over a much wider range of temperature, namely 5° to 35° C. His experiments revealed for the first time a diminution in the specific heat of water with rise of temperature between 0° and 30° C., amounting to four parts in 10·000 per 1° C. His thermometers were compared with a mercury thermometer standardized in Paris, and with a platinum thermometer standardized by Griffiths. The result was to reduce the coefficient of diminution of specific heat at 15° C. by nearly one half, but the absolute value at 20° C. is practically unchanged. Thus corrected his values are as follows:—

Temperature	10°	15°	20°	25°	30°	35°
Joules per cal.	4·197	4·188	4·181	4·176	4·175	4·177

These are expressed in terms of the hydrogen scale, but the difference from the nitrogen scale is so small as to be within the limits of experimental error in this particular case. Rowland himself considered his results to be probably correct to one part in 500, and supposed that the greatest uncertainty lay in the comparison of the scale of his mercury thermometer with the air thermometer. The subsequent correction, though not carried out strictly under the conditions of the experiment, showed that the order of accuracy of his work about the middle of the range from 15° to 25° was at least 1 in 1000, and probably 1 in 2000. At 30° he considered that, owing to the increasing magnitude and uncertainty of the radiation correction, there

" might be a small error in the direction of making the equivalent too great, and that the specific heat might go on decreasing to even 40° C." The results considered with reference to the variation of

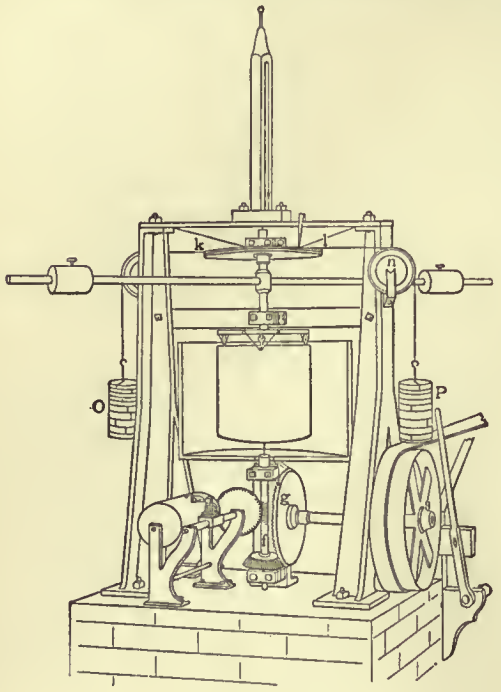


FIG. 5.

the specific heat of water are shown in the curve marked Rowland in Fig. 6.

§ 10. *Osborne Reynolds and W.H. Moorby* (*Phil. Trans.*, 1897, p. 381) determined the mechanical equivalent of the mean thermal unit between 0° and 100° C., on a very large scale, with a Froude-Reynolds hydraulic brake and a steam-engine of 100 h.p. This brake is practically a Joule calorimeter, ingeniously designed to churn the water in such a manner as to develop the greatest possible resistance. The admission of water at 0° C. to the brake was controlled by hand in such a manner as to keep the outflow nearly at the boiling-point, the quantity of water in the brake required to produce a constant torque being regulated automatically, as the speed varied, by a valve worked by the lifting of the weighted lever attached to the brake.

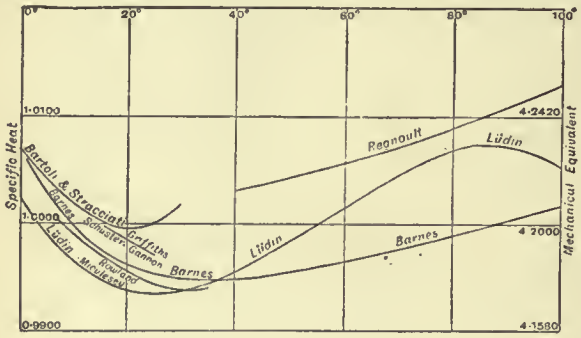


FIG. 6.

The accompanying illustration (fig. 7) shows the brake lagged with cotton-wool, and the 4-ft. lever to which the weights are suspended. The power of the brake may be estimated by comparison with the size of the rope pulley seen behind it on the same shaft. With 300 pounds on a 4-ft. lever at 300 revolutions per minute, the rate of generation of heat was about 12 kilo-calories per second. In spite of the large range of temperature, the correction for external loss of heat amounted to only 5 %, with the brake uncovered, and was reduced to less than 2 % by lagging. This is the special advantage of working on so large a scale with so rapid a generation of heat. But, for the same reason, the method necessarily presents peculiar difficulties, which were not overcome without great pains and ingenuity. The principal troubles arose from damp in the lagging which necessitated the rejection of several trials, and from dissolved air in the water, causing loss of heat by the formation of steam. Next to the radiation loss, the most uncertain correction was that for conduction of heat along the 4-in. shaft. These losses were as far as possible eliminated by combining the trials in pairs, with different loads on the brake, assuming that the heat-loss would be the same in the heavy and light trials, provided that the external temperature and the gradient in the shaft, as estimated from the temperature of the bearings, were the same. The values deduced in this manner for the equivalent agreed as closely as could be expected considering the impossibility of regulating the external condition of temperature and moisture with any certainty in an engine-room. The extreme variation of results in any one series was only from 776.63 to 779.46 ft.-pounds, or less than ½ %. This variation may have been due to the state of the lagging, which Moorby distrusted in spite of the great reduction of the heat-loss, or it may have been partly due to the difficulty of regulating the speed of the engine and the water-supply to the brake in such a manner as to maintain a constant temperature in the outflow, and avoid variations in the heat capacity of the brake. Since hand regulation is necessarily discontinuous, the speed and the temperature were constantly varying, so that it was useless to take readings nearer than the tenth of a degree. The largest variation recorded in the two trials of which full details are given, was 4–9° F. in two minutes in the outflow temperature, and four or five revolutions per minute on the speed. These variations, so far as they were of a purely accidental nature, would be approximately eliminated on the mean of a large number of trials, so that the accuracy of the final result would be of a higher order than might be inferred from a comparison of separate pairs of trials. Great pains

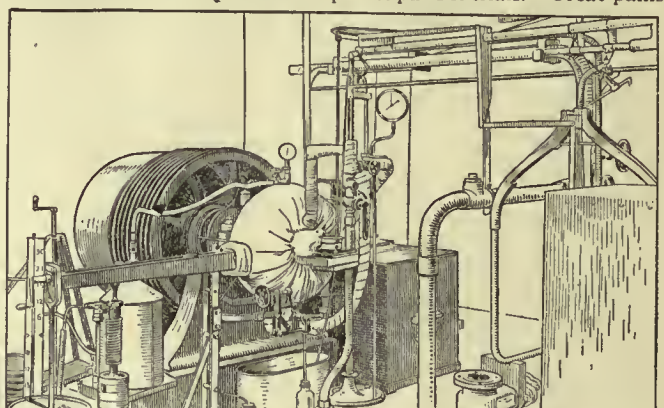


FIG. 7.

were taken to discuss and eliminate all the sources of constant error which could be foreseen. The results of the light trials with 400 ft.-pounds on the brake differ slightly from those with 600 ft.-pounds. This might be merely accidental, or it might indicate some constant difference in the conditions requiring further investigation. It would have been desirable, if possible, to have tried the effect of a larger range of variation in the experimental conditions of load and speed, with a view to detect the existence of constant errors; but owing to the limitations imposed by the use of a steam-engine, and the difficulty of securing steady conditions of running, this proved to be impossible. There can be no doubt, however, that the final result is the most accurate direct determination of the value of the mean calorie between 0° and 100° C. in mechanical units. Expressed in joules per calorie the result is 4·1832, which agrees very closely with the value found by Rowland as the mean over the range 15° to 20° C. The value 4·183 is independently confirmed in a remarkable manner by the results of the electrical method described below, which give 4·185 joules for the mean calorie, if Rowland's value is assumed as the starting-point, and taken to be 4·180 joules at 20° C.

§ 11. *Electrical Methods.*—The value of the international electrical units has by this time been so accurately determined in absolute measure that they afford a very good, though indirect, method of determining the mechanical equivalent of heat. But, quite apart from this, electrical methods possess the greatest value for calorimetry, on account of the facility and accuracy of regulating and measuring the quantity of heat supplied by an electric current. The frictional generation of heat in a metallic wire conveying a current can be measured in various ways, which correspond to slightly different methods. By Ohm's law, and by the definition of difference of electric pressure or potential, we obtain the following alternative expressions for the quantity of heat H in joules generated in a time T seconds by a current of C amperes flowing in a wire of resistance R ohms, the difference of potential between the ends of the wire being $E=CR$ volts:—

$$H=ECT=C^2RT=E^2T/R \quad . \quad . \quad . \quad (1.)$$

The method corresponding to the expression C^2RT was adopted

by Joule and by most of the early experimentalists. The defects of the earlier work from an electrical point of view lay chiefly in the difficulty of measuring the current with sufficient accuracy owing to the imperfect development of the science of electrical measurement. These difficulties have been removed by the great advances since 1880, and in particular by the introduction of accurate standard cells for measurements of electrical pressure.

§ 12. *Griffiths.*—The method adopted by E. H. Griffiths (*Phil. Trans.*, 1893, p. 361), whose work threw a great deal of light on the failure of previous observers to secure consistent results, corresponded to the last expression E^2T/R, and consisted in regulating the current by a special rheostat, so as to keep the potential difference E on the terminals of the resistance R balanced against a given number of standard Clark cells of the Board of Trade pattern. The resistance R could be deduced from a knowledge of the temperature of the calorimeter and the coefficient of the wire. But in order to obtain trustworthy results by this method he found it necessary to employ very rapid stirring (2000 revolutions per minute), and to insulate the wire very carefully from the liquid to prevent leakage of the current. He also made a special experiment to find how much the temperature of the wire exceeded that of the liquid under the conditions of the experiment. This correction had been neglected by previous observers employing similar methods. The resistance R was about 9 ohms, and the potential difference E was varied from three to six Clark cells, giving a rate of heat-supply about 2 to 6 watts. The water equivalent of the calorimeter was about 85 grammes, and was determined by varying the quantity of water from 140 to 260 or 280 grammes, so that the final results depended on a difference in the weight of water of 120 to 140 grammes. The range of temperature in each experiment was 14° to 26° C. The rate of rise was observed with a mercury thermometer standardized by comparison with a platinum thermometer under the conditions of the experiment. The time of passing each division was recorded on an electric chronograph. The duration of an experiment varied from about 30 to 70 minutes. Special observations were made to determine the corrections for the heat supplied by stirring, and that lost by radiation, each of which amounted to about 10% of the heat-supply. The calorimeter C, fig. 8, was gilded, and completely

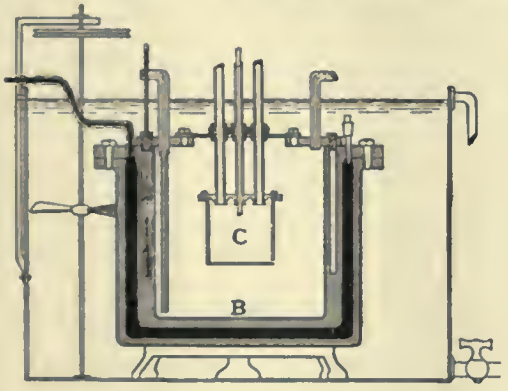


FIG. 8.

surrounded by a nickel-plated steel enclosure B, forming the bulb of a mercury thermo-regulator, immersed in a large water-bath maintained at a constant temperature. In spite of the large corrections the results were extremely consistent, and the value of the temperature-coefficient of the diminution of the specific heat of water, deduced from the observed variation in the rate of rise at different points of the range 15° to 25°, agreed with the value subsequently deduced from Rowland's experiments over the same range, when his thermometers were reduced to the same scale. Griffiths' final result for the average value of the calorie over this range was 4·192 joules, taking the E.M.F. of the Clark cell at 15° C. to be 1·4342 volts. The difference from Rowland's value, 4·181, could be explained by supposing the E.M.F. of the Clark cells to have in reality been 1·4323 volts, or about 2 millivolts less than the value assumed. Griffiths subsequently applied the same method to the measurement of the specific heat of aniline, and the latent heat of vaporization of benzene and water.

§ 13. *Schuster and Gannon.*—The method employed by A. Schuster and W. Gannon for the determination of the specific heat of water in terms of the international electric units (*Phil. Trans.* A, 1895, p. 415) corresponded to the expression ECT, and differed in many essential details from that of Griffiths. The current through a platinoid resistance of about 31 ohms in a calorimeter containing 1500 grammes of water was regulated so that the potential difference on its terminals was equal to that of twenty Board of Trade Clark cells in series. The duration of an experiment was about ten minutes, and the product of the mean current and the time, namely CT, was measured by the weight of silver deposited in a voltameter, which amounted to about 0·56 gramme. The uncertainty due to the correction for the water equivalent was minimized by making it small (about 27 grammes) in comparison with the water weight. The correction for external loss was reduced by employing a small rise of temperature (only 2·22°), and making the rate of heat-supply relatively rapid, nearly 24 watts. The platinoid coil was insulated from the water by shellac varnish. The wire had a length of 760 cms., and the potential difference on its terminals was nearly 30 volts. The rate of stirring adopted was so slow that the heat generated by it could be neglected. The result found was 4·191 joules per calorie at 19° C. This agrees very well with Griffiths considering the difficulty of measuring so small a rise of temperature at 2° with a mercury thermometer. Admitting that the electro-chemical equivalent of silver increases with the age of the solution, a fact subsequently discovered, and that the E.M.F. of the Clark cell is probably less than 1·4340 volts (the value assumed by Schuster and Gannon), there is no difficulty in reconciling the result with that of Rowland.

§ 14. *H. L. Callendar and H. T. Barnes* (*Brit. Assoc. Reports*, 1897 and 1899) adopted an entirely different method of calorimetry, as well as a different method of electrical measurement. A steady current of liquid, Q grammes per second, of specific heat, Js joules per degree, flowing through a fine tube, A B, fig. 9, is heated by a steady electric current during its passage through the tube, and the difference of temperature $d\theta$ between the inflowing and the outflowing liquid is measured by a single reading with a delicate pair of differential platinum thermometers at A and B. The difference of potential E between the ends of the tube, and the electric current C through it, are measured on an accurately calibrated potentiometer, in terms of a Clark cell and a standard resistance. If $hd\theta$ is the radiation loss in watts we have the equation,

$$EC = JsQd\theta + hd\theta \quad . \quad . \quad . \quad . \quad (2).$$

The advantage of this method is that all the conditions are steady, so that the observations can be pushed to the limit of accuracy and

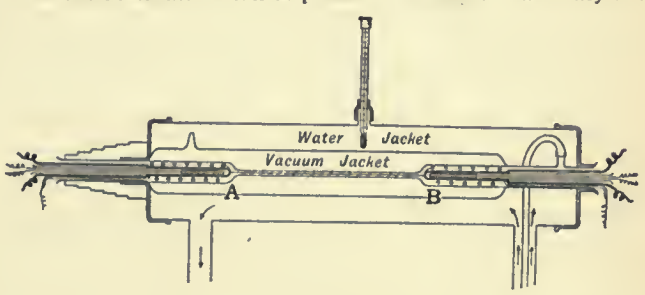


FIG. 9.

sensitiveness of the apparatus. The water equivalent of the calorimeter is immaterial, since there is no appreciable change of temperature. The heat-loss can be reduced to a minimum by enclosing the flow-tube in a hermetically sealed glass vacuum jacket. Stirring is effected by causing the water to circulate spirally round the bulbs of the thermometers and the heating conductor as indicated in the figure. The conditions can be very easily varied through a wide range. The heat-loss $hd\theta$ is determined and eliminated by varying the flow of liquid and the electric current simultaneously, in such a manner as to secure approximately the same rise of temperature for two or more widely different values of the flow of liquid. An example taken from the *Electrician*, September 1897, of one of the earliest experiments by this method on the specific heat of mercury will make the method clearer. The flow-tube was about 1 metre long and 1 millim. in diameter, coiled in a short spiral inside the vacuum jacket. The outside of the vacuum jacket was immersed in a water jacket at a steady temperature equal to that of the inflowing mercury.

SPECIFIC HEAT OF MERCURY BY CONTINUOUS ELECTRIC METHOD

Flow of Hg.	Rise of Temp.	Watts.	Heat-loss.	Specific Heat.
gm./sec.	$d\theta$	EC	$hd\theta$	Per gm. deg.
8·753	11·764	14·862	0·655	·13780 joules
4·594	12·301	7·912	0·685	·03297 cals.

It is assumed as a first approximation that the heat-loss is proportional to the rise of temperature $d\theta$, provided that $d\theta$ is nearly the same in both cases, and that the distribution of temperature in the apparatus is the same for the same rise of temperature whatever the flow of liquid. The result calculated on these assumptions is given in the last column in joules, and also in calories of 20° C. The heat-loss in this example is large, nearly 4·5% of the total supply, owing to the small flow and the large rise of temperature, but this correction was greatly reduced in subsequent observations on the specific heat of water by the same method. In the case of mercury the liquid itself can be utilized to conduct the electric current. In the case of water or other liquids it is necessary to employ a platinum wire stretched along the tube as heating conductor. This introduces additional difficulties of construction, but does not otherwise affect

the method. The absolute value of the specific heat deduced necessarily depends on the absolute values of the electrical standards employed in the investigation. But for the determination of relative values of specific heats in terms of a standard liquid, or of the variations of specific heat of a liquid, the method depends only on the constancy of the standards, which can be readily and accurately tested. The absolute value of the E.M.F. of the Clark cells employed was determined with a special form of electrodynamometer (Callendar, *Phil. Trans.* A. 313, p. 81), and found to be 1·4334 volts, assuming the ohm to be correct. Assuming this value, the result found by this method for the specific heat of water at 20° C. agrees with that of Rowland within the probable limits of error.

§ 15. *Variation of Specific Heat of Water.*—The question of the variation of the specific heat of water has a peculiar interest and importance in connexion with the choice of a thermal unit. Many of the uncertainties in the reduction of older experiments, such as those of Regnault, arise from uncertainty in regard to the unit in terms of which they are expressed, which again depends on the scale of the particular thermometer employed in the investigation. The first experiments of any value were those of Regnault in 1847 on the specific heat of water between 110° C. and 192° C. They were conducted on a very large scale by the method of mixture, but showed discrepancies of the order of 0·5 %, and the calculated results in many cases do not agree with the data. This may be due merely to deficient explanation of details of tabulation. We may probably take the tabulated values as showing correctly the rate of variation between 110° and 190° C., but the values in terms of any particular thermal unit must remain uncertain to at least 0·5 % owing to the uncertainties of the thermometry. Regnault himself adopted the formula,

$$s = 1 + 0{\cdot}00004t + 0{\cdot}0000009t^2 \text{ (Regnault)}, \qquad (3)$$

for the specific heat s at any temperature t C. in terms of the specific heat at 0° C. taken as the standard. This formula has since been very generally applied over the whole range 0° to 200° C., but the experiments could not in reality give any information with regard to the specific heat at temperatures below 100° C. The linear formula proposed by J. Bosscha from an independent reduction of Regnault's experiments is probably within the limits of accuracy between 100° and 200° C., so far as the mean rate of variation is concerned, but the absolute values require reduction. It may be written—

$$s = s_{100} + {\cdot}00023\,(t - 100) \quad \text{(Bosscha-Regnault)} \qquad (4).$$

The work of L. Pfaundler and H. Platter, of G. A. Hirn, of J. C. Jamin and Amaury, and of many other experimentalists who succeeded Regnault, appeared to indicate much larger rates of increase than he had found, but there can be little doubt that the discrepancies of their results, which often exceeded 5 %, were due to lack of appreciation of the difficulties of calorimetric measurements. The work of Rowland by the mechanical method was the first in which due attention was paid to the thermometry and to the reduction of the results to the absolute scale of temperature. The agreement of his corrected results with those of Griffiths by a very different method, left very little doubt with regard to the rate of diminution of the specific heat of water at 20° C. The work of A. Bartoli and E. Stracciati by the method of mixture between 0° and 30° C., though their curve is otherwise similar to Rowland's, had appeared to indicate a minimum at 20° C., followed by a rapid rise. This lowering of the minimum was probably due to some constant errors inherent in their method of experiment. The more recent work of Lüdin, 1895, under the direction of Prof. J. Pernet, extended from 0° to 100° C., and appears to have attained as high a degree of excellence as it is possible to reach by the employment of mercury thermometers in conjunction with the method of mixture. His results, exhibited in fig. 6, show a minimum at 25° C., and a maximum at 87° C., the values being ·9935 and 1·0075 respectively in terms of the mean specific heat between 0° and 100° C. He paid great attention to the thermometry, and the discrepancies of individual measurements at any one point nowhere exceed 0·3 %, but he did not vary the conditions of the experiments materially, and it does not appear that the well-known constant errors of the method could have been completely eliminated by the devices which he adopted. The rapid rise from 25° to 75° may be due to radiation error from the hot water supply, and the subsequent fall of the curve to the inevitable loss of heat by evaporation of the boiling water on its way to the calorimeter. It must be observed, however, that there is another grave difficulty in the accurate determination of the specific heat of water near 100° C. by this method, namely, that the quantity actually observed is not the specific heat *at* the higher temperature t, but the *mean specific heat* over the range 18° to t. The specific heat itself can be deduced only by differentiating the curve of observation, which greatly increases the uncertainty. The peculiar advantage of the electric method of Callendar and Barnes, already referred to, is that the specific heat itself is determined over a range of 8° to 10° at each point, by adding accurately measured quantities of heat to the water at the desired temperature in an isothermal enclosure, under perfectly steady conditions, without any possibility of evaporation or loss of heat in transference. These experiments, which have been extended by Barnes over the whole range 0° to 100°, agree very well with Rowland and Griffiths in the rate of variation at 20° C., but show a rather flat minimum of specific heat in the neighbourhood of 38° to 40° C. At higher points the rate of variation is very similar to that of Regnault's curve, but taking the specific heat at 20° as the standard of reference, the actual values are nearly 0·56 % less than Regnault's. It appears probable that his values for higher temperatures may be adopted with this reduction, which is further confirmed by the results of Reynolds and Moorby, and by those of Lüdin. According to the electric method, the whole range of variation of the specific heat between 10° and 80° is only 0·5 %. Comparatively simple formulae, therefore, suffice for its expression to 1 in 10,000, which is beyond the limits of accuracy of the observations. It is more convenient in practice to use a few simple formulae, than to attempt to represent the whole range by a single complicated expression:—

Below 20° C. $s = 0{\cdot}9982 + 0{\cdot}000{,}0045\,(t-40)^2 - 0{\cdot}000{,}0005\,(t-20)^3$.
From 20° to 60°, $s = 0{\cdot}9982 + 0{\cdot}000{,}0045\,(t-40)^2$ (5).
Above 60° to 200° $\begin{cases} s = 0{\cdot}9944 + {\cdot}000{\cdot}04t + 0{\cdot}000{,}0009\ t^2 \text{ (Regnault corrd.)} \\ s = 1{\cdot}000 + 0{\cdot}000{,}22\ (t-60), \text{ (Bosscha corrd.)} \end{cases}$

The addition of the cubic term below 20° is intended to represent the somewhat more rapid change near the freezing-point. This effect is probably due, as suggested by Rowland, to the presence of a certain proportion of ice molecules in the liquid, which is also no doubt the cause of the anomalous expansion. Above 60° C. Regnault's formula is adopted, the absolute values being simply diminished by a constant quantity 0·0056 to allow for the probable errors of his thermometry. Above 100° C., and for approximate work generally, the simpler formula of Bosscha, similarly corrected, is probably adequate.

The following table of values, calculated from these formulae, is taken from the *Brit. Assoc. Report*, 1899, with a slight modification

SPECIFIC HEAT OF WATER IN TERMS OF UNIT AT 20° C. 4·180 JOULES

t° C.	Joules.	s.	h.	Rowland.
0°	4·208	1·0094	0	0
5°	4·202	1·0054	5·037	5·037
10°	4·191	1·0027	10·056	10·058
15°	4·184	1·0011	15·065	15·068
20°	4·180	1·0000	20·068	20·071
25°	4·177	0·9992	25·065	25·067
30°	4·175	0·9987	30·060	30·057
35°	4·173	0·9983	35·052	35·053
40°	4·173	0·9982	40·044	
50°	4·175	0·9987	50·028	
60°	4·180	1·0000	60·020	
70°	4·187	1·0016	70·028	
80°	4·194	1·0033	80·052	
90°	4·202	1·0053	90·095	Shaw
100°	4·211	1·0074	100·158	Regnault
120°	4·231	1·0121	120·35	120·73
140°	4·254	1·0176	140·65	140·88
160°	4·280	1·0238	161·07	161·20
180°	4·309	1·0308	181·62	182·14
200°	4·341	1·0384	202·33	
220°	4·376	1·0467	223·20	

to allow for the increase in the specific heat below 20° C. This was estimated in 1899 as being equivalent to the addition of the constant quantity 0·020 to the values of the total heat h of the liquid as reckoned by the parabolic formula (5). This quantity is now, as the result of further experiments, added to the values of h, and also represented in the formula for the specific heat itself by the cubic term.

The unit of comparison in the following table is taken as the specific heat of water at 20° C. for the reasons given below. This unit is taken as being 4·180 joules per gramme-degree-centigrade on the scale of the platinum thermometer, corrected to the absolute scale as explained in the article THERMOMETRY, which has been shown to be practically equivalent to the hydrogen scale. The value 4·180 joules at 20° C. is the mean between Rowland's corrected result 4·181 and the value 4·179, deduced from the experiments of Reynolds and Moorby on the assumption that the ratio of the mean specific heat 0° to 100° to that at 20° is 1·0016, as given by the formulae representing the results of Callendar and Barnes. This would indicate that Rowland's corrected values should, if anything, be lowered. In any case the value of the mechanical equivalent is uncertain to at least 1 in 2000.

The mean specific heat, over any range of temperature, may be obtained by integrating the formulae between the limits required, or by taking the difference of the corresponding values of the total heat h, and dividing by the range of temperature. The quantity actually observed by Rowland was the total heat. It may be remarked that starting from the same value at 5°, for the sake of comparison, Rowland's values of the total heat agree to 1 in 5000 with those calculated from the formulae. The values of the total heat observed by Regnault, as reduced by Shaw, also show a very fair agreement, considering the uncertainty of the units. It must be admitted that it is desirable to redetermine the variation of the specific heat above 100° C. This is very difficult on account of the steam-pressure, and could not easily be accomplished by the electrical

method. Callendar has, however, devised a continuous method of mixture, which appears to be peculiarly adapted to the purpose, and promises to give more certain results. In any case it may be remarked that formulae such as those of Jamin, Henrichsen, Baumgartner, Winkelmann or Dieterici, which give far more rapid rates of increase than that of Regnault, cannot possibly be reconciled with his observations, or with those of Reynolds and Moorby, or Callendar and Barnes, and are certainly inapplicable above 100° C.

§ 16. *On the Choice of the Thermal Unit.*—So much uncertainty still prevails on this fundamental point that it cannot be passed over without reference. There are three possible kinds of unit, depending on the three fundamental methods already given: (1) the thermometric unit, or the thermal capacity of unit mass of a standard substance under given conditions of temperature and pressure on the scale of a standard thermometer. (2) The latent-heat unit, or the quantity of heat required to melt or vaporize unit mass of a standard substance under given conditions. This unit has the advantage of being independent of thermometry, but the applicability of these methods is limited to special cases, and the relation of the units to other units is difficult to determine. (3) The absolute or mechanical unit, the quantity of heat equivalent to a given quantity of mechanical or electrical energy. This can be very accurately realized, but is not so convenient as (1) for ordinary purposes.

In any case it is necessary to define a thermometric unit of class (1). The standard substance must be a liquid. Water is always selected, although some less volatile liquid, such as aniline or mercury, would possess many advantages. With regard to the scale of temperature, there is very general agreement that the absolute scale as realized by the hydrogen or helium thermometer should be adopted as the ultimate standard of reference. But as the hydrogen thermometer is not directly available for the majority of experiments, it is necessary to use a secondary standard for the practical definition of the unit. The electrical resistance thermometer of platinum presents very great advantages for this purpose over the mercury thermometer in point of reproducibility, accuracy and adaptability to the practical conditions of experiment. The conditions of use of a mercury thermometer in a calorimetric experiment are necessarily different from those under which its corrections are determined, and this difference must inevitably give rise to constant errors in practical work. The primary consideration in the definition of a unit is to select that method which permits the highest order of accuracy in comparison and verification. For this reason the definition of the thermal unit will in the end probably be referred to a scale of temperature defined in terms of a standard platinum thermometer.

There is more diversity of opinion with regard to the question of the standard temperature. Many authors, adopting Regnault's formula, have selected 0° C. as the standard temperature, but this cannot be practically realized in the case of water, and his formula is certainly erroneous at low temperatures. A favourite temperature to select is 4° C., the temperature of maximum density, since at this point the specific heat at constant volume is the same as that at constant pressure But this is really of no consequence, since the specific heat at constant volume cannot be practically realized. The specific heat at 4° could be accurately determined at the mean over the range 0° to 8° keeping the jacket at 0° C. But the change appears to be rather rapid near 0°, the temperature is inconveniently low for ordinary calorimetric work, and the unit at 4° would be so much larger than the specific heat at ordinary temperatures that nearly all experiments would require reduction. The natural point to select would be that of minimum specific heat, but if this occurs at 40° C. it would be inconveniently high for practical realization except by the continuous electrical method. It was proposed by a committee of the British Association to select the temperature at which the specific heat was 4·200 joules, leaving the exact temperature to be subsequently determined. It was supposed at the time, from the original reduction of Rowland's experiments, that this would be nearly at 10° C., but it now appears that it may be as low as 5° C., which would be inconvenient. This is really only an absolute unit in disguise, and evades the essential point, which is the selection of a standard temperature for the water thermometric unit. A similar objection applies to selecting the temperature at which the specific heat is equal to its mean value between 0° and 100°. The mean calorie cannot be accurately realized in practice in any simple manner, and is therefore unsuitable as a standard of comparison. Its relation to the calorie at any given temperature, such as 15° or 20°, cannot be determined with the same degree of accuracy as the ratio of the specific heat at 15° to that at 20°, if the scale of temperature is given. The most practical unit is the calorie at 15° or 20° or some temperature in the range of ordinary practice. The temperature most generally favoured is 15°, but 20° would be more suitable for accurate work. These units differ only by 11 parts in 10,000 according to Callendar and Barnes, or by 13 in 10,000 according to Rowland and Griffiths, so that the difference between them is of no great importance for ordinary purposes. But for purposes of definition it would be necessary to take the mean value of the specific heat *over a given range* of temperature, preferably at least 10°, rather than the specific heat *at a point* which necessitates reference to some formula of reduction for the rate of variation. The specific heat at 15° would be determined with reference to the mean over the range 10° to 20°, and that at 20° from the range 15° to 25°. There can be no doubt that the range 10° to 20° is too low for the accurate thermal regulation of the conditions of the experiment. The range 15° to 25° would be much more convenient from this point of view, and a mean temperature of 20° is probably nearest the average of accurate calorimetric work. For instance 20° is the mean of the range of the experiments of Griffiths and of Rowland, and is close to that of Schuster and Gannon. It is readily attainable at any time in a modern laboratory with adequate heating arrangements, and is probably on the whole the most suitable temperature to select.

§ 17. *Specific Heat of Gases.*—In the case of solids and liquids under ordinary conditions of pressure, the external work of expansion is so small that it may generally be neglected; but with gases or vapours, or with liquids near the critical point, the external work becomes so large that it is essential to specify the conditions under which the specific heat is measured. The most important cases are, the specific heats (1) at constant volume; (2) at constant pressure; (3) at saturation pressure in the case of a liquid or vapour. In consequence of the small thermal capacity of gases and vapours per unit volume at ordinary pressures, the difficulties of direct measurement are almost insuperable except in case (2). Thus the direct experimental evidence is somewhat meagre and conflicting, but the question of the relation of the specific heats of gases is one of great interest in connexion with the kinetic theory and the constitution of the molecule. The well-known experiments of Regnault and Wiedemann on the specific heat of gases at constant pressure agree in showing that the *molecular specific heat*, or the thermal capacity of the molecular weight in grammes, is approximately independent of the temperature and pressure in case of the more stable diatomic gases, such as H_2, O_2, N_2, CO, &c., and has nearly the same value for each gas. They also indicate that it is much larger, and increases considerably with rise of temperature, in the case of more condensible vapours, such as Cl_2, Br_2, or more complicated molecules, such as CO_2, N_2O, NH_3, C_2H_4. The direct determination of the specific heat at constant volume is extremely difficult, but has been successfully attempted by Joly with his steam calorimeter, in the case of air and CO_2. Employing pressures between 7 and 27 atmospheres, he found that the specific heat of air between 10° and 100° C. increased very slightly with increase of density, but that of CO_2 increased nearly 3 % between 7 and 21 atmospheres. The following formulae represent his results for the specific heat s at constant volume in terms of the density d in gms. per c. c.:—

$$\text{Air, } s = 0{\cdot}1715 + 0{\cdot}028d,$$
$$CO_2, s = 0{\cdot}165 + 0{\cdot}213d + 0{\cdot}34d^2.$$

§ 18. *Ratio of Specific Heats.*—According to the elementary kinetic theory of an ideal gas, the molecules of which are so small and so far apart that their mutual actions may be neglected, the kinetic energy of translation of the molecules is proportional to the absolute temperature, and is equal to 3/2 of pv, the product of the pressure and the volume, per unit mass. The expansion per degree at constant pressure is $v/\theta = R/p$. The external work of expansion per degree is equal to R, being the product of the pressure and the expansion, and represents the difference of the specific heats S−s, at constant pressure and volume, assuming as above that the internal work of expansion is negligible. If the molecules are supposed to be like smooth, hard, elastic spheres, incapable of receiving any other kind of energy except that of translation, the specific heat at constant volume would be the increase per degree of the kinetic energy namely $3pv/2\theta = 3R/2$, that at constant pressure would be $5R/2$, and the ratio of the specific heats would be 5/3 or 1·666. This appears to be actually the case for monatomic gases such as mercury vapour (Kundt and Warburg, 1876), argon and helium (Ramsay, 1896). For diatomic or compound gases Clerk Maxwell supposed that the molecule would also possess energy of rotation, and endeavoured to prove that in this case the energy would be equally divided between the six degrees of freedom, three of translation and three of rotation, if the molecule were regarded as a rigid body incapable of vibration-energy. In this case we should have $s = 3R$, $S = 4R$, $S/s = 4/3 = 1{\cdot}333$. In 1879 Maxwell considered it one of the greatest difficulties which the kinetic theory had yet encountered, that in spite of the many other degrees of freedom of vibration revealed by the spectroscope, the experimental value of the ratio

S/s was 1·40 for so many gases, instead of being less than 4/3. Somewhat later L. Boltzmann suggested that a diatomic molecule regarded as a rigid dumb-bell or figure of rotation, might have only five effective degrees of freedom, since the energy of rotation about the axis of symmetry could not be altered by collisions between the molecules. The theoretical value of the ratio S/s in this case would be the required 7/5. For a rigid molecule on this theory the smallest value possible would be 4/3. Since much smaller values are found for more complex molecules, we may suppose that, in these cases, the energy of rotation of a polyatomic molecule may be greater than its energy of translation, or else that heat is expended in splitting up molecular aggregates, and increasing energy of vibration. A hypothesis doubtfully attributed to Maxwell is that each additional atom in the molecule is equivalent to two extra degrees of freedom. From an m-atomic molecule we should then have $S/s = 1+2/(2m+1)$. This gives a series of ratios 5/3, 7/5, 9/7, 11/9, &c., for 1, 2, 3, 4, &c., atoms in the molecule, values which fall within the limits of experimental error in many cases. It is not at all clear, however, that energy of vibration should bear a constant ratio to that of translation, although this would probably be the case for rotation. For the simpler gases, which are highly diathermanous and radiate badly even at high temperature, the energy of vibration is probably very small, except under the special conditions which produce luminosity in flames and electric discharges. For such gases, assuming a constant ratio of rotation to translation, the specific heat at low pressures would be very nearly constant. For more complex molecules the radiative and absorptive powers are known to be much greater. The energy of vibration may be appreciable at ordinary temperatures, and would probably increase more rapidly than that of translation with rise of temperature, especially near a point of dissociation. This would account for an increase of S, and a diminution of the ratio S/s, with rise of temperature which apparently occurs in many vapours. The experimental evidence, however, is somewhat conflicting, and further investigations are very desirable on the variation of specific heat with temperature. Given the specific heat as a function of the temperature, its variation with pressure may be determined from the characteristic equation of the gas. The direct methods of measuring the ratio S/s, by the velocity of sound and by adiabatic expansion, are sufficiently described in many text-books.

§ 19. *Atomic and Molecular Heats.*—The ideal atomic heat is the thermal capacity of a gramme-atom in the ideal state of monatomic gas at constant volume. This would be nearly three calories. For a diatomic gas, the molecular heat would be nearly five calories, or the atomic heat of a gas in the diatomic state would be 2·5. Estimated at constant pressure the atomic heat would be 3·5. Some authors adopt 2·5 and some 3·5 for the ideal atomic heat. The atomic heat of a metal in the solid state is in most cases larger than six calories at ordinary temperatures. Considering the wide variations in the physical condition and melting points, the comparatively close agreement of the atomic heats of the metals at ordinary temperatures, known as Dulong and Petit's Law, is very remarkable. The specific heats as a rule increase with rise of temperature, in some cases, *e.g.* iron and nickel, very rapidly. According to W. A. Tilden (*Phil. Trans.*, 1900), the atomic heats of pure nickel and cobalt, as determined from experiments at the boiling-points of O_2, and CO_2, diminish so rapidly at temperatures below 0° C. as to suggest that they would reach the value 2·42 at the absolute zero. This is the value of the minimum of atomic heat calculated by Perry from diatomic hydrogen, but the observations themselves might be equally well represented by taking the imaginary limit 3, since the quantity actually observed is the mean specific heat between 0° and −182·5° C. Subsequent experiments on other metals at low temperatures did not indicate a similar diminution of specific heat, so that it may be doubted whether the atomic heats really approach the ideal value at the absolute zero. No doubt there must be approximate relations between the atomic and molecular heats of similar elements and compounds, but considering the great variations of specific heat with temperature and physical state, in alloys, mixtures or solutions, and in allotropic or other modifications, it would be idle to expect that the specific heat of a compound could be accurately deduced by any simple additive process from that of its constituents.

AUTHORITIES.—Joule's *Scientific Papers* (London, 1890); Ames and Griffiths, *Reports to the International Congress* (Paris, 1900), "On the Mechanical Equivalent of Heat," and "On the Specific Heat of Water"; Griffiths, *Thermal Measurement of Energy* (Cambridge, 1901); Callendar and Barnes, *Phil. Trans.* A, 1901, "On the Variation of the Specific Heat of Water"; for combustion methods, see article THERMOCHEMISTRY, and treatises by Thomsen, Pattison-Muir and Berthelot; see also articles THERMODYNAMICS and VAPORIZATION. (H. L. C.)

CALOVIUS, ABRAHAM (1612–1686), German Lutheran divine, was born at Mohrungen in east Prussia, on the 16th of April 1612. After studying at Königsberg, in 1650 he was appointed professor of theology at Wittenberg, where he afterwards became general superintendent and primarius. He died on the 25th of February 1686. Calovius was the most noteworthy of the champions of Lutheran orthodoxy in the 17th century. He strongly opposed the Catholics, Calvinists and Socinians, attacked in particular the reconciliation policy or "syncretism" of Georg Calixtus (cf. the *Consensus repetitus fidei vere lutheranae*, 1665), and as a writer of polemics he had few equals. His chief dogmatic work, *Systema locorum theologicorum* (12 vols. 1655–1677), represents the climax of Lutheran scholasticism. In his *Biblia Illustrata* (4 vols.), written from the point of view of a very strict belief in inspiration, his object is to refute the statements made by Hugo Grotius in his Commentaries. His *Historia Syncretistica* (1682) was suppressed.

CALPURNIUS, TITUS, Roman bucolic poet, surnamed SICULUS from his birthplace or from his imitation of the style of the Sicilian Theocritus, most probably flourished during the reign of Nero. Eleven eclogues have been handed down to us under his name, of which the last four, from metrical considerations and express MS. testimony, are now generally attributed to Nemesianus (*q.v.*), who lived in the time of the emperor Carus and his sons (latter half of the 3rd century A.D.). Hardly anything is known of the life of Calpurnius; we gather from the poems themselves (in which he is obviously represented by "Corydon") that he was in poor circumstances and was on the point of emigrating to Spain, when "Meliboeus" came to his aid. Through his influence Calpurnius apparently secured a post at Rome. The time at which Calpurnius lived has been much discussed, but all the indications seem to point to the time of Nero. The emperor is described as a handsome youth, like Mars and Apollo, whose accession marks the beginning of a new golden age, prognosticated by the appearance of a comet, doubtless the same that appeared some time before the death of Claudius; he exhibits splendid games in the amphitheatre (probably the wooden amphitheatre erected by Nero in 57); and in the words

maternis causam qui vicit Iulis[1] (i. 45),

there is a reference to the speech delivered in Greek by Nero on behalf of the Ilienses (Suetonius, *Nero*, 7; Tacitus, *Annals*, xii. 58), from whom the Julii derived their family.[2] Meliboeus, the poet's patron, has been variously identified with Columella, Seneca the philosopher, and C. Calpurnius Piso. Although the sphere of Meliboeus's literary activity (as indicated in iv. 53) suits none of these, what is known of Calpurnius Piso fits in well with what is said of Meliboeus by the poet, who speaks of his generosity, his intimacy with the emperor, and his interest in tragic poetry. His claim is further supported by the poem *De Laude Pisonis* (ed. C. F. Weber, 1859) which has come down to us without the name of the author, but which there is considerable reason for attributing to Calpurnius.[3] The poem exhibits a striking similarity with the eclogues in metre, language and subject-matter. The author of the *Laus* is young, of respectable family and desirous of gaining the favour of Piso as his Maecenas. Further, the similarity between the two names can hardly be accidental; it is suggested that the poet may have been adopted by the courtier, or that he was the son of a freedman of Piso. The attitude of the author of the *Laus* towards the subject of the panegyric seems to show less intimacy than the relations between Corydon and Meliboeus in the eclogues, and there is internal evidence that the *Laus* was written during the reign of Claudius (Teuffel-Schwabe, *Hist. of Rom. Lit.* § 306, 6).

Mention may here be made of the fragments of two short hexameter poems in an Einsiedeln MS., obviously belonging to the time of Nero, which if not written by Calpurnius, were imitated from him.

[1] *Iulis* for *in ulnis* according to the best MS. tradition.

[2] According to Dr R. Garnett (and Mr Greswell, as stated in Conington's *Virgil*, i. p. 123, note) the emperor referred to is the younger Gordian (A.D. 238). His arguments in favour of this will be found in the article on Calpurnius by him in the 9th edition of the *Encyclopaedia Britannica* and in the *Journal of Philology*, xvi., 1888; see in answer J. P. Postgate, "The Comet of Calpurnius Siculus" in *Classical Review*, June 1902. Dean Merivale (*Hist. of the Romans under the Empire*, ch. 60) and Pompei, "Intorno al Tempo del Poeta Calpurnio" in *Atti del Istituto Veneto*, v. 6 (1880), identify the amphitheatre with the Colosseum (Flavian amphitheatre) and assign Calpurnius to the reign of Domitian.

[3] It has been variously ascribed to Virgil, Ovid, Lucan, Statius and Saleius Bassus.

Although there is nothing original in Calpurnius, he is "a skilful literary craftsman." Of his models the chief is Virgil, of whom (under the name of Tityrus) he speaks with great enthusiasm; he is also indebted to Ovid and Theocritus. Calpurnius is "a fair scholar, and an apt courtier, and not devoid of real poetical feeling. The bastard style of pastoral cultivated by him, in which the description of nature is made the writer's pretext, while ingenious flattery is his real purpose, nevertheless excludes genuine pleasure, and consequently genuine poetical achievement. He may be fairly compared to the minor poets of the reign of Anne" (Garnett).

Calpurnius was first printed in 1471, together with Silius Italicus and has been frequently republished, generally with Gratius Faliscus and Nemesianus. The separate authorship of the eclogues of Calpurnius and Nemesianus was established by M. Haupt's *De Carminibus bucolicis Calpurnii et Nemesiani* (1854). Editions by H. Schenkl (1885), with full introduction and *index verborum*, and by C. H. Keene (1887), with introduction, commentary and appendix. English verse translation by E. J. L. Scott (1891); see H. E. Butler, *Post-Augustan Poetry* (Oxford, 1909), pp. 150 foll., and F. Skutsch in Pauly-Wissowa's *Realencyclopädie*, iii. 1 (1897). (J. H. F.)

CALTAGIRONE, a city and episcopal see of the province of Catania, Sicily, situated 1999 ft. above sea-level, 36 m. S.W. of Catania direct (55 m. by rail). Pop. (1881) 25,978; (1901) town 35,116; commune 45,956. It is well built, and is said to be the most civilized provincial town in Sicily. Extensive Sicel cemeteries have been explored to the north of the town (*Not. Scavi*, 1904, 65), and a Greek necropolis of the 6th and 5th centuries B.C. has been found to the south-east (*ibid.* 132). Remains of buildings of Roman date have also been discovered; but the name of the ancient city which stood here is unknown. The present name is a corruption of the Saracen *Kalat-al-Girche* (the castle of Girche, the chieftain who fortified it).

CALTANISETTA, a town and episcopal see of Sicily, the capital of a province of the same name, 60 m. S.E. of Palermo direct and 83 m. by rail, situated 1930 ft. above sea-level. Pop. (1901) 43,303. The town is of Saracenic origin, as its name *Kalat-al-Nisa*, the "Ladies' Castle," indicates, and some ruins of the old castle (called *Pietrarossa*) still exist. Otherwise the town contains no buildings of artistic or historical interest, but it commands striking views. It is the centre of the Sicilian sulphur industry and the seat of a royal school of mines. Two miles east is the interesting Norman abbey of S. Spirito.

CALTROP (from the Mid. Eng. *calketrappe*, probably derived from the Lat. *calx*, a heel, and *trappa*, Late Lat. for a snare), an iron ball, used as an obstacle against cavalry, with four spikes so arranged, that however placed in or on the ground, one spike always points upwards. It is also the botanical name for several species of thistles.

CALUIRE-ET-CUIRE, a town of eastern France, in the department of Rhône, 2½ m. N. by E. of Lyons by rail. Pop. (1906) 9255. It has manufactures of coarse earthenware and hard-ware, copper and bronze foundries and nursery-gardens.

CALUMET (Norm. Fr. form of *chalumet*, from Lat. *calamus*, a reed), the name given by the French in Canada to the "peace-pipe" of the American Indians. This pipe occupied among the tribes a position of peculiar symbolic significance, and was the object of profound veneration. It was smoked on all ceremonial occasions, even on declarations of war, but its special use was at the making of treaties of peace. It was usually about 2½ ft. long, and in the west the bowl was made of red pipestone (catlinite), a fine-grained, easily-worked stone of a rich red colour found chiefly in the Côteau des Prairies west of Big Stone Lake, Dakota. The quarries were formerly neutral ground among the warring Indian tribes, many sacred traditions being associated with the locality and its product (Longfellow, *Hiawatha*, i.). The pipe stem was of reed decorated with eagles' quills or women's hair. Native tobacco mixed with willow-bark or sumac leaves was smoked. The pipe was offered as a supreme proof of hospitality to distinguished strangers, and its refusal was regarded as a grievous affront. In the east and south-east, the bowl was of white stone, sometimes pierced with several stem holes so that many persons might smoke at once.

See Joseph D. Macguire (exhaustive report, 640 pages), "Pipes and Smoking Customs of the American Aborigines" in *Smithsonian Report* (American Bureau of Ethnology) for 1897, vol. i.; and authorities quoted in *Handbook of American Indians* (Washington, 1907).

CALUMPIT, a town of the province of Bulacán, Luzon, Philippine Islands, at the junction of the Quiñgua river with the Rio Grande de la Pampanga, about 25 m. N.W. of Manila. Pop. (1903) 13,897. It is served by the Manila & Dagupan railway, and the bridge across the Rio Grande is one of the longest in the Philippines. The surrounding country is a fertile plain, producing large quantities of rice, as well as sugar, Indian corn and a variety of fruits. Calumpit has a large rice-mill and one of the largest markets in the Philippines. The bridge, convent and church of the town were fired and completely destroyed by insurgent troops in 1899. The language is Tagalog.

CALVADOS, a department of north-western France, formed in 1790 out of Bessin, Cinglais, Hiémois, Bocage, the Campagne de Caen, Auge and the western part of Lieuvin. Pop. (1906) 403,431. Area, 2197 sq. m. It received its name from a ledge of rocks, stretching along the coast for a distance of about 15 m. between the mouths of the rivers Orne and Vire. It is bounded N. by the English Channel, E. by the department of Eure, S. by that of Orne, W. by that of Manche. The Bocage, or south-western part of the department, is elevated, being crossed from south-east to north-west by the hills of Normandy, the highest of which is 1197 ft.; the rest of the surface is gently undulating, and consists of extensive valleys watered by numerous streams which fall into the English Channel. The coast, formed by cliffs, sandy beaches or reefs, is generally inaccessible, except at the mouths of the principal rivers, such as the Touques, the Dives, the Orne and the Vire, which are navigable at high tide for several miles inland. Trouville is the chief of the numerous coast resorts. The climate, though humid and variable, is healthy. The raising of cattle, sheep and horses is the mainstay of the agriculture of the department. Pasture is good and abundant in the east and north-west, and there is a large export trade in the butter, eggs and cheese (Camembert, Livarot, Pont l'Evêque) of these districts, carried on by Honfleur, Isigny and other ports. The plain of Caen is a great centre for horse breeding. Wheat, oats, barley, colza and potatoes are the chief crops. The orchards of Auge and Bessin produce a superior kind of cider, of which upwards of 40,000,000 gallons are made in the department; a large quantity of cider brandy (eau-de-vie de Calvados) is distilled. Poultry to a considerable amount is sent to the Paris markets, and there is a large output of honey and wax. The spinning and weaving of wool and cotton are the chief industries. Besides these, paper-mills, oil-mills, tanneries, saw-mills, shipbuilding yards, rope-works, dye-works, distilleries and bleach-fields, scattered throughout the department, give employment to a number of hands. There are productive iron-mines and building-stone, slate and lime are plentiful. Fisheries, chiefly of lobster, oyster (Courseulles), herring and mackerel, are prosecuted. Coal, timber, grain, salt-fish and cement are among the imports; exports include iron, dairy products and sand. Caen and Honfleur are the most important commercial ports. There is a canal 9 m. in length from Caen to Ouistreham on the coast. The department is served by the Ouest-État railway. It is divided into the six arrondissements (38 cantons, 763 communes) of Caen, Falaise, Bayeux, Vire, Lisieux and Pont l'Évêque. Caen, the capital, is the seat of a court of appeal and the centre of an *académie* (educational division). The department forms the diocese of Bayeux, in the ecclesiastical province of Rouen, and belongs to the region of the III. army-corps. The other principal towns are Falaise, Lisieux, Condé-sur-Noireau, Vire, Honfleur and Trouville (*q.v.*).

Amongst the great number of medieval churches which the department possesses, the fine Gothic church of St. Pierre-sur-Dives is second in importance only to those of Lisieux and Bayeux; that of Norrey, a good example of the Norman-Gothic style, and that of Tour-en-Bessin, in which Romanesque and Gothic architecture are mingled, are of great interest. Fontaine-Henri has a fine château of the 15th and 16th centuries.

CALVART, DENIS (1540–1619), Flemish painter, was born at Antwerp. After studying landscape-painting for some time in

his native city he went to Bologna, where he perfected himself in the anatomy of the human form under Prospero Fontana, and so completely lost the mannerism of Flemish art that his paintings appear to be the work of an Italian. From Bologna he went to Rome, where he assisted Lorenzo Sabbatini (1533–1577) in his works for the papal palace, and devoted much of his time to copying and studying the works of Raphael. He ultimately returned to Bologna and founded a school, of which the greatest ornaments are Guido and Domenichino. His works are especially admired for the power of grouping and colouring which they display.

CALVARY, the conventional English rendering of the *calvaria* of the Vulgate, the Latin version of the Greek *κράνιον*, both meaning "skull" and representing the Hebrew Golgotha, the name given to the scene of Christ's crucifixion. The term "a Calvary" is applied to a sculptured representation of the Crucifixion, either inside a church, or adjoining one in the open air. There are many examples of the latter in France, Italy and Spain. Among the most important are the Sacro Monte (1486) at Varallo in Piedmont, and those at Guimiliau (1581), Plougastel (1602), St Thegonnec (1610), and Pleyben near Quimper (1670), in Brittany, all in good preservation.

CALVÉ, EMMA (1864–), Spanish operatic soprano, was born at Madrid, and trained in Paris, making her first important appearance in opera at Brussels in 1882. She sang mainly in Paris for some years, but in 1892 was first engaged at Covent Garden, London, and at once became famous as the most vivid Carmen (in Bizet's opera) of the day.

CALVERLEY, CHARLES STUART (1831–1884), English poet and wit, and the literary father of what may be called the university school of humour, was born at Martley in Worcestershire on the 22nd of December 1831. His father, the Rev. Henry Blayds, resumed in 1852 the old family name of Calverley, which his grandfather had exchanged for Blayds in 1807. It was as Charles Stuart Blayds that most of the son's university distinctions were attained. He went up to Balliol from Harrow in 1850, and was soon known in Oxford as the most daring and most high-spirited undergraduate of his time. He was a universal favourite, a delightful companion, a brilliant scholar and the playful enemy of all "dons." In 1851 he won the Chancellor's prize for Latin verse, and it is said that the entire exercise was written in an afternoon, when his friends had locked him into his rooms, declining to let him out till he had finished what they were confident would prove the prize poem. A year later he took his name off the books, to avoid the consequences of a college escapade, and migrated to Christ's College, Cambridge. Here he was again successful in Latin verse, and remains the unique example of an undergraduate who has won the Chancellor's prize at both universities. In 1856 he took second place in the first class in the Classical Tripos. He was elected fellow of Christ's (1858), published *Verses and Translations* in 1862, and was called to the bar in 1865. Owing to an accident while skating he was prevented from following up a professional career, and during the last years of his life he was an invalid. His *Translations into English and Latin* appeared in 1866; his *Theocritus translated into English Verse* in 1869; *Fly Leaves* in 1872; and *Literary Remains* in 1885. He died on the 17th of February 1884. Calverley was one of the most brilliant men of his day; and, had he enjoyed health, might have achieved distinction in any career he chose. Constitutionally indolent, he was endowed with singular gifts in every department of culture; he was a scholar, a musician, an athlete and a brilliant talker. What is left us marks only a small portion of his talent, but his sparkling, dancing verses, which have had many clever imitators, are still without a rival in their own line. His humour was illumined by good nature; his satire was keen but kind; his laughter was of that human sort which is often on the verge of tears. Imbued with the classical spirit, he introduced into the making of light verse the polish and elegance of the great masters, and even in its most whimsical mood his verse is raised to the level of poetry by the saving excellence of style.

His *Complete Works*, with a biographical notice by Sir W. J. Sendall, appeared in 1901. (A. Wa.)

CALVERT, the name of three English artists: Charles (1785–1852), a well-known landscape-painter; Edward (1803–1883), an important wood-engraver and follower of Blake; and Frederick, an excellent topographical draughtsman, whose work in water-colour is represented at the Victoria and Albert Museum, and who published a volume of *Picturesque Views in Staffordshire and Shropshire* (1830).

CALVERT, FREDERICK CRACE (1819–1873), English chemist, was born in London on the 14th of November 1819. From about 1836 till 1846 he lived in France, where, after a course of study at Paris, he became manager of some chemical works, later acting as assistant to M. E. Chevreul. On his return to England he settled in Manchester as a consulting chemist, and was appointed professor of chemistry at the Royal Institution in that city. Devoting himself almost entirely to industrial chemistry, he gave much attention to the manufacture of coal-tar products, and particularly carbolic acid, for the production of which he established large works in Manchester in 1865. Besides contributing extensively to the English and French scientific journals, he published a work on *Dyeing and Calico-Printing*. He died in Manchester on the 24th of October 1873.

CALVERT, SIR HARRY, Bart. (*c.* 1763–1826), British general, was probably born early in 1763 at Hampton, near London. He was educated at Harrow, and at the age of fifteen entered the army. In the following year he served with his regiment in America, being present at the siege of Charleston, and serving through the campaign of Lord Cornwallis which ended with the surrender of Yorktown. From 1781 to 1783 he was a prisoner of war. Returning to England in 1784, he next saw active service in 1793–1794 in the Low Countries, where he was aide-de-camp to the duke of York, and in 1795 was engaged on a confidential mission to Brunswick and Berlin. In 1799, having already served as deputy adjutant general, he was made adjutant general, holding the post till 1818. In this capacity he effected many improvements in the organization and discipline of the service. He greatly improved the administration of the army medical and hospital department, introduced regimental schools, developed the two existing military colleges (since united at Sandhurst), and was largely responsible for the founding of the Duke of York's school, Chelsea. In recognition of his work as adjutant general he was made a G.C.B. (1815), and, on retiring from office, received a baronetcy (1818). In 1820 he was made governor of Chelsea hospital. He died on the 3rd of September 1826, at Middle Claydon, Buckinghamshire.

CALVES' HEAD CLUB, a club established shortly after his death in derision of the memory of Charles I. Its chief meeting was held on the 30th of each January, the anniversary of the king's execution, when the dishes served were a cod's head to represent the individual, Charles Stuart; a pike representing tyranny; a boar's head representing the king preying on his subjects; and calves' heads representing Charles as king and his adherents. On the table an axe held the place of honour. After the banquet a copy of the king's *Ikon Basilike* was burnt, and the toast was "To those worthy patriots who killed the tyrant." After the Restoration the club met secretly. The first mention of it is in a tract reprinted in the *Harleian Miscellany* entitled "The Secret History of the Calves' Head Club." The club survived till 1734, when the diners were mobbed owing to the popular ill-feeling which their outrages on good taste provoked, and the riot which ensued put a final stop to the meetings.

CALVI, a sea-port in Corsica, capital of an arrondissement in the N.W. of the island, 112 m. N. of Ajaccio by road. Pop. (1906) 1967. It is situated on the Bay of Calvi, in a malarial region, and is the port in Corsica nearest to France, being 109 m. from Antibes; the harbour, however, is exposed to the east and north-east winds. The modern town lies at the foot of a rock, on which stands the old town with its steep rock-paved streets and fortified walls, commanded by the Fort Muzello. Fishing is carried on, and timber, oil, wine, lemons and other sub-tropical fruits are exported to some extent. The most important buildings are the old palace of the Genoese governor, used as barracks, and the church (16th century), with the monument of the Baglioni

family, which was intimately associated with the history of the town.

Calvi was founded in the 13th century and in 1278 passed into the hands of the Genoese. From that date it was remarkable for its adherence to their side, especially in 1553 when it repulsed two attacks of the united forces of the French and Turks. In recognition thereof the Genoese senate caused the words *Civitas Calvi semper fidelis* to be carved on the chief gate of the city, which still preserves the inscription. In 1794 Calvi was captured by the English, but it was retaken by the Corsicans in the following year.

CALVIN, JOHN (1509–1564), Swiss divine and reformer, was born at Noyon, in Picardy, on the 10th of July 1509. His father, Gérard Cauvin or Calvin,[1] was a notary-apostolic and procurator-fiscal for the lordship of Noyon, besides holding certain ecclesiastical offices in connexion with that diocese. The name of his mother was Jeanne le Franc; she was the daughter of an innkeeper at Cambrai, who afterwards came to reside at Noyon. Gérard Cauvin was esteemed as a man of considerable sagacity and prudence, and his wife was a godly and attractive lady. She bore him five sons, of whom John was the second. By a second wife there were two daughters.

Of Calvin's early years only a few notices remain. His father destined him from the first for an ecclesiastical career, and paid for his education in the household of the noble family of Hangest de Montmor. In May 1521 he was appointed to a chaplaincy attached to the altar of La Gésine in the cathedral of Noyon, and received the tonsure. The actual duties of the office were in such cases carried out by ordained and older men for a fraction of the stipend. The plague having visited Noyon, the young Hangests were sent to Paris in August 1523, and Calvin accompanied them, being enabled to do so by the income received from his benefice. He lived with his uncle and attended as an out-student the Collège de la Marche, at that time under the regency of Mathurin Cordier, a man of character, learning and repute as a teacher, who in later days followed his pupil to Switzerland, taught at Neuchâtel, and died in Geneva in 1564. In dedicating to him his *Commentary on the First Epistle to the Thessalonians*, as "eximiae pietatis et doctrinae viro," he declares that so had he been aided by his instruction that whatever subsequent progress he had made he only regarded as received from him, and "this," he adds, "I wish to testify to posterity that if any utility accrue to any from my writings they may acknowledge it as having in part flowed from thee." From the Collège de la Marche he removed to the Collège de Montaigu,[2] where the atmosphere was more ecclesiastical and where he had for instructor a Spaniard who is described as a man of learning and to whom Calvin was indebted for some sound training in dialectics and the scholastic philosophy. He speedily outstripped all his competitors in grammatical studies, and by his skill and acumen as a student of philosophy, and in the college disputations gave fruitful promise of that consummate excellence as a reasoner in the department of speculative truth which he afterwards displayed. Among his friends were the Hangests (especially Claude), Nicolas and Michel Cop, sons of the king's Swiss physician, and his own kinsman Pierre Robert, better known as Olivétan. Such friendships testify both to the worth and the attractiveness of his character, and contradict the old legend that he was an unsociable misanthrope. Pleased with his success, the canons at Noyon gave him the curacy of St Martin de Marteville in September 1527. After holding this preferment for nearly two years, he exchanged it in July 1529 for the cure of Pont L'Évêque, a village near to Noyon, and the place to which his father originally belonged. He appears to have been not a little elated by his early promotion, and although not ordained, he preached several sermons to the people. But though the career of ecclesiastical preferment was thus early opened to him, Calvin was destined not to become a priest. A change came over the mind both of his father and himself respecting his future career. Gérard Cauvin began to suspect that he had not chosen the most lucrative profession for his son, and that the law offered to a youth of his talents and industry a more promising sphere.[3] He was also now out of favour with the cathedral chapter at Noyon. It is said also that John himself, on the advice of his relative, Pierre Robert Olivétan, the first translator of the Bible into French, had begun to study the Scriptures and to dissent from the Roman worship. At any rate he readily complied with his father's suggestion, and removed from Paris to Orleans (March 1528) in order to study law under Pierre Taisan de l'Étoile, the most distinguished jurisconsult of his day. The university atmosphere here was less ascetic than at Paris, but Calvin's ardour knew no slackening, and such was his progress in legal knowledge that he was frequently called upon to lecture, in the absence of one or other of the regular staff. Other studies, however, besides those of law occupied him while in this city, and moved by the humanistic spirit of the age he eagerly developed his classical knowledge. "By protracted vigils," says Beza, "he secured indeed a solid erudition and an excellent memory; but it is probable he at the same time sowed the seeds of that disease (dyspepsia) which occasioned him various illnesses in after life, and at last brought upon him premature death."[4] His friends here were Melchior Wolmar, a German schoolmaster and a man of exemplary scholarship and character, François Daniel, François de Connam and Nicolas Duchemin; to these his earliest letters were written.

From Orleans Calvin went to Bourges in the autumn of 1529 to continue his studies under the brilliant Italian, Andrea Alciati (1492–1550), whom Francis I. had invited into France and settled as a professor of law in that university. His friend Daniel went with him, and Wolmar followed a year later. By Wolmar Calvin was taught Greek, and introduced to the study of the New Testament in the original, a service which he gratefully acknowledges in one of his printed works.[5] The conversation of Wolmar may also have been of use to him in his consideration of the doctrines of the Reformation, which were now beginning to be widely diffused through France. Twelve years had elapsed since Luther had published his theses against indulgences—twelve years of intense excitement and anxious discussion, not in Germany only, but in almost all the adjacent countries. In France there had not been as yet any overt revolt against the Church of Rome, but multitudes were in sympathy with any attempt to improve the church by education, by purer morals, by better preaching and by a return to the primitive and uncorrupted faith. Though we cannot with Beza regard Calvin at this time as a centre of Protestant activity, he may well have preached at Lignières as a reformatory Catholic of the school of Erasmus. Calvin's own record of his "conversion" is so scanty and devoid of chronological data that it is extremely difficult to trace his religious development with any certainty. But it seems probable that at least up to 1532 he was far more concerned about classical scholarship than about religion.

His residence at Bourges was cut short by the death of his father in May 1531. Immediately after this event he went to Paris, where the "new learning" was now at length ousting the medieval scholasticism from the university. He lodged in the Collège Fortet, reading Greek with Pierre Danès and beginning Hebrew with François Vatable. It was at this time (April 1532) that Calvin issued his first publication, a commentary in Latin on Seneca's tract *De Clementia*. This book he published at his own cost, and dedicated to Claude Hangest, abbot of St Éloi, a member of the de Montmor family, with whom Calvin had been

[1] The family name of Calvin seems to have been written indifferently Cauvin, Chauve, Chauvin, Calvus, Calvinus. In the contemporary notices of Gérard and his family, in the capitular registers of the cathedral at Noyon, the name is always spelt Cauuin. The anagram of Calvin is Alcuin, and this in its Latinized form Alcuinus appears in two editions of his *Institutio* as that of the author (Audin, *Vie de Calvin*, i. 520). The syndics of Geneva address him in a letter written in 1540, and still preserved, as "Docteur Caulvin." In his letters written in French he usually signs himself "Jean Calvin." He affected the title of "Maître," for what reason is not known.

[2] Pierre de Montaigu refounded this institution in 1388. Erasmus and Ignatius Loyola also studied here.

[3] Calv. *Praef. ad Comment. in Psalmos.*

[4] *Jo. Calvini Vita, sub init.*

[5] *Epist. Ded., Comment in Ep. II. ad Corinthios praefix.*

brought up. It was formerly thought that Calvin published this work with a view to influence the king to put a stop to the attacks on the Protestants, but there is nothing in the treatise itself or in the commentary to favour this opinion.

Soon after the publication of his first book Calvin returned to Orleans, where he stayed for a year, perhaps again reading law, and still undecided as to his life's work. He visited Noyon in August 1533, and by October of the same year was settled again in Paris. Here and now his destiny became certain. The conservative theology was becoming discredited, and humanists like Jacques Lefèvre of Étaples (Faber Stapulensis) and Gérard Roussel were favoured by the court under the influence of Margaret of Angoulême, queen of Navarre and sister of Francis I. Calvin's old friend, Nicolas Cop, had just been elected rector of the university and had to deliver an oration according to custom in the church of the Mathurins, on the feast of All Saints. The oration (certainly influenced but hardly composed by Calvin) was in effect a defence of the reformed opinions, especially of the doctrine of justification by faith alone. It is to the period between April 1532 and November 1533, and in particular to the time of his second sojourn at Orleans, that we may most fittingly assign the great change in Calvin which he describes (*Praef. ad Psalmos*; opera xxxi. 21-24) as his "sudden conversion" and attributes to direct divine agency. It must have been at least after his *Commentary on Seneca's De Clementia* that his heart was "so subdued and reduced to docility that in comparison with his zeal for true piety he regarded all other studies with indifference, though not entirely forsaking them. Though himself a beginner, many flocked to him to learn the pure doctrine, and he began to seek some hiding-place and means of withdrawal from people." This indeed was forced upon him, for Cop's address was more than the conservative party could bear, and Cop, being summoned to appear before the parlement of Paris, found it necessary, as he failed to secure the support either of the king, or of the university, to make his escape to Basel. An attempt was at the same time made to seize Calvin, but, being forewarned of the design by his friends, he also made his escape. His room in the Collège Fortet, however, was searched, and his books and papers seized, to the imminent peril of some of his friends, whose letters were found in his repositories. He went to Noyon, but, proceedings against him being dropped, soon returned to Paris. But desiring both security and solitude for study he left the city again about New Year of 1534 and became the guest of Louis du Tillet, a canon of the cathedral, at Angoulême, where at the request of his host he prepared some short discourses, which were circulated in the surrounding parishes, and read in public to the people. Here, too in du Tillet's splendid library, he began the studies which resulted in his great work, the *Institutes*, and paid a visit to Nérac, where the venerable Lefèvre, whose revised translation of the Bible into French was published about this time, was spending his last years under the kindly care of Margaret of Navarre.

Calvin was now nearly twenty-five years of age, and in the ordinary way would have been ordained to the priesthood. Up till this time his work for the evangelical cause was not so much that of the public preacher or reformer as that of the retiring but influential scholar and adviser. Now, however, he had to decide whether, like Roussel and other of his friends, he should strive to combine the new doctrines with a position in the old church, or whether he should definitely break away from Rome. His mind was made up, and on the 4th of May he resigned his chaplaincy at Noyon and his rectorship at Pont l'Évêque. Towards the end of the same month he was arrested and suffered two short terms of imprisonment, the charges against him being not strong enough to be pressed. He seems to have gone next to to Paris, staying perhaps with Étienne de la Forge, a Protestant merchant who suffered for his faith in February 1535. To this time belongs the story of the proposed meeting between Calvin and the Spanish reformer Servetus. Calvin's movements at this time are difficult to trace, but he visited both Orleans and Poitiers, and each visit marked a stage in his development.

The Anabaptists of Germany had spread into France, and were disseminating many wild and fanatical opinions among those who had seceded from the Church of Rome. Among other notions which they had imbibed was that of a sleep of the soul after death. To Calvin this notion appeared so pernicious that he composed a treatise in refutation of it, under the title of *Psychopannychia*. The preface to this treatise is dated Orleans 1534, but it was not printed till 1542. In it he chiefly dwells upon the evidence from Scripture in favour of the belief that the soul retains its intelligent consciousness after its separation from the body—passing by questions of philosophical speculation, as tending on such a subject only to minister to an idle curiosity. At Poitiers Calvin gathered round him a company of cultured and gentle men whom in private intercourse he influenced considerably. Here too in a grotto near the town he for the first time celebrated the communion in the Evangelical Church of France, using a piece of the rock as a table.

The year 1534 was thus decisive for Calvin. From this time forward his influence became supreme, and all who had accepted the reformed doctrines in France turned to him for counsel and instruction, attracted not only by his power as a teacher, but still more, perhaps because they saw in him so full a development of the Christian life according to the evangelical model. Renan, no prejudiced judge, pronounces him "the most Christian man of his time," and attributes to this his success as a reformer. Certain it is that already he had become conspicuous as a prophet of the new religion; his life was in danger, and he was obliged to seek safety in flight. In company with his friend Louis du Tillet, whom he had again gone to Angoulême to visit, he set out for Basel. On their way they were robbed by one of their servants, and it was only by borrowing ten crowns from their other servant that they were enabled to get to Strassburg, and thence to Basel. Here Calvin was welcomed by the band of scholars and theologians who had conspired to make that city the Athens of Switzerland, and especially by Oswald Myconius, the chief pastor, Pierre Viret and Heinrich Bullinger. Under the aupices and guidance of Sebastian Münster, Calvin now gave himself to the study of Hebrew.

Francis I., desirous to continue the suppression of the Protestants but anxious, because of his strife with Charles V., not to break with the Protestant princes of Germany, instructed his ambassador to assure these princes that it was only against Anabaptists, and other parties who called in question all civil magistracy, that his severities were exercised. Calvin, indignant at the calumny which was thus cast upon the reformed party in France, hastily prepared for the press his *Institutes of the Christian Religion*, which he published "first that I might vindicate from unjust affront my brethren whose death was precious in the sight of the Lord, and, next, that some sorrow and anxiety should move foreign peoples, since the same sufferings threatened many." The work was dedicated to the king, and Calvin says he wrote it in Latin that it might find access to the learned in all lands.[1] Soon after it appeared he set about translating it into French, as he himself attests in a letter dated October 1536. This sets at rest a question, at one time much agitated, whether the book appeared first in French or in Latin. The earliest French edition known is that of 1540, and this was after the work had been much enlarged, and several Latin editions had appeared. In its first form the work consisted of only six chapters, and was intended merely as a brief manual of Christian doctrine. The chapters follow a traditional scheme of religious teaching: (1) The Law, (as in the Ten Words), (2) Faith (as in the Apostles' Creed) (3) Prayer, (4) the Sacraments; to these were added (5) False Sacraments, (6) Christian liberty, ecclesiastical power and civil administration. The closing chapters of the work are more polemical than the earlier ones. His indebtedness to Luther is of course great, but his spiritual kinship with Martin Bucer of

[1] This edition forms a small 8vo of 514 pages, and 6 pages of index. It appeared at Basel from the press of Thomas Platter and Balthasar Lasius in March 1536, and was published by Johann Oporin. The dedicatory preface is dated 23rd August 1535. It is a masterpiece of apologetic literature. See W. Walker, *John Calvin*, 132 f., and for an outline of the contents of the treatise, *ib.* 137-149.

Strassburg is even more marked. Something also he owed to Scotus and other medieval schoolmen. The book appeared anonymously, the author having, as he himself says, nothing in view beyond furnishing a statement of the faith of the persecuted Protestants, whom he saw cruelly cut to pieces by impious and perfidious court parasites.[1] In this work, though produced when the author was only twenty-six years of age, we find a complete outline of the Calvinist theological system. In none of the later editions, nor in any of his later works do we find reason to believe that he ever changed his views on any essential point from what they were at the period of its first publication. Such an instance of maturity of mind and of opinion at so early an age would be remarkable under any circumstances; but in Calvin's case it is rendered peculiarly so by the shortness of the time which had elapsed since he gave himself to theological studies. It may be doubted also if the history of literature presents us with another instance of a book written at so early an age, which has exercised such a prodigious influence upon the opinions and practices both of contemporaries and of posterity.

After a short visit (April 1536) to the court of Renée, duchess of Ferrara (cousin to Margaret of Navarre), which at that time afforded an asylum to several learned and pious fugitives from persecution, Calvin returned through Basel to France to arrange his affairs before finally taking farewell of his native country. His intention was to settle at Strassburg or Basel, and to devote himself to study. But being unable, in consequence of the war between Francis I. and Charles V., to reach Strassburg by the ordinary route, he with his younger brother Antoine and his half-sister Marie journeyed to Lyons and so to Geneva, making for Basel. In Geneva his progress was arrested, and his resolution to pursue the quiet path of studious research was dispelled by what he calls the "formidable obtestation" of Guillaume Farel.[2] After many struggles and no small suffering, this energetic spirit had succeeded in planting the evangelical standard at Geneva; and anxious to secure the aid of such a man as Calvin, he entreated him on his arrival to relinquish his design of going farther, and to devote himself to the work in that city. Calvin at first declined, alleging as an excuse his need of securing more time for personal improvement, but ultimately, believing that he was divinely called to this task and that "God had stretched forth His hand upon me from on high to arrest me," he consented to remain at Geneva. He hurried to Basel, transacted some business, and returned to Geneva in August 1536. He at once began to expound the epistles of St Paul in the church of St Pierre, and after about a year was also elected preacher by the magistrates with the consent of the people, an office which he would not accept until it had been repeatedly pressed upon him. His services seem to have been rendered for some time gratuitously, for in February 1537 there is an entry in the city registers to the effect that six crowns had been voted to him, "since he has as yet hardly received anything."

Calvin was in his twenty-eighth year when he was thus constrained to settle at Geneva; and in this city the rest of his life, with the exception of a brief interval, was spent. The post to which he was thus called was not an easy one. Though the people of Geneva had cast off the obedience of Rome, it was largely a political revolt against the duke of Savoy, and they were still (says Beza) "but very imperfectly enlightened in divine knowledge; they had as yet hardly emerged from the filth of the papacy."[3] This laid them open to the incursions of those fanatical teachers, whom the excitement attendant upon the Reformation had called forth, and who hung mischievously upon the rear of the reforming body. To obviate the evils thence resulting, Calvin, in union with Farel, drew up a condensed statement of Christian doctrine consisting of twenty-one articles. This the citizens were summoned, in parties of ten each, to profess and swear to as the confession of their faith—a process which, though not in accordance with modern notions of the best way of establishing men in the faith, was gone through, Calvin tells us, "with much satisfaction." As the people took this oath in the capacity of *citizens*, we may see here the basis laid for that theocratic system which subsequently became peculiarly characteristic of the Genevan polity. Deeply convinced of the importance of education for the young, Calvin and his coadjutors were solicitous to establish schools throughout the city, and to enforce on parents the sending of their children to them; and as he had no faith in education apart from religious training, he drew up a catechism of Christian doctrine which the children had to learn whilst they were receiving secular instruction. Of the troubles which arose from fanatical teachers, the chief proceeded from the efforts of the Anabaptists; a public disputation was held on the 16th and 17th of March 1537, and so excited the populace that the Council of Two Hundred stopped it, declared the Anabaptists vanquished and drove them from the city. About the same time also, the peace of Calvin and his friends was much disturbed and their work interrupted by Pierre Caroli, another native of northern France, who, though a man of loose principle and belief, had been appointed chief pastor at Lausanne and was discrediting the good work done by Pierre Viret in that city. Calvin went to Viret's aid and brought Caroli before the commissioners of Bern on a charge of advocating prayers for the dead as a means of their earlier resurrection. Caroli brought a counter-charge against the Geneva divines of Sabellianism and Arianism, because they would not enforce the Athanasian creed, and had not used the words "Trinity" and "Person" in the confession they had drawn up. It was a struggle between the thoroughgoing humanistic reformer who drew his creed solely from the "word of God" and the merely semi-Protestant reformer who looked on the old creed as a priceless heritage. In a synod held at Bern the matter was fully discussed, when a verdict was given in favour of the Geneva divines, and Caroli deposed from his office and banished. He returned to France, rejoined the Roman communion and spent the rest of his life in passing to and from the old faith and the new. Thus ended an affair which seems to have occasioned Calvin much more uneasiness than the character of his assailant, and the manifest falsehood of the charge brought against him, would seem to justify. Two brief anti-Romanist tracts, one entitled *De fugiendis impiorum sacris*, the other *De sacerdotio papali abjiciendo*, were also published early in this year.

Hardly was the affair of Caroli settled, when new and severer trials came upon the Genevan Reformers. The austere simplicity of the ritual which Farel had introduced, and to which Calvin had conformed; the strictness with which the ministers sought to enforce not only the laws of morality, but certain sumptuary regulations respecting the dress and mode of living of the citizens; and their determination in spiritual matters and ecclesiastical ceremonies not to submit to the least dictation from the civil power, led to violent dissensions. Amidst much party strife Calvin perhaps showed more youthful impetuosity than experienced skill. He and his colleagues refused to administer the sacrament in the Bernese form, *i.e.* with unleavened bread, and on Easter Sunday, 1538, declined to do so at all because of the popular tumult. For this they were banished from the city. They went first to Bern, and soon after to Zürich, where a synod of the Swiss pastors had been convened. Before this assembly they pleaded their cause, and stated what were the points on which they were prepared to insist as needful for the proper discipline of the church. They declared that they would yield in the matter of ceremonies so far as to employ unleavened bread in the eucharist, to use fonts in baptism, and to allow festival days, provided the people might pursue their ordinary avocations after public service. These Calvin regarded as matters of indifference, provided the magistrates did not make them of importance, by seeking to enforce them; and he was the more willing to concede them, because he hoped thereby to meet the wishes of the Bernese brethren whose ritual was less simple than that established by Farel at Geneva. But he and his colleagues insisted, on the other hand, that for the proper maintenance of discipline, there should be a division of parishes—that excommunications should be permitted, and should be under the power of elders chosen by the council, in

[1] *Praef. ad Psalmos.* [2] *Ibid.*
[3] Beza, *Vit. Calv. an. 1536.*

conjunction with the clergy—that order should be observed in the admission of preachers—and that only the clergy should officiate in ordination by the laying on of hands. It was proposed also, as conducive to the welfare of the church, that the sacrament of the Lord's Supper should be administered more frequently, at least once every month, and that congregational singing of psalms should be practised in the churches. On these terms the synod interceded with the Genevese to restore their pastors; but through the opposition of some of the Bernese (especially Peter Kuntz, the pastor of that city) this was frustrated, and a second edict of banishment was the only response.

Calvin and Farel betook themselves, under these circumstances, to Basel, where they soon after separated, Farel to go to Neuchâtel and Calvin to Strassburg. At the latter place Calvin resided till the autumn of 1541, occupying himself partly in literary exertions, partly as a preacher and especially an organizer in the French church, and partly as a lecturer on theology. These years were not the least valuable in his experience. In 1539 he attended Charles V.'s conference on Christian reunion at Frankfort as the companion of Bucer, and in the following year he appeared at Hagenau and Worms, as the delegate from the city of Strassburg. He was present also at the diet at Regensburg, where he deepened his acquaintance with Melanchthon, and formed with him a friendship which lasted through life. He also did something to relieve the persecuted Protestants of France. It is to this period of his life that we owe a revised and enlarged form of his *Institutes*, his *Commentary on the Epistle to the Romans*, and his *Tract on the Lord's Supper*. Notwithstanding his manifold engagements, he found time to attend to the tenderer affections; for it was during his residence at Strassburg that he married, in August 1540, Idelette de Bure, the widow of one Jean Stordeur of Liége, whom he had converted from Anabaptism. In her Calvin found, to use his own words, "the excellent companion of his life," a "precious help" to him amid his manifold labours and frequent infirmities. She died in 1549, to the great grief of her husband, who never ceased to mourn her loss. Their only child Jacques, born on the 28th of July 1542, lived only a few days.

During Calvin's absence disorder and irreligion had prevailed in Geneva. An attempt was made by Cardinal Jacopo Sadoleto (1477–1547), bishop of Carpentras, to take advantage of this so as to restore the papal supremacy in that district; but this design Calvin, at the request of the Bernese authorities, who had been consulted by those of Geneva, completely frustrated, by writing such a reply to the letter which the bishop had addressed to the Genevese, as constrained him to desist from all further efforts. The letter had more than a local or temporary reference. It was a popular yet thoroughgoing defence of the whole Protestant position, perhaps the best apologia for the Reformation that was ever written. He seems also to have kept up his connexion with Geneva by addressing letters of counsel and comfort to the faithful there who continued to regard him with affection. It was whilst he was still at Strassburg that there appeared at Geneva a translation of the Bible into French, bearing Calvin's name, but in reality only revised and corrected by him from the version of Olivétan. Meanwhile the way was opening for his return. Those who had driven him from the city gradually lost power and office. Farel worked unceasingly for his recall. After much hesitation, for Strassburg had strong claims, he yielded and returned to Geneva, where he was received with the utmost enthusiasm (September 13, 1541). He entered upon his work with a firm determination to carry out those reforms which he had originally purposed, and to set up in all its integrity that form of church polity which he had carefully matured during his residence at Strassburg. He now became the sole directive spirit in the church at Geneva. Farel was retained by the Neuchâtelois, and Viret, soon after Calvin's return, removed to Lausanne. His duties were thus rendered exceedingly onerous, and his labour became excessive. Besides preaching every day in each alternate week, he taught theology three days in the week, attended weekly meetings of his consistory, read the Scriptures once a week in the congregation, carried on an extensive correspondence on a multiplicity of subjects, prepared commentaries on the books of Scripture, and was engaged repeatedly in controversy with the opponents of his opinions. "I have not time," he writes to a friend, "to look out of my house at the blessed sun, and if things continue thus I shall forget what sort of appearance it has. When I have settled my usual business, I have so many letters to write, so many questions to answer, that many a night is spent without any offering of sleep being brought to nature."

It is only necessary here to sketch the leading events of Calvin's life after his return to Geneva. He recodified the Genevan laws and constitution, and was the leading spirit in the negotiations with Bern that issued in the treaty of February 1544. Of the controversies in which he embarked, one of the most important was that in which he defended his doctrine concerning predestination and election. His first antagonist on this head was Albert Pighius, a Romanist, who, resuming the controversy between Erasmus and Luther on the freedom of the will, violently attacked Calvin for the views he had expressed on that subject. Calvin replied to him in a work published in 1543, in which he defends his own opinions at length, both by general reasonings and by an appeal to both Scripture and the Fathers, especially Augustine. So potent were his reasonings that Pighius, though owing nothing to the gentleness or courtesy of Calvin, was led to embrace his views. A still more vexatious and protracted controversy on the same subject arose in 1551. Jerome Hermes Bolsec, a Carmelite friar, having renounced Romanism, had fled from France to Veigy, a village near Geneva, where he practised as a physician. Being a zealous opponent of predestinarian views, he expressed his criticisms of Calvin's teaching on the subject in one of the public conferences held each Friday. Calvin replied with much vehemence, and brought the matter before the civil authorities. The council were at a loss which course to take; not that they doubted which of the disputants was right, for they all held by the views of Calvin, but they were unable to determine to what extent and in which way Bolsec should be punished for his heresy. The question was submitted to the churches at Basel, Bern, Zürich and Neuchâtel, but they also, to Calvin's disappointment, were divided in their judgment, some counselling severity, others gentle measures. In the end Bolsec was banished from Geneva; he ultimately rejoined the Roman communion and in 1577 avenged himself by a particularly slanderous biography of Calvin. Another painful controversy was that with Sébastien Castellio (1515–1563), a teacher in the Genevan school and a scholar of real distinction. He wished to enter the preaching ministry but was excluded by Calvin's influence because he had criticized the inspiration of the Song of Solomon and the Genevan interpretation of the clause "he descended into hell." The bitterness thus aroused developed into life-long enmity. During all this time also the less strict party in the city and in the council did not cease to harry the reformer.

But the most memorable of all the controversies in which Calvin was engaged was that into which he was brought in 1553 with Michael Servetus (*q.v.*). After many wanderings, and after having been condemned to death for heresy at Vienne, whence he was fortunate enough to make his escape, Servetus arrived in August 1553 at Geneva on his way to Naples. He was recognized in church and soon after, at Calvin's instigation, arrested. The charge of blasphemy was founded on certain statements in a book published by him in 1553, entitled *Christianismi Restitutio*, in which he animadverted on the Catholic doctrine of the Trinity, and advanced sentiments strongly savouring of Pantheism. The story of his trial is told elsewhere (see art. SERVETUS), but it must be noted here that the struggle was something more than a doctrinal one. The cause of Servetus was taken up by Calvin's Genevan foes headed by Philibert Berthelier, and became a test of the relative strength of the rival forces and of the permanence of Calvin's control. That Calvin was actuated by personal spite and animosity against Servetus himself may be open to discussion; we have his own express declaration that, after Servetus was convicted, he used no

urgency that he should be put to death, and at their last interview he told Servetus that he never had avenged private injuries, and assured him that if he would repent it would not be his fault if all the pious did not give him their hands.[1] There is the fact also that Calvin used his endeavour to have the sentence which had been pronounced against Servetus mitigated, death by burning being regarded by him as an "atrocity," for which he sought to substitute death by the sword.[2] It can be justly charged against Calvin in this matter that he took the initiative in bringing on the trial of Servetus, that as his accuser he prosecuted the suit against him with undue severity, and that he approved the sentence which condemned Servetus to death. When, however, it is remembered that the unanimous decision of the Swiss churches and of the Swiss state governments was that Servetus deserved to die; that the general voice of Christendom was in favour of this; that even such a man as Melanchthon affirmed the justice of the sentence;[3] that an eminent English divine of the next age should declare the process against him "just and honourable,"[4] and that only a few voices here and there were at the time raised against it, many will be ready to accept the judgment of Coleridge, that the death of Servetus was not "Calvin's guilt especially, but the common opprobrium of all European Christendom."[5]

Calvin was also involved in a protracted and somewhat vexing dispute with the Lutherans respecting the Lord's Supper, which ended in the separation of the evangelical party into the two great sections of Lutherans and Reformed,—the former holding that in the eucharist the body and blood of Christ are objectively and consubstantially present, and so are actually partaken of by the communicants, and the latter that there is only a virtual presence of the body and blood of Christ, and consequently only a spiritual participation thereof through faith. In addition to these controversies on points of faith, he was for many years greatly disquieted, and sometimes even endangered, by the opposition offered by the libertine party in Geneva to the ecclesiastical discipline which he had established there. His system of church polity was essentially theocratic; it assumed that every member of the state was also under the discipline of the church; and he asserted that the right of exercising this discipline was vested exclusively in the consistory or body of preachers and elders. His attempts to carry out these views brought him into collision both with the authorities and with the populace,—the latter being not unnaturally restive under the restraints imposed upon their liberty by the vigorous system of church discipline, and the former being inclined to retain in their own hands a portion of that power in things spiritual which Calvin was bent on placing exclusively in the hands of the church rulers. His dauntless courage, his perseverance, and his earnestness at length prevailed, and he had the satisfaction, before he died, of seeing his favourite system of church polity firmly established, not only at Geneva, but in other parts of Switzerland, and of knowing that it had been adopted substantially by the Reformers in France and Scotland. The men whom he trained at Geneva carried his principles into almost every country in Europe, and in varying degree these principles did much for the cause of civil liberty.[6] Nor was it only in religious matters that Calvin busied himself; nothing was indifferent to him that concerned the welfare and good order of the state or the advantage of its citizens. His work embraced everything; he was consulted on every affair, great and small, that came before the council,—on questions of law, police, economy, trade, and manufactures, no less than on questions of doctrine and church polity. To him the city owed her trade in cloths and velvets, from which so much wealth accrued to her citizens; sanitary regulations were introduced by him which made Geneva the admiration of all visitors; and in him she reverences the founder of her university. This institution was in a sense Calvin's crowning work. It added religious education to the evangelical preaching and the thorough discipline already established, and so completed the reformer's ideal of a Christian commonwealth.

Amidst these multitudinous cares and occupations, Calvin found time to write a number of works besides those provoked by the various controversies in which he was engaged. The most numerous of these were of an exegetical character. Including discourses taken down from his lips by faithful auditors, we have from him expository comments or homilies on nearly all the books of Scripture, written partly in Latin and partly in French. Though naturally knowing nothing of the modern idea of a progressive revelation, his judiciousness, penetration, and tact in eliciting his author's meaning, his precision, condensation, and concinnity as an expositor, the accuracy of his learning, the closeness of his reasoning, and the elegance of his style, all unite to confer a high value on his exegetical works. The series began with *Romans* in 1540 and ended with *Joshua* in 1564. In 1558–1559 also, though in very ill health, he finally perfected the Institutes.

The incessant and exhausting labours to which Calvin gave himself could not but tell on his fragile constitution. Amid many sufferings, however, and frequent attacks of sickness, he manfully pursued his course; nor was it till his frail body, torn by many and painful diseases — fever, asthma, stone, and gout, the fruits for the most part of his sedentary habits and unceasing activity—had, as it were, fallen to pieces around him, that his indomitable spirit relinquished the conflict. In the early part of the year 1564 his sufferings became so severe that it was manifest his earthly career was rapidly drawing to a close. On the 6th of February of that year he preached his last sermon, having with great difficulty found breath enough to carry him through it. He was several times after this carried to church, but never again was able to take any part in the service. With his usual disinterestedness he refused to receive his stipend, now that he was no longer able to discharge the duties of his office. In the midst of his sufferings, however, his zeal and energy kept him in continual occupation; when expostulated with for such unseasonable toil, he replied, "Would you that the Lord should find me idle when He comes?" After he had retired from public labours he lingered for some months, enduring the severest agony without a murmur, and cheerfully attending to all the duties of a private kind which his diseases left him strength to discharge. On the 25th of April he made his will, on the 27th he received the Little Council, and on the 28th the Genevan ministers, in his sick-room; on the 2nd of May he wrote his last letter—to his old comrade Farel, who hastened from Neuchâtel to see him once again. He spent much time in prayer and died quietly, in the arms of his faithful friend Theodore Beza, on the evening of the 27th of May, in the fifty-fifth year of his age. The next day he was buried without pomp "in the common cemetery called Plain-palais" in a spot not now to be identified.

Calvin was of middle stature; his complexion was somewhat pallid and dark; his eyes, to the latest clear and lustrous, bespoke the acumen of his genius. He was sparing in his food and simple in his dress; he took but little sleep, and was capable of extraordinary efforts of intellectual toil. He had a most retentive memory and a very keen power of observation. He spoke without rhetoric, simply, directly, but with great weight. He had many acquaintances but few close friends. His private character was in harmony with his public reputation and position. If somewhat severe and irritable, he was at the same time scrupulously just, truthful, and steadfast; he never deserted a friend or took an unfair advantage of an antagonist; and on befitting occasions he could be cheerful and even facetious among his intimates. "God gave him," said the Little Council after his death, "a character of great majesty." "I have been a witness of him for sixteen years," says Beza, "and I think I am fully entitled to say that in this man there was exhibited to all an

[1] Fidelis Expositio Errorum Serveti, *sub init.* Calvini, *Opp.* t. ix.
[2] Calvin to Farel, 20th Aug. 1553.
[3] Tuo judicio prorsus assentior. Affirmo etiam vestros magistratus juste fecisse quod hominem blasphemum, re ordine judicata, interfecerunt.—Melanchthon to Calvin, 14th Oct. 1554.
[4] Field *On the Church*, bk. iii. c. 27, vol. i. p. 288 (ed. Cambridge, 1847).
[5] *Notes on English Divines*, vol. i. p. 49. See also *Table Talk*, vol. ii. p. 282 (ed. 1835).
[6] W. Walker, *John Calvin*, pp. 403-8.

example of the life and death of the Christian, such as it will not be easy to depreciate, such as it will be difficult to emulate."

Though Calvin built his theology on the foundations laid by earlier reformers, and especially by Luther and Bucer, his peculiar gifts of learning, of logic and of style made him pre-eminently the theologian of the new religion. The following may be regarded as his characteristic tenets, though not all are peculiar to him.

The dominant thought is the infinite and transcendent sovereignty of God, to know whom is the supreme end of human endeavour. God is made known to man especially by the Scriptures, whose writers were " sure and authentic amanuenses of the Holy Spirit." To the Spirit speaking therein the Spirit-illumined soul of man makes response. While God is the source of all good, man as a sinner is guilty and corrupt. The first man was made in the image and likeness of God, which not only implies man's superiority to all other creatures, but indicates his original purity, integrity and sanctity. From this state Adam fell, and in his fall involved the whole human race descended from him. Hence depravity and corruption, diffused through all parts of the soul, attach to all men, and this first makes them obnoxious to the anger of God, and then comes forth in works which the Scripture calls works of the flesh (Gal. v. 19). Thus all are held vitiated and perverted in all parts of their nature, and on account of such corruption deservedly condemned before God, by whom nothing is accepted save righteousness innocence, and purity. Nor is that a being bound for another's offence; for when it is said that we through Adam's sin have become obnoxious to the divine judgment, it is not to be taken as if we, being ourselves innocent and blameless, bear the fault of his offence, but that, we having been brought under a curse through his transgression, he is said to have bound us. From him, however, not only has punishment overtaken us, but a pestilence instilled from him resides in us, to which punishment is justly due. Thus even infants, whilst they bring their own condemnation with them from their mother's womb, are bound not by another's but by their own fault. For though they have not yet brought forth the fruits of their iniquity, they have the seed shut up in them; nay, their whole nature is a sort of seed of sin, therefore it cannot but be hateful and abominable to God (*Instit.* bk. ii. ch. i. sect. 8).

To redeem man from this state of guilt, and to recover him from corruption, the Son of God became incarnate, assuming man's nature into union with His own, so that in Him were two natures in one person. Thus incarnate He took on Him the offices of prophet, priest and king, and by His humiliation, obedience and suffering unto death, followed by His resurrection and ascension to heaven, He has perfected His work and fulfilled all that was required in a redeemer of men, so that it is truly affirmed that He has merited for man the grace of salvation (bk. ii. ch. 13-17). But until a man is in some way really united to Christ so as to partake of Him, the benefits of Christ's work cannot be attained by him. Now it is by the secret and special operation of the Holy Spirit that men are united to Christ and made members of His body. Through faith, which is a firm and certain cognition of the divine benevolence towards us founded on the truth of the gracious promise in Christ, men are by the operation of the Spirit united to Christ and are made partakers of His death and resurrection, so that the old man is crucified with Him and they are raised to a new life, a life of righteousness and holiness. Thus joined to Christ the believer has life in Him and knows that he is saved, having the witness of the Spirit that he is a child of God, and having the promises, the certitude of which the Spirit had before impressed on the mind, sealed by the same Spirit on the heart (bk. iii. ch. 33-36). From faith proceeds repentance, which is the turning of our life to God, proceeding from a sincere and earnest fear of God, and consisting in the mortification of the flesh and the old man within us and a vivification of the Spirit. Through faith also the believer receives justification, his sins are forgiven, he is accepted of God, and is held by Him as righteous, the righteousness of Christ being imputed to him, and faith being the instrument by which the man lays hold on Christ, so that with His righteousness the man appears in God's sight as righteous. This imputed righteousness, however, is not disjoined from real personal righteousness, for regeneration and sanctification come to the believer from Christ no less than justification; the two blessings are not to be confounded, but neither are they to be disjoined. The assurance which the believer has of salvation he receives from the operation and witness of the Holy Spirit; but this again rests on the divine choice of the man to salvation; and this falls back on God's eternal sovereign purpose, whereby He has predestined some to eternal life while the rest of mankind are predestined to condemnation and eternal death. Those whom God has chosen to life He effectually calls to salvation, and they are kept by Him in progressive faith and holiness unto the end (bk. iii. *passim*). The external means or aids by which God unites men into the fellowship of Christ, and sustains and advances those who believe, are the church and its ordinances, especially the sacraments. The church universal is the multitude gathered from diverse nations, which though divided by distance of time and place, agree in one common faith, and it is bound by the tie of the same religion; and wherever the word of God is sincerely preached, and the sacraments are duly administered, according to Christ's institute, there beyond doubt is a church of the living God (bk. iv. ch. 1, sect. 7-11). The permanent officers in the church are pastors and teachers, to the former of whom it belongs to preside over the discipline of the church, to administer the sacraments, and to admonish and exhort the members; while the latter occupy themselves with the exposition of Scripture, so that pure and wholesome doctrine may be retained. With them are to be joined for the government of the church certain pious, grave and holy men as a senate in each church; and to others, as deacons, is to be entrusted the care of the poor. The election of the officers in a church is to be with the people, and those duly chosen and called are to be ordained by the laying on of the hands of the pastors (ch. 3, sect. 4-16). The sacraments are two—Baptism and the Lord's Supper. Baptism is the sign of initiation whereby men are admitted into the society of the church and, being grafted into Christ, are reckoned among the sons of God; it serves both for the confirmation of faith and as a confession before men. The Lord's Supper is a spiritual feast where Christ attests that He is the life-giving bread, by which our souls are fed unto true and blessed immortality. That sacred communication of His flesh and blood whereby Christ transfuses into us His life, even as if it penetrated into our bones and marrow, He in the Supper attests and seals; and that not by a vain or empty sign set before us, but there He puts forth the efficacy of His Spirit whereby He fulfils what He promises. In the mystery of the Supper Christ is truly exhibited to us by the symbols of bread and wine; and so His body and blood, in which He fulfilled all obedience for the obtaining of righteousness for us, are presented. There is no such presence of Christ in the Supper as that He is affixed to the bread or included in it or in any way circumscribed; but whatever can express the true and substantial communication of the body and blood of the Lord, which is exhibited to believers under the said symbols of the Supper, is to be received, and that not as perceived by the imagination only or mental intelligence, but as enjoyed for the aliment of the eternal life (bk. iv. ch. 15, 17).

The course of time has substantially modified many of these positions. Even the churches which trace their descent from Calvin's work and faith no longer hold in their entirety his views on the magistrate as the preserver of church purity, the utter depravity of human nature, the non-human character of the Bible, the dealing of God with man. But his system had an immense value in the history of Christian thought. It appealed to and evoked a high order of intelligence, and its insistence on personal individual salvation has borne worthy fruit. So also its insistence on the chief end of man " to know and do the will of God " made for the strenuous morality that helped to build up the modern world. Its effects are most clearly seen in Scotland, in Puritan England and in the New England states, but its influence was and is felt among peoples that have little desire or claim to be called Calvinist.

BIBLIOGRAPHY.—The standard edition of Calvin's works is that undertaken by the Strassburg scholars, J. W. Baum, E. Cunitz, E. Reuss, P. Lobstein, A. Erichson (59 vols., 1863–1900). The last of these contains an elaborate bibliography which was also published separately at Berlin in 1900. The bulk of the writings was published in English by the Calvin Translation Society (48 vols., Edinburgh, 1843–1855); the *Institutes* have often been translated. The early lives by Beza and Collodon are given in the collected editions. Among modern biographies are those by P. Henry, *Das Leben J. Calvins* (3 vols., Hamburg, 1835–1844; Eng. trans. by H. Stebbing, London and New York, 1849); V. Audin, *Histoire de la vie, des ouvrages, et des doctrines de Calvin* (2 vols., Paris, 1841; Eng. trans. by J. McGill, London, 1843 and 1850) unfairly antagonistic; T. H. Dyer, *Life of John Calvin* (London, 1850); E. Stähelin, *Joh. Calvin, Leben und ausgewählte Schriften* (2 vols., Elberfeld, 1863); F. W Kampschulte, *Joh. Calvin, seine Kirche und sein Staat in Genf* (2 vols., 1869, 1899, unfinished); Abel Lefranc, *La Jeunesse de Calvin* (Paris, 1888); E. Choisy, *La Théocratie à Genève au temps de Calvin* (Geneva, 1897); E. Doumergue, *Jean Calvin; les hommes et les choses de son temps* (5 vols., 1899–1908). See also A. M. Fairbairn, " Calvin and the Reformed Church " in the *Cambridge Modern History*, vol. ii. (1904); P. Schaff's, *History of the Christian Church*, vol. vii. (1892), and R. Stähelin's article in Hauck-Herzog's *Realencyk. für prot. Theologie und Kirche.* Each of these contains a useful bibliography, as also does the excellent life by Professor Williston Walker, *John Calvin, the Organizer of Reformed Protestantism*, " Heroes of the Reformation " series (1906). See also C. S. Horne in *Mansfield Coll. Essays* (1909). (W. L. A.; A. J. G.)

CALVINISTIC METHODISTS, a body of Christians forming a church of the Presbyterian order and claiming to be the only denomination in Wales which is of purely Welsh origin. Its beginnings may be traced to the labours of the Rev. Griffith Jones (1684–1761), of Llanddowror, Carmarthenshire, whose sympathy for the poor led him to set on foot a system of circulating charity schools for the education of children. In striking contrast to the general apathy of the clergy of the period, Griffith Jones's zeal appealed to the public imagination, and his powerful preaching exercised a widespread influence, many

travelling long distances in order to attend his ministry. There was thus a considerable number of earnest people dispersed throughout the country waiting for the rousing of the parish clergy. An impressive announcement of the Easter Communion Service, made by the Rev. Pryce Davies, vicar of Talgarth, on the 30th of March 1735, was the means of awakening Howell Harris (1714–1773) of Trevecca, and he immediately began to hold services in his own house. He was soon invited to do the same at the houses of others, and ended by becoming a fiery itinerant preacher, stirring to the depths every neighbourhood he visited. Griffith Jones, preaching at Llanddewi Brefi, Cardiganshire—the place at which the Welsh Patron Saint, David, first became famous—found Daniel Rowland (1713–1790), curate of Llangeitho, in his audience, and his patronizing attitude in listening drew from the preacher a personal supplication on his behalf, in the middle of the discourse. Rowland was deeply moved, and became an ardent apostle of the new movement. Naturally a fine orator, his new-born zeal gave an edge to his eloquence, and his fame spread abroad. Rowland and Harris had been at work fully eighteen months before they met, at a service in Devynock church, in the upper part of Breconshire. The acquaintance then formed lasted to the end of Harris's life—an interval of ten years excepted. Harris had been sent to Oxford in the autumn of 1735 to "cure him of his fanaticism," but he left in the following February. Rowland had never been to a university, but, like Harris, he had been well grounded in general knowledge. About 1739 another prominent figure appeared. This was Howell Davies of Pembrokeshire, whose ministry was modelled on that of his master, Griffith Jones, but with rather more clatter in his thunder.

In 1736, on returning home, Harris opened a school, Griffith Jones supplying him with books from his charity. He also set up societies, in accordance with the recommendations in Josiah Wedgwood's little book on the subject; and these exercised a great influence on the religious life of the people. By far the most notable of Harris's converts was William Williams (1717–1791), Pant y Celyn, the great hymn-writer of Wales, who while listening to the revivalist preaching on a tombstone in the graveyard of Talgarth, heard the "voice of heaven," and was "apprehended as by a warrant from on high." He was ordained deacon in the Church of England, 1740, but Whitefield recommended him to leave his curacies and go into the highways and hedges. On Wednesday and Thursday, January 5th and 6th, 1743, the friends of aggressive Christianity in Wales met at Wadford, near Caerphilly, Glam., in order to organize their societies. George Whitefield was in the chair. Rowland, Williams and John Powell—afterwards of Llanmartin—(clergymen), Harris, John Humphreys and John Cennick (laymen) were present. Seven lay exhorters were also at the meetings; they were questioned as to their spiritual experience and allotted their several spheres; other matters pertaining to the new conditions created by the revival were arranged. This is known as the first Methodist Association—held eighteen months before John Wesley's first conference (June 25th, 1744). Monthly meetings covering smaller districts, were organized to consider local matters, the transactions of which were to be reported to the Quarterly Association, to be confirmed, modified, or rejected. Exhorters were divided into two classes—public, who were allowed to itinerate as preachers and superintend a number of societies; private, who were confined to the charge of one or two societies. The societies were distinctly understood to be part of the established church, as Wedgwood's were, and every attempt at estranging them therefrom was sharply reproved; but persecution made their position anomalous. They did not accept the discipline of the Church of England, so the plea of conformity was a feeble defence; nor had they taken out licenses, so as to claim the protection of the Toleration Act. Harris's ardent loyalty to the Church of England, after three refusals to ordain him, and his personal contempt for ill-treatment from persecutors, were the only things that prevented separation.

A controversy on a doctrinal point—"Did God die on Calvary?"—raged for some time, the principal disputants being Rowland and Harris; and in 1751 it ended in an open rupture, which threw the Connexion first into confusion and then into a state of coma. The societies split up into Harrisites and Rowlandites, and it was only with the revival of 1762 that the breach was fairly repaired. This revival is a landmark in the history of the Connexion. Williams of Pant y Celyn had just published a little volume of hymns, the singing of which inflamed the people. This led the bishop of St David's to suspend Rowland's license, and Rowland had to confine himself to a meeting-house at Llangeitho. Having been turned out of other churches, he had leased a plot of land in 1759, anticipating the final withdrawal of his license, in 1763, and a spacious building was erected to which the people crowded from all parts on Sacrament Sunday. Llangeitho became the Jerusalem of Wales, and Rowland's popularity never waned until his physical powers gave way. A notable event in the history of Welsh Methodism was the publication in 1770, of a 4to annotated Welsh Bible by the Rev. Peter Williams, a forceful preacher, and an indefatigable worker, who had joined the Methodists in 1746, after being driven from several curacies. It gave birth to a new interest in the Scriptures, being the first definite commentary in the language. A powerful revival broke out at Llangeitho in the spring of 1780, and spread to the south, but not to the north of Wales. The ignorance of the people of the north made it very difficult for Methodism to benefit from these manifestations, until the advent of the Rev. Thomas Charles (1755–1814), who, having spent five years in Somersetshire as curate of several parishes, returned to his native land to marry Sarah Jones of Bala. Failing to find employment in the established church, he joined the Methodists in 1784. His circulating charity schools and then his Sunday schools gradually made the North a new country. In 1791 a revival began at Bala; and this, strange to say, a few months after the Bala Association had been ruffled by the proceedings which led to the expulsion of Peter Williams from the Connexion, in order to prevent him from selling John Canne's Bible among the Methodists, because of some Sabellian marginal notes.

In 1790, the Bala Association passed "Rules regarding the proper mode of conducting the Quarterly Association," drawn up by Charles; in 1801, Charles and Thomas Jones of Mold, published (for the association) the "Rules and Objects of the Private Societies among the People called Methodists." About 1795, persecution led the Methodists to take the first step towards separation from the Church of England. Heavy fines made it impossible for preachers in poor circumstances to continue without claiming the protection of the Toleration Act, and the meeting-houses had to be registered as dissenting chapels. In a large number of cases this had only been delayed by so constructing the houses that they were used both as dwellings and as chapels at one and the same time. Until 1811 the Calvinistic Methodists had no ministers ordained by themselves; their enormous growth in numbers and the scarcity of ministers to administer the Sacrament—only three in North Wales, two of whom had joined only at the dawn of the century—made the question of ordination a matter of urgency. The South Wales clergy who regularly itinerated were dying out; the majority of those remaining itinerated but irregularly, and were most of them against the change. The lay element, with the help of Charles and a few other stalwarts, carried the matter through—ordaining nine at Bala in June, and thirteen at Llandilo in August. In 1823, the *Confession of Faith* was published; it is based on the *Westminster Confession* as Calvinistically construed," and contains 44 articles. The Connexion's *Constitutional Deed* was formally completed in 1826.

Thomas Charles had tried to arrange for taking over Trevecca College when the trustees of the Countess of Huntingdon's Connexion removed their seminary to Cheshunt in 1791; but the Bala revival broke out just at the time, and, when things grew quieter, other matters pressed for attention. A college had been mooted in 1816, but the intended tutor died suddenly, and the matter was for the time dropped. Candidates for the Connexional ministry were compelled to shift for themselves until 1837,

when Lewis Edwards (1809–1887) and David Charles (1812–1878) opened a school for young men at Bala. North and South alike adopted it as their college, the associations contributing a hundred guineas each towards the education of their students. In 1842, the South Wales Association opened a college at Trevecca, leaving Bala to the North; the Rev. David Charles became principal of the former, and the Rev. Lewis Edwards of the latter. After the death of Dr Lewis Edwards, Dr. T. C. Edwards resigned the principalship of the University College at Aberystwyth to become head of Bala (1891), now a purely theological college, the students of which were sent to the university colleges for their classical training. In 1905 Mr David Davies of Llandinam—one of the leading laymen in the Connexion—offered a large building at Aberystwyth as a gift to the denomination for the purpose of uniting North and South in one theological college; but in the event of either association declining the proposal, the other was permitted to take possession, giving the association that should decline the option of joining at a later time. The Association of the South accepted, and that of the North declined, the offer; Trevecca College was turned into a preparatory school on the lines of a similar institution set up at Bala in 1891.

The missionary collections of the denomination were given to the London Missionary Society from 1798 to 1840, when a Connexional Society was formed; and no better instances of missionary enterprise are known than those of the Khasia and Jaintia Hills, and the Plains of Sylhet in N. India. There has also been a mission in Brittany since 1842.

The constitution of the denomination (called in Welsh, "Hen Gorph," *i.e.* the Old Body) is a mixture of Presbyterianism and Congregationalism; each church manages its own affairs and reports (1) to the district meeting, (2) to the monthly meeting, the nature of each report determining its destination. The monthly meetings are made up of all the officers of the churches comprised in each, and are split up into districts for the purpose of a more local co-operation of the churches. The monthly meetings appoint delegates to the quarterly Associations, of which all officers are members. The Associations of North and South are distinct institutions, deliberating and determining matters pertaining to them in their separate quarterly gatherings. For the purpose of a fuller co-operation in matters common to both, a general assembly (meeting once a year) was established in 1864. This is a purely deliberative conclave, worked by committees, and all its legislation has to be confirmed by the two Associations before it can have any force or be legal. The annual conference of the English churches of the denomination has no legislative standing, and is meant for social and spiritual intercourse and discussions.

In doctrine the church is Calvinistic, but its preachers are far from being rigid in this particular, being warmly evangelical, and, in general, distinctly cultured. The London degree largely figures on the Connexional Diary; and now the Welsh degrees, in arts and divinity, are being increasingly achieved. It is a remarkable fact that every Welsh revival, since 1735, has broken out among the Calvinistic Methodists. Those of 1735, 1762, 1780 and 1791 have been mentioned; those of 1817, 1832, 1859 and 1904–1905 were no less powerful, and their history is interwoven with Calvinistic Methodism, the system of which is so admirably adapted for the passing on of the torch. The ministerial system is quite anomalous. It started in pure itineracy; the pastorate came in very gradually, and is not yet in universal acceptance. The authority of the pulpit of any individual church is in the hands of the deacons; they ask the pastor to supply so many Sundays a year—from twelve to forty, as the case may be—and they then fill the remainder with any preacher they choose. The pastor is paid for his pastoral work, and receives his Sunday fee just as a stranger does; his Sundays from home he fills up at the request of deacons of other churches, and it is a breach of connexional etiquette for a minister to apply for engagements, no matter how many unfilled Sundays he may have. Deacons and preachers make engagements seven or eight years in advance. The Connexion provides for English residents wherever required, and the English ministers are oftener in their own pulpits than their Welsh brethren.

The Calvinistic Methodists form in some respects the strongest church in Wales, and its forward movement, headed by Dr. John Pugh of Cardiff, has brought thousands into its fold since its establishment in 1891. Its Connexional Book Room, opened in 1891, yields an annual profit of from £1600 to £2000, the profits being devoted to help the colleges and to establish Sunday school libraries, etc. Its chapels in 1907 numbered 1641 (with accommodation for 488,080), manses 229; its churches[1] numbered 1428, ministers 921, unordained preachers 318, deacons 6179; its Sunday Schools 1731, teachers 27,895, scholars 193,460, communicants 189,164, total collections for religious purposes £300,912. The statistics of the Indian Mission are equally good: communicants 8027, adherents 26,787, missionaries 23, native ministers (ordained) 15, preachers (not ordained) 60.

The Calvinistic Methodists are intensely national in sentiment and aspirations, beyond all suspicion loyalists. They take a great interest in social, political and educational matters, and are prominent on public bodies. They support the Eisteddfod as the promoter and inspirer of arts, letters and music, and are conspicuous among the annual prize winners. They thus form a living, democratic body, flexible and progressive in its movements, yet with a sufficient proportion of conservatism both in religion and theology to keep it sane and safe. (D. E. J.)

CALVISIUS, SETHUS (1556–1615), German chronologer, was born of a peasant family at Gorschleben in Thuringia on the 21st of February 1556. By the exercise of his musical talents he earned money enough for the start, at Helmstadt, of an university career, which the aid of a wealthy patron enabled him to continue at Leipzig. He became director of the music-school at Pforten in 1572, was transferred to Leipzig in the same capacity in 1594, and retained this post until his death on the 24th of November 1615, despite the offers successively made to him of mathematical professorships at Frankfort and Wittenberg. In his *Opus Chronologicum* (Leipzig, 1605, 7th ed. 1685) he expounded a system based on the records of nearly 300 eclipses. An ingenious, though ineffective, proposal for the reform of the calendar was put forward in his *Elenchus Calendarii Gregoriani* (Frankfort, 1612); and he published a book on music, *Melodiae condendae ratio* (Erfurt, 1592), still worth reading.

For details see V. Schmuck's *Leichenrede* (1615); J. Bertuch's *Chronicon Portense* (1739); F. W. E. Rost's *Oratio ad renovendam S. Calvisii memoriam* (1805); J. G. Stallbaum's *Nachrichten über die Cantoren an der Thomasschule* (1842); *Allgemeine Deutsche Biographie*; Poggendorff's *Biog.-Litterarisches Handwörterbuch.*

CALVO, CARLOS (1824–1906), Argentine publicist and historian, was born at Buenos Aires on the 26th of February 1824, and devoted himself to the study of the law. In 1860 he was sent by the Paraguayan government on a special mission to London and Paris. Remaining in France, he published in 1863 his *Derecho inlernacional teorico y praclico de Europa y America*, in two volumes, and at the same time brought out a French version. The book immediately took rank as one of the highest modern authorities on the subject, and by 1887 the first French edition had become enlarged to six volumes. Señor Calvo's next publications were of a semi-historical character. Between 1862 and 1869 he published in Spanish and French his great collection in fifteen volumes of the treaties and other diplomatic acts of the South American republics, and between 1864 and 1875 his *Annales historiques de la révolution de l'Amérique latine*, in five volumes. In 1884 he was one of the founders at the Ghent congress of the *Institut de Droit International.* In the following year he was Argentine minister at Berlin, and published his *Dictionnaire du droit international public et privé* in that city. Calvo died in May 1906 at Paris.

CALW or KALW, a town of Germany, in the kingdom of Württemberg, on the Nagold, 34 m. S.W. of Stuttgart by rail. Pop. (1905), 4943. It contains a Protestant and a Roman Catholic Church, two schools, missionary institution, and a fine

[1] Adherents and members in scattered hamlets and attending different meeting-houses or chapels, often combine to form one society or church.

public library. The industries include spinning and weaving operations in wool and cotton. Carpets, cigars and leather are also manufactured. The timber trade, chiefly with the Netherlands, is important. The place is in favour as a health resort.

The name of Calw appears first in 1037. In the middle ages the town was under the dominion of a powerful family of counts, whose possessions finally passed to Württemberg in 1345. In 1634 the town was taken by the Bavarians, and in 1692 by the French.

CALYDON (Καλυδών), an ancient town of Aetolia, according to Pliny, 7½ Roman m. from the sea, on the river Euenus. It was said to have been founded by Calydon, son of Aetolus; to have been the scene of the hunting, by Meleager and other heroes, of the famous Calydonian boar, sent by Artemis to lay waste the fields; and to have taken part in the Trojan war. In historical times it is first mentioned (391 B.C.) as in the possession of the Achaeans, who retained it for twenty years, by the assistance of the Lacedaemonian king, Agesilaus, notwithstanding the attacks of the Arcarnanians. After the battle of Leuctra (371 B.C.) it was restored by Epaminondas to the Aetolians. In the time of Pompey it was a town of importance; but Augustus removed its inhabitants to Nicopolis, which he founded to commemorate his victory at Actium (31 B.C.). The walls of Calydon are almost certainly to be recognized in the Kastro of Kurtagá. These comprise a circuit of over 2 m., with one large gate and five smaller ones, and are situated on a hill on the right or west bank of the Euenus. Remains of large terrace walls outside the town probably indicate the position of the temple of Artemis Laphria, whose gold and ivory statue was transferred to Patras, together probably with her ritual. This included a sacrifice in which all kinds of beasts, wild and tame, were driven into a wooden pyre and consumed.

See W. M. Leake, *Travels in N. Greece*, i. p. 109, iii. pp. 533 sqq.; W. J. Woodhouse, *Aetolia*, pp. 95 sqq. (E. Gr.)

CALYPSO, in Greek mythology, daughter of Atlas (or Oceanus, or Nereus), queen of the mythical island of Ogygia. When Odysseus was shipwrecked on her shores, Calypso entertained the hero with great hospitality, and prevailed on him to remain with her seven years. Odysseus was then seized with a longing to return to his wife and home; Calypso's promise of eternal youth failed to induce him to stay, and Hermes was sent by Zeus to bid her release him. When he set sail, Calypso died of grief. (Homer, *Odyssey*, i. 50, v. 28, vii. 254; Apollodorus i. 2, 7.)

CAM (CÃO), DIOGO (fl. 1480–1486), Portuguese discoverer, the first European known to sight and enter the Congo, and to explore the West African coast between Cape St Catherine (2° S.) and Cape Cross (21° 50′ S.) almost from the equator to Walfish Bay. When King John II. of Portugal revived the work of Henry the Navigator, he sent out Cam (about midsummer (?) 1482) to open up the African coast still further beyond the equator. The mouth of the Congo was now discovered (perhaps in August 1482), and marked by a stone pillar (still existing, but only in fragments) erected on Shark Point; the great river was also ascended for a short distance, and intercourse was opened with the natives. Cam then coasted down along the present Angola (Portuguese West Africa), and erected a second pillar, probably marking the termination of this voyage, at Cape Santa Maria (the Monte Negro of these first visitors) in 13° 26′ S. He certainly returned to Lisbon by the beginning of April 1484, when John II. ennobled him, made him a *cavalleiro* of his household (he was already an *escudeiro* or esquire in the same), and granted him an annuity and a coat of arms (8th and 14th of April 1484). That Cam, on his second voyage of 1485–1486, was accompanied by Martin Behaim (as alleged on the latter's Nuremberg globe of 1492) is very doubtful; but we know that the explorer revisited the Congo and erected two more pillars beyond the furthest of his previous voyage, the first at another "Monte Negro" in 15° 41′ S., the second at Cape Cross in 21° 50′, this last probably marking the end of his progress southward. According to one authority (a legend on the 1489 map of Henricus Martellus Germanus), Cam died off Cape Cross; but João de Barros and others make him return to the Congo, and take thence a native envoy to Portugal. The four pillars set up by Cam on his two voyages have all been discovered *in situ*, and the inscriptions on two of them from Cape Santa Maria and Cape Cross, dated 1482 and 1485 respectively, are still to be read and have been printed; the Cape Cross padrão is now at Kiel (replaced on the spot by a granite facsimile); those from the Congo estuary and the more southerly Monte Negro are in the Museum of the Lisbon Geographical Society.

See Barros, *Decadas da Asia*, Decade i. bk. iii., esp. ch. 3; Ruy de Pina, *Chronica d' el Rei D. João II.*; Garcia de Resende, *Chronica*; Luciano Cordeiro, "Diogo Cão" in *Boletim* of the *Lisbon Geog. Soc.*, 1892; E. G. Ravenstein, "Voyages of Diogo Cão," &c., in *Geog. Jnl.* vol. xvi. (1900); also *Geog. Jnl.* xxxi. (1908). (C. R. B.)

CAMACHO, JUAN FRANCISCO (1824–1896), Spanish statesman and financier, was born in Cadiz in 1824. The first part of his life was devoted to mercantile and financial pursuits at Cadiz and then in Madrid, where he managed the affairs of and liquidated a mercantile and industrial society to the satisfaction and profit of the shareholders. In 1837 he became a captain in the national militia, in 1852 Conservative deputy in the Cortes for Alcoy, in 1853 secretary of congress, and was afterwards elected ten times deputy, twice senator and life senator in 1877. Camacho took a prominent part in all financial debates and committees, was offered a seat in the Mon cabinet of 1864, and was appointed under-secretary of state finances in 1866 under Canovas and O'Donnell. After the revolution of 1868 he declined the post of minister of finance offered by Marshal Serrano, but served in that capacity in 1872 and 1874 in Sagasta's cabinets. When the restoration took place, Camacho sat in the Cortes among the dynastic Liberals with Sagasta as leader, and became finance minister in 1881 at a critical moment when Spain had to convert, reduce, and consolidate her treasury and other debts with a view to resuming payment of coupons. Camacho drew up an excellent budget and collected taxation with a decidedly unpopular vigour. A few years later Sagasta again made him finance minister under the regency of Queen Christina, but had to sacrifice him when public opinion very clearly pronounced against his too radical financial reforms and his severity in collection of taxes. He was for the same reasons unsuccessful as a governor of the Tobacco Monopoly Company. He then seceded from the Liberals, and during the last years of his life he affected to vote with the Conservatives, who made him governor of the Bank of Spain. He died in Madrid on the 23rd of January 1896. (A. E. H.)

CAMALDULIANS, or Camaldolese, a religious order founded by St Romuald. Born of a noble family at Ravenna *c.* 950, he retired at the age of twenty to the Benedictine monastery of S. Apollinare in Classe; but being strongly drawn to the eremitical life, he went to live with a hermit in the neighbourhood of Venice and then again near Ravenna. Here a colony of hermits grew up around him and he became the superior. As soon as they were established in their manner of life, Romuald moved to another district and there formed a second settlement of hermits, only to proceed in the same way to the establishment of other colonies of hermits or "deserts" as they were called. In this way during the course of his life Romuald formed a great number of "deserts" throughout central Italy. His chief foundation was at Camaldoli on the heights of the Tuscan Apennines not far from Arezzo, in a vale snow-covered during half the year. Romuald's idea was to reintroduce into the West the primitive eremitical form of monachism, as practised by the first Egyptian and Syrian monks. His monks dwelt in separate huts around the oratory, and came together only for divine service and on certain days for meals. The life was one of extreme rigour in regard to food, clothing, silence and general observance. Besides the hermits there were lay brothers to help in carrying out the field work and rougher occupations. St Romuald and the early Camaldolese exercised considerable influence on the religious movements of their time; the emperors Otto III. and Henry II. esteemed him highly and sought his advice on religious questions. Disciples of St Romuald went on missions to the still heathen parts of Russia, Poland and Prussia, where some of them suffered martyrdom. In his extreme old age St Romuald with twenty-five

of his monks started on a missionary expedition to Hungary, but he was unable to accomplish the journey. He died in 1027. After his death mitigations were gradually introduced into the rule and manner of life; and in the monastery of St Michael in Murano, Venice, the life became cenobitical. From that time to the present day there have always been both eremitical and cenobitical Camaldolese, the latter approximating to ordinary Benedictine life. The Camaldolese spread all over Italy, and into Germany, Poland and France. Camaldoli itself exists as a "desert," the primitive observance of the institute being strictly maintained. There are a few other "deserts," all in Italy, except one in Poland; and there are about 90 hermits. The chief monastery of the cenobitical Camaldolese is S. Gregorio on the Caelian Hill in Rome; they number less than forty. Since the 11th century there have been Camaldolese nuns; at present there are five nunneries with 150 nuns, all belonging to the cenobitical branch of the order. The habit of the Camaldulians is white.

See Helyot, *Hist. des ordres religieux* (1792) v. cc. 21-25; Max Heimbucher, *Orden und Kongregationen* (1896) i. § 29; and the art. "Camaldulenser" in Wetzer and Welte, *Kirchenlexikon* (2nd ed.), and Herzog, *Realencyklopädie* (3rd ed.). (E. C. B.)

CAMARGO, MARIE ANNE DE CUPIS DE (1710–1770), French dancer, of Spanish descent, was born in Brussels on the 15th of April 1710. Her father, Ferdinand Joseph de Cupis, earned a scanty living as violinist and dancing-master, and from childhood she was trained for the stage. At ten years of age she was given lessons by Mlle Françoise Prévost (1680–1741), then the first dancer at the Paris Opéra, and at once obtained an engagement as *première danseuse*, first at Brussels and then at Rouen. Under her grandmother's family name of Camargo she made her Paris *début* in 1726, and at once became the rage. Every new fashion bore her name; her manner of doing her hair was copied by all at court; her shoemaker—she had a tiny foot—made his fortune. She had many titled adorers whom she nearly ruined by her extravagances, among others Louis de Bourbon, comte de Clermont. At his wish she retired from the stage from 1736 to 1741. In her time she appeared in seventy-eight ballets or operas, always to the delight of the public. She was the first ballet-dancer to shorten the skirt to what afterwards became the regulation length. There is a charming portrait of her by Nicolas Lancret in the Wallace collection, London.

CAMARGUE (*Insula Camaria*), a thinly-populated region of southern France contained wholly in the department of Bouches-du-Rhône, and comprising the delta of the Rhone. The Camargue is a marshy plain of alluvial formation enclosed between the two branches of the river, the Grand Rhône to the east and the Petit Rhône to the west. Its average elevation is from 6½ to 8 ft. The Camargue has a coast-line some 30 m. in length and an area of 290 sq. m., of which about a quarter consists of cultivated and fertile land. This is in the north and on the banks of the rivers. The rest consists of rough pasture grazed by the black bulls and white horses of the region and by large flocks of sheep, or of marsh, stagnant water and waste land impregnated with salt. The region is inhabited by flocks of flamingoes, bustards, partridge, and by sea-birds of various kinds. The Étang de Vaccarès, the largest of the numerous lagoons and pools, covers about 23 sq. m.; it receives three main canals constructed to drain off the minor lagoons. The Camargue is protected by dikes from the inundations both of the sea and of the rivers. Inlets in the sea-dike let in water for the purposes of the lagoon fisheries and the salt-pans; and the river-water is used for irrigation and for the submersion of vines. The climate is characterized by hard winters and scorching summers. Rain falls in torrents, but at considerable intervals. The mistral, blowing from the north and north-west, is the prevailing wind. The south-eastern portion of the Camargue is known as the Ile du Plan du Bourg. A secondary delta to the west of the Petit Rhône goes by the name of Petite Camargue.

CAMARINA, an ancient city of Sicily, situated on the south coast, about 17 m. S.E. of Gela (Terranova). It was founded by Syracuse in 599 B.C., but destroyed by the mother city in 552 for attempting to assert its independence. Hippocrates of Gela received its territory from Syracuse and restored the town in 492, but it was destroyed by Gelon in 484; the Geloans, however, founded it anew in 461. It seems to have been in general hostile to Syracuse, but, though an ally of Athens in 427, it gave some slight help to Syracuse in 415–413. It was destroyed by the Carthaginians in 405, restored by Timoleon in 339 after its abandonment by Dionysius's order, but in 258 fell into the hands of the Romans. Its complete destruction dates from A.D. 853. The site of the ancient city is among rapidly shifting sandhills, and the lack of stone in the neighbourhood has led to its buildings being used as a quarry even by the inhabitants of Terranova, so that nothing is now visible above ground but a small part of the wall of the temple of Athena and a few foundations of houses; portions of the city wall have been traced by excavation, and the necropolis has been carefully explored (see J. Schubring in *Philologus*, xxxii. 490; P. Orsi in *Monumenti dei Lincei*, ix. 201, 1899; xiv. 756, 1904). To the north lay the lake to which the answer of the Delphic oracle referred, *μὴ κίνει Καμάριναν*, when the citizens inquired as to the advisability of draining it.

CAMBACÉRÈS, JEAN JACQUES RÉGIS DE, duke of Parma (1753–1824), French statesman, was born at Montpellier on the 18th of October 1753. He was descended from a well-known family of the legal nobility (*noblesse de la robe*). He was designed for the magistracy of his province; and in 1771, when for a time the provincial parlement was suppressed, with the others, by the chancellor Maupeou, he refused to sit in the royal tribunal substituted for it. He continued, however, to study law with ardour, and in 1774 succeeded his father as councillor in the court of accounts and finances of his native town. Espousing the principles of the Revolution in 1789, he was commissioned by the *noblesse* of the province to draw up the *cahier* (statement of principles and grievances); and the *sénéchaussée* of Montpellier elected him deputy to the states-general of Versailles; but the election was annulled on a technical point. Nevertheless in 1792 the new department of Hérault, in which Montpellier is situated, sent him as one of its deputies to the Convention which assembled and proclaimed the Republic in September 1792. In the strife which soon broke out between the Girondins and the Jacobins he took no decided part, but occupied himself mainly with the legal and legislative work which went on almost without intermission even during the Terror. The action of Cambacérès at the time of the trial of Louis XVI. (December 25, 1792–January 20, 1793) was characteristic of his habits of thought. At first he protested against the erection of the Convention into a tribunal in these words: "The people has chosen you to be legislators; it has not appointed you as judges." He also demanded that the king should have due facilities for his defence. Nevertheless, when the trial proceeded, he voted with the majority which declared Louis to be guilty, but recommended that the penalty should be postponed until the cessation of hostilities, and that the sentence should then be ratified by the Convention or by some other legislative body. It is therefore inexact to count him among the regicides, as was done by the royalists after 1815. Early in 1793 he became a member of the Committee of General Defence, but he did not take part in the work of its more famous successor, the Committee of Public Safety, until the close of the year 1794. In the meantime he had done much useful work, especially that of laying down, conjointly with Merlin of Douai, the principles on which the legislation of the revolutionary epoch should be codified. At the close of 1794 he also used his tact and eloquence on behalf of the restoration of the surviving Girondins to the Convention, from which they had been driven by the *coup d'état* of the 31st of May 1793. In the course of the year 1795, as president of the Committee of Public Safety, and as responsible especially for foreign affairs, he was largely instrumental in bringing about peace with Spain. Nevertheless, not being a regicide, he was not appointed to be one of the five Directors to whom the control of public affairs was entrusted after the *coup d'état* of Vendémiaire 1795; but, as before, his powers of judgment and of tactful debating soon carried him to the front in the council of Five Hundred. The

moderation of his views brought him into opposition to the Directors after the *coup d'état* of Fructidor (September 1797), and for a time he retired into private life. Owing, however, to the influence of Sieyès, he became minister of justice in July 1799. He gave a guarded support to Bonaparte and Sieyès in their enterprise of overthrowing the Directory (*coup d'état* of Brumaire 1799).

After a short interval Cambacérès was, by the constitution of December 1799, appointed second consul of France—a position which he owed largely to his vast legal knowledge and to the conviction which Sieyès entertained of his value as a manipulator of public assemblies. It is impossible here to describe in detail his relations to Napoleon, and the part which he played in the drawing up of the Civil Code, later on called the Code Napoleon. It must suffice to say that the skilful intervention of Cambacérès helped very materially to ensure to Napoleon the consulship for life (August 1, 1802); but the second consul is known to have disapproved of some of the events which followed, notably the execution of the duc d'Enghien, the rupture with England, and the proclamation of the Empire (May 19, 1804). This last occurrence ended his title of second consul; it was replaced by that of arch-chancellor of the Empire. To him was decreed the presidence of the Senate in perpetuity. He also became a prince of the Empire and received in 1808 the title duke of Parma. Apart from the important part which he took in helping to co-ordinate and draft the Civil Code, Cambacérès did the state good service in many directions, notably by seeking to curb the impetuosity of the emperor, and to prevent enterprises so fatal as the intervention in Spanish affairs (1808) and the invasion of Russia (1812) proved to be. At the close of the campaign of 1814 he shared with Joseph Bonaparte the responsibility for some of the actions which zealous Bonapartists have deemed injurious to the fortunes of the emperor. In 1815, during the Hundred Days, he took up his duties reluctantly at the bidding of Napoleon; and after the second downfall of his master, he felt the brunt of royalist vengeance, being for a time exiled from France. A decree of 13th May 1818 restored him to his civil rights as a citizen of France; but the last six years of his life he spent in retirement. He was a member of the Academy till the 31st of March 1816, when a decree of exclusion was passed. In demeanour he was quiet, reserved and tactful, but when occasion called for it he proved himself a brilliant orator. He was a celebrated *gourmet*, and his dinners were utilized by Napoleon as a useful adjunct to the arts of statecraft.

See A. Aubriet, *Vie de Cambacérès* (2nd ed., Paris, 1825).

(J. Hl. R.)

CAMBALUC, the name by which, under sundry modifications, the royal city of the great khan in China became known to Europe during the middle ages, that city being in fact the same that we now know as Peking. The word itself represents the Mongol Khan-Balik, "the city of the khan," or emperor, the title by which Peking continues, more or less, to be known to the Mongols and other northern Asiatics.

A city occupying approximately the same site had been the capital of one of the principalities into which China was divided some centuries before the Christian era; and during the reigns of the two Tatar dynasties that immediately preceded the Mongols in northern China, viz. that of the Khitans, and of the Kin or "Golden" khans, it had been one of their royal residences. Under the names of Yenking, which it received from the Khitan, and of Chung-tu, which it had from the Kin, it holds a conspicuous place in the wars of Jenghiz Khan against the latter dynasty. He captured it in 1215, but it was not till 1284 that it was adopted as the imperial residence in lieu of Karakorum in the Mongol steppes by his grandson Kublai. The latter selected a position a few hundred yards to the north-east of the old city of Chung-tu or Yenking, where he founded the new city of Ta-tu ("great capital"), called by the Mongols Taidu or Daitu, but also Khan-Balik; and from this time dates the use of the latter name as applied to this site.

The new city formed a rectangle, enclosed by a colossal mud rampart, the longer sides of which ran north and south. These were each about 5⅛ English m. in length, the shorter sides 3¾ m., so that the circuit was upwards of 18 m. The palace of the khan, with its gardens and lake, itself formed an inner enclosure fronting the south. There were eleven city gates, viz. three on the south side, always the formal front with the Tatars, and two on each of the other sides; and the streets ran wide and straight from gate to gate (except, of course, where interrupted by the palace walls), forming an oblong chess-board plan.

Ta-tu continued to be the residence of the emperors till the fall of the Mongol power (1368). The native dynasty (Ming) which supplanted them established their residence at Nan-king ("South Court"), but this proved so inconvenient that Yunglo, the third sovereign of the dynasty, reoccupied Ta-tu, giving it then, for the first time, the name of Pe-king ("North Court"). This was the name in common use when the Jesuits entered China towards the end of the 16th century, and began to send home accurate information about China. But it is not so now; the names in ordinary use being King-cheng or King-tu, both signifying "capital." The restoration of Cambaluc was commenced in 1409. The size of the city was diminished by the retrenchment of nearly one-third at the northern end, which brought the enceinte more nearly to a square form. And this constitutes the modern (so-called) "Tatar city" of Peking, the south front of which is identical with the south front of the city of Kublai. The walls were completed in 1437. Population gathered about the southern front, probably using the material of the old city of Yenking, and the excrescence so formed was, in 1544, enclosed by a wall and called the "outer city." It is the same that is usually called by Europeans "the Chinese city." The ruins of the retrenched northern portion of Kublai's great rampart are still prominent along their whole extent, so that there is no room for question as to the position or true dimensions of the Cambaluc of the middle ages; and it is most probable, indeed it is almost a necessity, that the present palace stands on the lines of Kublai's palace.

The city, under the name of Cambaluc, was constituted into an archiepiscopal see by Pope Clement V. in 1307, in favour of the missionary Franciscan John of Montecorvino (d. 1330); but though some successors were nominated it seems probable that no second metropolitan ever actually occupied the seat.

Maps of the 16th and 17th centuries often show Cambaluc in an imaginary region to the north of China, a part of the misconception that has prevailed regarding Cathay. The name is often in popular literature written Cambalu, and is by Longfellow accented in verse *Cámbălú*. But this spelling originates in an accidental error in Ramusio's Italian version, which was the chief channel through which Marco Polo's book was popularly known. The original (French) MSS. all agree with the etymology in calling it Cambaluc, which should be accented *Cămbăluc*.

CAMBAY, a native state of India, within the Gujarat division of Bombay. It has an area of 350 sq. m. Pop. (1901) 75,225, showing a decrease of 16% in the decade, due to the famine of 1899–1900. The estimated gross revenue is £27,189; the tribute, £1460. In physical character Cambay is entirely an alluvial plain. As a separate state it dates only from about 1730, the time of the dismemberment of the Mogul empire. The present chiefs are descended from Momin Khan II., the last of the governors of Gujarat, who in 1742 murdered his brother-in-law, Nizam Khan, governor of Cambay, and established himself there.

The town of Cambay had a population in 1901 of 31,780. It is supposed to be the *Camanes* of Ptolemy, and was formerly a very flourishing city, the seat of an extensive trade, and celebrated for its manufactures of silk, chintz and gold stuffs; but owing principally to the gradually increasing difficulty of access by water, owing to the silting up of the gulf, its commerce has long since fallen away, and the town has become poor and dilapidated. The spring tides rise upwards of 30 ft., and in a channel usually so shallow form a serious danger to shipping. The trade is chiefly confined to the export of cotton. The town is celebrated for its manufacture of agate and carnelian ornaments, of reputation principally in China. The houses in many instances are built of stone (a circumstance which indicates the former

wealth of the city, as the material had to be brought from a very considerable distance); and remains of a brick wall, 3 m. in circumference, which formerly surrounded the town, enclose four large reservoirs of good water and three bazaars. To the south-east there are very extensive ruins of subterranean temples and other buildings half-buried in the sand by which the ancient town was overwhelmed. These temples belong to the Jains, and contain two massive statues of their deities, the one black, the other white. The principal one, as the inscription intimates, is Pariswanath, or Parswanath, carved in the reign of the emperor Akbar; the black one has the date of 1651 inscribed. In 1780 Cambay was taken by the army of General Goddard, was restored to the Mahrattas in 1783, and was afterwards ceded to the British by the peshwa under the treaty of 1803. It was provided with a railway in 1901 by the opening of the 11 m. required to connect with the gaekwar of Baroda's line through Petlad.

CAMBAY, GULF OF, an inlet in the coast of India, in the Gujarat division of Bombay. It is about 80 m. in length, but is shallow and abounds in shoals and sandbanks. It is supposed that the depth of water in this gulf has been decreasing for more than two centuries past. The tides, which are very high, run into it with amazing velocity, but at low water the bottom is left nearly dry for some distance below the latitude of the town of Cambay. It is, however, an important inlet, being the channel by which the valuable produce of central Gujarat and the British districts of Ahmedabad and Broach is exported; but the railway from Bombay to Baroda and Ahmedabad, near Cambay, has for some time past been attracting the trade to itself.

CAMBER (derived through the Fr. from Lat. *camera*, vault), in architecture, the upward curvature given to a beam and provided for the depression or sagging, which it is liable to, before it has settled down to its bearings. A " camber arch " is a slight rise given to the straight-arch to correct an apparent sinking in the centre (see ARCH).

CAMBERT, ROBERT (1628–1677), French operatic composer, was born in Paris in 1628. He was a pupil of Chambonnières. In 1655, after he had obtained the post of organist at the church of St Honoré, he married Marie du Moustier. He was musical superintendent to Queen Anne of Austria, mother of Louis XIV., and for a time held a post with the marquis de Sourdeac. His earlier works, the words of which were furnished by Pierre Perrin, continued to be performed before the court at Vincennes till the death of his patron Cardinal Mazarin. In 1669 Perrin received a patent for the founding of the *Académie Nationale de musique*, the germ of the Grand Opéra, and Cambert had a share in the administration until both he and Perrin were discarded in the interests of Lulli. Displeased at his subsequent neglect, and jealous of the favour shown to Lulli, who was musical superintendent to the king, he went in 1673 to London, where soon after his arrival he was appointed master of the band to Charles II. One at least of his operas, *Pomone*, was performed in London under his direction, but it did not suit the popular taste, and he is supposed to have killed himself in London in 1677. His other principal operas were *Ariadne ou les amours de Bacchus* and *Les Peines et les plaisirs de l'amour*.

CAMBERWELL, a southern metropolitan borough of London, England, bounded N. by Southwark and Bermondsey, E. by Deptford and Lewisham, W. by Lambeth, and extending S. to the boundary of the county of London. Pop. (1901) 259,339. Area, 4480 acres. It appears in Domesday, but the derivation of the name is unknown. It includes the districts of Peckham and Nunhead, and Dulwich (*q.v.*) with its park, picture-gallery and schools. Camberwell is mainly residential, and there are many good houses, pleasantly situated in Dulwich and southward towards the high ground of Sydenham. Dulwich Park (72 acres) and Peckham Rye Common and Park (113 acres) are the largest of several public grounds, and Camberwell Green was once celebrated for its fairs. Immediately outside the southern boundary lies a well-known place of recreation, the Crystal Palace. Among institutions may be mentioned the Camberwell school of arts and crafts, Peckham Road. In Camberwell Road is Cambridge House, a university settlement, founded in 1897 and incorporating the earlier Trinity settlement. The parliamentary borough of Camberwell has three divisions, North, Peckham and Dulwich, each returning one member; but is not wholly coincident with the municipal borough, the Dulwich division extending to include Penge, outside the county of London. The borough council consists of a mayor, ten aldermen, and sixty councillors.

CAMBIASI, LUCA (1527–1585), Genoese painter, familiarly known as Lucchetto da Genova (his surname is written also Cambiaso or Cangiagio), was born at Moneglia in the Genoese state, the son of a painter named Giovanni Cambiasi. He took to drawing at a very early age, imitating his father, and developed great aptitude for foreshortening. At the age of fifteen he painted, along with his father, some subjects from Ovid's *Metamorphoses* on the front of a house in Genoa, and afterwards, in conjunction with Marcantonio Calvi, a ceiling showing great daring of execution in the Palazzo Doria. He also formed an early friendship with Giambattista Castello; both artists painted together, with so much similarity of style that their works could hardly be told apart; from this friend Cambiasi learned much in the way of perspective and architecture. Luchetto's best artistic period lasted for twelve years after his first successes; from that time he declined in power, though not at once in reputation, owing to the agitations and vexations brought upon him by a passion which he conceived for his sister-in-law. His wife having died, and the sister-in-law having taken charge of his house and children, he endeavoured to procure a papal dispensation for marrying her; but in this he was disappointed. In 1583 he accepted an invitation from Philip II. to continue in the Escorial a series of frescoes which had been begun by Castello, now deceased; and it is said that one principal reason for his closing with this offer was that he hoped to bring the royal influence to bear upon the pope, but in this again he failed. Worn out with his disquietudes, he died in the Escorial in the second year of his sojourn. Cambiasi had an ardent fancy, and was a bold designer in a Raphaelesque mode. His extreme facility astonished the Spanish painters; and it is said that Philip II., watching one day with pleasure the offhand zest with which Luchetto was painting a head of a laughing child, was allowed the further surprise of seeing the laugh changed, by a touch or two upon the lips, into a weeping expression. The artist painted sometimes with a brush in each hand, and with a certainty equalling or transcending that even of Tintoret. He made a vast number of drawings, and was also something of a sculptor, executing in this branch of art a figure of Faith. Altogether he ranks as one of the ablest artists of his day. In personal character, notwithstanding his executive energy, he is reported to have been timid and diffident. His son Orazio became likewise a painter, studying under Luchetto.

The best works of Cambiasi are to be seen in Genoa. In the church of S. Giorgio—the martyrdom of that saint; in the Palazzo Imperiali Terralba, a Genoese suburb—a fresco of the " Rape of the Sabines "; in S. Maria da Carignano—a " Pietà," containing his own portrait and (according to tradition) that of his beloved sister-in-law. In the Escorial he executed several pictures; one is a Paradise on the vaulting of the church, with a multitude of figures. For this picture he received 12,000 ducats, probably the largest sum that had, up to that time, ever been given for a single work.

CAMBODIA[1] (called by the inhabitants *Sroc Khmer* and by the French *Cambodge*), a country of south-eastern Asia and a protectorate of France, forming part of French Indo-China.

Geography.—It is bounded N. by Siam and Laos, E. by Annam, S.E. and S. by Cochin-China, S.W. by the Gulf of Siam, and W. by Siam. Its area is estimated at approximately 65,000 sq. m.; its population at 1,500,000, of whom some three-quarters are Cambodians, the rest Chinese, Annamese, Chams, Malays, and aboriginal natives. The whole of Cambodia lies in the basin of the lower Mekong, which, entering this territory on the north, flows south for some distance, then inclines south-west as far as Pnom-penh, where it spreads into a delta and resumes a southerly course. The salient feature of Cambodian geography is the large lake Tonlé-Sap, in a depression 68 m. long from south-east to north-west and 15 m. wide. It is fed by several

[1] See also INDO-CHINA, FRENCH.

rivers and innumerable torrents, and at flood-time serves as a reservoir for the Mekong, with which it is connected by a channel some 70 m. long, known as the Bras du Lac and joining the river at Pnom-Penh. In June the waters of the Mekong, swollen by the rains and the melting of the Tibetan snows, rise to a height of 40 to 45 ft. and flow through the Bras du Lac towards the lake, which then covers an area of 770 sq. m., and like the river inundates the marshes and forests on its borders. During the dry season the current reverses and the depression empties so that the lake shrinks to an area of 100 sq. m., and its depth falls from 45-48 ft. to a maximum of 5 ft. Tonlé-Sap probably represents the chief wealth of Cambodia. It supports a fishing population of over 30,000, most of whom are Annamese; the fish, which are taken by means of large nets at the end of the inundation, are either dried or fermented for the production of the sauce known as *nuoc-mam*. The northern and western provinces of Cambodia which fall outside the densely populated zone of inundation are thinly peopled; they consist of plateaus, in many places thickly wooded and intersected by mountains, the highest of which does not exceed 5000 ft. The region to the east of the Mekong is traversed by spurs of the mountains of Annam and by affluents of the Mekong, the most important of these being the Se-khong and the Tonle-srepok, which unite to flow into the Mekong at Stung-treng. Small islands, inhabited by a fishing population, fringe the west coast.

Climate, Fauna and Flora.—The climate of Cambodia, like that of Cochin China, which it closely resembles, varies with the monsoons. During the north-east monsoon, from the middle of October to the middle of April, dry weather prevails and the thermometer averages from 77° to 80° F. During the south-west monsoon, from the middle of April to the middle of October, rain falls daily and the temperature varies between 85° and 95°. The wild animals of Cambodia include the elephant, which is also domesticated, the rhinoceros, buffalo and some species of wild ox; also the tiger, panther, leopard and honey-bear. Wild boars, monkeys and rats abound and are the chief enemies of the cultivator. The crocodile is found in the Mekong, and there are many varieties of reptiles, some of them venomous. The horse of Cambodia is only from 11 to 12 hands in height, but is strong and capable of great endurance; the buffalo is the chief draught animal. Swine are reared in large numbers. Nux vomica, gamboge, caoutchouc, cardamoms, teak and other valuable woods and gums are among the natural products.

People.—The Cambodians have a far more marked affinity with their Siamese than with their Annamese neighbours. The race is probably the result of a fusion of the Malay aborigines of Indo-China with the Aryan and Mongolian invaders of the country. The men are taller and more muscular than the Siamese and Annamese, while the women are small and inclined to stoutness. The face is flat and wide, the nose short, the mouth large and the eyes only slightly oblique. The skin is dark brown, the hair black and, while in childhood the head is shaved with the exception of a small tuft at the top, in later life it is dressed so as to resemble a brush. Both sexes wear the langouti or loin-cloth, which the men supplement with a short jacket, the women with a long scarf draped round the figure or with a long clinging robe. Morose, superstitious, and given to drinking and gambling, the Cambodians are at the same time clean, fairly intelligent, proud and courageous. The wife enjoys a respected position and divorce may be demanded by either party. Polygamy is almost confined to the richer classes. Though disinclined to work, the Cambodians make good hunters and woodsmen. Many of them live on the borders of the Mekong and the great lake, in huts built upon piles or floating rafts. The religion of Cambodia is Buddhism, and involves great respect towards the dead; the worship of spirits or local genii is also wide-spread, and Brahmanism is still maintained at the court. Monks or *bonzes* are very numerous; they live by alms and in return they teach the young to read, and superintend coronations, marriages, funerals and the other ceremonials which play a large part in the lives of the Cambodians. As in the rest of Indo-China, there is no hereditary nobility, but there exist castes founded on blood-relationship—the members of the royal family within the fifth degree (the *Brah-Vansa*) those beyond the fifth degree (*Brah-Van*), and the *Bakou*, who, as descendants of the ancient Brahmans, exercise certain official functions at the court. These castes, as well as the mandarins, who form a class by themselves, are exempt from tax or forced service. The mandarins are nominated by the king and their children have a position at court, and are generally chosen to fill the vacant posts in the administration. Under the native régime the common people attached themselves to one or other of the mandarins, who in return granted them the protection of his influence. Under French rule, which has modified the old usages in many respects, local government of the Annamese type tends to supplant this feudal system. Slavery was abolished by a royal ordinance of 1897.

Cambodian idiom bears a likeness to some of the aboriginal dialects of south Indo-China; it is agglutinate in character and rich in vowel-sounds. The king's language and the royal writing, and also religious words are, however, apparently of Aryan origin and akin to Pali. Cambodian writing is syllabic and complicated. The books (manuscripts) are generally formed of palm-leaves upon which the characters are traced by means of a style.

Industry and Commerce.—Iron, worked by the tribe of the Kouis, is found in the mountainous region. The Cambodians show skill in working gold and silver; earthenware, bricks, mats, fans and silk and cotton fabrics, are also produced to some small extent, but fishing and the cultivation of rice and in a minor degree of tobacco, coffee, cotton, pepper, indigo, maize, tea and sugar are the only industries worthy of the name. Factories exist near Pnom-Penh for the shelling of cotton-seeds. The Cambodian is his own artificer and self-sufficing so far as his own needs are concerned. Rice, dried fish, beans, pepper and oxen are the chief elements in the export trade of the country, which is in the hands of Chinese. The native plays little or no part in commerce.

Trade is carried on chiefly through Saigon in Cochin-China, Kampot, the only port of Cambodia, being accessible solely to coasting vessels. With the exception of the highway from Pnom-Penh (*q.v.*) the capital, to Kampot, the roads of Cambodia are not suited for vehicles. Pnom-Penh communicates regularly by the steamers of the "Messageries Fluviales" by way of the Mekong with Saigon.

Administration.—At the head of the government is the king (*rāj*). His successor is either nominated by himself, in which case he sometimes abdicates in his favour, or else elected by the five chief mandarins from among the Brah Vansa. The *upayu-vrāj* (*obbaioureach*) or king who has abdicated, the heir-presumptive (*uparāj*, *obbareach*) and the first princess of the blood are high dignitaries with their own retinues. The king is advised by a council of five ministers, the superior members of the class of mandarins; and the kingdom is divided into about fifty provinces administered by members of that body. France is represented by a resident superior, who presides over the ministerial council and is the real ruler of the country, and by residents exercising supervision in the districts into which the country is split up for the purposes of the French administration. In each residential district there is a council, composed of natives and presided over by the resident, which deliberates on questions affecting the district. The resident superior is assisted by the protectorate council, consisting of heads of French administrative departments (chief of the judicial service, of public works, &c.) and one native "notable," and the royal orders must receive its sanction before they can be executed. The control of foreign policy, public works, the customs and the exchequer are in French hands, while the management of police, the collection of the direct taxes and the administration of justice between natives remain with the native government. A French tribunal alone is competent to settle disputes where one of the parties is not a native.

The following is a summary of the local budget of Cambodia for 1899 and 1904:—

	Receipts.	Expenditure.
1899 . .	£235,329	£188,654
1904 . .	250,753	229,880

The chief sources of revenue are the direct taxes, including the poll-tax and the taxes on the products of the soil, which together amounted to £172,636 in 1904. The chief heads of expenditure are the civil list, comprising the personal allowance to the king and the royal family (£46,018 in 1904), public works (£39,593) and government house and residences (£29,977).

History.—The Khmers, the ancient inhabitants of Cambodia, are conjectured to have been the offspring of a fusion between the autochthonous dwellers in the Indo-Chinese peninsula, now represented by the Kouis and other savage tribes, and an invading race from the plateaus of central Asia. As early as the 12th century B.C., Chinese chronicles, which are almost the only source for the history of Cambodia till the 5th century A.D., mention a region called Fou-nan, in later times appearing under the name of Tchin-la; embracing the basin of the Menam, it extended eastwards to the Mekong and may be considered approximately coextensive with the Khmer kingdom. Some centuries before the Christian era, immigrants from the east coast of India began to exert a powerful influence over Cambodia, into which they introduced Brahmanism and the Sanskrit language. This Hinduizing process became more marked about the 5th century A.D., when, under S'rutavarman, the Khmers as a nation rose into prominence. The name *Kambuja*, whence the European form Cambodia, is derived from the Hindu *Kambu*, the name of the mythical founder of the Khmer race; it seems to have been officially adopted by the Khmers as the title of their country about this period. At the end of the 7th century the dynasty of S'rutavarman ceased to rule over the whole of Cambodia, which during the next century was divided into two portions ruled over by two sovereigns. Unity appears to have been re-established about the beginning of the 9th century, when with Jayavarman III. there begins a dynasty which embraces the zenith of Khmer greatness and the era during which the great Brahman monuments were built. The royal city of Angkor-Thom (see ANGKOR) was completed under Yasovarman about A.D. 900. In the 10th century Buddhism, which had existed for centuries in Cambodia, began to become powerful and to rival Brahmanism, the official religion. The construction of the temple of Angkor Vat dates probably from the first half of the 12th century, and appears to have been carried out under the direction of the Brahman Divakara, who enjoyed great influence under the monarchs of this period. The conquest of the rival kingdom of Champa, which embraced modern Cochin-China and southern Annam, and in the later 15th century was absorbed by Annam, may probably be placed at the end of the 12th century, in the reign of Jayavarman VIII., the last of the great kings. War was also carried on against the western neighbours of Cambodia, and the exhaustion consequent upon all these efforts seems to have been the immediate cause of the decadence which now set in. From the last decade of the 13th century there dates a valuable description of Tchin-la[1] written by a member of a Chinese embassy thereto. The same period probably also witnessed the liberation of the Thais or inhabitants of Siam from the yoke of the Khmers, to whom they had for long been subject, and the expulsion of the now declining race from the basin of the Menam. The royal chronicles of Cambodia, the historical veracity of which has often to be questioned, begin about the middle of the 14th century, at which period the Thais assumed the offensive and were able repeatedly to capture and pillage Angkor-Thom. These aggressions were continued in the 15th century, in the course of which the capital was finally abandoned by the Khmer kings, the ruin of the country being hastened by internal revolts and by feuds between members of the royal family. At the end of the 16th century, Lovek, which had succeeded Angkor-Thom as capital, was itself abandoned to the conquerors. During that century, the Portuguese had established some influence in the country, whither they were followed by the Dutch, but after the middle of the 17th century, Europeans counted for little in Cambodia till the arrival of the French. At the beginning of the 17th century the Nguyen, rulers of southern Annam, began to encroach on the territory of Cochin-China, and in the course of that and the 18th century, Cambodia, governed by two kings supported respectively by Siam and Annam, became a field for the conflicts of its two powerful neighbours. At the end of the 18th century the provinces of Battambang and Siem-reap were annexed by Siam. The rivalries of the two powers were concluded after a last and indecisive war by the treaty of 1846, as a result of which Ang-Duong, the protégé of Siam, was placed on the throne at the capital of Oudong, and the Annamese evacuated the country. In 1863, in order to counteract Siamese influence there, Doudart de Lagrée was sent by Admiral la Grandière to the court of King Norodom, the successor of Ang-Duong, and as a result of his efforts Cambodia placed itself under the protectorate of France. In 1866 Norodom transferred his capital to Pnom-Penh. In 1867 a treaty between France and Siam was signed, whereby Siam renounced its right to tribute and recognized the French protectorate over Cambodia in return for the provinces of Battambang and Angkor, and the Laos territory as far as the Mekong. In 1884 another treaty was signed by the king, confirming and extending French influence, and reducing the royal authority to a shadow, but in view of the discontent aroused by it, its provisions were not put in force till several years later. In 1904 the territory of Cambodia was increased by the addition to it of the Siamese provinces of Melupré and Bassac, and the maritime district of Krat, the latter of which, together with the province of Dansai, was in 1907 exchanged for the provinces of Battambang, Siem-reap and Sisophon. By the same treaty France renounced its sphere of influence on the right bank of the Mekong. In 1904 King Norodom was succeeded by his brother Sisowath.

[1] Translated by Abel Rémusat, *Nouveaux Mélanges Asiatiques* (1829).

See E. Aymonier, *Le Cambodge* (3 vols., Paris, 1900–1904); L. Moura, *Le royaume de Cambodge* (2 vols., Paris, 1883); A. Leclère, *Les codes cambodgiens* (2 vols., Paris, 1898), and other works on Cambodian law; Francis Garnier, *Voyage d'exploration en Indo-Chine* (Paris, 1873).

CAMBON, PIERRE JOSEPH (1756–1820), French statesman, was the son of a wealthy cotton merchant at Montpellier. In 1785 his father retired, leaving the direction of the business to Pierre and his two brothers, but in 1788 Pierre turned aside to politics, and was sent by his fellow-citizens as deputy *suppléant* to Versailles, where he was little more than a spectator. In January 1790 he returned to Montpellier, was elected a member of the municipality, was one of the founders of the Jacobin club in that city, and on the flight of Louis XVI. in 1791, he drew up a petition to invite the Constituent Assembly to proclaim a republic,—the first in date of such petitions. Elected to the Legislative Assembly, Cambon became noted for his independence, his honesty and his ability in finance. He was the most active member of the committee of finance and was often charged to verify the state of the treasury. Nothing could be more false than the common opinion that as a financier his sole expedient was to multiply the emissions of *assignats*. His remarkable speech of the 24th of November 1791 is a convincing proof of his sagacity. In politics, while he held aloof from the clubs, and even from parties, he was an ardent defender of the new institutions. On the 9th of February 1792, he succeeded in having a law passed sequestrating the possessions of the *émigrés*, and demanded, though in vain, the deportation of refractory priests to French Guiana. He was the last president of the Legislative Assembly. Re-elected to the Convention, he opposed the pretensions of the Commune and the proposed grant of money to the municipality of Paris by the state. He denounced Marat's placards as inciting to murder, summoned Danton to give an account of his ministry, watched carefully over the furnishing of military supplies, and was a strong opponent of Dumouriez, in spite of the general's great popularity. Cambon then incurred the hatred of Robespierre by proposing the suppression of the pay to the clergy, which would have meant the separation of church and state. His authority grew steadily. On the 15th of December 1792 he got the Convention to adopt a proclamation to all nations in favour of a universal republic. In the trial of

Louis XVI. he voted for his death, without appeal or postponement. He attempted to prevent the creation of the Revolutionary Tribunal, but when called to the first Committee of Public Safety he worked on it energetically to organize the armies. On the 3rd of February 1793 he had decreed the emission of 800 millions of *assignats*, for the expenses of the war. His courageous intervention in favour of the Girondists on the 2nd of June 1793 served Robespierre as a pretext to prevent his re-election to the Committee of Public Safety. But Cambon soon came to the conclusion that the security of France depended upon the triumph of the Mountain, and he did not hesitate to accord his active co-operation to the second committee. He took an active share in the various expedients of the government for stopping the depreciation of the *assignats*. He was responsible, especially, for the great operation known as the opening of the *Grand Livre* (August 24), which was designed to consolidate the public debt by cancelling the stock issued under various conditions prior to the Revolution, and issuing new stock of a uniform character, so that all fund-holders should hold stock of the revolutionary government and thus be interested in its stability. Each fund-holder was to be entered in the Great Book, or register of the public debt, for the amount due to him every year. The result of this measure was a rise in the face value of the *assignats* from 27% to 48% by the end of the year. In matters of finance Cambon was now supreme; but his independence, his hatred of dictatorship, his protests against the excesses of the Revolutionary Tribunal, won him Robespierre's renewed suspicion, and on the 8th Thermidor Robespierre accused him of being anti-revolutionary and an aristocrat. Cambon's proud and vehement reply was the signal of the resistance to Robespierre's tyranny and the prelude to his fall. Cambon soon had reason to repent of that event, for he became one of those most violently attacked by the Thermidorian reaction. The royalist pamphlets and the journals of J. L. Tallien attacked him with fury as a former *Montagnard*. He was charged with being responsible for the discredit of the *assignats*, and even accused of malversations. On the 21st of February 1795 the project which he presented to withdraw four milliards of *assignats* from circulation, was rejected, and on the 3rd of April he was excluded from the committee of finance. On the 16th Germinal, Tallien procured a decree of accusation against him, but he was already in safety, taking refuge probably at Lausanne. In any case he does not seem to have remained in Paris, although in the riot of the 1st Prairial some of the insurgents proclaimed him mayor. The amnesty of the 4th Brumaire of the year IV. (the 5th of October 1795), permitted him to return to France, and he withdrew to his estate of Terral near Montpellier, where, during the White Terror, he had a narrow escape from an attempt upon his life. At first Cambon hoped to find in Bonaparte the saviour of the republic, but, deceived by the 18th Brumaire, he lived throughout the whole of the empire in peaceful seclusion. During the Hundred Days he was deputy for Hérault in the chamber of representatives, and pronounced himself strongly against the return of the Bourbons, and for religious freedom. Under the Restoration the "amnesty" law of 1816 condemned him as a regicide to exile, and he withdrew to Belgium, to St Jean-Ten-Noode, near Brussels, where he died on the 15th of February 1820. (R. A.*)

See Bornarel, *Cambon* (Paris).

CAMBON, PIERRE PAUL (1843–), French diplomatist, was born on the 20th of January 1843. He was called to the Parisian bar, and became private secretary to Jules Ferry in the prefecture of the Seine. After ten years of administrative work in France as secretary of prefecture, and then as prefect successively of the departments of Aube (1872), Doubs (1876), Nord (1877–1882), he exchanged into the diplomatic service, being nominated French minister plenipotentiary at Tunis. In 1886 he became French ambassador to Madrid; was transferred to Constantinople in 1890, and in 1898 to London. He was decorated with the grand cross of the Legion of Honour, and became a member of the French Academy of Sciences.

His brother, JULES MARTIN CAMBON (1845–), was called to the bar in 1866, served in the Franco-Prussian War and entered the civil service in 1871. He was prefect of the department of Nord (1882) and of the Rhone (1887–1891), and in 1891 became governor-general of Algeria (see Guyot, *L'œuvre de M. Jules Cambon*, Paris, 1897), where he had served in a minor position in 1874. He was nominated French ambassador at Washington in 1897, and in that capacity negotiated the preliminaries of peace on behalf of the Spanish government after the war with the United States. He was transferred in 1902 to Madrid, and in 1907 to Berlin.

CAMBORNE, a market town in the Camborne parliamentary division of Cornwall, England, on the Great Western railway, 13 m. E.N.E. of Penzance. Pop. of urban district (1901), 14,726. It lies on the northward slope of the central elevation of the county, and is in the neighbourhood of some of the most productive tin and copper mines. These and the manufacture of mining machinery employ most of the inhabitants. The parish church of St Martin contains several monuments and an ancient stone altar bearing a Latin inscription. There are science and art and mining schools, and practical mining is taught in South Condurrow mine, the school attracting a large number of students. It was developed from classes initiated in 1859 by the Miners' Association, and a three years' course of instruction is provided.

Camborne (*Cambron*, *Camron*) formed a portion of the extensive manor of Tehidy, which at the time of the Domesday Survey was held by the earl of Mortain and subsequently by the Dunstanville and Basset families. Its interests were economically insignificant until the beginning of the 18th century when the rich deposits of copper and tin began to be vigorously worked at Dolcoath. It has been estimated that in 1788 this mine alone had produced ore worth £2,000,000 and in 1882 ore worth £5,500,000. As the result of the prosperity of this and other mines in the neighbourhood the population in 1860 was double that of 1830, six times that of 1770 and fifteen times that of 1660. Camborne was the scene of the scientific labours of Richard Trevithick (1771–1833), the engineer, born in the neighbouring parish of Illogan, and of William Bickford, the inventor of the safety-fuse, a native of Camborne. Three fairs on the feasts of St Martin and St Peter and on 25th of February were granted in 1708. The two former are still held, the last has been transferred to the 7th of March. A Tuesday market formed the subject of a judicial inquiry in 1768, but since the middle of the 19th century it has been held on Saturdays.

CAMBRAI, a town of northern France, capital of an arrondissement in the department of Nord, 37 m. S.S.E. of Lille on the main line of the Northern railway. Pop. (1906) 21,791. Cambrai is situated on the right and eastern bank of the Scheldt (arms of which traverse the west of the town) and at one extremity of the canal of St Quentin. The fortifications with which it was formerly surrounded have been for the most part demolished. The fosses have been filled up and the ramparts in part levelled to make way, as the suburbs extended, for avenues stretching out on all sides. The chief survivals from the demolition are the huge square citadel, which rises to the east of the town, the château de Selles, a good specimen of the military architecture of the 13th century, and, among other gates, the Porte Notre-Dame, a stone and brick structure of the early 17th century. Handsome boulevards now skirt the town, the streets of which are clean and well-ordered, and a large public garden extends at the foot of the citadel, with a statue of Enguerrand de Monstrelet the chronicler. The former cathedral of Cambrai was destroyed after the Revolution. The present cathedral of Notre-Dame is a church of the 19th century built on the site of the old abbey church of St Sépulchre. Among other monuments it contains that of Fénelon, archbishop from 1695 to 1715, by David d'Angers. The church of St Géry (18th century) contains, among other works of art, a marble rood-screen of Renaissance workmanship. The Place d'Armes, a large square in the centre of the town, is bordered on the north by a handsome hôtel de ville built in 1634 and rebuilt in the 19th century. The Tour St Martin is an old church-tower of the 15th and 18th centuries transformed into a belfry. The triple stone portal, which gave entrance to the former archiepiscopal palace, is a work of the Renaissance period. The

present archbishop's palace, adjoining the cathedral, occupies the site of an old Benedictine convent.

Cambrai is the seat of an archbishop and a sub-prefect, and has tribunals of first instance and of commerce, a board of trade-arbitrators, a chamber of commerce and a branch of the Bank of France. Its educational institutions include communal colleges, ecclesiastical seminaries, and schools of drawing and music. The library has over 40,000 volumes and there is a museum of antiquities and objects of art. The chief industry of Cambrai is the weaving of muslin (*batiste*) and other fine fabrics (see CAMBRIC); wool-spinning and weaving, bleaching and dyeing, are carried on, as well as the manufacture of chicory, oil, soap, sausages and metal boxes. There are also large beet-sugar works and breweries and distilleries. Trade is in cattle, grain, coal, hops, seed, &c.

Cambrai is the ancient Nervian town of *Camaracum*, which is mentioned in the Antonine Itinerary. In the 5th century it was the capital of the Frankish king Raguacharius. Fortified by Charlemagne, it was captured and pillaged by the Normans in 870, and unsuccessfully besieged by the Hungarians in 953. During the 10th, 11th and 12th centuries it was the scene of frequent hostilities between the bishop and his supporters on the one hand and the citizens on the other; but the latter ultimately effected their independence. In 1478 Louis XI., who had obtained possession of the town on the death of Charles the Bold, duke of Burgundy, handed it over to the emperor, and in the 16th century Charles V. caused it to be fortified with a strong citadel, for the erection of which the castles of Cavillers, Escaudoeuvres and many others were demolished. From that date to the peace of Nijmwegen, 1678, which assigned it to France, it frequently passed from hand to hand by capture or treaty. In 1793 it was besieged in vain by the Austrians. The League of Cambrai is the name given to the alliance of Pope Julius II., Louis XII., Maximilian I., and Ferdinand the Catholic against the Venetians in 1508; and the peace of Cambrai, or as it is also called, the Ladies' Peace, was concluded in the town in 1529 by Louise of Savoy, mother of Francis I., and Margaret of Austria, aunt of Charles V., in the name of these monarchs. The bishopric of Cambrai dates from the 5th century, and was raised in 1559 to the rank of an archbishopric, which continued till the Revolution, and has since been restored. The bishops received the title of count from the emperor Henry I. (919–936), and in 1510 were raised to the dignity of dukes, their territory including the town itself and its territory, called Cambrésis.

See E. Bouly, *Histoire de Cambrai et du Cambrésis* (Cambria, 1843).

CAMBRIA, the Med. Lat. name for Wales. After the end of the western Roman empire the Cymric Celts held for a while both Wales and the land round the Solway (now Cumberland and adjacent regions), and the former came to be called Cambria, the latter Cumbria, though the two names were sometimes interchanged by early medieval writers.

CAMBRIAN SYSTEM, in geology, the name now universally employed to designate the earliest group of Palaeozoic rocks which possesses a connected suite of fossils. The strata of this system rest upon the Pre-Cambrian, and are succeeded by the Ordovician system. Until the fourth decade of the 19th century all stratified rocks older than the Carboniferous had been grouped by geologists into a huge and indefinite "Transition Series." In 1831 Adam Sedgwick and Sir Roderick I. Murchison began the herculean task of studying and sub-dividing this series of rocks as it occurs in Wales and the bordering counties of England. Sedgwick attacked the problem in the Snowdon district, where the rocks are highly altered and displaced and where fossils are comparatively difficult to obtain; Murchison, on the other hand, began to work at the upper end of the series where the stratigraphy is simple and the fossils are abundant. Murchison naturally made the most of the fossils collected, and was soon able to show that the transition series could be recognized by them, just as younger formations had fossils peculiar to themselves; as he zealously worked on he followed the fossiliferous rocks further afield and continually lower in the series. This fossil-bearing set of strata he first styled the "fossiliferous greywacke series," changing it in 1835 to "Silurian system."

In the same year Sedgwick introduced the name "Cambrian series" for the older and lower members. Murchison published his Silurian system in 1839, wherein he recognized the Cambrian to include the barren slates and grits of Harlech, Llanberis and the Long Mynd. So far, the two workers had been in agreement; but in his presidential address to the Geological Society of London in 1842 Murchison stated his opinion that the Cambrian contained no fossils that differed from those of the Lower Silurian. Whereupon Sedgwick undertook a re-examination of the Welsh rocks with the assistance of J. W. Salter, the palaeontologist; and in 1852 he included the Llandeilo and Bala beds (Silurian) in the Upper Cambrian. Two years later Murchison brought out his *Siluria*, in which he treated the Cambrian system as a mere local facies of the Silurian system, and he included in the latter, under J. Barrande's term "Primordial zone," all the lower rocks, although they had a distinctive fauna.

Meanwhile in Europe and America fossils were being collected from similar rocks which were classed as Silurian, and the use of "Cambrian" was almost discarded, because, following Murchison, it was taken to apply only to a group of rocks without a characteristic fauna and therefore impossible to recognize. Most of the Cambrian rocks were coloured as Silurian on the British official geological maps.

Nevertheless, from 1851 to 1855, Sedgwick, in his writings on the British palaeozoic deposits, insisted on the independence of the Cambrian system, and though Murchison had pushed his Silurian system downward in the series of rocks, Sedgwick adhered to the original grouping of his Cambrian system, and even proposed to limit the Silurian to the Ludlow and Wenlock beds with the May Hill Sandstone at the base. This attitude he maintained until the year of his death (1873), when there appeared his introduction to Salter's *Catalogue of Cambrian and Silurian Fossils.*

It is not to be supposed that one of these great geologists was necessarily in the wrong; each had right on his side. It was left for the subsequent labours of Salter and H. Hicks to prove that the rocks below the undoubted lower Silurian of Murchison did indeed possess a characteristic fauna, and their work was confirmed by researches going on in other countries. To-day the recognition of the earliest fossil-bearing rocks, below the Llandeilo formation of Murchison, as belonging to the Cambrian system, and the threefold subdivision of the system according to palaeontological evidence, may be regarded as firmly established.

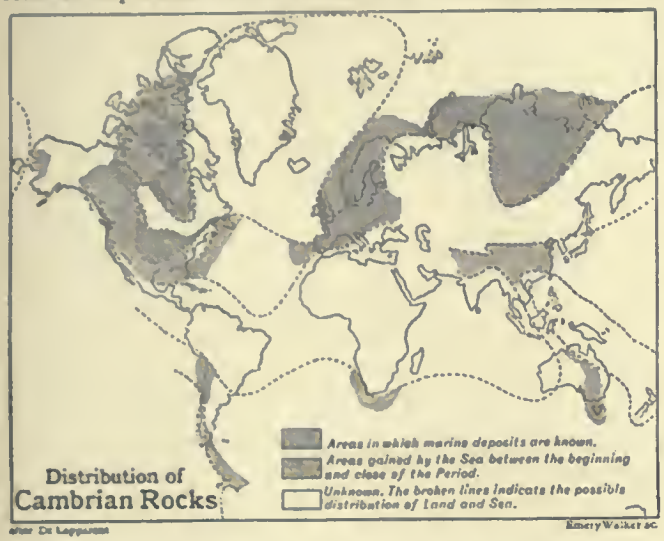
It should be noted that A. de Lapparent classifies the Cambrian as the lowest stage in the Silurian, the middle and upper stages being Ordovician and Gothlandian. E. Renevier proposed to use *Silurique* to cover the same period with the Cambrian as the lowest series, but these differences of treatment are merely nominal. Jules Marcou and others have used *Taconic* (Taconian) as the equivalent of Cambrian, and C. Lapworth proposed to apply the same term to the lowest sub-division only; he had also used "Annelidian" in the same sense. These names are of historical interest alone.

Cambrian Rocks.—The lithological characters of the Cambrian rocks possess a remarkable uniformity in all quarters of the globe. Muds, sands, grits and conglomerates are the predominant types. In Scotland, North America and Canada important deposits of limestone occur and subordinate limestones are found in the Cambrian of central Europe.

In some regions, notably in the Baltic province and in parts of the United States, the rocks still retain their original horizontality of deposition, the muds are scarcely indurated and the sands are still incoherent; but in most parts of the world they bear abundant evidence of the many movements and stresses to which they have been exposed through so enormous a period of time. Thus, we find them more frequently, folded, tilted and cleaved; the muds have become shales, slates, phyllites or schists, the grey and red sands and conglomerates have become quartzites and greywackes, while the limestones are very generally dolomitized. In the Cambrian limestones, as in their more

recent analogues, layers and nodules of chert and phosphatized material are not wanting.

Igneous rocks are not extensively developed; in Wales they form an important feature and occur in considerable thickness;


Areas in which marine deposits are known.
Areas gained by the Sea between the beginning and close of the Period.
Unknown. The broken lines indicate the possible distribution of Land and Sea.
Distribution of
Cambrian Rocks
after De Lapparent
Emery Walker sc.

they are represented by lavas of olivine-diabase and by contemporaneous tuffs which are traversed by later granite and quartz felsite. In the Cambrian of Brittany there are acid lavas and tuffs. Quartz porphyry, diabase and diorite appear in the Ardennes. In Bohemia, North America and Canada igneous rocks have been observed.

In China, on the Yang-tse river, a thick deposit has been found full of boulders of diverse kinds of rock, striated in the manner that is typical of glacial action. A similar deposit occurs in the Gaisa beds near the Varanger Fjord in Norway. These formations lie at the base of the lowest Cambrian strata and may possibly be included in the pre-Cambrian, though in Norway they are clearly resting upon a striated floor of crystalline rocks.

Cambrian Life.—In a general survey of the life of this period, as it is revealed by the fossils, three outstanding facts are apparent: (1) the great divergence between the Cambrian fauna and that of the present day; (2) the Cambrian life assemblage differs in no marked manner from that of the succeeding Ordovician and Silurian periods; there is a certain family likeness which unites all of them; (3) the extraordinary complexity and diversity not only in the assemblage as a whole but within certain limited groups of organisms. Although in the Cambrian strata we have the oldest known fossiliferous rocks—if we leave out of account the very few and very obscure organic remains hitherto recorded from the pre-Cambrian—yet we appear to enter suddenly into the presence of a world richly peopled with a suite of organisms already far advanced in differentiation; the Cambrian fauna seems to be as far removed from what must have been the first forms of life, as the living forms of this remote period are distant from the creatures of to-day.

With the exception of the vertebrates, every one of the great classes of animals is represented in Cambrian rocks. Simple protozoa appear in the form of Radiolaria; Lithistid sponges are represented by such forms as *Archaeoscyphia*, Hexactinellid sponges by *Protospongia*; Graptolites (*Dictyograptus* (*Dictyonema*)) come on in the higher parts of the system. Medusa-like casts have been found in the lower Cambrian of Scandinavia (*Medusina*) and in the mid-Cambrian of Alabama (*Brooksella*). Corals, *Archaeocyathus*, *Spirocyathus*, &c., lived in the Cambrian seas along with starfishes (*Palaeasterina*), Cystideans, *Protocystites*, *Trochocystites* and possibly Crinoids, *Dendrocrinus*. Annelids left their traces in burrows and casts on the sea-floor (*Arenicolites*, *Cruziana*, *Scolithus*, &c.). Crustacea occupied an extremely prominent place; there were Phyllocarids such as *Hymenocaris*, and Ostracods like *Entomidella*; but by far the most important in numbers and development were the Trilobites, now extinct, but in palaeozoic times so abundant. In the Cambrian period trilobites had already attained their maximum size; some species of *Paradoxides* were nearly 2 ft. long, but in company with these monsters were tiny forms like *Agnostus* and *Microdiscus*. Many of the Cambrian trilobites appear to have been blind, and they had not at this period developed that flexibility in the carapace that some forms acquired later.

Brachiopods were fairly abundant, particularly the non-articulated forms (*Obolus*, *Lingulella*, *Acrotreta*, *Discinopsis*, &c.); amongst the articulate genera are *Kutorgina*, *Orthis*, *Rhynchonella*. It is a striking fact that certain of these non-articulate "lamp-shells" are familiar inhabitants of our present seas. Each of the principal groups of true mollusca was represented: Pelecypods (*Modioloides*); Gasteropods (*Scenella*, *Pleurotomaria*, *Trochonema*); Pteropods (*Hyolithellus*, *Hyolithes*, *Salterella*); Cephalopods (*Orthoceras*, *Cystoceras*). Of land plants no traces have yet been discovered. Certain markings on slates and sandstones, such as the "fucoids" of Scandinavia and Scotland, the *Phycoides* of the Fichtelgebirge, *Eophyton* and other seaweed-like impressions, may indeed be the casts of fucoid plants; but it is by no means sure that many of them are not mere inorganic imitative markings or the tracks or casts of worms. *Oldhamia*, a delicate branching body, abundant in the Cambrian of the south-east of Ireland, is probably a calcareous alga, but its precise nature has not been satisfactorily determined.

Cambrian Stratigraphy.—Wherever the Cambrian strata have been carefully studied it has now been found possible and convenient to arrange them into three series, each of which is characterized by a distinctive genus of trilobite. Thus we have a Lower Cambrian with *Olenellus*, a middle series with *Paradoxides* and an Upper Cambrian with *Olenus*. It is true that these fossils are not invariably present in every occurrence of Cambrian strata, but this fact notwithstanding, the threefold division holds with sufficient constancy. An uppermost series lies above the *Olenus* fauna in some areas; it is represented by the Tremadoc beds in Britain or by the *Dictyonema* beds or *Euloma-Niobe* fauna elsewhere. Three regions deserve special attention: (1) Great Britain, the area in which the Cambrian was first differentiated from the old "Transition Series"; (2) North America, on account of the wide-spread occurrence of the rocks and the abundance and perfection of the fossils; and (3) Bohemia, made classic by the great labours of J. Barrande.

Great Britain and Ireland.—The table on p. 660 contains the names that have been applied to the subdivisions of the Cambrian strata in the areas of outcrop in Wales and England; at the same time it indicates approximately their relative position in the system.

In *Scotland* the upper and middle series are represented by a thick mass of limestone and dolomite, the Durness limestone (1500 ft.). In the lower series are, in descending order, the "Serpulite grits" or "Salterella beds," the "Fucoid beds" and the "Eriboll quartzite," which is divided into an upper "Pipe rock" and lower "Basal quartzite."

The Cambrian rocks of *Ireland*, a great series of purple and green shales, slates and grits with beds of quartzite, have not yet yielded sufficient fossil evidence to permit of a correlation with the Welsh rocks, and possibly some parts of the series may be transferred in the future to the overlying Ordovician.

North America.—On the North American continent, as in Europe, the Cambrian system is divisible into three series: (1) the lower or "Georgian," with *Olenellus* fauna; (2) the middle or "Acadian," with *Paradoxides or Dikelocephalus* fauna; (3) the upper or "Potsdam," with *Olenus* fauna (with Saratogan or St Croix as synonyms for Potsdam). The lower division appears on the Newfoundland and Labrador coasts, and is traceable thence, in a great belt south-west of those points, through Maine and the Hudson-Champlain valley into Alabama, a distance of some 2000 m.; and the rocks are brought up again on the western uplift, in Nevada, Idaho, Utah, western Montana and British Columbia. The middle division covers approximately the same region as the lower one, and in addition it is found in Texas, Oklahoma, Indian Territory, Arizona, in western Montana, and possibly in western Wisconsin. The lower division, in addition to covering the areas already indicated, spreads over the interior of the United States.

Bohemia.—The Cambrian rocks of this country are now recognized by J. F. Pompeskj to comprise the Paradoxidian and Olenellidian groups. They were made famous through the researches of Barrande. The Cambrian system is covered by his stages "B" and "C"; the

former a barren series of conglomerates and quartzites, the latter a series of grey and green fissile shales 1200 ft. thick with sandstones, greywackes and conglomerates.

Scandinavia.—Here the Cambrian system is only distinguished clearly on the eastern side, where the three subdivisions are found in a thin series of strata (400 ft.), in which black concretion-bearing shales play an important part. Limestones and shales with the *Euloma-Niobe* fauna come at the top. The upper series (*Olenus*) has been minutely zoned by W. C. Brögger, S. A. Tullberg and J. C. Moberg. In the middle series (*Paradoxides*) three thin limestone bands have been distinguished, the Fragmenten-Kalk, the Exulans-Kalk and the Andrarums-Kalk.

On the Norwegian side the Cambrian is perhaps represented by the Röros schists which lie at the base of a great series of crystalline schists, the probable equivalent of Ordovician and Silurian rocks.

Baltic Province.—The Cambrian rocks in this region are nearly all soft sediments, some 600 ft. thick; they reach from the Gulf of Finland towards Lake Ladoga. At the base is the so-called "blue clay" (really greenish) with ferruginous sandstones and with a fucoidal sandstone at its summit. This division is the equivalent of the Lower Cambrian. Above the fucoidal sandstone an important break appears in the system, for the *Paradoxides* and *Olenus* divisions are absent. The upper members are the "Ungulite grit" and about 20 ft. of Dictyonema shale. Cambrian rocks have been traced into Siberia (lat. 71°) and on the island of Vaigatch.

Central Europe.—Besides the Bohemian region previously mentioned, Cambrian rocks are present in Belgium and the north of France, in Spain and the Thüringer Wald. In the Ardennes the system is represented by grits and sandstones, shales, slates and quartz schists, and includes also whet slates and some igneous rocks. A. Dumont has arranged the whole series (*Terrain ardennais*) into three systems, an upper "Salmien," a middle "Revinien" and a lower "Devillien," but J. Gosselet has subsequently proposed to unite the two lower groups in one.

France.—In northern France Cambrian rocks, mostly purple conglomerates and red shales, rest with apparent unconformability upon pre-Cambrian strata in Brittany, Normandy and northern Poitou. In the Rennes basin limestones—often dolomitic—are associated with quartzites and conglomerates; silicious limestones also occur in the Sarthe region. Farther south, around the old lands of Languedoc, equivalents of the two upper divisions of the Cambrian have been recorded; and the uppermost members of the system appear in Herault. Patches of Cambrian rocks are found in the Pyrenees.

In *Spain* slates and quartzites, the slates of Rivadeo, more than 9000 ft. thick, are followed by the middle Cambrian beds of La Vega, thick quartzites with limestone, slates and iron ores. Cambrian rocks occur also in the provinces of Seville and Ciudad-Real. Upper Cambrian strata have been found in upper Alemtejo in Portugal.

In *Russian Poland* is a series of conglomerates, quartzites and shales; some of the beds yield a *Paradoxides* fauna.

In the *Thüringer Wald* are certain strata, presumably Cambrian since the uppermost beds contain the *Euloma-Niobe* fauna.

Sardinia contains both middle and upper Cambrian. The Cambrian system is represented in the Salt Range of India by the Neobolus or Khussack beds, which may possibly belong to the middle subdivision. The same group is probably represented in Corea and the Liao-tung by the thick "Sinisian" formation of F. von Richthofen.

In *South America* upper Cambrian rocks have been recorded from north Argentina.

The Lower Cambrian has been found at various places in *South Australia*; and in *Tasmania* a thick series of strata appears to be in part at least of Upper Cambrian age.

	North Wales.	South Wales.	Midland and West of England.		
			Shropshire.	Malvern Hills.	Nuneaton.
Upper Cambrian, *Olenus* fauna	Tremadoc slates (*Euloma-Niobe* fauna) Lingula flags (1) Dolgelly beds (2) Ffestiniog beds (3) Maentwrog beds	Tremadoc beds Lingula flags	Shineton shales and shales with *Dictyonema*	Bronsil shales, grey (*Niobe* fauna) Malvern black shales (White-leaved-oak shales)	Upper Stockingford shales (Merivale shales) Middle Stockingford shales, (Oldbury shales)
Middle Cambrian, *Paradoxides* fauna	Menevian beds	Menevian beds Solva group	Comley or Hollybush sandstone with upper Comley limestone	Hollybush sandstone	Lower Stockingford shales (Purley shales)
Lower Cambrian, *Olenellus* fauna	Harlech grits and Llanberis slates	Caerfai group	Lower Comley limestone Wrekin quartzite	Hollybush sandstone with Malvern quartzite and conglomerate at the base	Upper Hartshill quartzite. *Hyolithes* shales and limestone Middle and lower Hartshill quartzite and the quartzite of the Lickey Hills

General Physical Conditions in the Cambrian Period.—The Cambrian rocks previously described are all such as would result from deposition, in comparatively shallow seas, of the products of degradation of land surfaces by the ordinary agents of denudation. Evidences of shallow water conditions are abundant; very frequently on the bedding surfaces of sandstones and other rocks we find cracks made by the sun's heat and pittings caused by the showers that fell from the Cambrian sky, and these records of the weather of this remote period are preserved as sharply and clearly as those made only to-day on our tidal reaches. Ripple marks and current bedding further point to the shallowness of the water at the places where the rocks were made.

No Cambrian rocks are such as would be formed in the abysses of the sea—although the absence of well-developed eyes in the trilobites has led some to assume that this condition was an indication that the creatures lived in abyssal depths.

At the close of the pre-Cambrian, many of the deposits of that period must have been elevated into regions of fairly high ground; this we may assume from the nature of the Cambrian deposits which are mainly the product of the denudation of such ground. Over the land areas thus formed, the seas in Cambrian time gradually spread, laying down first the series known as Lower Cambrian, then by further encroachment on the land the wider spread Upper Cambrian deposits—in Europe, the middle series is the most extensive. Consequently, Cambrian strata are usually unconformable on older rocks.

During the general advance of the sea, local warpings of the crust may have given rise to shallow lagoon or inland-lake conditions. The common occurrence of red strata has been cited in support of this view.

Compared with some other periods, the Cambrian was free from extensive volcanic disturbances, but in Wales and in Brittany the earlier portions of this period were marked by voluminous outpourings; a condition that was feebly reflected in central and southern Europe.

No definite conclusions can be drawn from the fossils as to the climatic peculiarities of the earth in Cambrian times. The red rocks may in some cases suggest desert conditions; and there is good reason to suppose that in what are now Norway and China a glacial cold prevailed early in the period.

Considerable variations occur in the thickness of Cambrian deposits, which may generally be explained by the greater

rapidity of deposition in some areas than in others. Nothing could be more striking than the difference between the thicknesses in western and eastern Europe; in Brittany the deposits are over 24,000 ft. thick, in Wales at least 12,000 ft., in western England they are only 3000 ft., and in northern Scotland 2000 ft., while no farther east than Scandinavia the complete Cambrian succession is only about 400 ft. thick. Again, in North America, the greatest thicknesses are found along the mountainous regions on the west and on the east—reaching 12,000 ft. in the latter and probably nearly 40,000 ft. in the former (in British Columbia)—while over the interior of the continent it is seldom more than 1000 ft. thick.

Any attempt to picture the geographical conditions of the Cambrian period must of necessity be very imperfect. It was pointed out by Barrande that early in Palaeozoic Europe there appeared two marine provinces—a northern one extending from Russia to the British Isles through Scandinavia and northern Germany, and a southern one comprising France, Bohemia, the Iberian peninsula and Sardinia. It is assumed that some kind of land barrier separated these two provinces. Further, there is a marked likeness between the Cambrian of western Europe and eastern America; many fossils of this period are common to Britain, Sweden and eastern Canada; therefore it is likely that a north Atlantic basin existed. Prof. Kayser suggests that there was also a Pacific basin more extensive than at present; this is borne out by the similarity between the Cambrian faunas of China, Siberia and Argentina. The same author postulates an Arctic continent, bordering upon northern Europe, Greenland and North America; an African-Brazilian continent across the present south Atlantic, and a marine communication between Australia and India, where the faunas have much in common.

REFERENCES.—The literature devoted to the Cambrian period is very voluminous, important contributions having been made by A. Sedgwick, Sir R. I. Murchison, H. Hicks, C. Lapworth, T. Groom, J. W. Salter, J. E. Marr, C. D. Walcott, G. F. Matthew, E. Emmons, E. Billings, J. Barrande, F. Schmidt, W. C. Brögger, S. A. Tullberg, S. L. Törngrist, G. Linnarsson and many others. A good general account of the period will be found in Sir A. Geikie's *Text-Book of Geology*, vol. ii. 4th ed. 1903 (with references), and from an American point of view, in T. C. Chamberlain and R. O. Salisbury's *Geology*, vol. ii., 1906 (references to American sources). See also J. E. Marr, *The Classification of the Cambrian and Silurian Rocks*, 1883 (with bibliography up to the year of publication); A. Geikie, *Q. J. Geol. Soc.*, 1891, xlvii., Ann. address, p. 90; F. Frech, "Die geographische Verbreitung und Entwickelung des Cambrium," *Comple Rendu. Congrès Géol. Internat. 1897, St-Pétersbourg* (1899); *Geological Literature added to the Geological Society's Library*, published annually since 1893. (J. A. H.)

CAMBRIC, a word derived from *Kameryk* or *Kamerijk*, the Flemish name of Cambrai, a town in the department of Nord, France, where the cloth of this name is said to have been first made. It was originally made of fine linen. There is a record of a privy purse expenditure in 1530 for cambric for Henry VIII.'s shirts. Cambric has been used for many years in the manufacture of handkerchiefs, collars, cuffs, and for fine underclothing; also for the best shrouds, and for fine baby linen. The yarns for this cloth are of very fine quality, and the number of threads and picks often reaches and sometimes exceeds 120 per inch. Embroidery cambric is a fine linen used for embroidery. Batiste, said to be called after Baptiste, a linen-weaver of Cambrai, is a kind of cambric frequently dyed or printed. All these fabrics are largely copied in cheaper materials, mixtures of tow and cotton, and in many cases cotton alone, taking the place of the original flax line yarns.

CAMBRIDGE, EARLS AND DUKES OF. Under the Norman and early Plantagenet kings of England the earldom of Cambridge was united with that of Huntingdon, which was held among others by David I., king of Scotland, as the husband of earl Waltheof's daughter, Matilda. As a separate dignity the earldom dates from about 1340, when William V., count (afterwards duke) of Juliers, was created earl of Cambridge by King Edward III.; and in 1362 (the year after William's death) Edward created his own son, Edmund of Langley, earl of Cambridge, the title being afterwards merged in that of duke of York, which was bestowed upon Edmund in 1385. Edmund's elder son, Edward, earl of Rutland, who succeeded his father as duke of York and earl of Cambridge in 1402, appears to have resigned the latter dignity in or before 1414, as in this year his younger brother, Richard, was made earl of Cambridge. In the following year Richard was executed for plotting against King Henry V., and his title was forfeited, but it was restored to his son, Richard, who in 1415 became duke of York in succession to his uncle Edward. Subsidiary to the dukedom of York the title was held by Richard, and after his death in 1460 by his son Edward, afterwards King Edward IV., becoming extinct on the fall of the Yorkist dynasty.

In 1619 King James I., anxious to bestow an English title upon James Hamilton, 2nd marquess of Hamilton (d. 1625), created him earl of Cambridge, a title which came to his son and successor James, 3rd marquess and first duke of Hamilton (d. 1649). In 1651 when William, 2nd duke of Hamilton, died, his English title became extinct.

Again bestowed upon a member of the royal house, the title of earl of Cambridge was granted in 1659 by Charles II. to his brother Henry, duke of Gloucester, only to become extinct on Henry's death in the following year. In 1661 Charles, the infant son of James, duke of York, afterwards King James II., was designated as marquess and duke of Cambridge, but the child died before the necessary formalities were completed. However, two of James's sons, James (d. 1667) and Edgar (d. 1671), were actually created in succession dukes of Cambridge, but both died in childhood. After the passing of the Act of Settlement in 1701 it was proposed to grant an English title to George Augustus, electoral prince of Hanover, who, after his grandmother, the electress Sophia, and his father, the elector George Louis, was heir to the throne of England; and to give effect to this proposal George Augustus was created marquess and duke of Cambridge in November 1706. The title lapsed when he became king of Great Britain and Ireland in 1727, but it was revived in 1801 in favour of Adolphus Frederick, the seventh son of George III. He and his son are dealt with below.

ADOLPHUS FREDERICK, duke of Cambridge (1774–1850), was born in London on the 24th of February 1774. Having studied at the university of Göttingen, Adolphus Frederick served in the Hanoverian and British armies, and, in November 1801, was created earl of Tipperary and duke of Cambridge, becoming a member of the privy council in the following year. The duke is chiefly known for his connexion with Hanover. In 1815, on the conclusion of the war, the electorate of Hanover was raised to the rank of a kingdom, and in the following year the duke was appointed viceroy. He held this position until the separation of Great Britain and Hanover in 1837, and displaying tact and moderation, appears to have ruled the country with great success during a difficult period. Returning to England the duke became very popular, and was active in supporting many learned and benevolent societies. He died in London on the 8th of July 1850. In 1818 he married Augusta (1797–1889), daughter of Frederick, landgrave of Hesse-Cassel. He left three children: his successor, George; Augusta Caroline (b. 1822), who married Frederick William, grand duke of Mecklenburg-Strelitz; and Mary Adelaide (1833–1897), who married Francis, duke of Teck.

GEORGE WILLIAM FREDERICK CHARLES, duke of Cambridge (1819–1904), was born at Hanover on the 26th of March 1819. He was thus about two months older than his cousin, Queen Victoria, and was for that period in the line of succession to the British throne. He was educated at Hanover by the Rev. J. R. Wood, a canon of Worcester. In November 1837, after he had served for a short time in the Hanoverian army, the rank of colonel in the British army was conferred upon him, and he was attached to the staff at Gibraltar from October 1838 to April 1839. After serving in Ireland with the 12th Royal Lancers, he was appointed in April 1842 colonel of the 17th Light Dragoons (now Lancers). From 1843 to 1845 he was colonel on the staff in the Ionian Islands, and was then promoted major-general. In October 1846 he took command of the Limerick district, and shortly afterwards of the Dublin district. In 1850 his father died, and he succeeded to the

dukedom. Being appointed inspector of cavalry in 1852, he held that post until 1854, when, upon the outbreak of the Crimean War, he was placed in command of the 1st division (Guards and Highland brigades) of the British army in the East. In June of the same year he was promoted lieutenant-general. He was present at the battles of the Alma, Balaklava and Inkerman, and at the siege of Sevastopol. On the 15th of July 1856 he was appointed general commanding-in-chief, on the 9th of November 1862 field marshal, and by letters patent, 1887, commander-in-chief. The long period during which he held the command of the army was marked by many changes. The Crimean War brought to light great administrative defects, and led to a re-grouping of the departments, which, with the whole personnel of the army, were brought under the authority of the secretary of state for war. The constitutional changes involved did not, however, affect seriously the organization of the military forces. Only in 1870, after the successes of Prussia had created a profound impression, were drastic changes introduced by Cardwell into the entire fabric of the army. The objects of the reformers of 1870 were undoubtedly wise; but some of the methods adopted were open to question, and were strongly resented by the duke of Cambridge, whose views were shared by the majority of officers. Further changes were inaugurated in 1880, and again the duke found much to criticize. His opinions stand recorded in the voluminous evidence taken by the numerous bodies appointed to inquire into the condition of the army. They show a sound military judgment, and, as against innovations as such, a strong attachment to the old regimental system. That this judgment and this attachment were not so rigid as was generally supposed is proved by his published correspondence. Throughout the period of change, while protesting, the duke invariably accepted and loyally endeavoured to carry out the measures on which the government decided. In a memorandum addressed to Mr Childers in 1880 he defined his attitude as follows:—"Should it appear, however, that for reasons of state policy it is necessary that the contemplated changes should be made, I am prepared to carry them out to the best of my ability." This attitude he consistently maintained in all cases in which his training and associations led him, rightly or wrongly, to deprecate changes the need for which was not apparent to him. His judgment was especially vindicated in the case of an ill-advised reduction of the artillery carried out by Mr. Stanhope. Under the order in council of February 1888, the whole responsibility for military duties of every kind was for the first time centred upon the commander-in-chief. This, as pointed out by the Hartington commission in 1890, involved "an excessive centralization" which "must necessarily tend to weaken the sense of responsibility of the other heads of departments, and thus to diminish their efficiency." The duke of Cambridge, whose position entailed many duties apart from those strictly appertaining to a commander-in-chief, could not give personal attention to the vast range of matters for which he was made nominally responsible. On the other hand, the adjutant-general could act in his name, and the secretary of state could obtain military advice from officials charged with no direct responsibility. The effect was to place the duke in a false position in the eyes of the army and of the country. If the administration of the army suffered after 1888, this was due to a system which violated principles. His active control of its training during the whole period of his command was less hampered, and more directly productive of good results.

Throughout his long term of office the duke of Cambridge evinced a warm interest in the welfare of the soldier, and great experience combined with a retentive memory made him a master of detail. He was famous for plain, and strong, language; but while quick to condemn deviations from the letter of regulations, and accustomed to insist upon great precision in drill, he was never a martinet, and his natural kindliness made him ready to bestow praise. Belonging to the older generation of soldiers, he could not easily adapt himself to the new conditions, and in dispensing patronage he was somewhat distrustful of originality, while his position as a member of the royal family tended to narrow his scope for selection. He was thus inclined to be influenced by considerations of pure seniority, and to underrate the claims of special ability. The army, however, always recognized that in the duke of Cambridge it had a commander-in-chief devoted to its interests, and keenly anxious amid many difficulties to promote its well-being. The duke resigned the commandership-in-chief on the 1st of November 1895, and was succeeded by Lord Wolseley, the duties of the office being considerably modified. He was at the same time gazetted honorary colonel-in-chief to the forces. He was made ranger of Hyde Park and St James's Park in 1852, and of Richmond Park in 1857; governor of the Royal Military Academy in 1862, and its president in 1870, and personal aide-de-camp to Queen Victoria in 1882. He died on the 17th of March 1904 at Gloucester House, London. The chief honours conferred upon him were: G.C.H., 1825; K.G., 1835; G.C.M.G., 1845; G.C.B., 1855; K.P., 1861; K.T., 1881. From 1854 he was president of Christ's hospital. The duke of Cambridge was married to Louisa Fairbrother, who took the name of FitzGeorge after her marriage. She died in 1890.

See Rev. E. Sheppard, *George, Duke of Cambridge; a Memoir of his Private Life* (London, 1906); and Willoughby Verner, *Military Life of the Duke of Cambridge* (1905).

CAMBRIDGE, RICHARD OWEN (1717–1802), English poet, was born in London on the 14th of February 1717. He was educated at Eton and at St John's College, Oxford. Leaving the university without taking a degree, he took up residence at Lincoln's Inn in 1737. Four years later he married, and went to live at his country seat of Whitminster, Gloucestershire. In 1751 he removed to Twickenham, where he enjoyed the society of many notable persons. Horace Walpole in his letters makes many jesting allusions to Cambridge in the character of newsmonger. He died at Twickenham on the 17th of September 1802. His chief work is the *Scribleriad* (1751), a mock epic poem, the hero of which is the Martinus Scriblerus of Pope, Arbuthnot and Swift. The poem is preceded by a dissertation on the mock heroic, in which he avows Cervantes as his master. The satire shows considerable learning, and was eagerly read by literary people; but it never became popular, and the allusions, always obscure, have little interest for the present-day reader. He made a valuable contribution to history in his *Account of the War in India . . . on the Coast of Coromandel from the year 1750 to 1760 . . .* (1761). He had intended to write a history of the rise and progress of British power in India, but this enterprise went no further than the work just named, as he found that Robert Orme, who had promised him the use of his papers, contemplated the execution of a similar plan.

The Works of Richard Owen Cambridge, Esq., including several Pieces never before published, with an Account of his Life and Character by his Son, George Owen Cambridge (1803), includes, besides the *Scribleriad*, some narrative and satirical poems, and about twenty papers originally published in Edward Moore's paper called *The World*. His poems are included in A. Chalmers's *English Poets* (1816).

CAMBRIDGE, a municipal and parliamentary borough, the seat of a university, and the county town of Cambridgeshire, England, 56 m. N. by E. of London by the Great Eastern railway, served also by the Great Northern, London & North-Western and Midland lines. Pop. (1901) 38,379. It lies in a flat plain at the southern border of the low Fen country, at an elevation of only 30 to 50 ft. above sea-level. The greater part of the town is situated on the east (right) bank of the Cam, a tributary of the Ouse, but suburbs extend across the river. To the south and west the slight hills bordering the fenland rise gently. The parliamentary borough of Cambridge returns one member. The municipal borough is under a mayor, 12 aldermen, and 36 councillors. Area, 3233 acres.

History.

Cambridge University[1] shares with that of Oxford the first place among such institutions in the British empire. It is the dominating factor in the modern importance of the town, and it is therefore necessary to outline the historical conditions which led to its establishment. The geographical situation of Cambridge, in its present appearance

[1] See also UNIVERSITIES.

possessing little attraction or advantage, calls nevertheless for first consideration. Cambridge, in fact, owed its growth to its position on a natural line of communication between the east and the midlands of England, flanked on the one hand by the deep forests which covered the uplands, on the other by the unreclaimed fens, then desolate and in great part impenetrable. The importance of this highway may be judged from the number of early earthworks in the vicinity of Cambridge; and the Castle Hill, at the north side of the present town (near the west bank of the river), is perhaps a British work. Roman remains discovered in the same locality give evidence of the existence of a small town or village at the junction of roads; the name of *Camboritum* is usually attached to it, but without certainty. The modern name of Cambridge has no connexion with this. The present form of the name has usually been derived from a corruption of the original name Grantebrycge or Grantabridge (Skeat); but Mr Arthur Gray points out that there is no documentary evidence for this corruption in the shape of such probable intermediate forms as Grantebrig or Crantebrig. On the other hand, he brings evidence to show that the name Cantebrig, though not applied to the whole town, was very early given to that quarter of it near the Cante brig, *i.e.* the bridge over the Cante (the ward beyond the Great Bridge was called "Parcelle of Cambridge" as late as 1340); in this quarter, close to the bridge, Cambridge castle was built by the Conqueror, and from the castle and the castle-quarter the name spread within sixty years to the whole town, the similarity between the names Grantebrig and Cantebrig playing some part in this extension (*The Dual Origin of the Town of Cambridge*, p. 31). Granta is the earlier and still an alternative name of the river Cam, this more common modern form having been adopted in sympathy with the modern name of the town. Cambridge had a further importance from its position at the head of river navigation, and a charter of Henry I., in which the town is already referred to as a borough, grants it exclusive rights as a river-port, and regulates traffic and tolls. The wharves lay principally along that part of the river where are now the celebrated "backs" of some of the colleges, whose exquisite grounds slope down to the water. The great Sturbridge or Stourbridge Fair at Barnwell, formerly one of the most important in England, is a further illustration of the ancient commercial importance of Cambridge; the oldest known charter concerning it dates from the opening of the 13th century, though its initiation may perhaps be placed a century before.

Concerning the early municipal history of Cambridge little is known, but at the time of the Domesday survey its citizens felt themselves strong enough to protest against the exactions of the Norman sheriff, Roger Picot; and the town had attained a considerable degree of importance when, in 1068, William the Conqueror built a castle on the site known as Castle Hill, and used it as a base of operations against Hereward the Wake and the insurgents of the fenland. Cambridge, however, has practically no further military history. From the 14th century onward materials were taken from the castle by the builders of colleges, while the gatehouse, the last surviving portion, was removed in 1842.

The medieval spirit of emulation between the universities of Cambridge and Oxford resulted in a series of remarkable fables to account for the foundation of both. That of Cambridge was assigned to a Spanish prince, Cantaber, in the 4321st year after the Creation. A charter from King Arthur dated 531, and the transference of students from Cambridge to Oxford by King Alfred, were also claimed as historical facts. The true germ of the university is to be sought in the religious foundations in the town. The earliest to be noticed is the Augustinian house of St Giles, founded by Hugoline, wife of Roger Picot the sheriff, in 1092; this was removed in 1112 to Barnwell, where the chapel dedicated to St Andrew the Less is practically the sole remnant of its buildings. In 1224 the Franciscans came to Cambridge, and later in the same century a number of other religious orders settled here, such as the Dominicans, the Gilbertines and the Carmelites, who had before been established at Newnham. Students were gradually attracted to these several religious houses, and Cambridge was already recognized as a centre of learning when, in 1231, Henry III. issued a writ for its governance as such, among other provisions conferring certain disciplinary powers on the bishop of Ely. It soon became evident that the influence of the religious orders on those who came to them for instruction was too narrow. This was recognized elsewhere, for it was in order to counteract that influence that Walter de Merton drew up the statute of governance for his foundation of Merton College, Oxford, a statute which was soon afterwards used as a model by Hugh de Balsham, bishop of Ely, when, in 1281–1284 he founded the first Cambridge college, Peterhouse.

The friction between town and university, due in the main to the conflict of their jurisdictions, the tradition of which, as in the sister university, died hard in the annual efforts of some undergraduates to revive the "town and gown" riots, culminated during the rebellion of Wat Tyler (1381) in an episode which is alone worthy of record and may serve to illustrate the whole. This was an attack by the rabble, instigated, it is said, by the more reputable townspeople, on the colleges, several of which were sacked. The attack was ultimately defeated by the courage and resource of Henry Spenser or Le Dispencer, bishop of Norwich. The relations of the university of Cambridge with the crown were never so intimate as those of Oxford. Henry III. fortified the town with two gates, but these were burnt by the rebellious barons; and in much later times the two first of the Stuart kings, and the two first of the Georges, cultivated friendly personal relations with the university. During the civil war the colleges even melted down their plate for the war chest of King Charles; but Cambridge showed little of the stubborn royalism of Oxford, and submitted to the Commonwealth without serious resistance.

Colleges.

The history of collegiate foundation in Cambridge after that of Peterhouse may be followed through the ensuing description of the colleges, but for ease of reference these are dealt with in alphabetical order. The main street which traverses the town from south to north, parallel to, and at a short distance from the river, is known successively as Trumpington Street, King's Parade, Trinity Street, St John's Street and Bridge Street. The majority of the colleges lie on either side of this street, and chiefly between it and the river. Those of St John's, Trinity, Trinity Hall, Clare, King's and Queens' present the famous "backs" towards the river, which is crossed by a series of picturesque bridges leading to the gardens and grounds on the opposite bank.

Christ's College is not among the group indicated above; it stands farther to the east, in St Andrew's Street. It was founded in 1505 by the Lady Margaret Beaufort, mother of Henry VII. It incorporated God's House, which had been founded by William Bingham, a cleric of London, in 1439, had been removed when the site was required for part of King's College, and had been refounded with the countenance of Henry VI. in 1448. This was a small house, but the Lady Margaret's endowment provided for a master, twelve fellows and forty-seven scholars. Edward VI. added another fellowship and three scholarships and the present number of fellows is fifteen. There are certain exhibitions in election to which preference is given to schools in the north of England—Giggleswick, Kirkby Lonsdale, Skipton and Sedbergh. The buildings of Lady Margaret's foundation were in great part faced in classical style in the 17th century; a building east of the old quadrangle is also of this period, and is ascribed to Inigo Jones. The rooms occupied by the foundress herself are preserved, though in an altered condition, as are those of the poet Milton, who was educated here, and with whom the college has many associations. In the fine gardens is an ancient mulberry tree believed to have been planted by him. Among illustrious names connected with this college are John Leland the antiquary, Archdeacon Paley, author of the *Evidences*, and Charles Darwin, while Henry More and others of the school of Cambridge Platonists in the 17th century were educated here.

Clare College lies close to the river, south of Trinity Hall. In 1326 the university erected a hall, known as University Hall, to accommodate a number of students, and in 1338 Elizabeth de

Burgh, countess of Clare, re-endowed the hall, which took the name of Clare Hall, and only became known as college in 1856. There was a strong ecclesiastical tendency in this foundation; six out of the twenty fellows were to be priests when elected. The foundation now consists of a master and fifteen fellows, besides scholars, of whom three receive emoluments from the endowment of Lady Clare. The old college buildings were in great part destroyed by fire in 1521; the present buildings date from 1638 to 1715, and are admirable examples of their period. They surround a very beautiful quadrangle, and the back towards the river is also fine. Unconfirmed tradition indicates the poet Chaucer as an *alumnus* of this college; other famous men associated with it were Hugh Latimer the martyr, Ralph Cudworth, one of the "Platonists," and Archbishop Tillotson.

Corpus Christi College (commonly called Corpus) stands on the east side of Trumpington Street. The influence of medieval gilds in Cambridge, the character of which was primarily religious, was exceedingly strong. About the beginning of the 14th century there is first mentioned the gild of St Mary, which was connected with Great St Mary's church. The gild was at this time prosperous, but about 1350, when the idea of the foundation of a college by the gilds was matured, the fraternity of St Mary lacked the means to proceed save by amalgamating with another gild, that of Corpus Christi. The age of this institution, whose church was St Benedict's or St Benet's, is not known. By the two gilds, therefore, the "House of Scholars of Corpus Christi and the Blessed Virgin Mary" was founded in 1352, the foundation being the only instance of its kind. In early times it was commonly known as St Benet's from the church connected with the Corpus gild which stands over against the college, and served as its chapel for nearly three centuries. The foundation consists of a master and twelve fellows, with scholars of the old and later foundations. The ancient small quadrangle remains, and is of historical rather than architectural interest. The great quadrangle dates from 1823–1825. The library contains the famous collection of MSS. bequeathed by Archbishop Matthew Parker, *alumnus* of the college, in the 16th century.

Downing College is in the southern part of the town, to the east of Trumpington Street. Sir George Downing, baronet, of Gamlingay Park, who died in 1749, left estates to various relations, who died without issue. In this event, Downing's will provided for the foundation of a college, but the heirs contested the will with the university, and in spite of a decision against them in 1769, continued to hold the estates for many years, so that it was not until 1800 that the charter for the college was obtained. The foundation-stone was laid in 1807, and the two ranges of buildings, in classical style, represent all that was completed of an intended quadrangle. The foundation consists of a master, professors of English law and of medicine, six fellows and six scholars.

Emmanuel College overlooks St Andrew's Street. It was founded in 1584 by Sir Walter Mildmay (*c.* 1520–1589), chancellor of the exchequer and privy councillor under Queen Elizabeth. The foundation, considerably enlarged from the original, consists of a master, sixteen fellows and thirty scholars. There are further scholarships on other foundations which are awarded by preference to pupils of Uppingham and other schools in the midlands. Emmanuel was noted from the outset as a stronghold of Puritanism; it is indeed recorded that Elizabeth rallied the founder on his intention that this should be so. Mildmay assuredly had the welfare of the church primarily at heart, and he attempted to provide against the life residence of fellows, which he considered an unhealthy feature in some colleges. The site of Emmanuel was previously occupied by a Dominican friary, and some of its buildings were adapted to collegiate uses. There is only a little of the earliest building remaining; the greater part of the present college dates from the second half of the 18th century. The chapel, however, is by Sir Christopher Wren (1677). Richard Holdsworth, Gresham professor, and William Sancroft, archbishop of Canterbury, were masters of this college; Bishops Joseph Hall and Thomas Percy were among its *alumni*, as was John Harvard, principal founder of the great American college which bears his name.

Gonville and Caius College (commonly called Caius, pronounced Kees), stands mainly on the west side of Trinity Street. It arose out of an earlier foundation. In 1348 Edmund Gonvile or Gonevill founded the hall of the Annunciation of the Blessed Virgin, which was commonly called Gonville Hall, for the education of twenty scholars in dialectic and other sciences, with endowment for a master and three fellows. This hall stood on part of the present site of Corpus, but on the death of its founder in 1351 it was moved to the north-west corner of the site of the present Caius, by William Bateman, bishop of Norwich and founder of Trinity Hall. The famous physician John Caius (*q.v.*), who was educated at this small institution, later conceived the idea of refounding and enlarging it, obtained a charter to do so in 1557, and became master of the new foundation of Gonville and Caius College. The foundation consists of a master and not less than twenty-two fellows, exclusive of the provision under the will of William Henry Drosier (d. 1889), doctor of medicine and fellow of the college, for the endowment of seven additional fellowships. Since its refoundation by Caius, the college has had a peculiar connexion with the study of medicine, while, besides many eminent physicians, Sir Thomas Gresham, Judge Jeffreys, Robert Hare, Jeremy Taylor, Henry Wharton and Lord Thurlow are among its noted names. Three sides of the main quadrangle, Tree Court, including the frontage towards Trinity Street, are modern (1870). The interior of this court is picturesque, and the design of the smaller Caius Court was inspired by Caius himself. He also designed the gates of Honour, Virtue and Humility, of which the two first stand *in situ*; the gate of Honour is a peculiarly good example of early Renaissance work. Caius is buried in the chapel.

Jesus College lies apart from and to the north-east of the majority of the colleges. It was founded in 1496 by John Alcock, bishop of Ely. The site was previously occupied by a Benedictine nunnery dedicated to St Radigund, which was already in existence in the first half of the 12th century and was claimed by Alcock to have been founded from Ely, to the bishops of which it certainly owed much. The name given to Alcock's college was that of "the most Blessed Virgin Mary, St John the Evangelist, and the glorious Virgin Saint Radigund," but it appears that the founder himself intended the name to be Jesus College. He provided for a master and six fellows, but the foundation now consists of a master and sixteen fellows, with twenty scholars or more. There are several further scholarships confined to the sons of clergymen of the Church of England. Architecturally Jesus is one of the most interesting colleges in Cambridge, for Alcock retained, and there still remains, a considerable part of the old buildings of the nunnery. The most important of these is the church, which Alcock, by removing most of the nave and other portions, converted into the usual form of a college chapel. The tower, however, is retained. The bulk of the building is an admirable example of Early English work, but there are traces of Norman; and Alcock added certain Perpendicular features. Of the rest of the college buildings, the hall is Alcock's work, the brick gatehouse is a fine structure of the close of the 15th century, while the cloister is a little later, and stands on the site of the nuns' cloister. Another court dates from the 17th and early 18th centuries, and there is a considerable amount of modern building. The most famous name connected with Jesus College is that of Cranmer. Among many others are Sir Thomas Elyot, John Bale, John Pearson, bishop of Chester, Hugh Peters, Gilbert Wakefield, Thomas Malthus, Laurence Sterne and Samuel Taylor Coleridge.

King's College has its fine frontage upon the western side of King's Parade. It was founded by King Henry VI. in 1441. The first site was small and circumscribed, and in 1443 the existing site was with difficulty cleared of dwellings. The king designed a close connexion between this college and his other foundation at Eton; he provided for a provost and for seventy scholars, all of whom should be Etonians. In 1861 open scholarships

were instituted, and the foundation now consists of a provost, forty-six fellows and forty-eight scholars. Half the scholarships are still appropriated to Eton. An administrative arrangement peculiar to King's College is that by which the provost has absolute authority within its walls, to the exclusion of officers of the University. The chief architectural ornament of the college, and one of the most notable in the town, is the magnificent Perpendicular chapel, comparable with those of St George at Windsor and Henry VII. at Westminster Abbey. The building was begun in 1446, and extended (apart from the interior fittings) over nearly seventy years. Within, the most splendid features are the fan-vaulting which extends throughout the chapel, the noble range of stained-glass windows, which date for the most part from the early part of the 16th century, and the wooden organ screen, which, with part of the stalls, is of the time of Henry VIII. The college services are celebrated for the beauty of their music. The bulk of the other collegiate buildings are of the 18th century or modern. The old court of King's College is occupied by the modern university library, north of the chapel; the gateway, a good example (1444), is preserved. John Frith the Martyr, Richard Croke, Giles Fletcher, Richard Mulcaster, Sir William Temple, William Oughtred, the poet Waller, and Horace Walpole and others of his family are among many illustrious *alumni* of the college.

Magdalene College (pronounced Maudlin) stands on the west bank of the Cam, near the Great Bridge. In 1428 the Benedictines of Crowland Abbey founded a home for student monks on this site, and in 1519 Edward, duke of Buckingham, partly secularized this institution by founding Buckingham College in connexion with it. After the dissolution of the monastery, Thomas, Baron Audley of Walden, erected Magdalene in place of the former house in 1542. The foundation consists of a master and seven fellows, besides scholars. There are some valuable exhibitions appropriated to Wisbech school. The appointment of the master is peculiar, the office being in the gift of the occupant of Audley End, an estate near Saffron Walden, Essex. Some parts of the original building are preserved, but the most notable portion of the college is the Pepysian library, dating *c.* 1700. It contains the very valuable collection of books bequeathed by Samuel Pepys to the college, at which he was a student. Buckingham College had Archbishop Cranmer as a lecturer; Charles Kingsley and Charles Stewart Parnell were educated at Magdalene.

Pembroke College stands to the east of Trumpington Street. It was founded in 1347 by Mary de St Paul, widow of Aylmer de Valence, earl of Pembroke. Henry VI. made notable benefactions to it. The foundation consists of a master and thirteen fellows, and there are six scholarships on the original foundation, besides others of later institution. The older existing buildings are mainly of the 18th century, but much of the original fabric was removed and rebuilt in 1874. The chapel is of the middle of the 17th century, and is ascribed to Sir Christopher Wren. The poets Spenser and Gray, Nicholas Ridley the martyr, Archbishop Whitgift and William Pitt were associated with this college; and from the number of bishops whose names are associated with it the college has obtained the style of *collegium episcopale*.

Peterhouse or St Peter's College is on the west side of Trumpington Street, almost opposite Pembroke. It has already been indicated as the oldest Cambridge college (1284). Hugh de Balsham, the founder, had settled some secular scholars in the ancient Augustinian Hospital of St John in 1280, but the experiment was not a success. Nor did he carry out his full intentions as regards Peterhouse, the foundation of which followed on the failure of the fusion of his scholars with the hospital; but Simon Montagu, his successor in the bishopric of Ely, carried on his work, and in 1344 gave the college a code of statutes in which the influence of the Merton code is plainly visible. A master and fourteen fellows formed the original foundation, but the present consists of a master, and not less than eleven fellows and twenty-three scholars. The hall retains some original work; it was first built out of a legacy from the founder. The library building (*c.* 1590) is due to a legacy from Dr Andrew Perne (master 1554–1580); and Dr Matthew Wren (master 1625–1634), uncle of the famous architect Sir Christopher Wren, directed the building of the chapel and cloisters. The most famous name connected with the college is that of Cardinal Beaufort.

Queens' College stands at the south of the riverside group, and one of its ranges of buildings rises immediately from the river. A college of St Bernard had been established in 1445 by Andrew Docket or Dokett, rector of St Botolph's church, who had also been principal of a hostel, or students' lodge, of St Bernard. He sought and obtained the patronage of Margaret of Anjou, wife of Henry VI., who undertook the foundation of a new house on another site in 1448, to bear the name of Queens'. Docket became the first master. In 1465 Elizabeth Woodville, wife of Edward IV., became the college's second foundress. The foundation consists of a president and eleven fellows. The buildings are exceedingly picturesque. The main quadrangle, of red brick, was completed very soon after the foundation. The smaller cloister court, towards the river, retains building of the same period, and the beautiful wooden gallery of the president's lodge deserves notice. Another court is called Erasmus's; the rooms which he is said to have occupied remain, and a walk in the college garden across the river bears his name.

St Catherine's College, on the west side of Trumpington Street, was founded by Dr Robert Woodlark or Wodelarke, chancellor of the university and (1452) provost of King's College. It was opened in 1473, but the charter of incorporation dates from 1475. The foundation provided for a master (Woodlark being the first) and three fellows; there are now six fellows, and twenty-six scholars. The principal buildings, surrounding a court on three sides, date mainly from a complete reconstruction of the college at the close of the 17th century.

St John's College, at the north of the riverside group of colleges, was founded in 1511 by the Lady Margaret Beaufort, also foundress of Christ's College. It replaced the Hospital of St John, which dated from the early years of the 13th century, and has been mentioned already in connexion with Peterhouse. The Lady Margaret died before the college was firmly established, and her designs were not carried out without many difficulties, which were overcome chiefly by the exertions of John Fisher, bishop of Rochester, one of her executors. Thirty-two fellowships were endowed, but subsequent endowments allowed extension, and the foundation now consists of a master, fifty-six fellows, sixty scholars and nine sizars. A large number of exhibitions are appropriated to special schools. Of the four courts of St John's, the easternmost is the original, and has a very fine Tudor gateway of brick. The chapel is modern (1863–1869), an ornate example of the work of Sir Gilbert Scott. The second court, practically unaltered, dates from 1598–1602. In this there is a beautiful masters' gallery, panelled, with a richly-moulded ceiling; it is now used as a combination room or fellows' common-room. The third court, which contains the library (1624), backs on to the river, and the fourth, which is on the opposite bank, was built *c.* 1830. A covered bridge connects the two, and is commonly called the Bridge of Sighs from a certain resemblance to the bridge of that name at Venice. Among the notable names connected with this college are Cecil, Lord Burghley, Thomas Cartwright, Wentworth, earl of Strafford, Roger Ascham, Richard Bentley, John Cleveland, the satirist, Thomas Baker, the historian, Lord Palmerston, Professor Adams, Sir John Herschel, Bishop Colenso, Dr Benjamin Kennedy, Dean Merivale, Horne Tooke, Samuel Parr and William Wilberforce, and the poets Herrick (afterwards of Trinity Hall) and Wordsworth.

Selwyn College, standing west of the river (Sidgwick Avenue), was founded in 1882 by public subscription in memory of George Augustus Selwyn, bishop of New Zealand and afterwards of Lichfield, for the purpose of giving university education with economy "combined," according to the charter, "with Christian training, based upon the principles of the Church of England."

Sidney Sussex College faces Sidney Street. It was founded under the will (1588) of the Lady Frances Sidney, dowager countess of Sussex (d. 1589), and received its charter in 1596. The foundress provided for a master, ten fellows and twenty

scholars, but thirty-six scholarships are now provided. The original buildings were of brick, but they were plastered over and greatly altered by Wyatville about 1830. The Grey Friars had occupied the site, and part of their buildings remained in the chapel until 1777. A beautiful block of new buildings, with a cloister, was erected in 1890. The most famous name associated with the college is that of Oliver Cromwell, who was a fellow commoner, as also was Thomas Fuller, author of the *Worthies of England*.

Trinity College, the front of which is on Trinity Street, is the largest collegiate foundation in Cambridge, and larger than any in Oxford. It was founded in 1546 by King Henry VIII. and absorbed several earlier institutions—King's Hall (founded by Edward III. in 1336), St Michael's or Michaelhouse (founded by Hervey de Stanton, chancellor of the exchequer under Edward II., in 1323), Fyswick or Physick's Hostel, belonging to Gonville Hall, and other hostels. Henry's original foundation was for a master and sixty fellows and scholars, but Queen Mary and other later benefactors enabled extensions to be made, and the foundation now consists of a master (appointed by the crown), at least sixty fellows, seventy-four scholars and sixteen sizars, with minor scholars, chaplains librarian and the regius professors of Divinity, Hebrew and Greek. Major scholarships are open to undergraduates, not being of standing to take the degree of bachelor of arts, as well as to non-members of the university under nineteen years of age, while minor scholarships and exhibitions are open only to the latter. There are valuable exhibitions appropriated to certain schools, of which the most important are those confined to Westminster school. Trinity College is entered from Trinity Street by the King's Gateway (1518–1535) preserved from King's Hall, but subsequently altered. The principal or Great Court is the largest in Cambridge and very fine. Its buildings are of different dates. In the centre is a picturesque fountain, erected by Thomas Neville, master (1593–1615), under whose direction much of the building was carried out. The chapel on the north side of the court was begun in the reign of Mary. The carved oak fittings within date from the mastership of Richard Bentley (1700–1742). The organ is particularly fine. A statue of Sir Isaac Newton by Roubiliac stands in the antechapel, and Richard Porson and William Whewell are buried here. The hall on the west of the court is Neville's work (1605), and very beautiful. The second court is also his foundation and bears his name. The library on the west side is the work of Sir Christopher Wren. Its interior is excellent, and besides busts of some of the vast number of famous men connected with Trinity, it contains a statue of Lord Byron by the Danish sculptor Thorvaldsen. The New Court, Gothic in style, was begun in 1823. The beautiful grounds and walks of the college extend down to and beyond the river. The college has extended its buildings to the opposite side of Trinity Street, where the two courts known as Whewell's Hostel were built (*c.* 1860) at the charge of Dr William Whewell during his mastership. The eminent *alumni* of this great college are too numerous to admit of selection.

Trinity Hall, which lies near the river, south of Trinity, was founded by William Bateman, bishop of Norwich, in 1350. On the site there had been, for about twenty years before the foundation, a house of monastic students from Ely. The present college is alone in preserving the term Hall in its title. The foundation consists of a master and thirteen fellows, and the study of law, which the founder had especially in mind, is provided for by lectureships, and not less than three studentships tenable by graduates of the college. The buildings are for the most part modern or modernized, but the interior of the library well preserves its character of the early part of the 17th century.

University buildings.

Of the churches of Cambridge one has long been recognized as the church of the university, namely Great St Mary's, which stands in the centre of the town, between King's Parade and Market Hill. It is a fine Perpendicular structure, founded in 1478; but the tower was not completed until 1608. Some Decorated details are preserved from a former building. The university preachers deliver their sermons in this church, but it was formerly the meeting-place of the university for the transaction of business, for learned disputations and for secular festivals. The "Cambridge chimes" struck by the clock are famous, and a curfew is rung each evening on the great bell. The Senate House, standing opposite Great St Mary's, dates from 1730 and is classical in style. The buildings of the university library, in the immediate vicinity, enclose two quadrangles, and in part occupy the site of the old court of King's College. One of the quadrangles was formerly occupied by the schools or lecture rooms, but as the library grew it usurped their place. The most important part of the building dates from 1842. The façade of the old schools is an excellent work of 1758. The library is one of those which is entitled to receive, under the Copyright Act, a copy of every book published in the United Kingdom. The Fitzwilliam Museum, a massive classical building, was begun in 1837 to contain the bibliographical and art collection bequeathed by Richard, Viscount Fitzwilliam, in 1816. The museum of archaeology (classical, general and local, 1884), is connected with the Fitzwilliam Museum. The Pitt Press (1833), housing the university printing establishment, was begun out of the residue of a fund for erecting the statues of William Pitt in Hanover Square, London, and Westminster Abbey. It stands near Pembroke, Pitt's college. The Selwyn Divinity School (1879), opposite St John's College, was built largely at the charge of Dr William Selwyn, Lady Margaret professor of divinity. The museums and lecture rooms (begun in 1863) are extensive buildings on each side of Downing Street. Included in these are the museum of zoology, which had its origin in collections made by Sir Busick Harwood, professor of anatomy in 1785–1814, and contains the collection of fishes made by Charles Darwin in the ship "Beagle"; the medical school, botanical museum and herbarium, mineralogical museum, engineering laboratory (1894), optical and astronomical lecture room, chemical laboratory (1887), and the Cavendish laboratory for physical research (1874), the gift of William Cavendish, 7th duke of Devonshire and chancellor of the university. The Sedgwick Geological Museum, opened by King Edward VII. in 1904, commemorates Adam Sedgwick, Woodwardian professor of geology, and originated in the collections of Dr John Woodward (d. 1728). Adjoining this building, in Downing Street is the law library, founded on a bequest from Miss Rebecca Flower Squire (d. 1898) with the law school. The observatory (1824) is on the outskirts of the town in Madingley Road, and the pleasant botanic garden (1762) borders Trumpington Road. The club-rooms and debating hall of the Cambridge Union Society are adjacent to the Holy Sepulchre church.

The non-collegiate students of the university (*i.e* those who receive the university education and possess the same status as collegiate students without belonging to any college) have lecture and other rooms and a library in Fitzwilliam Hall. This body was created in 1869. The students reside in lodgings. There are two women's colleges—Girton, established in 1873 on the north-western outskirts of the town, having been previously opened at Hitchin in 1869, and Newnham (1875), originally (1873) a hall of residence for students attending special lectures for women. Among other educational establishments mention must be made of the Leys school, founded in 1875 by a number of prominent Wesleyans for the non-sectarian education of boys. The school is divided into classical and modern sides.

Non-university buildings.

Out of a number of ancient churches in Cambridge, two, besides Great St Mary's, deserve special notice. In St Benedict's or Benet's, which has been already mentioned in connexion with Corpus College, the tower is of great interest, being the oldest surviving building in Cambridge, of pre-Norman workmanship, having rude ornamentation on the exterior and the tower arch within. The church of the Holy Sepulchre in Bridge Street is one of the four ancient round churches in England. Its supposed date is 1120–1140, but although it is doubtless to be associated with the Knights Templars, the circumstances of its foundation are not

known. The chancel is practically a modern reconstruction, and an extensive restoration, which has been adversely criticized, was applied by the Cambridge Camden Society to the whole fabric in 1841. At several of the villages neighbouring or suburban to Cambridge there are churches of interest, as at Chesterton, Trumpington, Grantchester (where the name indicates a Roman station, borne out by the discovery of remains), Fen Ditton and Barnwell, near which is the Norman Sturbridge chapel. In Cambridge itself there is a Norman house, much altered, which by a tradition of unknown origin bears the name of the School of Pythagoras.

University constitution and administration.

The university is a corporate body, including all the colleges. These, however, are also corporations in themselves, and have their own statutes, but they are further subject to the paramount laws of the university. The university statutes of Queen Elizabeth were only replaced in 1858. The statutes as revised by a commission in that year were soon found to require emendation; in 1872 another commission was appointed, and in 1882 new statutes received the approval of the queen in council. The head of the university is the chancellor. He is a member of the university, of high rank and position, elected by the senate. Being generally non-resident, he delegates his administrative duties to the vice-chancellor, who is the head of a college, and is elected for one year by the senate. The principal executive officers under the vice-chancellor are as follows. The two proctors have as their main duty that of disciplinary officers over the members of the university *in statu pupillari*. In each year two colleges nominate one proctor each, according to a fixed rotation which gives the larger colleges a more frequent choice than the smaller. The proctors are assisted by four pro-proctors. The public orator is the spokesman of the senate upon such public occasions as the conferring of honorary degrees. The librarian has charge of the university library. The registrar, with his assistant, records the proceedings of the senate, &c., and has charge of documents. The university returns two members to parliament, elected by the members of the senate. The chancellor and *sex viri* (elected by the senate) form a court for offences against the university statutes by members not *in statu pupillari*. The chancellor and six heads of colleges, appointed by the senate, form a court of discipline for members *in statu pupillari*.

Senate.

The senate in congregation is the legislative body. Those who have votes in it are the chancellor, vice-chancellor, doctors of divinity, law, medicine, science, letters and music, and masters of art, law, surgery and music. The council of the senate, consisting of the chancellor, vice-chancellor, four heads of colleges, four professors and eight other members of the senate chosen by the vice-chancellor, brings all proposals (called Graces) before the senate. The revenues of the university are derived chiefly from fees at matriculation, for certain examinations, and for degrees, from a tax upon all members of the university, and from contributions by the colleges, together with the profits of the University Press. A financial board, consisting of the vice-chancellor *ex officio* and certain elected members, administers the finances of the university. There are boards for each of the various faculties, and a General Board of Studies, with the vice-chancellor at the head. There are university professors, readers or lecturers in a large number of subjects. The oldest professorship is the Lady Margaret professorship of divinity, instituted by the founders of Christ's and St John's Colleges in 1502. In 1540 Henry VIII. founded the regius professorships of divinity, civil law, physic, Hebrew and Greek.

College organization—undergraduates.

The head of a college generally bears the title of master, as indicated above in the account of the several colleges. It has also been seen that the foundation of each college includes a certain number of fellows and scholars. The affairs of the college are managed by the head and the fellows, or a committee of fellows. The scholars and other members *in statu pupillari* are generally termed collectively undergraduates. Those who receive no emoluments (and therefore pay the full fees) are technically called pensioners, and form the bulk of the undergraduates. Another group of students receiving emoluments are termed sizars; the primary object of sizarships is to open the university course to men of limited means. The title of fellow-commoners belongs to wealthy students who pay special fees and have the right of dining at the fellows' tables. This class has virtually ceased to exist. As regards his work, the undergraduate in college is under the intimate direction of his tutor; the disciplinary officer in college is the dean. Besides the foundation scholarships in each college there are generally certain scholarships and exhibitions founded by private or special benefactions; these are frequently awarded for the encouragement of specific branches of study, or are confined wholly, or by preference, to students from certain schools.

Residence and examinations.

The total number of students is about 3000. The colleges cannot accommodate this number, so that a student commonly spends some part of his residence in lodgings, which are licensed by, and under the control of, the university authorities. Such residence implies no sacrifice of membership of a college. There are three terms—Michaelmas (October), Lent and Easter (summer). They include together not less than 227 days, though the actual period of residence for undergraduates is about 24 weeks annually. Undergraduates usually begin residence in Michaelmas term. An elementary examination or other evidence of qualification is required for admission to a college. After nine terms' (three years') residence an undergraduate can take the first degree, that of bachelor of arts (B.A.). The examinations required for the ordinary B.A. degree are—(1) Previous examination or Little-go (usually taken in the first term of residence or at least in the first year), including classics, mathematics and a gospel in Greek and Paley's *Evidences of Christianity*, or an additional Greek or Latin classic and logic. (2) General examination in classics and mathematics, with a portion of English history, &c. (3) Special examination in a subject other than classical or mathematical. Candidates for honours are required to pass the Previous examination with certain additional subjects; they then have only a "tripos" examination in one of the following subjects—mathematics, classics, moral sciences, natural sciences, theology, law, history, oriental languages, medieval and modern languages, mechanical sciences, economics. The mathematical tripos is divided into two parts, in the first of which, down to 1909, the candidates were classed in the result as Wranglers, Senior Optimes and Junior Optimes. There was also an individual order of merit, the most proficient candidate being placed at the head of the list as Senior Wrangler. But in 1906 a number of important reforms of this tripos were proposed by the Mathematical Board, and among these the abolition of the individual order of merit was recommended and passed by the senate. It is not employed in any other tripos. The classical tripos is also in two parts, to the second of which certain kindred subjects are added (ancient philosophy, history, &c.). Individual order of merit is not observed in either part, the candidates being grouped in classes. There are a large number of university prizes and scholarships on special foundations. Such are the Smith's prizes for mathematics and natural philosophy, on the foundation (1768) of Robert Smith, master of Trinity, awarded up to 1883 after examination, but since then for an essay on some branch of each subject, and the Chancellor's medals, of which two have been awarded annually in classics since the foundation of the prizes in 1751 by Thomas Holles, duke of Newcastle.

Affiliated colleges.

The university may adopt as affiliated colleges institutions in the United Kingdom or in any part of the British empire which fulfil certain conditions as to the education of adult students. Attendance at these institutions is counted as equivalent to a certain period of residence at Cambridge University in the event of a student wishing to pursue his work here. There are over twenty such affiliated colleges. There are also, in England, certain "affiliated centres." These are towns in which there is no affiliated college, but students who have there attended a course of education managed in connexion with the university by a committee may enter the university

with privileges similar to those enjoyed by students from affiliated colleges.

The principal social function of the university is the "May Week" at the close of the Easter term. It actually takes place in June and lasts longer than a week. There is a great influx of visitors into Cambridge for this occasion. The first four days are occupied by the college boat-races on the Cam, and on subsequent days there are college balls, concerts, theatrical performances and other entertainments. On the Tuesday after the races there is a Congregation, at which prize exercises are recited, and usually, but not invariably, a number of honorary degrees are conferred on eminent men by invitation. This final period of the academic year is called Commencement, or in Latin *Comitia Maxima*.

May week.

AUTHORITIES.—For details of the administration of the university and colleges, regulations as to studies, prizes, scholarships, &c., see the annual *Cambridge University Calendar* and *The Students' Handbook to the University and Colleges of Cambridge*; see also R. Willis and J. W. Clark, *Architectural History of the University of Cambridge* (3 vols., Cambridge, 1886); J. Bass Mullinger, *History of the University of Cambridge from the Earliest Times to the Accession of Charles I.* (2 vols., 1873–1884; third vol., 1909); and smaller *History of Cambridge*, in Longman's "Epoch" Series (1888); J. W. Clark, *Cambridge, Historical and Picturesque* (London, 1890); T. D. Atkinson, *Cambridge Described and Illustrated*, with introduction by J. W. Clark (London, 1897); F. W. Maitland, *Township and Borough* (Cambridge, 1898); C. W. Stubbs, *Cambridge*, in "Mediaeval Towns" series (London, 1905); Arthur Gray, *The Dual Origin of the Town of Cambridge* (publications of the Cambridge Antiquarian Soc., new ser. No. 1, Cambridge, 1908); J. W. Clark, *Liber memorandorum ecclesie de Bernewelle* (Cambridge, 1907), with an introduction by F. W. Maitland. For the individual colleges, see the series of *College Histories*, by various authors (London, 1899 et seq.).

CAMBRIDGE, a city and the county-seat of Dorchester county, Maryland, U.S.A., on the Choptank river, near Chesapeake Bay, about 60 m. S.E. of Baltimore. Pop. (1890) 4192; (1900) 5747, of whom 1958 were negroes. It is served by the Cambridge branch of the Philadelphia, Baltimore & Washington railway (Pennsylvania railway), which connects with the main line at Seaford, 30 m. distant, and with the Baltimore, Chesapeake & Atlantic at Hurlock, 16 m. distant; and by steamers of the Baltimore, Chesapeake & Atlantic railway company. It is a business centre for the prosperous farming region by which it is surrounded, and is a shipping point for oysters and fish; among its manufactures are canned fruits and vegetables, flour, hominy, phosphates, underwear and lumber. Cambridge was founded in 1684, received its present name in 1686, and was chartered as a city in 1900.

CAMBRIDGE, a city and one of the county-seats of Middlesex county, Massachusetts, U.S.A., situated on the Charles river, in the outskirts of Boston, of which it is in effect a part, although under separate government. Pop. (1880) 52,669; (1890) 70,028; (1900) 91,886; (estimated, 1906) 98,554. Of the total population in 1900, 30,446 were foreign-born, including 11,235 Irish, 9613 English Canadians, 1944 English, 1483 French Canadians and 1584 Swedish; and 54,200 were of foreign parentage (both parents foreign-born), including 24,961 of Irish parentage, 9829 of English-Canadian parentage, 2587 of English parentage, and 2288 of French-Canadian parentage. Cambridge is entered directly by only one railway, the Boston & Maine. The township, now practically built over by the city, contained originally several separate villages, the names of which are still used as a convenience in designating corresponding sections of the municipality: Old Cambridge, North Cambridge, Cambridgeport and East Cambridge, the last two being manufacturing and commercial centres.

Old Cambridge is noted as the seat of Harvard University (*q.v.*) and as a literary and scientific centre. Radcliffe College (1879), for women, practically a part of Harvard; an Episcopal Theological School (1867), and the New Church (Swedenborgian or New Jerusalem) Theological School (1866) are other educational institutions of importance. To Cambridge also, in 1908, was removed Andover Theological Seminary, a Congregational institution chartered in 1807, opened in Andover, Massachusetts, in 1808 (re-incorporated under separate trustees in 1907). This seminary is one of the oldest and most famous theological institutions in the United States; it grew out of the theological teaching previously given in Phillips Academy, and was founded by the widow of Lt.-Governor Samuel Phillips, her son John Phillips and Samuel Abbot (1732–1812). The instruction was strongly Calvinistic in the earlier period, but the seminary has always been "equally open to Protestants of every denomination." Very liberal aid is given to students, and there is no charge for tuition. The *Bibliotheca Sacra*, founded in 1843 by Edward Robinson and in 1844 taken over by Professors Bela B. Edwards and Edwards A. Park, and the *Andover Review* (1884–1893), have been the organs of the seminary. In 1886 some of its professors published *Progressive Orthodoxy*, a book which made a great stir by its liberal tone, its opposition to supernaturalism and its evident trend toward the methods of German "higher criticism." Legal proceedings for the removal of five professors, after the publication of this book, failed; and their successful defence helped to secure greater freedom in thought and in instruction in American Presbyterian and Congregational theological seminaries. The seminary is now affiliated with Harvard University, though it remains independent and autonomous.

Cambridge is a typical New England city, built up in detached residences, with irregular streets pleasantly shaded, and a considerable wealth of historic and literary associations. There are many reminders of the long history of Harvard, and of the War of Independence. Cambridge was the site of the camp of the first American army, at the outbreak of the war, and from it went the detachment which intrenched on Bunker's Hill. Here are the Apthorp House (built in 1760), in which General Burgoyne and his officers were lodged as prisoners of war in 1777; the elm under which, according to tradition, Washington took command of the Continental Army on the 3rd of July 1775; the old Vassall or Craigie House (1759), where Washington lived in 1775–1776, and which was later the home of Edward Everett, Joseph E. Worcester, Jared Sparks and (1837–1882) Henry W. Longfellow. Elbridge Gerry lived and James Russell Lowell was born, lived and died in "Elmwood" (built in 1767); Oliver Wendell Holmes was born in Cambridge also; John Fiske, the historian, lived here; and there are many other literary associations, attractive and important for those interested in American letters. In Mt Auburn Cemetery are buried many artists, poets, scholars and other men and women of fame. Cambridge is one of the few American cities possessing a crematorium (1900). The municipal water-works are excellent. A handsome bridge joining Cambridgeport to Boston (cost about $2,250,000) was opened late in 1906. Four other bridges span the Charles river between the two cities. A dam between East Cambridge and Boston, traversed by a roadway 150 ft. wide, was in the process of construction in 1907; and an extension of the Boston subway into Cambridge to the grounds of Harvard University, a distance of about 3 m., was projected. The city government is administered almost entirely under the state civil-service laws, Cambridge having been a leader in the adoption of its provisions. A non-partisan association for political reform did excellent work from 1890 to 1900, when it was superseded by a non-partisan party. Since 1887 the city has declared yearly by increasing majorities for prohibition of the liquor traffic. The high schools enjoy a notable reputation. A handsome city hall (cost $235,000) and public library (as well as a manual training school) were given to the city by Frederick H. Rindge, a one-time resident, whose benefactions to Cambridge aggregated in value $650,000. Cambridge has many manufacturing establishments, and in 1905 the city's factory products were valued at $42,407,064, an increase of 45·8% over their value in 1900. The principal manufactures are slaughtering and meat-packing products, foundry and machine-shop products, rubber boots and shoes, rubber belting and hose, printing and publishing products, carpentering, pianos and organs, confectionery and furniture. Cambridge is one of the chief publishing centres of the country. The tax valuation of property in 1906 ($105,153,235) was more than $1000 per inhabitant.

Cambridge is "one of the few American towns that may be said to have owed their very name and existence to the pursuit of letters" (T. W. Higginson). Its site was selected in 1630 by Governor Winthrop and others as suitable for fortifications and defence, and it was intended to make it the capital of the Massachusetts Bay Colony; but as Boston's peninsular position gave it the advantage in commerce and in defence against the Indians, the plan fell through, although up to 1638 various sessions of the general court and particular courts were held here. The township records (published) are continuous since 1632. A direct tax for the wooden "pallysadoe" about Cambridge led the township of Watertown in 1632 to make the first protest in America against taxation without representation. The settlement was first known as the "New Towne," but in 1638 was named Cambridge in honour of the English Cambridge, where several score of the first immigrants to the colony were educated. The oldest college in America (Harvard) was founded here in 1636. In 1639 there was set up in Cambridge the first printing press of British North America (Boston having none until 1676). Other notable dates in history are 1637 and 1647, when general synods of New England churches met at Cambridge to settle disputed doctrine and define orthodoxy; the departure for Connecticut of Thomas Hooker's congregation in 1636; the meeting of the convention that framed the present constitution of the commonwealth, 1779–1780; the separation of the Congregationalists and Unitarians of the first parish church, in 1829; and the grant of a city charter in 1846. The original township of Cambridge was very large, and there have been successively detached from it, Newton (1691), Lexington (1713), Brighton (1837) and Arlington (1867).

See Lucius R. Page, *History of Cambridge, Massachusetts, 1630–1877* (Boston, New York, 1877); T. W. Higginson, *Old Cambridge* (New York, 1899); Arthur Gilman (ed.), *The Cambridge of Eighteen Hundred and Ninety-Six* (Cambridge, 1896); and *Historic Guide to Cambridge* (Cambridge, 1907.)

CAMBRIDGE, a city and the county-seat of Guernsey county, Ohio, U.S.A., on Wills Creek, about 75 m. E. by N. of Columbus. Pop. (1890) 4361; (1900) 8241, of whom 407 were foreign-born; (1906, estimate) 10,569. It is served by the Baltimore & Ohio and the Pennsylvania railways, and is connected by an electric line with Byesville (pop. in 1900, 1267), about 7 m. S. Cambridge is built on a hill about 800 ft. above sea-level. There is a public library. Coal, oil, natural gas, clay and iron are found in the vicinity, and among the city's manufactures are iron, steel, glass, furniture and pottery. The value of its factory products in 1905 was $2,440,917. The municipality owns and operates the water-works. Cambridge was first settled in 1798 by emigrants from the island of Guernsey (whence the name of the county); was laid out as a town in 1806; was incorporated as a village in 1837; and was chartered as a city in 1893.

CAMBRIDGE PLATONISTS, a school of philosophico-religious thinkers which flourished mainly at Cambridge University in the second half of the 17th century. The founder was Benjamin Whichcote and the chief members were Ralph Cudworth, Richard Cumberland, Joseph Glanvill, Henry More and John Norris (see separate articles). Other less important members were Nathanael Culverwel (d. 1651?), Theophilus Gale (1628–1678), John Pordage (1607–1681), George Rust (d. 1670), John Smith (1618–1652) and John Worthington (1618–1671). They represented liberal thought at the time and were generally known as Latitudinarians. Their views were due to a reaction against three main tendencies in contemporary English thought: the sacerdotalism of Laud and his followers, the obscurantist sectaries and, most important of all, the doctrines of Hobbes. They consist chiefly of a reconciliation between reason and religion, resulting in a generally tolerant spirit. They tend always to mysticism and the comtemplation of things transcendental. In spite of inaccuracy and the lack of critical capacity in dealing with their authorities both ancient and modern, the Cambridge Platonists exercised a valuable influence on English theology and thought in general. Their chief contributions to thought were Cudworth's theory of the "plastic nature" of God, More's elaborate mysticism, Norris's appreciation of Malebranche, Glanvill's conception of scepticism as an aid to Faith, and, in a less degree, the harmony of Faith and Reason elaborated by Culverwel. The one doctrine on which they all combined to lay especial emphasis was the absolute existence of right and wrong quite apart from the theory of divine authority. Their chief authorities were Plato and the Neo-platonists (between whom they made no adequate distinction), and among modern philosophers, Descartes, Malebranche and Boehme. From these sources they attempted to evolve a philosophy of religion, which would not only refute the views of Hobbes, but would also free theology finally from the errors of scholasticism, without plunging it in the newer dangers of unfettered rationalism (see ETHICS).

See Tulloch, *Rational Theology in England in the 17th Century*; Hallam, *Literature of Europe* (chap. on Philosophy from 1650 to 1700; Hunt, *Religious Thought in England*; von Stein, *Sieben Bücher zur Geschichte des Platonismus* (1862), and works on individual philosophers appended to biographies.

CAMBRIDGESHIRE, an eastern county of England, bounded N. by Lincolnshire, E. by Norfolk and Suffolk, S. by Essex and Hertfordshire, and W. by Bedfordshire, Huntingdonshire and Northamptonshire. The area is 858·9 sq. m. The greater part of the county falls within the district of the Fens, and is flat, elevated only a few feet above sea-level, and intersected with innumerable drainage channels. The physical characteristics of this district, and the history of its reclamation from a marshy and in great part uninhabitable condition, fall for consideration under the heading FENS. Except in the south of the county the scenery of the flat land is hardly ever varied by rising ground or wood, and owes the attraction it possesses rather to individuality than to beauty. At the south-eastern and southern boundaries, and to the west of Cambridge, bordering the valley of the Cam on the north, the land rises in gentle undulations; but for the rest, such elevations as the Gog Magog Hills, S.E. of Cambridge, and the gentle hillock on which the city of Ely stands, are isolated and conspicuous from afar. The principal rivers are the Ouse and its tributaries in the south and centre, and the Nene in the north; the greater part of the waters of both these rivers within Cambridgeshire flow in artificial channels, of which those for the Ouse, two great parallel cuts between Earith and Denver Sluice, in Norfolk, called the Bedford Rivers, form the most remarkable feature in the drainage of the county. The old main channel of the Ouse, from Ely downward to Denver (below which are tidal waters), is filled chiefly by the waters of the Cam or Granta, which joins the Ouse 3 m. above Ely, the Lark (which with its feeder, the Kennett, forms the boundary of the county with Suffolk for a considerable distance) and the Little Ouse, forming part of the boundary with Norfolk.

Geology.—By its geological features, Cambridgeshire is divisible into three well-marked regions; in the south and south-east are the low uplands formed by the Chalk; north of this, but best developed in the south-west, is a clay and greensand area; all the remaining portion is alluvial Fenland. The general strike of the rocks is along a south-west and north-east line, the dip is south-easterly. The oldest rock is the Jurassic Oxford Clay, which appears as an irregular strip of elevated flat ground reaching from Croxton by Conington and Fenny Drayton to Willingham and Rampton. Eastward and northward it no doubt forms the floor of the Fen country, and at Thorney and Whittlesea small patches rise like islands, through the level fen alluvium. The Coralline Oolite, with the Elsworth or St Ives rock at the base, occurs as a small patch, covered by Greensand, at Upware, whence many fossils have been obtained; elsewhere its place is taken by the Ampthill Clays, which are passage beds between the Oxford and Kimmeridge Clays. The latter clay lies in a narrow strip by Papworth St Agnes, Oakington and Cottenham; a large irregular outcrop surrounds Haddenham and Ely, and similar occurrences are at March, Chatteris and Manea. Above the Kimmeridge Clay comes the Lower Greensand, sandy for the

greater part, but here and there hardened into the condition known as "Carstone," which has been used as an inferior building-stone. This formation is thickest in the south-west; it extends from the border by Gamlingay, Cuxton and Cottenham, and appears again in outliers at Upware, Ely and Haddenham. The Gault forms a strip of flat ground, 4 to 6 m. wide, running roughly parallel with the course of the river Cam, from Guilden Morden through Cambridge to Soham; it is a stiff blue clay 200 ft. thick in the south-west, but is thinner eastward. At the bottom of the chalk is the Chalk Marl, 10 to 20 ft. thick, with a glauconitic and phosphatic nodule-bearing layer at its base, known as the Cambridge Greensand. This bed has been largely worked for the nodules and for cement; it contains many fossils derived from the Gault below. Several outliers of Chalk Marl lie upon the Gault west of the Cam. The Chalk comprises all the main divisions of the formation, including the Totternhoe stone, Melbourn rock and Chalk rock. Much glacial boulder clay covers all the higher ground of the county; it is a stiff brownish clay with many chalk fragments of travelled rocks. Near Ely there is a remarkable mass of chalk, evidently transported by ice, resting on and surrounded by boulder clay. Plateau gravel caps some of the chalk hills, and old river gravels occur at lower levels with the bones of mammoth, rhinoceros and other extinct mammals. The low-lying Fen beds are marly silt with abundant peat beds and buried forests; at the bottom is a gravel layer of marine origin.

Industries.—The climate is as a whole healthy, the fens being so carefully drained that diseases to which dwellers in marshy districts are commonly liable are practically eliminated. The land is very fertile, and although some decrease is generally apparent in the acreage under grain crops, Cambridgeshire is one of the principal grain-producing counties in England. Nearly nine-tenths of the total area is under cultivation, and an unusually small proportion is under permanent pasture. Wheat is the chief grain crop, but large quantities of barley and oats are also grown. Among green crops potatoes occupy a large and increasing area. Dairy-farming is especially practised in the south-west, where the district of the Cam valley has long been known as the Dairies; and much butter and cheese are sent to the London markets. Sheep are pastured extensively on the higher ground, but the number of these and of cattle for the county as a whole is not large. Beans occupy a considerable acreage, and fruit-growing and market-gardening are important in many parts. There is no large manufacturing industry common to the county in general; among minor trades brewing is carried on at several places, and brick-making and lime-burning may also be mentioned.

Communications.—The principal railway serving the county is the Great Eastern, of which system numerous branch lines centre chiefly upon Cambridge, Ely and March. Cambridge is also served by branches of the Great Northern line from Hitchin, of the London & North-Western from Bletchley and Bedford, and of the Midland from Kettering. A trunk line connecting the eastern counties with the north and north-west of England runs northward from March under the joint working of the Great Northern and Great Eastern companies. The artificial waterways provide the county with an extensive system of inland navigation; and a considerable proportion of the industrial population is employed on these. In this connexion the building of boats and barges is carried on at several towns.

Population and Administration.—The area of the ancient county is 549,723 acres, with a population in 1891 of 188,961, and in 1901 of 190,682. The ancient county includes the two administrative counties of Cambridge in the south and the Isle of Ely in the north. The liberty of the Isle of Ely was formerly of the independent nature of a county palatine, but ceased to be so under acts of 1836 and 1837. Its area is 238,048 acres, and that of the administrative county of Cambridge 315,171 acres. Cambridgeshire contains seventeen hundreds. The municipal boroughs are Cambridge, the county town (pop. 38,379), in the administrative county of Cambridge, and Wisbech (9381) in the Isle of Ely. The other urban districts are—in the administrative county of Cambridge, Chesterton (9591), and in the Isle of Ely, Chatteris (4711), Ely (7713), March (7565) and Whittlesey (3909). Among other considerable towns Soham (4230) and Littleport (4181), both in the neighbourhood of Ely, may be mentioned. The town of Newmarket, which, although wholly within the administrative county of West Suffolk, is mainly in the ancient county of Cambridgeshire, is famous for its race-meetings. The county is in the south-eastern circuit, and assizes are held at Cambridge. Each administrative county has a court of quarter sessions, and the two are divided into ten petty sessional divisions. The borough of Cambridge has a separate court of quarter sessions, and this borough and Wisbech have separate commissions of the peace. The university of Cambridge exercises disciplinary jurisdiction over its members. There are 168 entire civil parishes in the two administrative counties. Cambridgeshire is almost wholly in the diocese of Ely and the archdeaconries of Ely and Sudbury, but small portions are within the dioceses of St Albans and Norwich. There are 194 ecclesiastical parishes or districts wholly or in part within the county. The parliamentary divisions are three, namely, Northern or Wisbech, Western or Chesterton, and Eastern or Newmarket, each returning one member. The county also contains the parliamentary borough of Cambridge, returning one member; and the university of Cambridge returns two members.

History.—The earliest English settlements in what is now Cambridgeshire were made about the 6th century by bands of Engles, who pushed their way up the Ouse and the Cam, and established themselves in the fen-district, where they became known as the Gyrwas, the districts corresponding to the modern counties of Huntingdonshire and Cambridgeshire being distinguished as the lands of the North Gyrwas and the South Gyrwas respectively. At this period the fen-district stretched southward as far as Cambridge, and the essential unity which it preserved is illustrated later by its inclusion under one sheriff, chosen in successive years from Cambridgeshire proper, the Isle of Ely and Huntingdonshire. In 656 numerous lands in the neighbourhood of Wisbech were included in the endowment of the abbey of Peterborough, and in the same century religious houses were established at Ely and Thorney, both of which, however, were destroyed during the Danish invasions of the 9th century. After the treaty of Wedmore the district became part of the Danelaw. On the expulsion of the Danes by Edward in the 10th century it was included in East Anglia, but in the 11th century was again overrun by the Danes, who in the course of their devastations burnt Cambridge. The first mention of the shire in the Saxon Chronicle records the valiant resistance which it opposed to the invaders in 1010 when the rest of East Anglia had taken ignominious flight. The shire-system of East Anglia was in all probability not definitely settled before the Conquest, but during the Danish occupation of the 9th century the district possessed a certain military and political organization round Cambridge, its chief town, whence probably originated the constitution and demarcation of the later shire. At the time of the Domesday Survey the county was divided as now, except that the Isle of Ely, which then formed two hundreds having their meeting-place at Witchford, is now divided into the four hundreds of Ely, Wisbech, North Witchford and South Witchford, while Cambridge formed a hundred by itself. The hundred of Flendish was then known as Flamingdike. Cambridgeshire was formerly included in the diocese of Lincoln, until, on the erection of Ely to a bishop's see in 1109, almost the whole county was placed in that diocese. In 1291 the whole county, with the exception of parishes in the deanery of Fordham and diocese of Norwich, constituted the archdeaconry of Ely, comprising the deaneries of Ely, Wisbech, Chesterton, Cambridge, Shingay, Bourn, Barton and Camps. The Isle of Ely formerly constituted an independent franchise in which the bishops exercised quasi-palatinate rights, and offences were held to be committed against the bishop's peace. These privileges were considerably abridged in the reign of Henry VIII., but the Isle still had separate civil officers, appointed by the bishop, chief

among whom were the chief justice, chief bailiff, deputy bailiff and two coroners. The bishop is still *custos rotulorum* of the Isle. Cambridgeshire has always been remarkable for its lack of county families, and for the frequent changes in the ownership of estates. No Englishmen retained lands of any importance after the Conquest, and at the time of the Domesday Survey the chief lay proprietors were Alan, earl of Brittany, whose descendants the Zouches retained estates in the county until the 15th century; Picot the sheriff, whose estates passed to the families of Peverell and Peche; Aubrey de Vere, whose descendants retained their estates till the 16th century; and Hardwinus de Scalariis, ancestor of the Scales of Whaddon.

From the time of Hereward's famous resistance to the Conqueror in the fen-district, the Isle of Ely was intimately concerned with the great political struggles of the country. It was defended against Stephen by Bishop Nigellus of Ely, who fortified Ely and Aldreth, and the latter in 1144 was held for the empress Maud by Geoffrey de Mandeville. During the struggles between John and his barons, Faukes de Breauté was made governor of Cambridge Castle, which, however, surrendered to the barons in the same year. The Isle of Ely was seized by the followers of Simon de Montfort in 1266, but in 1267 was taken by Prince Edward. At the Reformation period the county showed much sympathy with the Reformers, and in 1642 the knights, gentry and commoners of Cambridgeshire petitioned for the removal of all unwarrantable orders and dignities, and the banishment of popish clergy. In the civil war of the 17th century Cambridgeshire was one of the associated counties in which the king had no visible party, though the university assisted him with contributions of plate and money.

Cambridgeshire has always been mainly an agricultural county. The Domesday Survey mentions over ninety mills and numerous valuable fisheries, especially eel-fisheries, and contains frequent references to wheat, malt and honey. The county had a flourishing wool-industry in the 14th century, and became noted for its worsted cloths. The Black Death of 1349 and the ravages committed during the Wars of the Roses were followed by periods of severe depression, and in 1439 several Cambridgeshire towns obtained a remission of taxation on the plea of poverty. In the 16th century barley for malt was grown in large quantities in the south, and the manufacture of willow-baskets was carried on in the fen-districts. Saffron was extensively cultivated in the 18th century, and paper was manufactured near Sturbridge. Sturbridge fair was at this period reckoned the largest in Europe, the chief articles of merchandise being wool, hops and leather; and the Newmarket races and horse-trade were already famous. Large waste areas were brought under cultivation in the 17th century through the drainage of the fen-district, which was brought to completion about 1652 through the labours of Cornelius Vermuyden, a Dutchman. The coprolite industry was very profitable for a short period from 1850 to 1880, and its decline was accompanied by a general industrial and agricultural depression. Cambridgeshire returned three members to parliament in 1290, and in 1295 the county returned two members, the borough of Cambridge two members, and the city of Ely two members, this being the sole return for Ely. The university was summoned to return members in 1300 and again in 1603, but no returns are recorded before 1614, after which it continued to return two members. Under the Reform Act of 1832 the county returned three members.

Antiquities.—In ecclesiastical architecture Cambridgeshire would be rich only in the possession of the magnificent cathedral at Ely and the round church of the Holy Sepulchre, Jesus College and King's College chapels, and many other examples in Cambridge. But there are many fine churches elsewhere. At Thorney, a small town in the north of the county, which owes much in appearance to the 8th duke of Bedford (d. 1872), the parish church is actually a portion of the church of an abbey said to date originally from the 7th century, and refounded in 972 by Ethelwold, bishop of Winchester, as a Benedictine monastery. The church is partly fine Norman. Another Norman building of special interest is Sturbridge chapel near Cambridge, which belonged to a lepers' hospital. To this foundation King John granted a fair, which became, and continued until the 18th century, one of the most important in England. It is still held in September. At Swaffham Prior there are remains of two churches in one churchyard, the tower of one being good Transitional Norman, while that of the other is Perpendicular, the upper part octagonal. Among many Early English examples the church of Cherry Hinton near Cambridge may be mentioned. The churches of Trumpington and Bottisham are fine specimens of the Decorated style; in the first is a famous brass to Sir Roger de Trumpington (1289). As Perpendicular examples the tower and spire of St Mary's, Whittlesey, and the rich wooden roof of Outwell church, may be selected. Monastic remains are scanty. Excluding the town of Cambridge there are no domestic buildings, either ancient or modern, of special note, with the exception of Sawston Hall, in the south of the county, a quadrangular mansion dated 1557–1584.

AUTHORITIES.—See D. and S. Lysons, *Magna Britannia*, vol. ii. part i. (London, 1808); C. C. Babington, *Ancient Cambridgeshire* (Cambridge, 1883); R. Bowes, *Catalogue of Books printed at or relating to Cambridge* (Cambridge, 1891 et seq.); E. Conybeare, *History of Cambridgeshire* (London, 1897); *Victoria County History, Cambridgeshire.*

CAMBUSLANG, a town of Lanarkshire, Scotland. It is situated near the Clyde, 4½ m. S.E. of Glasgow (of which it is a residential suburb) by the Caledonian railway. Pop. (1891) 8323; (1901) 12,252. Its leading industries include coal-mining, turkey-red dyeing and brick-making. It contains one of the largest steel works in the United Kingdom. Among the chief edifices are a public hall, institute and library. It was the birthplace of John Claudius London (1783–1843), the landscape gardener and writer on horticulture, whose *Arboretum et Fruticetum Britannicum* still ranks as an authority.

CAMBYSES (Pers. *Kambujiya*), the name borne by the father and the son of Cyrus the Great. When Cyrus conquered Babylon in 539 he was employed in leading religious ceremonies (*Chronicle of Nabonidus*), and in the cylinder which contains Cyrus's proclamation to the Babylonians his name is joined to that of his father in the prayers to Marduk. On a tablet dated from the first year of Cyrus, Cambyses is called king of Babel. But his authority seems to have been quite ephemeral; it was only in 530, when Cyrus set out on his last expedition into the East, that he associated Cambyses on the throne, and numerous Babylonian tablets of this time are dated from the accession and the first year of Cambyses, when Cyrus was "king of the countries" (*i.e.* of the world). After the death of his father in the spring of 528 Cambyses became sole king. The tablets dated from his reign in Babylonia go down to the end of his eighth year, *i.e.* March 521 B.C.[1] Herodotus (iii. 66), who dates his reign from the death of Cyrus, gives him seven years five months, *i.e.* from 528 to the summer of 521. For these dates cf. Ed. Meyer, *Forschungen zur alten Geschichte*, ii. 470 ff.

The traditions about Cambyses, preserved by the Greek authors, come from two different sources. The first, which forms the main part of the account of Herodotus (iii. 2; 4; 10-37), is of Egyptian origin. Here Cambyses is made the legitimate son of Cyrus and a daughter of Apries (Herod. iii. 2, Dinon fr. 11, Polyaen. viii. 29), whose death he avenges on the successor of the usurper Amasis. (In Herod. iii. 1 and Ctesias *ap.* Athen. xiii. 560 D, this tradition is corrected by the Persians: Cambyses wants to marry a daughter of Amasis, who sends him a daughter of Apries instead of his own daughter, and by her Cambyses is induced to begin the war.) His great crime is the killing of the Apis, for which he is punished by madness, in which he commits many other crimes, kills his brother and his sister, and at last loses his empire and dies from a wound in the hip, at the same place where he had wounded the sacred animal. Intermingled are some stories derived from the Greek mercenaries, especially about their leader Phanes of Halicarnassus, who

[1] On the much discussed tablet, which is said to date from his 11th year, the writer had at first written "10th year of Cyrus," and then corrected this date into "1st year of Cambyses"; see Strassmaier, *Inschriften von Cambyses*, No. 97.

betrayed Egypt to the Persians. In the Persian tradition the crime of Cambyses is the murder of his brother; he is further accused of drunkenness, in which he commits many crimes, and thus accelerates his ruin. These traditions are found in different passages of Herodotus, and in a later form, but with some trustworthy detail about his household, in the fragments of Ctesias. With the exception of Babylonian dated tablets and some Egyptian inscriptions, we possess no contemporary evidence about the reign of Cambyses but the short account of Darius in the Behistun inscription. It is impossible from these sources to form a correct picture of Cambyses' character; but it seems certain that he was a wild despot and that he was led by drunkenness to many atrocious deeds.

It was quite natural that, after Cyrus had conquered Asia, Cambyses should undertake the conquest of Egypt, the only remaining independent state of the Eastern world. Before he set out on his expedition he killed his brother Bardiya (Smerdis), whom Cyrus had appointed governor of the eastern provinces. The date is given by Darius, whereas the Greek authors narrate the murder after the conquest of Egypt. The war took place in 525, when Amasis had just been succeeded by his son Psammetichus III. Cambyses had prepared for the march through the desert by an alliance with Arabian chieftains, who brought a large supply of water to the stations. King Amasis had hoped that Egypt would be able to withstand the threatened Persian attack by an alliance with the Greeks. But this hope failed; the Cyprian towns and the tyrant Polycrates of Samos, who possessed a large fleet, now preferred to join the Persians, and the commander of the Greek troops, Phanes of Halicarnassus, went over to them. In the decisive battle at Pelusium the Egyptians were beaten, and shortly afterwards Memphis was taken. The captive king Psammetichus was executed, having attempted a rebellion. The Egyptian inscriptions show that Cambyses officially adopted the titles and the costume of the Pharaohs, although we may very well believe that he did not conceal his contempt for the customs and the religion of the Egyptians. From Egypt Cambyses attempted the conquest of Ethiopia (Cush), *i.e.* the kingdom of Napata and Meroe, the modern Nubia. But his army was not able to cross the deserts; after heavy losses he was forced to return. In an inscription from Napata (in the Berlin museum) the Ethiopian king Nastesen relates that he had beaten the troops of Kembasuden, *i.e.* Cambyses, and taken all his ships (H. Schäfer, *Die Aethiopische Königsinschrift des Berliner Museums*, 1901). Another expedition against the great oasis failed likewise, and the plan of attacking Carthage was frustrated by the refusal of the Phoenicians to operate against their kindred. Meanwhile in Persia a usurper, the Magian Gaumata, arose in the spring of 522, who pretended to be the murdered Bardiya (Smerdis). He was acknowledged throughout Asia. Cambyses attempted to march against him, but, seeing probably that success was impossible, died by his own hand (March 521). This is the account of Darius, which certainly must be preferred to the traditions of Herodotus and Ctesias, which ascribe his death to an accident. According to Herodotus (iii. 64) he died in the Syrian Ecbatana, *i.e.* Hamath; Josephus (*Ant.* xi. 2. 2) names Damascus; Ctesias, Babylon, which is absolutely impossible.

See A. Lincke, *Kambyses in der Sage, Litteratur und Kunst des Mittelalters*, in *Aegyptiaca: Festschrift für Georg Ebers* (Leipzig 1897), pp. 41-61; also PERSIA: *Ancient History*. (ED. M.)

CAMDEN, CHARLES PRATT, 1ST EARL (1714–1794), lord chancellor of England, was born in Kensington in 1714. He was a descendant of an old Devonshire family of high standing, the third son of Sir John Pratt, chief-justice of the king's bench in the reign of George I. He received his early education at Eton and King's College, Cambridge. In 1734 he became a fellow of his college, and in the following year obtained his degree of B.A. Having adopted his father's profession, he had entered the Middle Temple in 1728, and ten years later he was called to the bar. He practised at first in the courts of common law, travelling also the western circuit. For some years his practice was so limited, and he became so much discouraged, that he seriously thought of turning his back on the law and entering the church. He listened, however, to the advice of his friend Sir Robert Henley, a brother barrister, afterwards known as Lord Chancellor Northington, and persevered, working on and waiting for success. The first case which brought him prominently into notice and gave him assurance of ultimate success was the government prosecution, in 1752, of a bookseller, William Owen, for a libel on the House of Commons.

His speech for the defence contributed much to the verdict for the defendant. In 1757, through the influence of William Pitt (afterwards earl of Chatham), with whom he had formed an intimate friendship while at Eton, he received the appointment of attorney-general. The same year he entered the House of Commons as member for the borough of Downton in Wiltshire. He sat in parliament four years, but did not distinguish himself as a debater. His professional practice now largely increased. One of the most noticeable incidents of his tenure of office as attorney-general was the prosecution of Dr. J. Shebbeare (1709–1788), a violent party writer of the day, for a libel against the government contained in his notorious *Letters to the People of England*, which were published in the years 1756–1758. As a proof of Pratt's moderation in a period of passionate party warfare and frequent state trials, it is noted that this was the only official prosecution for libel which he set on foot. In January 1762 Pratt was raised to the bench as chief-justice of the common pleas. He was at the same time knighted. Soon after his elevation the nation was thrown into great excitement about the prosecution of John Wilkes, and the question involved in it of the legality of "general warrants." Chief-Justice Pratt pronounced, with decisive and almost passionate energy, against their legality, thus giving voice to the strong feeling of the nation and winning for himself an extraordinary degree of popularity as one of the "maintainers of English constitutional liberty." Honours fell thick upon him in the form of addresses from the city of London and many large towns, and of presentations of freedom from various corporate bodies. In July 1765 he was raised to the peerage as Baron Camden, of Camden Place, in the county of Kent; and in the following year he was removed from the court of common pleas to take his seat as lord chancellor (July 30, 1766). This seat he retained less than four years; for although he discharged its duties in so efficient a manner that, with one exception, his decisions were never reversed on appeal, he took up a position of such uncompromising hostility to the governments of the day, the Grafton and North administrations, on the greatest and most exciting matters, the treatment of the American colonies and the proceedings against John Wilkes, that the government had no choice but to require of him the surrender of the great seal. He retired from the court of chancery in January 1770, but he continued to take a warm interest in the political affairs and discussions of the time. He continued steadfastly to oppose the taxation of the American colonists, and signed, in 1778, the protest of the Lords in favour of an address to the king on the subject of the manifesto of the American commissioners. In 1782 he was appointed president of the council under the Rockingham administration, but retired in the following year. Within a few months he was reinstated in this office under the Pitt administration, and held it till his death. Lord Camden was a strenuous opponent of Fox's India Bill, took an animated part in the debates on important public matters till within two years of his death, introduced in 1786 the scheme of a regency on occasion of the king's insanity, and to the last zealously defended his early views on the functions of juries, especially of their right to decide on all questions of libel. He was raised to the dignity of an earl in May 1786, and was at the same time created Viscount Bayham. Earl Camden died in London on the 18th of April 1794. His remains were interred in Seale church in Kent.

CAMDEN, JOHN JEFFREYS PRATT, 2ND EARL and 1ST MARQUESS (1759–1840), only son of the 1st earl, was born on the 11th of February 1759, and was educated at Trinity College, Cambridge. In 1780 he was chosen member of parliament for Bath, and he obtained the lucrative position of teller of the

exchequer, an office which he kept until his death, although after 1812 he refused to receive the large income arising from it. In the ministry of William Pitt, Pratt was successively a lord of the admiralty and a lord of the treasury; then, having succeeded his father in the earldom in 1794, he was appointed lord-lieutenant of Ireland in 1795. Disliked in Ireland as an opponent of Roman Catholic emancipation and as the exponent of an unpopular policy, Camden's term of office was one of commotion and alarm, culminating in the rebellion of 1798. Immediately after the suppression of the rising he resigned, and in 1804 became secretary for war and the colonies under Pitt, and in 1805 lord president of the council. He was again lord president from 1807 to 1812, after which date he remained for some time in the cabinet without office. In 1812 he was created earl of Brecknock and Marquess Camden. He died on the 8th of October 1840, and was succeeded by his only son, George Charles, 2nd marquess (1799–1866). The present marquess is his descendant. Camden was chancellor of the university of Cambridge and a knight of the Garter.

CAMDEN, WILLIAM (1551–1623), English antiquary and historian, was born in London on the 2nd of May 1551. His father, Sampson Camden, a native of Lichfield, had settled in London, and, as a painter, had become a member of the company of painter-stainers. His mother, Elizabeth, belonged to the old Cumberland family of Curwen. Young Camden received his early education at Christ's Hospital and St Paul's school, and in 1566 went to Magdalen College, Oxford, probably as a servitor or chorister. Failing to obtain a demyship at Magdalen he removed to Broadgates Hall, afterwards Pembroke College, and later to Christ Church, where he was supported by his friend, Dr Thomas Thornton, canon of Christ Church. As a defender of the established religion he was soon engaged in controversy, and his failure to secure a fellowship at All Souls' College is attributed to the hostility of the Roman Catholics. In 1570 he supplicated in vain for the degree of B.A., and although a renewed application was granted in 1573 it is doubtful if he ever took a degree; and in 1571 he went to London and devoted himself to antiquarian studies, for which he had already acquired a taste.

Camden spent some time in travelling in various parts of England collecting materials for his *Britannia*, a work which was first published in 1586. Owing to his friendship with Dr Gabriel Goodman, dean of Westminster, Camden was made second master of Westminster school in 1575; and when Dr Edward Grant resigned the headmastership in 1593 he was appointed as his successor. The vacations which he enjoyed as a schoolmaster left him time for study and travel, and during these years he supervised the publication of three further editions of the *Britannia*. Although a layman he was granted the prebend of Ilfracombe in 1589, and in 1597 he resigned his position at Westminster on being made Clarencieux king-at-arms, an appointment which caused some ill-feeling, and the York herald, Ralph Brooke, led an attack on the genealogical accuracy of the *Britannia*, and accused its author of plagiarism. Camden replied to Brooke in an appendix to the fifth edition of the *Britannia*, published in 1600, and his reputation came through the ordeal untarnished. Having brought out an enlarged and improved edition of the *Britannia* in 1607, he began to work on a history of the reign of Queen Elizabeth, to which he had been urged by Lord Burghley in 1597. The first part of this history dealing with the reign down to 1588 was published in 1615 under the title *Annales rerum Anglicarum et Hibernicarum regnante Elizabetha*. With regard to this work some controversy at once arose over the author's treatment of Mary, queen of Scots. It was asserted that Camden altered his original narrative in order to please James I., and, moreover, that the account which he is said to have given to his friend, the French historian, Jacques de Thou, differed substantially from his own. It seems doubtful if there is any truth in either of these charges. The second part of this work, finished in 1617, was published, after the author's death, at Leiden in 1625 and in London in 1627. In 1622 Camden carried out a plan to found a history lectureship at Oxford. He provided an endowment from some lands at Bexley, and appointed as the first lecturer, his friend, Degory Wheare. The present occupant of the position is known as the Camden professor of ancient history. His concluding years were mainly spent at Chislehurst, where he had taken up his residence in 1609, and in spite of recurring illnesses he continued to work at material for the improvement of the *Britannia* and kindred subjects. He died at Chislehurst on the 9th of November 1623, and was buried in Westminster Abbey, where a monument now stands to his memory.

The *Britannia*, the first edition of which is dedicated to Burghley, is a survey of the British islands written in elegant Latin. It was first translated into English in 1610, probably under the author's direction, and other translations have subsequently appeared, the best of which is an edition edited by Richard Gough and published in three volumes in 1789, and in four volumes in 1806. The *Annales* has been translated into French, and English translations appeared in 1635, 1675 and 1688. The Latin version was published at Leiden in 1639 and 1677, and under the editorship of T. Hearne at Oxford in 1717. In addition to these works Camden compiled a Greek grammar, *Institutio Graecae Grammatices Compendiaria*, which became very popular, and he published an edition of the writings of Asser, Giraldus Cambrensis, Thomas Walsingham and others, under the title, *Anglica, Hibernica, Normannica, Cambrica, a veteribus scripta*, published at Frankfort in 1602, and again in 1603. He also drew up a list of the epitaphs in Westminster Abbey, which was issued as *Reges, Reginae, Nobiles et alii in ecclesia collegiata Beati Petri Westmonasterii sepulti*. This was enlarged and published again in 1603 and 1606. In 1605 he published his *Remains concerning Britain*, a book of collections from the *Britannia*, which quickly passed through seven editions; and he wrote an official account of the trial of the Gunpowder Plot conspirators as *Actio in Henricum Garnetum, Societatis Jesuiticae in Anglia superiorem et caeteros*.

Camden, who refused a knighthood, was a man of enormous industry, and possessed a modest and friendly disposition. He had a large number of influential friends, among whom were Archbishop Ussher, Sir Robert Cotton, John Selden, the French jurist Brisson, and Isaac Casaubon. His correspondence was published in London in 1691 by Dr Thomas Smith under the title, *Vita Gulielmi Camdeni et Illustrium virorum ad G. Camdenum Epistolae*. This volume also contains his *Memorabilia de scipso*; his notes of the reign of James I.; and other interesting matter. In 1838 the Camden Society was founded in his honour, and much valuable work has been done under its auspices.

CAMDEN, a city and the county-seat of Camden county, New Jersey, U.S.A., on the Delaware river, directly opposite Philadelphia, Pa. Pop. (1880) 41,659; (1890) 58,313; (1900) 75,935, of whom 10,097 were foreign-born and 5576 were negroes; (1910) 94,538. It is a terminus of the Atlantic city, the West Jersey & Sea Shore, and the Pennsylvania (Amboy division) railways, and is also served by river and coasting steamboat lines. Camden is practically a suburb of Philadelphia, with which it is connected by ferries. It has several pleasant residential sections, and among its public buildings are the city hall, the Camden county court house, the post office, the free public library, the Cooper hospital and the West Jersey homeopathic hospital. The high school has a thoroughly equipped manual training department. The city owns and operates its water-works system, and is an important manufacturing and ship-building centre, among its manufactories being chemical works; asbestos, wall-paper, oil-cloth and morocco-leather factories; woollen, worsted and yarn mills; preserving factories; iron and steel mills; boot and shoe factories; and ship-yards. In 1900 the total value of the city's manufactured products was $20,451,874 (of which $17,969,954 was the value of factory products, which in 1905 had increased 86·5% to $33,587,273), several of the largest items being worsted goods ($2,090,991 in 1900, and $2,528,040 in 1905); leather, tanned, curried and finished ($1,515,935 in 1900, and $6,364,928 in 1905); oil-cloth ($1,638,556 in 1900); pickles, preserves and

sauces ($685,358 in 1900), and wooden ships and boats ($409,500 in 1900, and $361,089 in 1905, when the value of the iron and steel ship-building industry was $4,673,504). The first settlers on the site of Camden came in 1679, but for a century the settlement consisted of isolated farms and a small group of houses about the ferry by which travellers from the east crossed to Philadelphia. The early settlers were largely Quakers. About 1773 Jacob Cooper laid out a town near the ferry, and gave it the name Camden in honour of Lord Chancellor Camden, who had been one of the strongest opponents of the Stamp Act. The settlement, however, was known variously as "Pluckemin," "The Ferry" and "Cooper's Ferry" until about the time of the War of 1812. Until 1828 it was administratively a part of the town of Newton, Gloucester county, but in that year, with more than a thousand inhabitants, it was chartered as a city under its present name. During the British occupation of Philadelphia in the War of Independence, a British force was stationed here, and Camden was the scene of several skirmishes between the British troops and the New Jersey irregular militia. Camden was the home of Walt Whitman from 1873 until his death.

CAMDEN, a town and the county-seat of Kershaw county, South Carolina, U.S.A., near the Wateree river, 33 m. N.E. of Columbia. Pop. (1890) 3533; (1900) 2441; this decrease was due to the separation from Camden during the decade of its suburb "Kirkwood," which was re-annexed in 1905. It is served by the Atlantic Coast Line, the Seaboard Air Line and the Southern railways. Camden is situated about 100 ft. above the river, which is navigable to this point. The town is a winter resort, chiefly for Northerners. Cotton, grain and rice are produced in the vicinity, and there are some manufactories, including cotton mills, a cotton-seed oil mill and planing mills. Camden, first known as Pine Tree Hill, is one of the oldest interior towns of the state, having been settled in 1758; in 1768 the present name was adopted in honour of Lord Chancellor Camden. The town was first incorporated in 1791; its present charter dates from 1890. For a year following the capture of Charleston by the British in May 1780, during the War of Independence, Camden was the centre of important military operations. It was occupied by the British under Cornwallis in June 1780, was well fortified and was garrisoned by a force under Lord Rawdon. On the 16th of August Gen. Horatio Gates, with an American force of about 3600, including some Virginia militia under Charles Porterfield (1750–1780) and Gen. Edward Stevens (1745–1820), and North Carolina militia under Gen. Richard Caswell (1729–1789), was defeated here by the British, about 2000 strong, under Lord Cornwallis, who had joined Rawdon in anticipation of an attack by Gates. Soon after the engagement began a large part of the Americans, mostly North Carolina and Virginia militia, fled precipitately, carrying Gates with them; but Baron De Kalb and the Maryland troops fought bravely until overwhelmed by numbers, De Kalb himself being mortally wounded. A monument was erected to his memory in 1825, Lafayette laying the corner-stone. The British loss in killed, wounded and missing was 324; the American loss was about 800 or 900 killed and 1000 prisoners, besides arms and baggage. On the 3rd of December Gates was superseded by Gen. Nathanael Greene, who after Cornwallis had left the Carolinas, advanced on Camden and arrived in the neighbourhood on the 19th of April 1781. Considering his force (about 1450) insufficient for an attack on the fortifications, he withdrew a short distance north of Camden to an advantageous position on Hobkirk's Hill, where on the 25th of April Rawdon, with a force of only 950, took him somewhat by surprise and drove him from the field. The casualties on each side were nearly equal: American 271; British 258. On the 8th of May Rawdon evacuated the town, after burning most of it. On the 24th of February 1865, during the Civil War, a part of Gen. W. T. Sherman's army entered Camden and burned stores of tobacco and cotton, and several buildings. (See AMERICAN WAR OF INDEPENDENCE.)

See also T. J. Kirkland and R. M. Kennedy, *Historic Camden* (Columbia, S.C., 1905).

CAMEL (from the Arabic *Djemal* or the Heb. *Gamal*), the name of the single-humped Arabian *Camelus dromedarius*, but also applied to the two-humped central Asian *C. bactrianus* and to the extinct relatives of both. The characteristics of camels and their systematic position are discussed under the headings TYLOPODA and ARTIODACTYLA. The two living species are distinguishable at a glance. It may be mentioned that the Bactrian camel, which is a shorter-legged and more ponderous animal than the Arabian species, grows an enormously long and thick winter coat, which is shed in blanket-like masses in spring. The Arabian camel, which is used not only in the country from which it takes its name, but also in North Africa and India, and has been introduced into Australia and North America, is known only as a domesticated animal. On the other hand, the Bactrian species, which is employed throughout a large tract of central Asia in the domesticated condition, appears, according to recent researches, to exist in the wild state in some of the central Asian deserts. From the examination of specimens collected by Dr Sven Hedin, Professor W. Leche shows that the wild Bactrian camel differs from the domesticated breed of central Asia in the following external characters: the humps are smaller; the long hair does not occupy nearly so much of the body; the colour is much more rufous; and the ears and muzzle are shorter. Many important differences are also recorded between the skulls of the two animals, and it is especially noteworthy that the last lower molar is smaller in the wild than in the tame race. In connexion with this point it should be noticed that, unlike what occurs in the yak, the wild animal is not larger than the tame one, although it is incorrect to say that the former is decidedly the inferior of the latter in point of stature. Dr Leche also institutes a comparison between the skeletons of the wild and the tame Bactrian camel with the remains of certain fossil Asiatic camels, namely, *Camelus knoblochi* from Sarepta, Russia, and *C. alutensis* from the Aluta valley, Rumania. This comparison leads to the important conclusion that the wild Bactrian *Camelus bactrianus ferus* comes much nearer to the fossil species than it does to the domesticated breed, the resemblance being specially noticeable in the absolutely and relatively small size of the last molar. In view of these differences from the domesticated breed, and the resemblance of the skull or lower jaw to that of the extinct European species, it becomes practically impossible to regard the wild camels as the offspring of animals that have escaped from captivity.

On the latter hypothesis it has been generally assumed that the wild camels are the descendants of droves of the domesticated breed which escaped when certain central Asian cities were overwhelmed by sand-storms. This theory, according to Professor Leche, is rendered improbable by Dr Sven Hedin's observations on the habits and mode of life of the wild camel. The habitat of the latter extends from the lower course of the Keria river to the desert at the termination of that river, and thence to the neighbourhood of the Achik, the ancient bed of the Tarim river. These animals also occur in the desert district south of the Tarim; but are most abundant in the deserts and mountains to the southward of Kuruktagh, where there are a few brackish-water pools, and are also common in the barren mountains between Kuruktagh and Choetagh. Large herds have also been observed in the deserts near Altyntagh. The capacity of camels for travelling long distances without water —owing to special structural modifications in the stomach— is familiar to all. That the Arabian species was one of the earliest animals to be domesticated is evident from the record of Scripture, where six thousand camels are said to have formed part of the wealth of the patriarch Job. Camels also formed part of the present which Pharaoh gave to Abraham, and it was to a company of Ishmaelites travelling from Gilead to Egypt on camels, laden with spices, much as their Arabian descendants do at the present day, that Joseph was sold by his brothers.

The hump (or humps) varies in size according to the condition of the animal, becoming small and flaccid after hard work and poor diet.

During the rutting-season male camels become exceedingly

savage and dangerous, uttering a loud bubbling roar and engaging in fierce contests with their fellows. The female carries her young for fully eleven months, and produces only one calf at a time, which she suckles for a year. Eight days after birth the young Arabian camel stands 3 ft. high, but does not reach its full growth till its sixteenth or seventeenth year; it lives from forty to fifty years. The flesh of the young camel resembles veal, and is a favourite food of the Arabs, while camel's milk forms an excellent and highly nutritious beverage, although it does not furnish butter. The long hair is shorn every summer, and woven into a variety of stuffs used by the Arab for clothing himself and his family, and covering his tent. It was in raiment of camel's hair that John the Baptist appeared as a preacher. The hair imported into Europe is chiefly used in the manufacture of small brushes used by painters, while the thick hide is formed into a very durable leather. The droppings are used as fuel, and from the incinerated remains of these sal-ammoniac is extracted, which was at one time largely exported from Egypt.

The Bactrian camel is, if possible, of still more importance to many of the central Asian Mongol races, supplying them alike with food and raiment. It is, however, as "the ship of the desert," without which vast tracts of the earth's surface could scarcely be explored, that the camel is specially valuable. In its fourth year its training as a beast of burden begins, when it is taught to kneel and to rise at a given signal, and is gradually accustomed to bear increasing loads. These vary in weight from 500 to 1000 lb, according to the variety of camel employed, for of the Arabian camel there are almost as many breeds as there are of the horse. When crossing a desert camels are expected to carry their loads 25 m. a day for three days without drink, getting a supply of water, however, on the fourth; but the fleeter breeds will carry their rider and a bag of water 50 m. a day for five days without drinking. When too heavily laden the camel refuses to rise, but on the march it is exceedingly patient under its burden, only yielding beneath it to die. Relieved from its load it does not, like other animals, seek the shade, even when that is to be found, but prefers to kneel beside its burden in the broad glare of the sun, seeming to luxuriate in the burning sand. When overtaken by a dust-storm it falls on its knees, and stretching its neck along the sand, closes its nostrils and remains thus motionless till the atmosphere clears; and in this position it affords some shelter to its driver, who, wrapping his face in his mantle, crouches behind his beast.

The food of the camel consists chiefly of the leaves of trees, shrubs and dry hard vegetables, which it is enabled to tear down and masticate by means of its powerful front teeth. As regards temperament, if, writes Sir F. Palgrave, "docile means stupid, well and good; in such a case the camel is the very model of docility. But if the epithet is intended to designate an animal that takes an interest in its rider so far as a beast can, that in some way understands his intentions, or shares them in a subordinate fashion, that obeys from a sort of submissive or half-fellow-feeling with his master, like the horse or elephant, then I say that the camel is by no means docile—very much the contrary. He takes no heed of his rider, pays no attention whether he be on his back or not, walks straight on when once set agoing, merely because he is too stupid to turn aside, and then should some tempting thorn or green branch allure him out of the path, continues to walk on in the new direction simply because he is too dull to turn back into the right road. In a word, he is from first to last an undomesticated and savage animal rendered serviceable by stupidity alone, without much skill on his master's part, or any co-operation on his own, save that of an extreme passiveness. Neither attachment nor even habit impresses him; never tame, though not wide-awake enough to be exactly wild."

For extinct camels see TYLOPODA. (R. L.*)

The Biblical expression (Matt. xix. 24, &c.), "it is easier for a camel to go through a needle's eye," &c., is sometimes explained by saying that the "needle's eye" means the small gate which is opened in the great gate of a city, when the latter is closed for the night; but recent criticism (*e.g.* Post in *Hastings' Dict.*, under "Camel") throws doubt on this explanation, and assumes that the more violent hyperbole is intended. There is a various reading κάμιλος (cable) for κάμηλος (camel), but Cheyne, in the *Ency. Biblica*, rejects this (see CABLE).

CAMELFORD, THOMAS PITT, 1ST BARON (1737–1793), English politician and art patron, was a nephew of the 1st earl of Chatham. He sat in parliament from 1761 till 1784, siding against his uncle and following George Grenville, who was also a relative; and in 1784 he was raised to the peerage. He dabbled in architecture and the arts generally, and was a prominent figure in the artistic circles of his day. His son THOMAS PITT, 2nd Baron Camelford (1775–1804), who succeeded him in 1793, had an adventurous and misspent career in the navy, but is principally remembered for his death in a duel with Mr Best on the 10th of March 1804, the title becoming extinct.

CAMELLIA, a genus or subgenus of evergreen trees or shrubs belonging to the natural order Ternstroemiaceae, with thick dark shining leaves and handsome white or rose-coloured flowers. The name *Camellia* was given by Linnaeus in honour of George Joseph Camellus or Kamel, a Moravian Jesuit who travelled in Asia and wrote an account of the plants of the Philippine Island, Luzon, which is included in the third volume of John Ray's *Historia Plantarum* (1704). Modern botanists are agreed that the tea-plant, placed by Linnaeus in a separate genus, *Thea*, is too nearly allied to *Camellia* to admit of the two being regarded as distinct genera. *Thea* and *Camellia* are therefore now considered to represent one genus, which has been generally called *Camellia*, but more correctly *Thea*, as this name was the earlier of the two. Under the latter view *Camellia* is regarded as a subgenus or section of *Thea*. It contains about eight species, natives of India, China and Japan. Most of the numerous cultivated forms are horticultural products of *C. japonica*, a native of China and Japan, which was introduced into Europe by Lord Petre in 1739. The wild plant has red flowers, recalling those of the wild rose, but most of the cultivated forms are double. In the variety *anemonaeflora* nearly all the stamens have become transformed into small petaloid structures which give the flower the appearance of a double anemone.

Another species, *C. reticulata*, a native of Hongkong, is also prized for its handsome flowers, larger than those of *C. japonica*, which are of a bright rose colour and as known in cultivation semi-double or double.

Both *C. sasanqua* and *C. drupifera*, the former inhabiting Japan and China, the latter Cochin-China and the mountains of India, are oil-yielding plants. The oil of *C. sasanqua* (of which sasankwa is the native Japanese name) has an agreeable odour and is used for many domestic purposes. It is obtained from the seeds by subjecting them to pressure sufficient to reduce them to a coarse powder, and then boiling and again pressing the crushed material. The leaves are also used in the form of a decoction by the Japanese women for washing their hair; and in a dried state they are mixed with tea on account of their pleasant flavour. The oil of *C. drupifera*, which is closely allied to *C. sasanqua*, is used medicinally in Cochin-China. The flowers of these two species, unlike those of *C. japonica* and *C. reticulata*, are odoriferous.

Camellias, though generally grown in the cool greenhouse, are hardy in the south of England and the south-west of Scotland and Ireland. They grow best in a rich compost of sandy peat and loam, and should not be allowed to get too dry at the roots; a liberal supply of water is especially necessary during the flowering period. The best position—when grown out of doors—is one facing north or north-west, with a wall or hedge behind for protection from cold winds. July is the best time for planting; care must be taken that the roots are evenly spread, not matted into a ball.

The plants are propagated by layers or cuttings, and the single-flowered ones also by seeds. Cuttings are taken in August and placed in sandy peat or loam in a cold shaded frame. In the following spring those which have struck are placed in a gentle heat, and in September or October the rooted plants are potted off. Camellias are also propagated by grafting or inarching in early spring on stocks of the common variety of *C. japonica*.

The scale insect sometimes attacks the camellia. To remove

the white scale, the plants are washed with a sponge and solution of soft soap as soon as their growth is completed, and again before the buds begin to swell. The brown scale may be got rid of by repeated washings with one of the many insecticides, but it should be applied at a temperature of 90°.

CAMEO, a term of doubtful origin, applied in the first instance to engraved work executed in relief on hard or precious stones. It is also applied to imitations of such stones in glass, called "pastes," or on the shells of molluscous animals. A cameo is therefore the converse of an intaglio, which consists of an incised or sunk engraving in the same class of materials. For the history of this branch of art, and for an account of some of its most remarkable examples, see GEM.

The origin of the word is doubtful and has been a matter of copious controversy. The *New English Dictionary* quotes its use in a Sarum inventory of 1222, "*lapis unus cameu*" and "*magnus camehu.*" The word is in current use in the 13th century. Thus Matthew Paris, in his Life of Abbot Leofric of St Albans, in the *Abbatum S. Albani Vitae*, says: "*retentis quibusdam nobilibus lapidibus insculptis, quos camaeos vulgariter appellamus.*" In variant forms the word has found its way into most languages, *e.g.* Latin, *camahutus, camahelus, camaynus*; Italian, *chammeo, chameo*; French, *camahieu, chemahou, camaut, camaieu.* The following may be mentioned among the derivations that have been proposed:—von Hammer: *camaut*, the hump of a camel; Littré and others: *camateum*, an assumed Low Latin form from καματεύειν and κάματον; Chabouillet and Babelon: κειμήλια, treasures, connecting the word in particular with the dispersion of treasures from Constantinople, in 1204; King: Arabic *camea*, an amulet.

For a bibliography of the question, see Babelon, *Cat. des Camées . . . de la Bibliothèque Nationale*, p. iv.

CAMERA (a Latin adaptation of Gr. καμάρα, an arched chamber), in law, a word applied at one time to the English judges' chambers in Serjeants' Inn, as distinct from their bench in Westminster Hall. It was afterwards applied to the judges' private room behind the court, and, hence, in the phrase *in camera*, to cases heard in private, *i.e.* in chambers. So far as criminal cases are concerned, the courts have no power to hear them in private, nor have they any power to order adults (men or women) out of court during the hearing. In civil proceedings at common law, it may also be laid down that the public cannot be excluded from the court; in *Malan* v. *Young*, 1889, 6 T.L.R. 68, Mr Justice Denman held that he had power to hear the case *in camera*, but he afterwards stated that there was considerable doubt among the judges as to the power to hear cases *in camera*, even by consent, and the case was, by consent of the parties, finally proceeded with before the judge *as arbitrator*. In the court of chancery it is the practice to hear in private cases affecting wards of the court and lunatics, family disputes (by consent), and cases where a public trial would defeat the object of the action (*Andrew* v. *Raeburn*, 1874, L.R. 9 Ch. 522). In an action for infringement of a patent for a chemical process the defendant was allowed to state a secret process *in camera* (*Badische Anilin und Soda Fabrik* v. *Gillman*, 1883, 24 Ch. D. 156). The Court of Appeal has decided that it has power to sit in private; in *Mellor* v. *Thompson*, 1885, 31 Ch. D. 55, it was stated that a public hearing would defeat the object of the action, and render the respondent's success in the appeal useless. In matrimonial causes, the divorce court, following the practice of the ecclesiastical courts under the provisions of the Matrimonial Causes Act 1857, s. 22, hears suits for nullity of marriage on physical grounds *in camera*, but not petitions for dissolution of marriage, which must be heard in open court. It was also decided in *Druce* v. *Druce*, 1903, 19 T.L.R. 387, that in cases for judicial separation the court has jurisdiction to hear the case *in camera*, where it is satisfied that justice cannot be done by hearing the case in public.

CAMERA LUCIDA, an optical instrument invented by Dr William Hyde Wollaston for drawing in perspective. Closing one eye and looking vertically downwards with the other through a slip of plain glass, *e.g.* a microscope cover-glass, held close to the eye and inclined at an angle of 45° to the horizon, one can see the images of objects in front, formed by reflection from the surface of the glass, and at the same time one can also see through the transparent glass. The virtual images of the objects appear projected on the surface of a sheet of paper placed beneath the slip of glass, and their outline can be accurately traced with a pencil. This is the simplest form of the camera lucida. The image (see fig. 1) is, however, inverted and perverted, and it is not very bright owing to the poor reflecting power of unsilvered glass. The brightness of the image is sometimes increased by silvering the glass; and on removing a small portion of the silver the observer can see the image with part of the pupil while he sees the paper through the unsilvered aperture with the remaining part. This form of the instrument is often used in conjunction with the microscope, the mirror being attached to the eye-piece and the tube of the microscope being placed horizontally.

FIG. 1.

About the beginning of the 19th century Dr Wollaston invented a simple form of the camera lucida which gives bright and erect images. A four-sided prism of glass is constructed having one angle of 90°, the opposite angle of 135°, and the two remaining angles each of $67\frac{1}{2}$°. This is represented in cross-section and in position in fig. 2. When the pupil of the eye is held half over the edge of the prism *a*, one sees the image of the object with one half of the pupil and the paper with the other half. The image is formed by successive total reflection at the surfaces *b c* and *a b*. In the first place an inverted image (first image) is formed in the face *b c*, and then an image of this image is formed in *a b*, and it is the outline of this second image seen projected on the paper that is traced by the pencil. It is desirable for two reasons that the image should lie in the plane of the paper, and this can be secured by placing a suitable lens between the object and the prism. If the image does not lie in the plane of the paper, it is impossible to see it and the pencil-point clearly at the same time. Moreover, any slight movement of the head will cause the image to appear to move relatively to the paper, and will render it difficult to obtain an accurate drawing.

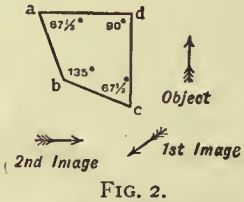


FIG. 2.

Before the application of photography, the camera lucida was of considerable importance to draughtsmen. The advantages claimed for it were its cheapness, smallness and portability; that there was no appreciable distortion, and that its field was much larger than that of the camera obscura. It was used largely for copying, for reducing or for enlarging existing drawings. It will readily be understood, for example, that a copy will be half-size if the distance of the object from the instrument is double the distance of the instrument from the copy. (C. J. J.)

CAMERA OBSCURA, an optical apparatus consisting of a darkened chamber (for which its name is the Latin rendering) at the top of which is placed a box or lantern containing a convex lens and sloping mirror, or a prism combining the lens and mirror. If we hold a common reading lens (a magnifying lens) in front of a lamp or some other bright object and at some distance from it, and if we hold a sheet of paper vertically at a suitable distance behind the lens, we see depicted on the paper an image of the lamp. This image is inverted and perverted. If now we place a plane mirror (*e.g.* a lady's hand glass) behind the lens and inclined at an angle of 45° to the horizon so as to reflect the rays of light vertically downwards, we can produce on a horizontal sheet of paper an unperverted image of the bright object (fig. 1), *i.e.* the image has the same appearance as the object and is not perverted as when the reflection of a printed page is viewed in a mirror. This is the principle of the

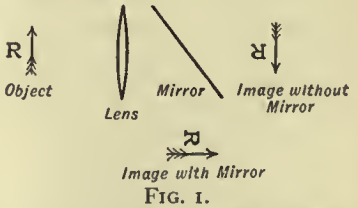


FIG. 1.

camera obscura, which was extensively used in sketching from nature before the introduction of photography, although it is now scarcely to be seen except as an interesting side-show at places of popular resort. The image formed on the paper may be traced out by a pencil, and it will be noticed that in this case the image is real—not virtual as in the case of the camera lucida. Generally the mirror and lens are combined into a single piece of worked glass represented in section in fig. 2.

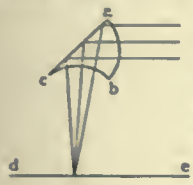


FIG. 2.

Rays from external objects are first refracted at the convex surface *a b*, then totally reflected at the plane surface *a c*, and finally refracted at the concave surface *b c* (fig. 2) so as to form an image on the sheet of paper *d e*. The curved surfaces take the place of the lens in fig. 1, and the plane surface performs the function of the mirror. The prism *a b c* is fixed at the top of a small tent furnished with opaque curtains so as to prevent the diffused daylight from overpowering the image on the paper, and in the darkened tent the images of external objects are seen very distinctly.

Quite recently, the camera obscura has come into use with submarine vessels, the *periscope* being simply a camera obscura under a new name. (C. J. J.)

History.—The invention of this instrument has generally been ascribed, as in the ninth edition of this work, to the famous Neapolitan savant of the 16th century, Giovanni Battista della Porta, but as a matter of fact the principle of the simple camera obscura, or darkened chamber with a small aperture in a window or shutter, was well known and in practical use for observing eclipses long before his time. He was anticipated in the improvements he claimed to have made in it, and all he seems really to have done was to popularize it. The increasing importance of the camera obscura as a photographic instrument makes it desirable to bring together what is known of its early history, which is far more extensive than is usually recognized. In southern climes, where during the summer heat it is usual to close the rooms from the glare of the sunshine outside, we may often see depicted on the walls vivid inverted images of outside objects formed by the light reflected from them passing through chinks or small apertures in doors or window-shutters. From the opening passage of Euclid's *Optics* (*c.* 300 B.C.), which formed the foundation for some of the earlier middle age treatises on geometrical perspective, it would appear that the above phenomena of the simple darkened room were used by him to demonstrate the rectilinear propagation of light by the passage of sunbeams or the projection of the images of objects through small openings in windows, &c. In the book known as Aristotle's *Problems* (sect. xv. cap. 5) we find the correlated problem of the image of the sun passing through a quadrilateral aperture always appearing round, and he further notes the lunated image of the eclipsed sun projected in the same way through the interstices of foliage or lattice-work.

There are, however, very few allusions to these phenomena in the later classical Greek and Roman writers, and we find the first scientific investigation of them in the great optical treatise of the Arabian philosopher Alhazen (*q.v.*), who died at Cairo in A.D. 1038. He seems to have been well acquainted with the projection of images of objects through small apertures, and to have been the first to show that the arrival of the image of an object at the concave surface of the common nerve—or the retina—corresponds with the passage of light from an object through an aperture in a darkened place, from which it falls upon a surface facing the aperture. He also had some knowledge of the properties of concave and convex lenses and mirrors in forming images. Some two hundred years later, between A.D. 1266 and 1279, these problems were taken up by three almost contemporaneous writers on optics, two of whom, Roger Bacon and John Peckham, were Englishmen, and Vitello or Witelo, a Pole.

That Roger Bacon was acquainted with the principle of the camera obscura is shown by his attempt at solving Aristotle's problem stated above, in the treatise *De Speculis*, and also from his references to Alhazen's experiments of the same kind, but although Dr John Freind, in his *History of Physick*, has given him the credit of the invention on the strength of a passage in the *Perspectiva*, there is nothing to show that he constructed any instrument of the kind. His arrangement of concave and plane mirrors, by which the realistic images of objects inside the house or in the street could be rendered visible though intangible, there alluded to, may apply to a camera on Cardan's principle or to a method of aerial projection by means of concave mirrors, which Bacon was quite familiar with, and indeed was known long before his time. On the strength of similar arrangements of lenses and mirrors the invention of the camera obscura has also been claimed for Leonard Digges, the author of *Pantometria* (1571), who is said to have constructed a telescope from information given in a book of Bacon's experiments.

Archbishop Peckham, or Pisanus, in his *Perspectiva Communis* (1279), and Vitello, in his *Optics* (1270), also attempted the solution of Aristotle's problem, but unsuccessfully. Vitello's work is to a very great extent based upon Alhazen and some of the earlier writers, and was first published in 1535. A later edition was published, together with a translation of Alhazen, by F. Risner in 1572.

The first practical step towards the development of the camera obscura seems to have been made by the famous painter and architect, Leon Battista Alberti, in 1437, contemporaneously with the invention of printing. It is not clear, however, whether his invention was a camera obscura or a show box, but in a fragment of an anonymous biography of him, published in Muratori's *Rerum Italicarum Scriptores* (xxv. 296), quoted by Vasari, it is stated that he produced wonderfully painted pictures, which were exhibited by him in some sort of small closed box through a very small aperture, with great verisimilitude. These demonstrations were of two kinds, one nocturnal, showing the moon and bright stars, the other diurnal, for day scenes. This description seems to refer to an arrangement of a transparent painting illuminated either from the back or the front and the image projected through a hole on to a white screen in a darkened room, as described by Porta (*Mag. Nat.* xvii. cap. 7) and figured by A. Kircher (*Ars Magna Lucis et Umbrae*), who notes elsewhere that Porta had taken some arrangement of projecting images from an Albertus, whom he distinguished from Albertus Magnus, and who was probably L. B. Alberti, to whom Porta also refers, but not in this connexion.

G. B. I. T. Libri-Carucci dalla Sommaja (1803–1869), in his account of the invention of the camera obscura in Italy (*Histoire des sciences mathématiques en Italie*, iv. 303), makes no mention of Alberti, but draws attention to an unpublished MS. of Leonardo da Vinci, which was first noticed by Venturi in 1797, and has since been published in facsimile in vol. ii. of J. G. F. Ravaisson-Mollien's reproductions of the MSS. in the Institut de France at Paris (MS. *D*, fol. 8 *recto*). After discussing the structure of the eye he gives an experiment in which the appearance of the reversed images of outside objects on a piece of paper held in front of a small hole in a darkened room, with their forms and colours, is quite clearly described and explained with a diagram, as an illustration of the phenomena of vision. Another similar passage is quoted by Richter from folio 404b of the reproduction of the *Codice Atlantico*, in Milan, published by the Italian government. These are probably the earliest distinct accounts of the natural phenomena of the camera obscura, but remained unpublished for some three centuries. Leonardo also discussed the old Aristotelian problem of the rotundity of the sun's image after passing through an angular aperture, but not so successfully as Maurolycus. He has also given methods of measuring the sun's distance by means of images thrown on screens through small apertures. He was well acquainted with the use of magnifying glasses and suggested a kind of telescope for viewing the moon, but does not seem to have thought of applying a lens to the camera.

The first published account of the simple camera obscura was discovered by Libri in a translation of the *Architecture* of

Vitruvius, with commentary by Cesare Caesariano, one of the architects of Milan cathedral, published at Como in 1521, shortly after the death of Leonardo, and some twenty years before Porta was born. He describes an experiment made by a Benedictine monk and architect, Dom Papnutio or Panuce, of the same kind as Leonardo's but without the demonstration.

About the same time Francesco Maurolico, or Maurolycus, the eminent mathematician of Messina, in his *Theoremata de Lumine et Umbra*, written in 1521, fully investigated the optical problems connected with vision and the passage of rays of light through small apertures with and without lenses, and made great advances in this direction over his predecessors. He was the first correctly to solve Aristotle's problem, stated above, and to apply it practically to solar observations in a darkened room (*Cosmographia*, 1535). Erasmus Reinhold has described the method in his edition of G. Purbach's *Theoricae Novae Planetarum* (1542), and probably got it from Maurolycus. He says it can also be applied to terrestrial objects, though he only used it for the sun. His pupil, Rainer Gemma-Frisius, used it for the observation of the solar eclipse of January 1544 at Louvain, and fully described the methods he adopted for making measurements and drawings of the eclipsed sun, in his *De Radio Astronomico et Geometrico* (1545). He says they can be used for observation of the moon and stars and also for longitudes. The same arrangement was used by Copernicus, Tycho Brahe, by M. Moestlin and his pupil Kepler—the latter applying it in 1607 to the observation of a transit of Mercury—also by Johann Fabricius, in 1611, for the first observations of sun-spots. It is interesting to note this early employment of the camera obscura in the field of astronomical research, in which its latest achievements have been of such pre-eminent value.

The addition of optical appliances to the simple dark chamber for the purpose of seeing what was going on outside, was first described by Girolamo Cardan in his *De Subtilitate* (1550), as noted by Libri. The sun shining, he fixed a round glass speculum (*orbem e vitro*) in a window-shutter, and then closing it the images of outside objects would be seen transmitted through the aperture on to the opposite wall, or better, a white paper screen suitably placed. The account is not very clear, but seems to imply the use of a concave mirror rather than a lens, which might be suggested by the word *orbem*. He refers to Maurolycus' work with concave specula.

We now come to Giovanni Battista della Porta, whose account of the camera obscura in the first edition of the *Magia Naturalis*, in four books (1558, lib. iv. cap. 2), is very similar to Caesariano's —a darkened room, a pyramidal aperture towards the sun, and a whitened wall or white paper screens, but no lens. He discloses as a great secret the use of a concave speculum in front of the aperture, to collect the rays passing through it, when the images will be seen reversed, but by prolonging them beyond the centre they would be seen larger and unreversed. This is much the same as Cardan's method published eight years earlier, but though more detailed is not very clear. He then notes the application to portraiture and to painting by laying colours on the projected images. Nothing is said about the use of a lens or of solar observations. The second edition, in which he in the same words discloses the use of a convex lens in the aperture as a secret he had intended to keep, was not published till 1589, thirty-one years after the first. In this interval the use of the lens was discovered and clearly described by Daniello Barbaro, a Venetian noble, patriarch of Aquileia, in his work *La Pratica della perspettiva* (p. 192), published in 1568, or twenty-one years before Porta's mention of it. The lens used by Barbaro was an ordinary convex or old man's spectacle-glass; concave, he says, will not do. He shows how the paper must be moved till it is brought into the focus of the lens, the use of a diaphragm to make the image clearer, and also the application of the method for drawing in true perspective. That Barbaro was really the first to apply the lens to the camera obscura is supported by Marius Bettinus in his *Apiaria* (1645), and by Kaspar Schott in his *Magia Universalis* (1657), the former taunting Porta with the appropriation.

In an Italian translation of Euclid's *Optica*, with commentary, Egnacio Danti (1573), after discussing the effects of plane, convex and concave reflectors, fully describes the method of showing reversed images passing through an aperture in a darkened room, and shows how, by placing a mirror behind the aperture, unreversed images might be obtained, both effects being illustrated by diagrams. F. Risner, who died in 1580, also in his *Opticae* (1606) very clearly explained the reversal of the images of the simple camera obscura. He notes the convenience of the method for solar observations and its previous use by some of the observers already mentioned, as well as its advantages for easily and accurately copying on an enlarged or reduced scale, especially for chorographical or topographical documents. This is probably the first notice of the application of the camera to cartography and the reproduction of drawings, which is one of its principal uses at the present time. In the *Diversarum Speculationum Mathematicarum et Physicarum* (1585), by the Venetian Giovanni Battista Benedetti, there is a letter in which he discusses the simple camera obscura and mentions the improvement some one had made in it by the use of a double convex lens in the aperture; he also says that the images could be made erect by reflection from any plane mirror.

Thus the use of the camera and of the lens with it was well known before Porta published his second edition of the *Magia Naturalis* in 1589. In this the description of the camera obscura is in lib. xvii. cap. 6. The use of the convex lens, which is given as a great secret, in place of the concave speculum of the first edition, is not so clearly described as by Barbaro; the addition of the concave speculum is proposed for making the images larger and clearer, and also for making them erect, but no details are given. He describes some entertaining peep-show arrangements, possibly similar to Alberti's, and indicates how the dark chamber with a concave speculum can be used for observing eclipses. There is no mention whatever of a portable box or construction beyond the darkened room, nor is there in his later work, *De Refractione Optices Parte* (1593), in which he discusses the analogy between vision and the simple dark room with an aperture, but incorrectly. Though Porta's merits were undoubtedly great, he did not invent or improve the camera obscura. His only novelty was the use of it as a peep-show; his descriptions of it are vague, but being published in a book of general reference, which became popular, he acquired credit for the invention.

The first to take up the camera obscura after Porta was Kepler, who used it in the old way for solar observations in 1600, and in his *Ad Vitellionem Paralipomena* (1604) discusses the early problems of the passages of light through small apertures, and the rationale of the simple dark chamber. He was the first to describe an instrument fitted with a sight and paper screen for observing the diameters of the sun and moon in a dark room. In his later book, *Dioptrice* (1611), he fully discusses refraction and the use of lenses, showing the action of the double convex lens in the camera obscura, with the principles which regulate its use and the reason of the reversal of the image. He also demonstrates how enlarged images can be produced and projected on paper by using a concave lens at a suitable distance behind the convex, as in modern telephotographic lenses. He was the first to use the term *camera obscura*, and in a letter from Sir H. Wotton written to Lord Bacon in 1620 we learn that Kepler had made himself a portable dark tent fitted with a telescope lens and used for sketching landscapes. Further, he extended the work of Maurolycus, and demonstrated the exact analogy between the eye and the camera and the arrangement by which an inverted image is produced on the retina.

In 1609 the telescope came into use, and the danger of observing the sun with it was soon discovered. In 1611 Johann Fabricius published his observations of sun-spots and describes how he and his father fell back upon the old method of projecting the sun's image in a darkened room, finding that they could observe the spots just as well as with the telescope. They do not seem to have used a lens, or thought of using the telescope for projecting an enlarged image on Kepler's principle. This

was done in 1612 by Christoph Scheiner, who fully described his method of solar observation in the *Rosa Ursina* (1630), demonstrating very clearly and practically the advantages and disadvantages of using the camera, without a lens, with a single convex lens, and with a telescopic combination of convex object-glass and concave enlarging lens, the last arrangement being mounted with an adjustable screen or tablet on an equatorial stand. Most of the earlier astronomical work was done in a darkened room, but here we first find the dark chamber constructed of wooden rods covered with cloth or paper, and used separately to screen the observing-tablet.

Various writers on optics in the 17th century discussed the principle of the simple dark chamber alone and with single or compound lenses, among them Jean Tarde (*Les Astres de Borbon*, 1623); Descartes, the pupil of Kepler (*Dioptrique*, 1637); Bettinus (*Apiaria*, 1645); A. Kircher (*Ars Magna Lucis et Umbrae*, 1646); J. Hevelius (*Selenographia*, 1647); Schott *Magia Universalis Naturae et Artis*, 1674); C. F. M. Deschales (*Cursus, seu Mundus Mathematicus*, 1674); Z. Traber (*Nervus Opticus*, 1675), but their accounts are generally more interesting theoretically than as recording progress in the practical use and development of the instrument.

The earliest mention of the camera obscura in England is probably in Francis Bacon's *De Augmentis Scientiarum*, but it is only as an illustration of the projected images showing better on a white screen than on a black one. Sir H. Wotton's letter of 1620, already noted, was not published till 1651 (*Reliquiae Wottonianae*, p. 141), but in 1658 a description of Kepler's portable tent camera for sketching, taken from it, was published in a work called *Graphice, or the most excellent Art of Painting*, but no mention is made of Kepler. In W. Oughtred's English edition (1633) of the *Récréations mathématiques* (1627) of Jean Leurechon ("Henry van Etten") there is a quaint description, with figures, of the simple dark chamber with aperture, and also of a sort of tent with a lens in it and the projection on an inner wall of the face of a man standing outside. The English translation of Porta's *Natural Magick* was published in 1658.

Robert Boyle seems to have been the first to construct a box camera with lens for viewing landscapes. It is mentioned in his essay *On the Systematic or Cosmical Qualities of Things* (ch. vi.), written about 1570, as having been made several years before and since imitated and improved. It could be extended or shortened like a telescope. At one end of it paper was stretched, and at the other a convex lens was fitted in a hole, the image being viewed through an aperture at the top of the box. Robert Hooke, who was some time Boyle's assistant, described (*Phil. Trans.*, 1668, 3, p. 741) a camera lucida on the principle of the magic lantern, in which the images of illuminated and inverted objects were projected on any desired scale by means of a broad convex lens through an aperture into a room where they were viewed by the spectators. If the objects could not be inverted, another lens was used for erecting the images. From Hooke's *Posthumous Works* (1705), p. 127, we find that in one of the Cutlerian lectures on Light delivered in 1680, he illustrated the phenomena of vision by a darkened room, or perspective box, of a peculiar pattern, the back part, with a concave white screen at the end of it, being cylindrical and capable of being moved in and out, while the fore part was conical, a double convex lens being fixed in a hole in front. The image was viewed through a large hole in the side. It was between 4 and 5 ft. long.

Johann Zahn, in his *Oculus Artificialis Teledioptricus* (1685–1686), described and figured two forms of portable box cameras with lenses. One was a wooden box with a projecting tube in which a combination of a concave with a convex lens was fitted, for throwing an enlarged image upon the focusing screen, which in its proportions and application is very similar to our modern telephotographic objectives. The image was first thrown upon an inclined mirror and then reflected upwards to a paper screen on the top of the box. In an earlier form the image is thrown upon a vertical thin paper screen and viewed through a hole in the back of the camera. There is a great deal of practical information on lenses in connexion with the camera and other optical instruments, and the book is valuable as a repertory of early practical optics, also for the numerous references to and extracts from previous writers. An improved edition was published in 1702.

Most of the writers already noticed worked out the problems connected with the projection of images in the camera obscura more by actual practice than by calculation, but William Molyneux, of Dublin, seems to have been the first to treat them mathematically in his *Dioptrica Nova* (1692), which was also the first work in English on the subject, and is otherwise an interesting book. He has fully discussed the optical theory of the dark chamber, with and without a lens, and its analogy to the eye. also several optical problems relating to lenses of various forms and their combinations for telescopic projection, rules for finding foci, &c. He does not, however, mention the camera obscura as an instrument in use, but in John Harris's *Lexicon Technicum* (1704) we find that the camera obscura with the arrangement called the "scioptric ball," and known as *scioptricks*, was on sale in London, and after this must have been in common use as a sketching instrument or as a show.

Sir Isaac Newton, in his *Opticks* (1704), explains the principle of the camera obscura with single convex lens and its analogy with vision in illustration of his seventh axiom, which aptly embodies the correct solution of Aristotle's old problem. He also made great use of the simple dark chamber for his optical experiments with prisms, &c. Joseph Priestley (1772) mentions the application of the solar microscope, both to the small and portable and the large camera obscura. Many patterns of these two forms for sketching and for viewing surrounding scenes are described in W. J.'s Gravesande's *Essai de perspective* (1711), Robert Smith's *Compleat System of Optics* (1738), Joseph Harris's *Treatise on Optics* (1775), Charles Hutton's *Philosophical and Mathematical Dictionary*, and other books on optics and physics of that period. The camera obscura was first applied to photography (*q.v.*) probably about 1794, by Thomas Wedgwood. His experiments with Sir Humphrey Davy in endeavouring to fix the images of natural objects as seen in the camera were published in 1802 (*Journ. Roy. Inst.*). (J. WA.)

CAMERARIUS, JOACHIM (1500–1574), German classical scholar, was born at Bamberg on the 12th of April 1500. His family name was Liebhard, but he was generally called Kammermeister, previous members of his family having held the office of chamberlain (*camerarius*) to the bishops of Bamberg. He studied at Leipzig, Erfurt and Wittenberg, where he became intimate with Melanchthon. For some years he was teacher of history and Greek at the gymnasium, Nuremberg. In 1530 he was sent as deputy for Nuremberg to the diet of Augsburg, where he rendered important assistance to Melanchthon in drawing up the Confession of Augsburg. Five years later he was commissioned by Duke Ulrich of Württemberg to reorganize the university of Tübingen; and in 1541 he rendered a similar service at Leipzig, where the remainder of his life was chiefly spent. He translated into Latin Herodotus, Demosthenes, Xenophon, Homer, Theocritus, Sophocles, Lucian, Theodoretus, Nicephorus and other Greek writers. He published upwards of 150 works, including a *Catalogue of the Bishops of the Principal Sees*; *Greek Epistles*; *Accounts of his Journeys*, in Latin verse; a Commentary on Plautus; a treatise on Numismatics; *Euclid* in Latin; and the Lives of Helius Eobanus Hessus, George of Anhalt and Philip Melanchthon. His *Epistolae Familiares* (published after his death) are a valuable contribution to the history of his time. He played an important part in the Reformation movement, and his advice was frequently sought by leading men. In 1535 he entered into a correspondence with Francis I. as to the possibility of a reconciliation between the Catholic and Protestant creeds; and in 1568 Maximilian II. sent for him to Vienna to consult him on the same subject. He died at Leipzig on the 17th of April 1574.

See article by A. Horawitz in *Allgemeine deutsche Biographie*; C. Bursian, *Die Geschichte der klassischen Philologie in Deutschland* (1883); J. E. Sandys, *Hist. Class. Schol.* (ed. 1908), ii. 266.

CAMERARIUS, JOACHIM (1534–1598), German botanist and physician, son of the classical scholar of the same name, was born at Nuremberg on the 6th of November 1534. After finishing his studies in Germany he visited Italy, where he graduated as doctor of medicine. On his return he was invited to reside at the courts of several princes, but preferred to settle in his native town of Nuremberg, where he had a botanical garden and formed extensive collections. He wrote a *Hortus Medicus* (1588) and several other works. He died at Nuremberg on the 11th of October 1598.

CAMERARIUS, RUDOLF JAKOB (1665–1721), German botanist and physician, was born at Tübingen on the 12th of February 1665, and became professor of medicine and director of the botanical gardens at Tübingen in 1687. He died at Tübingen on the 11th of September 1721. He is chiefly known for his investigations on the reproductive organs of plants (*De sexu plantarum epistola*, 1694).

CAMERINO (anc. *Camerinum*), a city and episcopal see (since 465, if not sooner; Treia is now combined with it) of the Marches, Italy, in the province of Macerata, 6 m. S. of the railway station of Castelraimondo (to which there is an electric tramway) which is 24 m. W. of Macerata; 2148 ft. above sea-level. Pop. (1901) of town, 4005; of commune, 12,083. The cathedral is modern, the older building having fallen in 1799; the church of S. Venanzio suffered similarly, but preserves a portal of the 15th century. The citadel, perhaps constructed from the plans of Leonardo da Vinci, dates from 1503. Camerino occupies the site of the ancient Camerinum, the inhabitants of which (*Camertes Umbri*) became allies of the Romans in 310 B.C. (at the time of the attack on the Etruscans in the Ciminian Forest). On the other hand, the Καμέρτιοι referred to in the history of the year 295 B.C. are probably the inhabitants of Clusium. Later it appears as a dependent autonomous community with the *foedus aequum* (Mommsen, *Röm. Staatsrecht*, iii. 664). Two cohorts of Camertes fought with distinction under Marius against the Cimbri. It was much affected by the conspiracy of Catiline, and is frequently mentioned in the Civil Wars; under the empire it was a *municipium*. It belonged to ancient Umbria, but was on the borders of Picenum. No ancient buildings are visible, the Roman level lying as much as 30 ft. below the modern.

See P. Savini, *Storia della Città di Camerino* (2nd ed., Camerino, 1895); M. Mariani, *Intorno agli antichi Camerti Umbri* (Camerino, 1900). (T. As.)

CAMERON, JOHN (1579–1623), Scottish theologian, was born at Glasgow about 1579, and received his early education in his native city. After having taught Greek in the university for twelve months, he removed to Bordeaux, where he was soon appointed a regent in the college of Bergerac. He did not remain long at Bordeaux, but accepted the offer of a chair of philosophy at Sedan, where he passed two years. He then returned to Bordeaux, and in the beginning of 1604 he was nominated one of the students of divinity who were maintained at the expense of the church, and who for the period of four years were at liberty to prosecute their studies in any Protestant seminary. During this period he acted as tutor to the two sons of Calignon, chancellor of Navarre. They spent one year at Paris, and two at Geneva, whence they removed to Heidelberg. In this university, on the 4th of April 1608, he gave a public proof of his ability by maintaining a series of theses, *De triplici Dei cum Homine Foedere*, which were printed among his works. The same year he was recalled to Bordeaux, where he was appointed the colleague of Dr Primrose; and when Francis Gomarus was removed to Leiden, Cameron, in 1618, was appointed professor of divinity at Saumur, the principal seminary of the French Protestants.

In 1620 the progress of the civil troubles in France obliged Cameron to seek refuge for himself and family in England. For a short time he read private lectures on divinity in London; and in 1622 the king appointed him principal of the university of Glasgow in the room of Robert Boyd, who had been removed from his office in consequence of his adherence to Presbyterianism. Cameron was prepared to accept Episcopacy, and was cordially disliked for his adherence to the doctrine of passive obedience. He resigned his office in less than a year.

He returned to France, and lived at Saumur. After an interval of a year he was appointed professor of divinity at Montauban. The country was still torn by civil and religious dissensions; and Cameron excited the indignation of the more strenuous adherents of his own party. He withdrew to the neighbouring town of Moissac; but he soon returned to Montauban, and a few days afterwards he died at the age of about forty-six. Cameron left by his first wife several children, whose maintenance was undertaken by the Protestant churches in France. All his works were published after his death.

His name has a distinct place in the development of Calvinistic theology in Europe. He and his followers maintained that the will of man is determined by the practical judgment of the mind; that the cause of men's doing good or evil procceds from the knowledge which God infuses into them; and that God does not move the will physically, but only morally, by virtue of its dependence on the judgment of the mind. This peculiar doctrine of grace and free-will was adopted by Amyraut, Cappel, Bochart, Daillé and others of the more learned among the Reformed ministers, who dissented from Calvin's. The Cameronites (not to be confused with the Scottish sect called Cameronians) are moderate Calvinists, and approach to the opinion of the Arminians. They are also called Universalists, as holding the universal reference of Christ's death, and sometimes Amyraldists. The rigid adherents to the synod of Dort accused them of Pelagianism, and even of Manichaeism, and the controversy between the parties was carried on with great zeal; yet the whole question between them was only, whether the will of man is determined by the immediate action of God upon it, or by the intervention of a knowledge which God impresses on the mind.

CAMERON, RICHARD (1648?–1680), founder of a Scottish religious sect of Cameronians, which formed the nucleus of the regiment of this name in the British army, was born at Falkland in the county of Fife. He was educated at the village school, and his success was so great that, while still a youth, he was appointed schoolmaster. In this situation he became acquainted with some of the more enthusiastic field-preachers. Persuaded by them he resigned his post and entered the family of Sir Walter Scott of Harden as chaplain and tutor. Refusing to acknowledge the Indulgence, he joined the ranks of the nonconforming ministers, and incited the inhabitants of the southern counties of Scotland to protest openly against the new edict. So formidable was the agitation that the government pronounced illegal all armed assemblages for religious purposes. Cameron took refuge in Holland, where he resided for some time; but in the autumn of 1679 (probably) he returned to Scotland, and once more made himself formidable to the government. Shortly after the defeat of the Covenanters at Bothwell Bridge in that year, Cameron was slain in a skirmish at the Aird's, or Airs, Moss, fighting bravely at the head of the few troops which he had been able to collect. His prayer before going into battle became a tradition—"Lord spare the green and take the ripe." After the accession of William III. the survivors were amnestied, and the Cameronian regiment was formed from them.

See Andrew Lang, *History of Scotland*, vol. iii. (1907); Herzog-Hauck, *Realencyklopädie* (1897), *s.v.* "Cameronianer"; A. Smellie, *Men of the Covenant*; Herkless, *Richard Cameron*; P. Walker, *Six Saints of the Covenant*.

CAMERON, SIMON (1799–1889), American politician, was born in Lancaster county, Pennsylvania, on the 8th of March 1799. Left an orphan at the age of nine, he early entered journalism, and, in banking and railway enterprises, accumulated a considerable fortune. He became influential in Pennsylvania politics, and in 1845–1849 served in the United States Senate, being elected by a combination of Democratic, Whig and "American" votes to succeed James Buchanan. In 1854, having failed to secure the nomination for senator from the "Know-Nothing" Party, which he had recently joined, he became a leader of the "People's Party," as the Republican

Party was at first called in Pennsylvania. In 1857 he was elected to the United States Senate as a Republican, despite a Democratic majority in the state legislature, a fact that gave rise to charges of bribery. His prominence as a candidate first for the presidential and then for the vice-presidential nomination in the Republican national convention of 1860 led to his being selected by President Lincoln as secretary of war. His administration of this office at a critical time was marked by his accustomed energy, but unfortunately also by partiality in the letting of government contracts, which brought about his resignation at Lincoln's request in January 1862 and his subsequent censure by the House of Representatives. Lincoln sent him as minister to Russia, but he returned in November 1862. He again served in the Senate (after 1872, being chairman of the committee on foreign relations) from 1867 until 1877, when he resigned to make room for his son, whose election he dictated. Cameron was one of the ablest political organizers the United States has ever known, and his long undisputed control of Pennsylvania politics was one of the most striking examples of "boss rule" in American history. The definition of an honest politician as "one who when he is bought will stay bought" has been attributed to him. He died on the 26th of June 1889.

His son JAMES DONALD CAMERON (1833–) was born at Middletown, Pennsylvania, on the 14th of May 1833, graduated at Princeton in 1852, became actively interested in his father's banking and railway enterprises, and from 1863 to 1874 was president of the Northern Central railway. Trained in the political school of his father, he developed into an astute politician. From June 1876 to March 1877 he was secretary of war in President Grant's cabinet. In the Republican national convention of 1876 he took an influential part in preventing the nomination of James G. Blaine, and later was one of those who directed the policy of the Republicans in the struggle for the presidency between Tilden and Hayes. From 1877 until 1897 he was a member of the United States Senate, having been elected originally to succeed his father, who resigned in order to create the vacancy. He was chairman of the Republican national committee during the campaign of 1880.

CAMERON, VERNEY LOVETT (1844–1894), English traveller in Central Africa, was born at Radipole, near Weymouth, Dorsetshire, on the 1st of July 1844. He entered the navy in 1857, served in the Abyssinian campaign of 1868, and was employed for a considerable time in the suppression of the East African slave trade. The experience thus obtained led to his being selected to command an expedition sent by the Royal Geographical Society in 1873, to succour Dr. Livingstone. He was also instructed to make independent explorations, guided by Livingstone's advice. Soon after the departure of the expedition from Zanzibar, Livingstone's servants were met bearing the dead body of their master. Cameron's two European companions turned back, but he continued his march and reached Ujiji, on Lake Tanganyika, in February 1874, where he found and sent to England Livingstone's papers. Cameron spent some time determining the true form of the south part of the lake, and solved the question of its outlet by the discovery of the Lukuga river. From Tanganyika he struck westward to Nyangwe, the Arab town on the Lualaba previously visited by Livingstone. This river Cameron rightly believed to be the main stream of the Congo, and he endeavoured to procure canoes to follow it down. In this he was unsuccessful, owing to his refusal to countenance slavery, and he therefore turned south-west. After tracing the Congo-Zambezi watershed for hundreds of miles he reached Bihe and finally arrived at the coast on the 28th of November 1875, being the first European to cross Equatorial Africa from sea to sea. His travels, which were published in 1877 under the title *Across Africa*, contain valuable suggestions for the opening up of the continent, including the utilization of the great lakes as a "Cape to Cairo" connexion. In recognition of his work he was promoted to the rank of commander, made a Companion of the Bath and given the gold medal of the Geographical Society. The remainder of Cameron's life was chiefly devoted to projects for the commercial development of Africa, and to writing tales for the young. He visited the Euphrates valley in 1878–1879 in connexion with a proposed railway to the Persian Gulf, and accompanied Sir Richard Burton in his West African journey of 1882. At the Gold Coast Cameron surveyed the Tarkwa region, and he was joint author with Burton of *To the Gold Coast for Gold* (1883). He was killed, near Leighton Buzzard, by a fall from horseback when returning from hunting, on the 24th of March 1894.

A second edition of *Across Africa*, with new matter and corrected maps, appeared in 1885. A summary of Cameron's great journey, from his own pen, appears in Dr Robert Brown's *The Story of Africa*, vol. ii. pp. 266-279 (London, 1893).

CAMERON OF LOCHIEL, SIR EWEN (1629–1719), Scottish Highland chieftain, was the eldest son of John Cameron and the grandson of Alan Cameron, the head of the clan Cameron. Having lost his father in infancy he passed part of his youth with the marquess of Argyll at Inveraray, leaving his guardian about 1647 to take up his duties as chief of the clan Cameron, a position in which he succeeded his grandfather. In 1653 Lochiel joined the earl of Glencairn in his rising on behalf of Charles II., and after the defeat of this attempt he served the Royalist cause by harassing General Monk. In 1681 he was knighted by Charles II., and in July 1689 he was with Viscount Dundee at Killiecrankie. He was too old to share personally in the Jacobite rising of 1715, but his sympathies were with the Stuarts, and his son led the Camerons at Sheriffmuir. Lochiel, who died in February 1719, is called by Macaulay the "Ulysses of the Highlands." He was a man of enormous strength and size, and one who met him in 1716 says "he wrung some blood from the point of my fingers with a grasp of his hand." An incident showing his strength and ferocity in single combat is used by Sir Walter Scott in *The Lady of the Lake* (canto v.). Lochiel's son and successor, John, who was attainted for sharing in the rebellion of 1715, died in Flanders in 1748. John's son Donald, sometimes called "gentle Lochiel," joined Charles Edward, the Young Pretender, in 1745, was wounded at Culloden, and escaped to France, dying in the same year as his father. The 79th regiment, or Cameron Highlanders, was raised from among the members of the clan in 1793 by Sir Alan Cameron (1753–1828).

See *Memoirs of Sir Ewen Cameron of Lochiel* (Bannatyne Club, 1842).

CAMERONIANS, the name given to that section of the Scottish Covenanters (*q.v.*) who followed Richard Cameron (*q.v.*), and who were chiefly found among those who signed the Sanquhar Declaration in 1680. Known also as "Society Men," "Sanquharians" and "Hillmen," they became a separate church after the religious settlement of 1690, taking the official title of Reformed Presbyterians in 1743. Societies of Cameronians for the maintenance of the Presbyterian form of worship were formed about 1681; their testimony, "The Informatory Vindication," is dated 1687; and they quickly became the most pronounced and active adherents of the covenanting faith. Holding fast to the two covenants, the National Covenant of 1580 and the Solemn League and Covenant of 1643, they wished to restore the ecclesiastical order which had existed between 1638 and 1649, and were dissatisfied with the moderate character of the religious settlement of 1690. Refusing to take the oaths of allegiance to an "uncovenanted" ruler, or to exercise any civil function, they passed through a period of trial and found some difficulty in maintaining a regular ministry; but in 1706 they were reinforced by some converts from the established church. They objected strongly to the proposal for the union of England and Scotland, and were suspected of abetting a rising which took place in the west of Scotland in 1706; but there appears to be no foundation for the statement that they intrigued with the Jacobites, and they gave no trouble to the government either in 1715 or in 1745. In 1712 they publicly renewed the covenants at Auchensauch Hill in Lanarkshire, and in 1743 their first presbytery was constituted at Braehead, while a presbytery was formed in North America in 1774. In 1863 the Cameronians, or Reformed Presbyterians, decided to inflict no penalties upon those members who had taken the oaths, or had exercised civil functions, and

consequently a few congregations seceded. In 1876 the general body of the Reformed Presbyterians united with the Free Church of Scotland, leaving the few seceding congregations as the representatives of the principles of the Cameronians. In the British army the first battalion of the Cameronians (Scottish Rifles) is directly descended from the "Cameronian guard," which, composed of Cameronians, was embodied by the convention parliament in 1689, and was afterwards employed to restore order in the Highlands.

See J. H. Burton, *History of Scotland*, vols. vii. and viii. (Edinburgh, 1905); and A. Lang, *History of Scotland*, vol. iv. (Edinburgh, 1907).

CAMEROON[1] (Ger. *Kamerun*), a German protectorate in West Africa, bounded W. by the Atlantic, N.W. by British Nigeria, N. by Lake Chad, E. and S. by French Congo, save for a short distance on the south where it is conterminous with the Spanish Muni river settlement.

Boundaries and Area.—The sea frontier extends from the Rio del Rey, just where the great bend of the coast-line east to south begins, forming the Bight of Biafra, to the Campo river, a distance of 200 m. The north-western boundary, laid down in an agreement between Germany and Great Britain on the 15th of November 1893, runs from the mouth of the Rio del Rey to the "rapids" of the Cross river in 8° 48′ E. Thence it is continued in a north-east line towards Yola, as far as the confines of that town. The boundary is then deflected south so as to leave Yola in British territory, turning north again to cross the Benue river at a spot 3 m. west of where the Faro joins the Benue. From this point the frontier goes north-east to the border of Lake Chad, 35 m. east of the meridian of the town of Kuka. The southern shores of Lake Chad for a distance of some 40 m. belong to the protectorate. The south and east boundaries were laid down by agreements between Germany and France on the 24th of December 1885, the 15th of March 1894 and the 18th of April 1908. The south boundary runs in a fairly direct line from the mouth of the Campo river to the river Dscha (or Ngoko), which it follows to its confluence with the Sanga. The eastern boundary runs from the Sanga irregularly north to 10° N., where it approaches the British frontier at Yola, so that at its narrowest part the protectorate is little more than 50 m. across. From 10° N. the frontier turns eastwards to the Logone, thence going north-east to the Shari river, which it follows to Lake Chad. The protectorate has an area of about 190,000 sq. m. Estimated population (1908) 3,500,000, of whom 1128 were whites.

Origin of the Name.—The name Camarões was first given by the Portuguese discoverers of the 15th and 16th centuries to a large bay or estuary, lying south-east of a great mountain close to the sea, met with after passing the Niger delta. This estuary they called the Rio dos Camarões (the river of Prawns), from the abundance of the crustacea found therein. The name Camarões was also used to designate the neighbouring mountains. The English usage until nearly the end of the 19th century was to confine the term "the Cameroons" to the mountain range, and to speak of the estuary as the Cameroons river. Locally it was often called "the Bay." On their acquisition of the country in 1884 the Germans extended the use of the name in its Teutonic form—Kamerun—to the whole protectorate.

Physical Features.—Cameroon forms the north-west corner of the great Central African plateau. This becomes evident in its eastern section, where are wide-spreading plains, which farther west assume an undulating character, and gradually merge into a picturesque mountain range. This range, running from north to south, is flanked by a parallel and lower range in the west, with a wide valley between. In the north-west the Upper Guinea mountains send their eastern spurs across the boundary, and from a volcanic rift, which runs south-west to north-east, the Cameroon peak towers up, its summit 13,370 ft. high. This mountain, whose south-western base is washed by the Atlantic, is the highest point on the western side of Africa, and it alone of the great mountains of the continent lies close to the coast. From any vantage point, but especially from the sea, it presents a magnificent spectacle, while some 30 m. westward rises Clarence peak, the culminating point of Fernando Po. With an area, on an isolated base, of 700 to 800 sq. m., Cameroon mountain has but two distinct peaks, Great Cameroon and Little Cameroon (5820 ft.), which is from foot to top covered with dense forest. The native designation of the highest peak is Mongo-ma-Loba, or the Mountain of Thunder, and the whole upper region is usually called Mongo-mo-Ndemi, or the Mountain of Greatness. On the principal summit there are a group of craters. In 1909 the mountain was in eruption and huge streams of lava were ejected. Inland the Chebchi and Mandara mountains indicate the direction and extent of the rift.

The mountains of the plateau sweep grandly round to the

[1] This English form of the name, adopted in the 10th ed. of the *Ency. Brit.*, from the German, appears preferable both to the un-English Kamerun and to the older and clumsy "the Cameroons."

east on reaching the eighth degree of N. lat. Here they give rise to a number of small rivers, which collect in the rift and form the Benue, the great eastern affluent of the Niger. This part of the protectorate is known as Adamawa (*q.v.*). Farther north, beyond the Mandara mountains, the country, here part of the ancient sultanate of Bornu, slopes to the shores of Lake Chad, and has a general level of 800 to 1000 ft. The greater part of Cameroon is thus a mountainous country, with, on the coast, a strip of low land. In the south this is very narrow; it widens towards the north save where the Cameroon peak reaches to the sea.

At the foot of the Cameroon peak a number of estuaries cut deep bays which form excellent harbours. The small rivers which empty into them can be ascended for some miles by steam launches. The principal estuary, which is over 20 m. wide, is called, as already noted, the Cameroon river or bay. The term river is more particularly confined to a ramification of the estuary which receives the waters of the Mungo river (a considerable stream which flows south from the Cameroon mountains), the Wuri, a river coming from the north-east, and various smaller rivers. Under the shadow of Cameroon peak lies the bay of Ambas, with the islands of Ndami (Ambas) and Mondola. It forms a tolerable harbour, capable of receiving large vessels.

Traversing the central portion of the country is a large river known in its upper course as the Lom, and in its lower as the Sanaga, which enters the ocean just to the south of the Cameroon estuary. Both the Lom and the Nyong (a more southerly stream) rise in the central plateau, from which they descend in splendid cascades, breaking through the parallel coast range in rapids, which indicate the extent of their navigability. The Lokunja and Kribi are smaller rivers with courses parallel to and south of the Nyong. In the south-east of the colony the streams—of which the chief are the Dscha and Bumba—are tributaries of the Sanga, itself an affluent of the Congo (*q.v.*). About 100 m. of the right bank of the Sanga, from the confluence of the Dscha upwards, are in German territory. In the north the country drains into Lake Chad through the Logone and Shari (*q.v.*). Including the headwaters of the Benue the colony has four distinct river-systems, one connecting with the Niger, another with the Congo, and a third with Lake Chad, the fourth being the rivers which run direct to the sea. The Niger and Shari systems communicate, with, at high water, but one obstruction to navigation. The connecting link is a marshy lake named Tuburi. From it issues the Kebbi (Mao Kebi) a tributary of the Benue, and through it flows a tributary of the Logone, the chief affluent of the Shari. The one obstruction in the waterway is a fall of 165 ft. in the Kebbi.

Geology.—The oldest rocks, forming the greater mass of the hinterland, are gneisses, schists and granites of Archaean age. Along the Benue river a sandstone (Benue sandstone) forms the banks to 14° E. Cretaceous rocks occur around the basalt platform of the Cameroon mountain and generally along the coastal belt. Basalt and tuff, probably of Tertiary age, form the great mass of the Cameroon mountain, also the island of Fernando Po. Extensive areas in the interior, more especially towards Lake Chad, are covered with black earth of alluvial or lacustrine origin.

Climate.—The country lies wholly within the tropics and has a characteristic tropical climate. In the interior four seasons can be distinguished; a comparatively dry and a wet one alternating. July to October are the coldest months, and also bring most rain, but there is hardly a month without rain. On the coast the temperature is high all the year round, but on the plateau it is cooler. Malarial fever is frequent, and even the Africans, especially those coming from other countries, suffer from it. The middle zone of the Cameroon mountain has, however, a temperate climate and affords excellent sites for sanatoria.

Flora and Fauna.—The southern part of the low coast is chiefly grass land, while the river mouths and arms of the bays are lined with mangroves. The mountainous region is covered with primeval forest, in which timber and valuable woods for cabinet-making are plentiful. Most important are the *Elaeis guineensis*, *Sterculia acuminata* and the wild coffee tree. On Cameroon peak the forest ascends to 8000 ft.; above it is grass land. Towards the east the forest gradually grows thinner, assumes a park-like appearance, and finally disappears, wide grass uplands taking its place. The country north of the Benue is rich and well cultivated. Cotton and rubber are found in considerable quantities, and fields of maize, corn, rice and sugar-cane bear witness to the fertility of the soil.

Animals are plentiful, including the great pachyderms and carnivora. The latter prey on the various kinds of antelopes which swarm on the grass lands. Two kinds of buffaloes are found in the forests, which are the home of the gorilla and chimpanzee. Large rodents, like the porcupine and cane rat, are numerous. Of birds there are 316 species, and several of venomous snakes.

Inhabitants.—The north of Cameroon is inhabited by Fula (*q.v.*) and Hausa (*q.v.*) and allied tribes, the south by Bantu-speaking races. The Fula came from the north and north-east, gradually driving the Bantu-negroes before them. They brought horses and horned cattle, unknown in these regions until then, and they founded well-organized states, like that of Adamawa, now divided between Cameroon and the British protectorate of Nigeria. In the vicinity of the rivers Benue, Faro and Kebbi, the people, who are good agriculturists, raise cereals and other crops, while on the plateaus stock-raising forms the chief pursuit of the inhabitants. In this northern region villages are built in the Sudanese zeriba style, surrounded with thorn fences; more important places are enclosed by a well-built wall and strongly fortified. Of martial disposition, the people often waged war with their neighbours, and also amongst themselves until the pacification of the hinterland by Germany at the beginning of the 20th century.

The Bantu-negroes inhabit the country south of about 7° N. Chief among the tribes are the Dualla (*q.v.*), the Ba-kwiri (*q.v.*), the Ba-Long, the Ba-Farami, the Wuri, the Abo and the Ba-Kundu. They build square houses, are active traders and are ruled by independent chiefs, having no political cohesion. Among the Dualla a curious system of drum signals is noteworthy. In the coast towns are numbers of Krumen, who, however, rarely settle permanently in the country. The Fula, as also most of the Hausa, are Moslems, the other tribes are pagans. Missionary societies, both Protestant and Roman Catholic, are represented in the colony, and their schools are well attended, as are the schools belonging to the government. In all the schools German is taught, but pidgin-English is largely spoken at the coast towns.

Chief Towns.—Duala, the chief town in the protectorate, is situated on the Cameroon estuary at the mouth of the Wuri river in 4° 2′ N. 9° 42′ E. It consists of various trading stations and native towns close to one another on the south bank of the river and known, before the German occupation, as Cameroon, Bell town, Akwa town, &c. Hickory, on the north side of the stream and the starting point of the railway to the interior, is also part of Duala, which has a total population of 22,000, including about 170 Europeans. Duala is the headquarters of the merchants and missionaries. The principal streets are wide and tree lined, the sanitation is good. The government offices are placed in a fine park in which are statues of Gustav Nachtigal and others. The port is provided with a floating dock. The seat of government is Buea, a post 3000 ft. above the sea on the slopes of the Cameroon mountain. Victoria is a flourishing town in Ambas Bay, founded by the British Baptist missionaries expelled from Fernando Po in 1858 (see below). Batanga and Campo are trading stations in the southern portion of the colony. On the route from Duala to Lake Chad is the large commercial town of Ngaundere, inhabited chiefly by Hausas and occupied by the Germans in 1901. Another large town is Garua on the Benue river. Farther north and within 30 m. of Lake Chad is Dikwa (Dikoa), in Bornu, the town chosen by Rabah (*q.v.*) as his capital after his conquest of Bornu. Gulfei on the lower Shari and Kusseri on the Logone are also towns of some note. Ngoko is a trading station on the Dscha, in the south-east of the protectorate, near the confluence of that river with the Sanga.

Products and Industry.—Cameroon is rich in natural products, one of the most important being the oil-palm. Cocoa cultivation was introduced by the Germans and proved remarkably successful. Rubber is collected from the Landolphia and various species of Ficus. Palm-oil, palm kernels, cocoa, copal, copra, Calabar beans, kola-nuts and ivory are the principal exports. There are several kinds of finely-grained wood, amongst which a very dark ebony is specially remarkable. Cotton, indigo and various fibres of plants deserve notice. The natives grow several kinds of bananas, yams and batatas, maize, pea-nuts, sugar-cane, sorghum and pepper. Minerals have not been found in paying quantities. Iron is smelted by the natives, who, especially amongst the Hausas, are very clever smiths, and manufacture fine lances and arrow heads, knives and swords, and also hoes. Dikwa is the centre of an important trade of which the chief articles are coffee, sugar, velvet, silk and weapons, as well as gold and silver objects brought by caravans from Tripoli. The natives round the Cameroon estuary are clever carvers of wood, and make highly ornamental figure heads for their canoes, which also sometimes show very fine workmanship. In the interior the people use the wild-growing cotton and fibres of plants to manufacture coarse drapery and plait-work. Plantations founded by German industry are fairly successful. Large reserves are set apart for the natives by government when marking off the land granted to plantation companies. The best-known of these companies, the *Süd-Kamerun*, holds a concession over a large tract of country by the Sanga river, exporting its rubber, ivory and other produce via the Congo. The principal imports are cotton goods, spirits, building material, firearms, hardware and salt. The annual value of the external trade in the period 1900–1905 averaged about £800,000. In 1907 the value of the trade had increased to £1,700,000. Some 70% of the import and export trade was with Germany, the remainder being almost entirely with Great Britain. The percentage of the trade with Germany was increasing, that with Britain decreasing.

Communications.—There is regular steamship communication with Europe by German and British boats. On the rivers which run into the Cameroon estuary small steam launches ply. The protectorate belongs to the Postal Union, and is connected by cable with the British telegraph station at Bonny in the Niger delta.

An imperial guarantee of interest was obtained in 1905 for the construction of a railway from Hickory to Bayong, a place 100 m. to the north, the district traversed being fertile and populous. From Victoria a line runs to Soppo (22 m.) near Buea and is continued thence northward. Another line, sanctioned in 1908, runs S.E. from Duala to the upper waters of the Nyong. In the neighbourhood of government stations excellent roads have been built. The chief towns in the coast region are connected by telegraph and telephone.

Government Revenue, &c.—The administration is under the direction of a governor appointed by and responsible to the imperial authorities. The governor is assisted by a chancellor and other officials and an advisory council whose members are merchants resident in the protectorate. Decrees having the force of law are issued by the imperial chancellor on the advice of the governor. In Adamawa and German Bornu are various Mahommedan sultanates controlled by residents stationed at Garua and Kusseri. Revenue is raised chiefly by customs dues on spirits and tobacco and a general 10% *ad valorem* duty on most goods. A poll tax is imposed on the natives. The local revenue (£131,000 in 1905) is supplemented by an imperial grant, the protectorate in the first twenty-one years of its existence never having raised sufficient revenue to meet its expenditure, which in 1905 exceeded £230,000. Order is maintained by a native force officered by Germans.

History.—Cameroon and the neighbouring coast were discovered by the Portuguese navigator, Fernando Po, towards the close of the 15th century. They were formerly regarded as within the Oil Rivers district, sometimes spoken of as the Oil Coast. Trading settlements were established by Europeans as early as the 17th century. The trade was confined to the coast, the Dualla and other tribes being recognized intermediaries between the coast "factories" and the tribes in the interior, whither they allowed no strange trader to proceed. They took a quantity of goods on trust, visited the tribes in the forest, and bartered for ivory, rubber and other produce. This method of trade, called the trust system, worked well, but when the country came under the administration of Germany, the system broke down, as inland traders were allowed to visit the coast. Before this happened the "kings" of the chief trading stations—Akwa and Bell—were wealthy merchant princes. From the beginning until near the end of the 19th century they were very largely under British influence. In 1837 the king of Bimbia, a district on the mainland on the north of the estuary, made over a large part of the country round the bay to Great Britain. In 1845, at which time there was a flourishing trade in slaves between Cameroon and America, the Baptist Missionary Society made its first settlement on the mainland of Africa, Alfred Saker (1814–1880) obtaining from the Akwa family the site for a mission station. In 1848 another mission station was established at Bimbia, the king agreeing to abolish human sacrifices at the funerals of his great men. Into the Cameroon country Saker and his colleagues introduced the elements of civilization, and with the help of British men-of-war the oversea slave trade was finally stopped (*c.* 1875). The struggles between the Bell (Mbeli) and Akwa families were also largely composed. In 1858, on the expulsion of the Baptists from Fernando Po (*q.v.*), Saker founded at Ambas Bay a colony of the freed negroes who then left the island, the settlement being known as Victoria. Two years after this event the first German factory was established in the estuary by Messrs Woermann of Hamburg. In 1870 the station at Bimbia was given up by the missionaries, but that at Akwa town continued to flourish, the Dualla showing themselves eager to acquire education, while Saker reduced their language to writing. He left Cameroon in 1876, the year before George Grenfell, afterwards famous for his work on the Congo, came to the country, where he remained three years. Like the earlier missionaries he explored the adjacent districts, discovering the Sanaga in its lower course. Although British influence was powerful and the British consul for the Oil Rivers during this period exercised considerable authority over the native chiefs, requests made by them—in particular by the Dualla chiefs in 1882—for annexation by Great Britain, were refused or neglected, with the result that when Germany started on her quest to pick up unappropriated parts of the African coast she was enabled to secure Cameroon. A treaty with King Bell was negotiated by Dr Gustav Nachtigal, the signature of the king and the other chiefs being obtained at midnight on the 15th of July 1884. Five days later Mr E. H. Hewett, British consul, arrived with a mission to annex the country to Great Britain.[1] Though too late to secure King Bell's territory, Mr Hewett concluded treaties with all the neighbouring chiefs, but the British government decided to recognize the German claim not only to Bell town, but to the whole Cameroon region. Some of the tribes, disappointed at not being taken over by Great Britain, refused to acknowledge German sovereignty. Their villages were bombarded and they were reduced to submission. The settlement of the English Baptists at Victoria, Ambas Bay, was at first excluded from the German protectorate, but in March 1887 an arrangement was made by which, while the private rights of the missionaries were maintained, the sovereignty of the settlement passed to Germany. The Baptist Society thereafter made over its missions, both at Ambas Bay and in the estuary, to the Basel Society.

The extension of German influence in the interior was gradually accomplished, though not without considerable bloodshed. That part of Adamawa recognized as outside the British frontier was occupied in 1901 after somewhat severe fighting. In 1902 the imperial troops first penetrated into that part of Bornu reserved to Germany by agreements with Great Britain and France. They found the country in the military occupation of France. The French officers, who stated that their presence was due to

[1] On the 26th of July a French gunboat also entered the estuary on a belated annexation mission.

the measures rendered necessary by the ravages of Rabah and his sons, withdrew their troops into French territory. The shores of Lake Chad were first reached by a German military force on the 2nd of May 1902. In 1904 and again in 1905 there were native risings in various parts of the protectorate. These disturbances were followed, early in 1906, by the recall of the governor, Herr von Puttkamer, who was called upon to answer charges of maladministration. He was succeeded in 1907 by Dr T. Seitz. Collisions on the southern border of the protectorate between French and German troops led in 1905–1906 to an accurate survey of the south and east frontier regions and to a new convention (1908) whereby for the straight lines marking the frontier in former agreements natural features were largely substituted. Germany gained a better outlet to the Sanga river.

The ascent of the Cameroon mountain was first attempted by Joseph Merrick of the Baptist Missionary Society in 1847; but it was not till 1861 that the summit was gained, when the ascent was made by Sir Richard Burton, Gustav Mann, a noted botanist, and Señor Calvo. The starting-point was Babundi, a place on the seashore west of the mountain. From the south-east the summit was reached by Mary Kingsley in 1895.

See Mary H. Kingsley, *Travels in West Africa* (London, 1897); Sir R. Burton, *Abeokuta and the Cameroons Mountains* (2 vols., London, 1863); E. B. Underhill, *Alfred Saker . . . A Biography* (London, 1884); Sir H. H. Johnston, *George Grenfell and the Congo . . . and Notes on the Cameroons . . .* (London, 1908); Max Buchner, *Kamerun Skizzen und Betrachtungen* (Leipzig, 1887); S. Passarge, *Adamaua* (Berlin, 1895); E. Zintgraph, *Nord-Kamerun* (Berlin, 1895); F. Hutter, *Wanderungen und Forschungen im Nord-Hinterland von Kamerun* (Brunswick, 1902); F. Bauer, *Die deutsche Niger-Benue-Tsadsee-Expedition, 1902–1903* (Berlin, 1904); C. René, *Kamerun und die deutsche Tsâdsee Eisenbahn* (Berlin, 1905); O. Zimmermann, *Durch Busch und Steppe vom Campo bis zum Schari, 1892–1902* (Berlin, 1909); also British Foreign Office Reports. For special study of particular sciences see F. Wohltmann, *Der Plantagenbau in Kamerun und seine Zukunft* (Berlin, 1896); F. Plehn, *Die Kamerunküste, Studien zur Klimatologie, Physiologie und Pathologie in den Tropen* (Berlin, 1898); E. Esch, F. Solger, M. Oppenheim and O. Jaekel, *Beiträge zur Geologie von Kamerun* (Stuttgart, 1904). For geology the following works may also be consulted: Stromer von Reichenbach, *Geologie der deutschen Schutzgebiete in Afrika* (Berlin, 1896); A. von Koenen, "Über Fossilien der unteren Kreide am Ufer des Mungo in Kamerun," *Abh. k. Wiss.*, Göttingen, 1897; E. Cohen, "Lava vom Camerun-Gebirge," *Neues Jahrb. f. Min.*, 1887. (F. R. C.)

CAMILING, a town of the province of Tarlac, Luzon, Philippine Islands, on the Camiling river, about 80 m. N.N.W. of Manila. Pop. (1903) 25,243. In 1903 after the census had been taken, the adjacent towns of Santa Ignacia (pop. 1911) and San Clemente (pop. 1822) were annexed to Camiling. Its products are rice, Indian corn and sugar. Fine timber grows in the vicinity. The principal language is Ilocano; Pangasinan, too, is spoken. Being in an isolated position, very difficult of access during the rainy season, Camiling has always been infested with thieves and bands of outlaws, who come here for concealment.

CAMILLUS, MARCUS FURIUS, Roman soldier and statesman, of patrician descent, censor in 403 B.C. He triumphed four times, was five times dictator, and was honoured with the title of Second Founder of Rome. When accused of having unfairly distributed the spoil taken at Veii, which was captured by him after a ten years' siege, he went into voluntary exile at Ardea. The real cause of complaint against him was no doubt his patrician haughtiness and his triumphal entry into Rome in a chariot drawn by white horses. Subsequently the Romans, when besieged in the Capitol by the Gauls, created him dictator; he completely defeated the enemy (but see BRENNUS and ROME: *History*, ii., "The Republic") and drove them from Roman territory. He dissuaded the Romans, disheartened by the devastation wrought by the Gauls, from migrating to Veii, and induced them to rebuild the city. He afterwards fought successfully against the Aequi, Volsci and Etruscans, and repelled a fresh invasion of the Gauls in 367. Though patrician in sympathy, he saw the necessity of making concessions to the plebeians and was instrumental in passing the Licinian laws. He died of the plague in the eighty-first year of his age (365). The story of Camillus is no doubt largely traditional. To this element probably belongs the story of the schoolmaster who, when Camillus was attacking Falerii (*q.v.*), attempted to betray the town by bringing into his camp the sons of some of the principal inhabitants of the place. Camillus, it is said, had him whipped back into the town by his pupils, and the Faliscans were so affected by this generosity that they at once surrendered.

See Livy v. 10, vi. 4; Plutarch, *Camillus*. For the Gallic retreat, see Polybius ii. 18; T. Mommsen, *Römische Forschungen*, ii. pp. 113-152 (1879).

CAMILLUS and **CAMILLA**, in Roman antiquity, originally terms used for freeborn children. Later, they were used to denote the attendants on certain priests and priestesses, especially the flamen dialis and flaminica and the curiones. It was necessary that they should be freeborn and the children of parents still alive (Dion. Halic. ii. 21). The name Camillus has been connected with the Cadmilus or Casmilus of the Samothracian mysteries, identified with Hermes (see CABEIRI).

CAMISARDS (from *camisade*, obsolete Fr. for "a night attack," from the Ital. *camiciata*, formed from *camicia*—Fr. *chemise*—a shirt, from the fact of a shirt being worn over the armour in order to distinguish friends from foes), the name given to the peasantry of the Cévennes who, from 1702 to 1705 and for some years afterwards, carried on an organized military resistance to the *dragonnades*, or conversion by torture, death and confiscation of property, by which, in the Huguenot districts of France, the revocation of the edict of Nantes was attempted to be enforced. The Camisards were also called Barbets ("water-dogs," a term also applied to the Waldenses), Vagabonds, Assemblers (*assemblée* was the name given to the meeting or conventicle of Huguenots), Fanatics and the Children of God. They belonged to that romance-speaking people of Gothic descent whose mystic imagination and independent character made the south of France the most fertile nursing-ground of medieval heresy (see CATHARS and ALBIGENSES). At the time of the Reformation the same causes produced like results. Calvin was warmly welcomed when he preached at Nîmes; Montpellier became the chief centre for the instruction of the Huguenot youth. It was, however, in the great triangular plateau of mountain called the Cévennes that, among the small farmers, the cloth and silk weavers and vine dressers, Protestantism was most intense and universal. These people were (and still are) very poor, but intelligent and pious, and of a character at once grave and fervent. From the lists of Huguenots sent from Languedoc to the galleys (1684 to 1762), we gather that the common type of *physique* is "belle taille, cheveux bruns, visage ovale." The chief theatre of the revolt comprised that region of the Cévennes bounded by the towns of Florac, Pont-de-Montvert, Alais and Lasalle, thus embracing the southern portion of the department of Lozère (the Bas-Gévaudan) and the neighbouring district in the east of the department of Gard.

In order to understand the War of the Cévennes it is necessary to recall the persecutions which preceded and followed the revocation of the edict of Nantes. It is also necessary to remember the extraordinary religious movement which had for a great number of years agitated the Protestants of France. Faced by the violation of that most solemn of treaties, a treaty which had been declared perpetual and irrevocable by Henry IV., Louis XIII. and even Louis XIV. himself, they could not, in the enthusiasm of their faith, believe that such a crime would be left unpunished. But being convinced that no human power could give them liberty of conscience, they went to the Bible to find when their deliverance would come. As far back as 1686 Pierre Jurieu published his work *L'Accomplissement des prophéties*, in which, speaking of the Apocalypse, he predicted the end of the persecution and the fall of Babylon—that is to say of Roman Catholicism—for 1689. The Revolution in England seemed to provide a striking corroboration of his prophecies, and the apocalyptic enthusiasm took so strong a hold on people's minds that Bossuet felt compelled to refute Jurieu's arguments in his *Apocalypse expliquée*, published in 1689. The *Lettres pastorales* of Jurieu (Rotterdam, 1686–1687), a series of brief tracts which were secretly circulated in France,

continued to narrate events and prodigies in which the author saw the intervention of God, and thus strengthened the courage of his adherents. This religious enthusiasm, under the influence of Du Serre, was manifested for the first time in the Dauphiné. Du Serre, who was a pupil of Jurieu, communicated his mystic faith to young children who were called the "petits prophètes," the most famous of whom was a girl named "La belle Isabeau." Brought up on the study of the prophets and the Apocalypse, these children went from village to village quoting and requoting the most obscure and terrible passages from these ancient prophecies (see ANTICHRIST). It is necessary to remember that at this time the Protestants were without ministers, all being in exile, and were thus deprived of all real religious instruction. They listened with enthusiasm to this strange preaching, and thousands of those who were called New Catholics were seen to be giving up attendance at Mass. The movement advanced in Languedoc with such rapidity that at one time there were more than three hundred children shut up in the prisons of Uzès on the charge of prophesying, and the Faculty of Medicine of Montpellier, which was entrusted with their examination, went so far in their ignorance as to pronounce these irresponsible infants guilty of fanaticism. After the peace of Ryswick, 1697, the fierceness of the persecution was redoubled in the South. "I will show no mercy to the preachers," wrote the terrible Baville, the so-called "king of Languedoc," and he kept his word. The people of the Cévennes were in despair, for their loyalty to the king had been remarkable. In 1683 on the 6th of September an assembly composed of fifty pastors, sixty-four noblemen and thirty-four notables, held at Colognac, had drawn up a statement of its unalterable loyalty to Louis XIV. It is important to notice that the revolt of the Cévennes was essentially a popular movement. Among its leaders there was not a single nobleman, but only men of the people, a baker, a blacksmith, some ex-soldiers; but by far the most extraordinary characterisic is the presence, no longer of children, but of men and women who declared themselves inspired, who fell into religious ecstasies and roused in their comrades the most heroic bravery in battle and at the stake.

The assassination of the abbé du Chayla marks the beginning of the war of the Cévennes. The abbé, a veteran Catholic missionary from Siam, had been appointed inspector of missions in the Cévennes. There he introduced the "squeezers" (which resembled the Scottish "boot"), and his systematic and refined cruelty at last broke the patience of his victims. His murder, on the 23rd of July 1702, at Pont de Monvert, was the first blow in the war. It was planned by Esprit Séguier, who at once began to carry out his idea of a general massacre of the Catholic priests. He soon fell, and was succeeded by Laporte, an old soldier, who, as his troop increased, assumed the title of "the Colonel of the Children of God," and named his camp the "Camp of the Eternal." He used to lead his followers to the fight, singing Clement Marot's grand version of the 68th Psalm, "Que Dieu se montre seulement," to the music of Goudimel. Besides Laporte, the forest-ranger Castanet, the wool-carders Conderc and Mazel, the soldiers Catinat, Joany and Ravenel were selected as captains —all men whom the *théomanie* or prophetic malady had visited. But the most important figures are those of Roland, who afterwards issued the following extraordinary despatch to the inhabitants of St André:—"Nous, comte et seigneur Roland, généralissime des Protestants de France, nous ordonnons que vous ayez à congédier dans trois jours tous les prêtres et missionnaires qui sont chez vous, sous peine d'être brûlés tout vifs, vous et eux" (Court, i. p. 219); and Jean Cavalier, the baker's boy, who, at the age of seventeen, commanded the southern army of the Camisards, and who, after defeating successively the comte de Broglie and three French marshals, Montrevel, Berwick and Villars, made an honourable peace. (See CAVALIER, JEAN.)

Cavalier for nearly two years continued to direct the war. Regular taxes were raised, arsenals were formed in the great limestone caves of the district, the Catholic churches and their decorations were burned and the clergy driven away. Occasionally routed in regular engagements, the Camisards, through their desperate valour and the rapidity of their movements, were constantly successful in skirmishes, night attacks and ambuscades. A force of 60,000 was now in the field against them; among others, the Irish Brigade which had just returned from the persecutions of the Waldenses. The rising was far from being general, and never extended to more than three or four thousand men, but it was rendered dangerous by the secret and even in many places the open support of the people in general. On the other hand their knowledge of a mountainous country clothed in forests and without roads, gave the insurgents an enormous advantage over the royal troops. The rebellion was not finally suppressed until Baville had constructed roads throughout this almost savage country.

Montrevel adopted a policy of extermination, and 466 villages were burned in the Upper Cévennes alone, the population being for the most part put to the sword. Pope Clement XI. assisted in this work by issuing a bull against the "execrable race of the ancient Albigenses," and promising remission of sins to the holy militia which was now formed among the Catholic population, and was called the Florentines, Cadets of the Cross or White Camisards. Villars, the victor of Hochstädt and Friedlingen, saw that conciliation was necessary; he took advantage of the feeling of horror with which the quiet Protestants of Nîmes and other towns now regarded the war, and published an amnesty. In May 1704 a formal meeting between Cavalier and Villars took place at Nîmes. The result of the interview was that a document entitled *Très humble requête des réformés du Languedoc au Roi* was despatched to the court. The three leading requests for liberty of conscience and the right of assembly outside walled towns, for the liberation of those sentenced to prison or the galleys under the revocation, and for the restitution to the emigrants of their property and civil rights, were all granted,—the first on condition of no churches being built, and the third on condition of an oath of allegiance being taken. The greater part of the Camisard army under Roland, Ravenel and Joany would not accept the terms which Cavalier had arranged. They insisted that the edict of Nantes must be restored,—"*point de paix, que nous n'ayons nos temples.*" They continued the war till January 1705, by which time all their leaders were either killed or dispersed.

In 1709 Mazel and Claris, with the aid of two preaching women, Marie Desubas and Elizabeth Catalon, made a serious effort to rekindle revolt in the Vivarais. In 1711 all opposition and all signs of the reformed religion had disappeared. On the 8th of March 1715, by medals and a proclamation, Louis XIV. announced the entire extinction of heresy.

What we know of the spiritual manifestations in the Cévennes (which much resembled those of the Swedish Raestars of Smaland in 1844) is chiefly derived from *Le Théâtre sacré des Cévennes*, London, 1707, reprinted at Paris in 1847; *A Cry From the Desert*, &c., by John Lacy, London, 1707; *La Clef des prophéties de M. Marion*, London, 1707; *Avertissements prophétiques d'Élie Marion*, &c., London, 1707. About the date of these publications the three prophets of the Cévennes, Marion, Durand-Fage and Cavalier (a cousin of the famous Jean Cavalier) were in London and were objects of lively curiosity. The consistory of the French church in the Savoy sent a protest to the lord mayor against "cette secte impie et extravagante" and the matter was tried at the Guildhall. Misson, author of the *Théâtre sacré*, declared in defence of the accused, that the same spirit which had caused Balaam's ass to speak could speak through the mouths of these prophets from the Cévennes. Marion and his two friends Fatio, a member of the Royal Society of London, and Daudé, a leading savant, who acted as his secretaries, were condemned to the pillory and to the stocks. Voltaire relates (*Siècle de Louis XIV.* c. 36) that Marion wished to prove his inspiration by attempting to raise a dead body (Thomas Emes) from St Paul's churchyard. He was at last compelled to leave England.[1]

The inspiration (of which there were four degrees, *avertissement*,

[1] This curious affair provoked a lengthy controversy, which is described in "La Relation historique de ce qui s'est passé à Londres au sujet des prophètes camisards" (*République des Lettres*, 1708), in the study of M. Vesson, *Les Prophètes camisards à Londres* (1893), and also in the book *Les Prophètes cévenols*, ch. iii. (1861) by Alfred Dubois.

souffle, prophétie, dons) was sometimes communicated by a kiss at the assembly. The patient, who had gone through several fasts three days in length, became pale and fell insensible to the ground. Then came violent agitations of the limbs and head, as Voltaire remarks, "quite according to the ancient custom of all nations, and the rules of madness transmitted from age to age." Finally the patient (who might be a little child, a woman, a half-witted person) began to speak in the good French of the Huguenot Bible words such as these: "Mes frères, amendez-vous, faites pénitence, la fin du monde approche; le jugement général sera dans trois mois; répentez-vous du grand péché que vous avez commis d'aller à la messe; c'est le Saint-Esprit qui parle par ma bouche" (Brueys, *Histoire du fanatisme de notre temps*, Utrecht, 1737, vol. i. p. 153). The discourse might go on for two hours; after which the patient could only express himself in his native patois,—a Romance idiom,—and had no recollection of his "ecstasy." All kinds of miracles attended on the Camisards. Lights in the sky guided them to places of safety, voices sang encouragement to them, shots and wounds were often harmless. Those entranced fell from trees without hurting themselves; they shed tears of blood; and they subsisted without food or speech for nine days. The supernatural was part of their life. Much literature has been devoted to the discussion of these marvels. The Catholics Fléchier (in his *Lettres choisies*) and Brueys consider them the product of fasting and vanity, nourished on apocalyptic literature. The doctors Bertrand (*Du magnétisme animal*, Paris, 1826) and Calmeil (*De la folie*, Paris, 1845) speak of magnetism, hysteria and epilepsy, a prophetic monomania based on belief in divine possession. The Protestants especially emphasized the spirituality of the inspiration of the Camisards; Peyral, *Histoire des pasteurs du désert*, ii. 280, wrote: "Il fallait à cet effort gigantesque un ressort prodigieux, l'enthousiasme ordinaire n'y eût pas suffi." Dubois, who has made a careful study of the problem, says: "L'inspiration cévenole nous apparaît comme un phénomène purement spirituel." Conservative Catholics, such as Hippolyte Blanc in his book on *L'Inspiration des Camisards* (1859), regard the whole thing as the work of the devil. The publication of J. F. K. Hecker's work, *Die Volkskrankheiten des Mittelalters*, made it possible to consider the subject in its true relation. This was translated into English in 1844 by B. G. Babington as *The Epidemics of the Middle Ages*.

Although the Camisards were guilty of great cruelties in the prosecution of the war, there does not seem to be sufficient ground for the charge made by Marshal de Villars: "Le plupart de leurs chefs ont leurs demoiselles" (letter of 9th August 1704, in the *War Archives*, vol. 1797). Court replied to these unjust charges: "Their enemies have accused them of leading a life of licence because there were women in their camps. These were their wives, their daughters, their mothers, who were there to prepare their food and to nurse the wounded" (*Histoire*, vol. i. p. 71).

BIBLIOGRAPHY.—The works devoted to the history of the Camisards are very numerous. Nevertheless there exists no work specifically devoted to this extremely interesting period in French history, for in none of the published works has proper use been made of the valuable documents preserved in the archives of the ministry of war. Among the chief works are:—Père Louvreleuil (priest, former curé of St. Germain de Calberte), *Histoire du fanatisme renouvelé où l'on raconte les sacrilèges, les maladies et les meurtres commis dans les Cévennes* (Toulouse, 1704); M. de Brueys, *Suite de l'histoire du fanatisme de notre temps où l'on voit les derniers troubles des Cévennes* (Paris, 1709); *Lettres choisies de M. Fléchier évêque de Nîmes avec une relation des fanatiques du Vivarez* (Paris, 1715); Madame de Merez de l'Incarnation, *Mémoires et journal très fidèle de ce qui s'est passé le 11 de may 1703 jusqu'au 1 juin 1705 à Nîmes touchant les phanatiques*, published by E. de Barthélemy (Montpellier, 1874). These works are written by Catholic writers immediately after the war of the Cévennes, and, despite their partiality, include some valuable documents. *Mémoires du marquis de Guiscard* (Delft, 1705); Maximilien Misson, *Le Théâtre sacré des Cévennes ou Récit de diverses merveilles nouvellement opérées dans cette partie de la province de Languedoc* (London, 1707); Misson, the author of the *Voyages en Italie*, which met with such a great success, gave prominence to the facts relating to the inspiration of the Camisards; the *Théâtre* also contains important extracts from the works of Benoit, Brueys, Guiscard and Boyer, and several original letters from Camisards; *Histoire des Camisards, &c.* (London, 1740), the anonymous work of a distinguished writer, which was eventually condemned by the parlement of Toulouse to be torn up and burnt in 1759; Antoine Court, *Histoire des troubles des Cévennes* (3 vols., 1760), the best work of this period, compiled from numerous manuscript references. The war of the Cévennes has been treated in several English works, e.g. *A Compleat History of the Cevennes, giving a Particular Account of the Situation, &c.*, by a doctor of civil law (London, 1703). This work includes a dedication to the queen, an historical account of the people of the Cévennes, the bull of Pope Clement against the Camisards, and the bishop of Nîmes's mandate publishing the bull, and a discourse on the obligations of the English to help the Camisards, and a form of prayer used in the Camisard assembly, printed in London in 1703 under the title *Formulaire de prières des Cévennols dans leurs assemblées*. *The History of the Rise and Downfal of the Camisards, &c.* (London, 1709), dealt with the prophets of the Cévennes in London, and is only an abridged translation of Père Louvreleuil's work. Among modern works are, Ernest Moret, *Quinze ans du règne de Louis XIV* (3 vols., 1859), a work which gives a remarkable history of the war of the Cévennes; *Les Insurgés protestants sous Louis XIV*, studies and unedited documents published by G. Frosterus (1868); *Mémoires de Bonbonnoux*, chief Camisard and pastor of the desert, published by Vielles (1883); Bonnemère, *Histoire de la guerre des Camisards* (1859). Two popular works are—F. Puaux, *Histoire populaire de la guerre des Camisards* (1875); Anna E. Bray, *The Revolt of the Protestants of the Cévennes with some Account of the Huguenots of the Seventeenth Century* (London, 1870). (F. Px.)

CAMOENS [CAMÕES], **LUIS VAZ DE** (1524–1580), the prince of Portuguese poets, sprang from an illustrious and wealthy family of Galician origin, whose seat, called the castle of Camoens, lay near Cape Finisterre. His ancestor, the poet Vasco Pires de Camoens, followed the party of Peter the Cruel of Castile against Henry II., and on the defeat of the former had to take refuge along with other Galician nobles in Portugal, where he founded the Portuguese family of his name. King Fernando received him well, and gave him posts of honour and estates, and though the master of Aviz sequestered some of these and Vasco lost others after the battle of Aljubarrota, where he fought on the Spanish side, considerable possessions still remained to him. Antão Vaz, the grandfather of Luis, married one of the Algarve Gamas, so that Vasco da Gama and Camoens, the discoverer of the sea route to India and the poet who immortalized the voyage in his *Lusiads*, were kinsmen. Antão's eldest son Simão Vaz was born in Coimbra at the close of the 15th century, and married Anna de Sá e Macedo, who bore him an only son, Luis Vaz de Camoens; thus the poet, like his father and grandfather, was a *cavalleiro fidalgo*, that is, an untitled noble.

Four cities dispute the honour of being his birthplace, though Lisbon has the better title; and there is a like dispute about the year, which, however, was almost certainly 1524. The poet spent his childhood in Coimbra, where his father owned a property, and made his first studies at the college of All Saints, designed for "honourable poor students," and there contracted friendships with noblemen like D. Gonçalo da Silveira and his brother D. Alvaro, who were inmates of the nobles' college of St Michael. These colleges were offshoots from and attached to the Augustinian monastery of Santa Cruz, an important religious and scholastic establishment, where the poet's uncle D. Bento de Camoens, a virtuous and very learned man, was professed. The Renaissance, though late in penetrating into Portugal, had by this time definitely triumphed, and the university of Coimbra, after its reform in 1537 under the auspices of King John III., boasted the best teachers drawn from every country, among them George Buchanan. The possession of classical culture was regarded as the mark of a gentleman; the colleges of Santa Cruz required conversation within the walls to be in Greek or Latin, and the university, when it absorbed the colleges, adopted the same rule. In these surroundings, aided by a retentive memory, Camoens steeped himself in the literature and mythology of the ancients, as his works show, and he was thus able in after years to perfect the Portuguese language and to enrich it with many neologisms of classical origin. It is fortunate, however, for his country and his fame that he never followed the fashion of writing in Latin; on the contrary, except for his Spanish poems, he always employed his native tongue. After completing his grammar and rhetoric the poet entered on his university course for the degree of bachelor of arts, which lasted for three years, from 1539 to 1542, and during this period he met Jorge

de Montemayor, the author of *Diana*, who was then studying music. He seems to have imbibed much of that encyclopaedic instruction to which the humanists aspired, for his writings show a very extensive reading, and his scientific knowledge and faculty of observation compelled the admiration of the great Humboldt. The thoroughness of his teaching is apparent when we remember that he wrote his epic in the fortresses of Africa and Asia, far from books, and yet gave proof of acquaintance with universal history, geography, astronomy, Greek and Latin literature, and the modern poetry of Italy and Spain. Much of the credit for this learning must be attributed to the encouragement of D. Bento, now prior of Santa Cruz, who became chancellor of the university the very year when Camoens entered it. There is a tradition that this uncle destined him for the church and caused him to study theology. The poet's knowledge of dogma and the Bible, his friendly intercourse with the Lisbon Dominicans at the end of his life, and the share he is said to have taken in their disputations, make the hypothesis a likely one, but he made his own choice and preferred a lay life. We have very little verse of his Coimbra time, but it seems that he began in the Italian manner, following the new classical school of Sá de Miranda (*q.v.*),and that, though attached to the popular muse and well acquainted with the national songs and romances, legends and lore, his poetry in the old style (*medida velha*) is mostly of later date. An exception may perhaps be found in his *Auto* after the manner of Gil Vicente (*q.v.*), *The Amphitryons*, a Portuguese adaptation from Plautus which was very well received. At the age of eighteen Camoens left Coimbra, bidding adieu to the old city in verses breathing the most tender *saudade*. Lisbon, which impressed Cervantes so much as to draw from him a classic description in the novel *Persiles y Sigismunda*, made an even greater impression on the youthful Camoens, and the *Lusiads* are full of eulogistic epithets on the city and the Tagus.

Arriving in 1543, it has been conjectured that he became tutor to D. Antonio de Noronha, son of the great noble D. Francisco de Noronha, count of Linhares, who had lately returned from a French embassy to his palace at Xabregas. The poet's birth and talents admitted him to the society of men like D. Constantine de Braganza, the duke of Aveiro, the marquis of Cascaes, the count of Redondo, D. Manoel de Portugal and D. Gonçalo da Silveira, son of the count of Sortelha, who died a Christian martyr in Monomotapa. At Xabregas Camoens must have met Francisco de Moraes (*q.v.*), who had served as secretary to the count of Linhares on his embassy, and there he probably read the MS. of *Palmeirim*; this would explain the origin of two of his roundels which are clearly founded on passages in the romance. Camoens had had a youthful love affair in Coimbra, but on Good Friday of the year 1544 he experienced the passion of his life. On that day in some Lisbon church he caught sight of D. Catherina de Ataide (daughter of D. Antonio de Lima, high chamberlain to the infant D. Duarte), who had recently become a lady-in-waiting to the queen. This young girl, the Nathercia of his after songs, counted then some thirteen years, and was destined to be his Beatrice. To see more of her, he persuaded the count of Linhares to introduce him to the court, where his poetical gifts and culture ensured him a ready welcome, and his fifth idyll, addressed to his patron on this occasion, paved the way for his entrance. Though inferior to his later compositions, it excels in harmony any verse previously written in Portuguese. At first his suit probably met with few difficulties, and if Catherina's family regarded it seriously, their poverty, combined with the fact that the poet came of a good stock and had the future in his hands, may have prevented any real opposition. It was his own imprudence that marred his fortunes, and his consciousness of this fact gave his muse that moving expression, truth and *saudade*, which are lacking in the somewhat artificial productions of the sentimental Petrarch. But while Camoens gained protectors and admirers, his temperament and conduct ensured him envious foes, and the secret of his love got out and became the subject of gossip. All was not smooth with the lady, who showed herself coy; now yielding to her heart, she was kind; and then listening to her friends, who would have preferred a better match for her, she repelled her lover. Jealousy then seized him, and sick of court life for the moment, he gladly accompanied his patron to the latter's country house; but once there he recognized that Lisbon was the centre of attraction for him and that he could not be happy at a distance. His verses at this time reveal his parlous condition. He oscillates between joy and depression. He passes from tender regrets to violent outbursts, which are followed by calm and peace, while expressions of passionate love alternate with bold desires and lofty ambitions. It is clear that there was an understanding between him and Catherina and that they looked forward to a happy ending, and this encouraged him in his weary waiting and his search for a lucrative post which would enable him to approach her family and ask for her hand. From this period date the greater part of his roundels and sonnets, some of the odes and nearly all the eclogues.

His fifth eclogue shows that he was seriously thinking of his patriotic poem in 1544; and from the fourth it seems likely that the *Lusiads* were in course of composition, and that cantos 3 and 4 were practically completed. He had by now established his fame and was known as the Lusitanian Virgil, but presently he had a rude awakening from his dreams of love and glory. He had shown his affection too openly, and some infraction of court etiquette, about which the queen was strict, caused the tongue of scandal to wag; perhaps it was an affair with one of Catherina's brothers, even a duel, that led to the decree which exiled him from Lisbon.

Camoens's rashness, self-confidence and want of respect for the authorities all contributed to the penalty, and the composition of the play *El Rei Seleuco* would aggravate his offence in the eyes of John III. Produced in 1545 and derived from Plutarch, the plot was calculated to draw attention to the relations between the king and his stepmother, and to recall the action of D. Manoel in robbing his son John III. of his intended bride. Camoens composed it for a wedding festivity in the house of Estacio da Fonseca, and some of the verses refer so openly to his passion, that if, as is likely, he spoke them himself, emphasizing them with voice and gesture so as to publish his love to the world, this new boldness, combined with the subject of the piece, must have rendered his exile a certainty. All we know definitely, however, is that the court was henceforth closed to him, and in 1546 he had to leave Lisbon, the abode of his love and the scene of his triumph. Tradition says that he went to the Ribatejo and spent seven or eight months with his mother's relatives in or near Santarem, whence he poured out a number of his finest poems, including his *Elegy of Exile* and some magnificent sonnets, which, in vigour of ideas and beauty of expression, exceeded anything he had hitherto produced. Poets cannot live on bays, however, and pressed by necessity he determined to become a soldier.

One of his best modern biographers thinks that he petitioned the king for liberty to commute his penalty into military service in Africa; but whether this be so, or whether he merely went there to gain his spurs, certain it is that in the autumn of 1547 he proceeded to Ceuta. For the next two years, the usual period of service there, he lived the routine life of a common soldier in this famous trade emporium and outpost-town, and he lost his right eye in a skirmish with the Moroccans, though some writers make the incident occur on the voyage across the straits when his ship was attacked by Sallee rovers. Elegy ii. and a couple of odes date from his stay in Ceuta. He is full of sadness and almost in despair, but is saved from suicide by love and memory of the past. He has intervals of calm and resignation, even of satirical humour, and these become more frequent as the term of his exile draws near, and in one of them he wrote his prose letter to a " Lisbon friend." The octaves on the *Discontent of the World*, which breathe a philosophic equanimity and lift the reader out of the tumult of daily life, go to show that his restless heart had found peace at last and that he had accustomed himself to solitude.

In November 1549 the aged governor of Ceuta, D. Affonso de Noronha, was summoned to court and created viceroy of India,

and Camoens accompanied him to Lisbon, intending to follow him to the East in the armada which was due to sail in the spring of 1550. Reaching the capital in December, the poet almost immediately enlisted, but when the time came for departure he had changed his mind. His affection for Catherina and dreams of literary glory detained him, and he lived on in the expectation of obtaining a post on the strength of his services and wound. But month after month passed by without result, and in his disappointment he allied himself with a group of hot-blooded youths, including the ex-friar Antonio Ribeiro, nicknamed "the Chiado," after whom the main street of Lisbon takes its name, and endeavoured to forget his troubles in their society. He took part in their extravagances and gained the name of "Trinca-fortes" ("Crack-braves") from his bohemian companions, while there were ladies who mocked at his disfigurement, dubbing him "devil" and "eyeless face." In the course of his adventures he had often to draw his sword, either as attacker or attacked, and he boasted that he had seen the soles of the feet of many but none had seen his. When the reply to his application came from the palace it was a negative one, and he had now nothing further to expect. His stock of money brought from Ceuta was certainly exhausted, and misery stared him in the face, making him desperate. On the feast of Corpus Christi, the 16th of June 1552, he found two masked friends of his engaged in a street fight near St Dominic's convent, and joining in the fray he wounded one Gonçalo Borges, a palace servant, with the result that he was apprehended and lodged in gaol. This unprovoked attack upon a royal servant on so holy a day constituted a serious offence and cost him eight months' imprisonment. In a pathetic sonnet he describes his terrible experiences, which made such an impression on him that years afterwards he recurred to them in his great autobiographical Canzon 10. When Borges' wound was completely healed, the poet's friends intervened to assist him, and it was arranged that on his formally imploring pardon Borges should grant it and desist from proceeding with the case. This was effected on the 13th of February 1553, and on the 7th of March the king, taking into consideration that Camoens was "a youth and poor and decided to serve this year in India," confirmed the pardon. He had been obliged to humble his pride and enlist again, but while he complained of his troubles he recognized, in his frank, honest way, that his own mistakes were in part the causes of them.

After bidding good-bye to Catherina for the last time, Camoens set sail on Palm Sunday, the 24th of March 1553, in the "S. Bento," the flagship of a fleet of four vessels, under Fernaõ Alvares Cabral. His last words, he says in a letter, were those of Scipio Africanus, "Ingrata patria, non possidebis ossa mea."

He relates some of his experiences on board and the events of the voyage in various sonnets in Elegy iii. and in the *Lusiads*. In those days the sailors navigated the ships, while the men-at-arms kept the day and night watches, helped in the cleaning and, in case of necessity, at the pumps, but the rank of Camoens doubtless saved him from manual work. He had much time to himself in his six months' voyage and was able to lay in a store of nautical knowledge, while tempestuous weather off the Cape of Good Hope led him to conceive the dramatic episode of Adamastor (*Lusiads*, canto 5). The "S. Bento," the best ship of the fleet, weathered the Cape safely, and without touching at Mozambique, the watering-place of ships bound for India, anchored at Goa in September. It seems probable that the idea of the *Lusiads* took further shape on the voyage out, and that Camoens modified his plan; cantos 3 and 4 were already written, but from an historical he now made it a maritime epic. The discovery of India became the main theme, while the history of Portugal was interlaced with it, and the poem ended with the espousals between Portugal and the ocean, and a prophecy of the future greatness of the fatherland.

At the time of his arrival Goa boasted 100,000 inhabitants, and with its magnificent harbour was the commercial capital of the west of India. The first viceroy had been content with a sea dominion, but the great Affonso de Albuquerque saw that this was not enough to secure the supremacy of the Portuguese; recognizing the strategic value of Goa, he seized it and made it the capital of a land empire, and built fortresses in every important point through the East. Since his death a succession of remarkable victories had made the flag of Portugal predominant, but the enervating climate, the pleasures and the plunder of Asia, began to tell on the conquerors. Corruption was rife from the governor downwards, because the ruling ambition was to get rich and return home, and the hero of one day was a pirate the next. After all, it was only human nature, for a governorship lasted but three years and Portugal was far away, so the saying went round—"They are installed the first year, they rob the second, and then pack up in the third to sail away." Camoens was well received at first, owing to his talents and bravery, and he found the life cheap and merry, but having left his country with high ideals, the injustice and demoralization of manners he found in India soon disgusted him. He compared Goa to Babylon, and called it "the mother of villains and the stepmother of honest men."

His first military service in the East took place in November 1553, when he went with a force led by the viceroy to chastise a petty king on the Malabar coast. The expedition only lasted two or three months, and after some trivial combats it returned to Goa. In February of the following year Camoens accompanied the viceroy's son, D. Fernando de Menezes, who led an armada to the mouth of the Red Sea and thence up the Arabian coast to snap up hostile merchantmen and suppress piracy. Next the fleet went on to Ormuz, as was the custom with these annual cruises, and then to Bassora, where the poet helped to make some valuable prizes, and wrote a sonnet—it was ever, with him, "in one hand the sword, in the other the pen"! Returning to Goa in November he learnt of the deaths of Prince John, and of his friend and pupil the young D. Antonio de Noronha, and paid his tribute in a feeling sonnet and eclogue. In February 1555 he sailed on another pirate hunt and spent six weary months off Cape Guardafui, varied by a visit to Mombasa and by further work on his epic, and only got back to Goa in the following September. His experiences are recorded in the profound and sad 10th Canzon.

Meanwhile Francisco Barreto, an honourable and generous man, had become governor-general of India in the June of 1555, and, his appointment being popular, a reign of festivities began in Golden Goa to welcome his succession, in the course of which Camoens produced his *Filodemo*, a dramatized novel written in his court days. The same occasion probably gave birth to the *Disparates na India* ("Follies of India"), and certainly to the *Satyra do Torneio* ("Satire of the Tourney"), which confirmed the poet's reputation as a sayer of sharp things and gave considerable umbrage to those whom the cap fitted. However, it was not the enmities thus aroused but military duty which compelled him to quit Goa once more in the spring of 1556. He had enlisted in Lisbon for five years, the usual term, and in compliance with the orders of the governor he sailed for the Moluccas in April and there fought and versified for two years, though nearly all is guesswork at this period of his life. He appears to have spent the time between September 1556 and February 1557 in the island of Ternate, where he wrote Canzon 6, revealing a state of moral depression similar to that of Canzon 10, and he perhaps visited Banda and Amboina. In the following year he took part in the military occupation of Macao, which the emperor of China had presented to the Portuguese in return for their destruction of a pirate fleet which had besieged Canton. The poet's five years' term of service was now over, and he remained at Macao many months waiting for a ship to carry him back to India. He had made some profit out of the *Merci de Viagem*, granted by the governor Barreto to free him from the poverty in which he habitually lived, and he spent his money royally. At the same time he continued his epic, working in the grotto which still bears his name.

All seemed to be going smoothly with him until suddenly his fortunes took a serious turn for the worse. As the result of an intrigue the captain of the yearly ship from China to India, who acted as governor of Macao during his stay in port, imprisoned

Camoens, and took him on board with a view of bringing him to trial in India. The ship, however, was wrecked in October 1559 at the mouth of the Mekong river, and the poet had to save his life and his *Lusiads* by swimming to shore, and though he preserved the six or seven finished cantos of the poem, he lost everything else. While wandering about on the Cambodian coast awaiting the monsoon and a vessel to take him to Malacca, he composed those magnificent stanzas "By the Waters of Babylon," called by Lope de Vega "the pearl of all poetry," in which he recalls the happy days of his youth, sighs for Lisbon (Sion) and his love, and mourns his long exile from home. He got somehow to Malacca, and after a short stay there reached Goa, still as prisoner, in June 1561. He was straightway lodged in gaol, where he heard for the first time of the death of Catherina, and he poured out his grief in the great sonnet, *Alma Minha Gentil*. The viceroy, D. Constantius de Bragança, had recently returned from Jafanapatam, bringing as prize a tooth of Buddha, and Camoens approached him with a splendid epistle in twenty octaves, after the manner of Horace's ode to Augustus. It failed, however, to hasten the consideration of his case, but in September the Conde de Redondo, a good friend, came into office and immediately ordered his release from prison. His troubles were not yet at an end, however, for one Miguel Rodriguez Coutinho, a well-known soldier and citizen of Goa who lent money at usurious rates, thought the opportunity a good one to obtain repayment of a debt, and had Camoens lodged once more in gaol. As soon as he came out the poet composed a burlesque roundel satirizing his persecutor under the nickname of Fios Seccos ("dry threads").

Though very poor he now led an easier, even a pleasant life for a time. He was able to see his friends D. Vasco de Ataide, D. Francisco de Almeida, Heitor da Silveira, João Lopes Leitaõ and Francisco de Mello, all men of family and note. One day he invited them to a banquet, at which, instead of the usual dishes, each guest was served with a set of witty verses, and after these had been read out and chaff had gone round, the food came and they formed a merry party. The poet used his interest with the viceroy to recommend to him the naturalist Garcia da Orta, whose *Colloquies* on the simples and drugs of the East, the first product of the press in India, appeared in April 1563 with an ode by Camoens. His life for the next three years is almost a blank, but we know that he was hard at work finishing his epic, assisted by the advice of the historian Diogo do Couto, who became its commentator, and further that the new viceroy, his friend D. Antão de Noronha, nominated him to a reversion of the factory of Chaul, which, however, never fell into possession. It is clear from his writings that fourteen years in the East had told on Camoens. His best friends were dead or scattered, and he was overwhelmed with *saudade*. His sole ambition was to go home and print his poem, but he had no money to pay his passage. In September 1567, however, Pedro Barreto was named captain of Mozambique, and insisted on the poet accompanying him to Sofala, at the same time lending him two hundred cruzades. It was part of the way home, so Camoens accepted, but after they reached Mozambique Barreto called in this money, and his debtor, being unable to pay, was detained there for two whole years. Here Diogo do Couto found him "so poor that he ate at the cost of friends, and in order that he might embark for the Kingdom we friends collected for him the clothes he needed and some gave him to eat, and that winter he finished perfecting the *Lusiads* for the press and wrote much in a book he was making, which he called *Parnaso of Luiz de Camoes*, a book of much learning, doctrine and philosophy, which was stolen from him." Thanks to Couto and others, Camoens was able to liquidate his debt and set sail in November 1569 in the "Santa Clara," and he reached Portugal on the 7th of April 1570, after an absence of seventeen years.

The only wealth he brought with him from India was the MS. of his great poem, a "*Tesoro del Luso*" in the words of Cervantes. Moreover, he returned at an unfortunate moment—one of pest and famine. The great plague which had killed a quarter, or, as some say, half of the population of the capital, was declining, but a rigid quarantine prevailed, and the ship had to lie off Cascaes until the sanitary authorities allowed her to enter the Tagus. Camoens was welcomed by his mother, whom he found "very old and very poor"—his father had died at Goa about 1555—and after a visit to Catherina's tomb, which inspired the poignant sonnet 337, he set about obtaining the royal licence to print the *Lusiads*. This was dated the 24th of September 1571 and gave him a ten years' copyright, and as soon as the book appeared some friendly and influential hand, perhaps D. Manoel de Portugal, perhaps D. Francisca de Aragão for whom he had rhymed in the happy days of his youth, presented the national epic to King Sebastian. Shortly afterwards, on the 28th of July 1572, the king gave the poet a pension of fifteen milreis for the term of three years, as a reward for his services in India and for his poem. It was relatively a considerable sum, seeing that he had no great military record, and it seems even generous when we remember that Magellan had only received twelve, and had left Portugal because King Manoel would not give him a slight increase. Many functionaries with families had less to live on, and Camoens's subsistence was secure for the time being, and he could afford an attendant, so that the legend of the slave Antonio may well be true. Moreover, he was in the enjoyment of the fame his poem brought him. Philip II. is said to have read and admired it, and the powerful minister, Pedro de Alcaçova Carneiro, echoed the general opinion when he remarked that it had only one defect, in not being short enough to learn by heart or long enough to have no ending. Tributes came from abroad too. Tasso wrote and sent Camoens a sonnet in his praise, Fernando de Herrera celebrated him, and the year 1580 saw the publication of two Spanish versions, one at Alcalá, the other at Salamanca. His pension lapsed in 1575, but on the 2nd of August it was renewed for a further term; owing, however, to a mistake of the treasury officials, Camoens drew nothing for about a year and a half and fell into dire distress. This explains the story of Ruy da Camara, who had engaged him to translate the penitential psalms, and not receiving the version, called on the poet, who said in excuse that he had no spirit for such work now that he wanted for everything, and that his slave had asked him for a penny for fuel and he could not give it.

On the 2nd of June 1578, just before his start for the expedition to Africa which cost him his life and Portugal her independence, King Sebastian had renewed the poet's pension for a further period. Though Camoens had neither the health nor the means to accompany the splendid train of nobles and courtiers who followed the last crusading monarch to his doom, he began an epic to celebrate the enterprise, but burnt it when he heard the news of the battle of Alcacer. Instead, he mourned the death of his royal benefactor in a magnificent sonnet, and in Elegy x. reproached the cowardly soldiery who contributed to the rout. On the 31st of January 1580 the cardinal king Henry died, and, foreseeing the Spanish invasion, Camoens wrote in March to his old friend D. Francisco de Almeida: "All will see that I so loved my country that I was content not only to die in her but with her." A great plague had been raging in Lisbon since the previous year, and the poet, who lay ill in his poor cottage in the rua de Santa Anna, depressed by the calamities of his country, fell a victim to it. He was removed to a hospital and there passed away, unmarried and the last of his line, on the 10th of June 1580. A Carmelite, Frei José Indio, attended him in his last moments and received the only recognition Camoens could give, his copy of the *Lusiads*. He wrote afterwards: "What more grievous thing than to see so great a genius thus unfortunate. I saw him die in a hospital in Lisbon, without a sheet to cover him, after having triumphed in the East Indies and sailed 5000 leagues by sea." The house of Vimioso supplied the winding-sheet, and Camoens was buried with other victims of the plague in a common grave in the cemetery of Santa Anna. Years later D. Gonçalo Coutinho erected in the church of that invocation an *in memoriam* slab of marble with an inscription, and subsequently epitaphs were added by other admirers, but the earthquake of 1755 damaged the building, and all traces of these last acts of homage

to genius have disappeared. The third centenary of the poet's death was made the occasion of a national apotheosis, and on the 8th of June 1880 some remains, piously believed to be his, were borne with those of Vasco da Gama to the national pantheon, the Jeronymos at Belem.

The masterpiece of Camoens, the *Lusiads*, is the *epos* of discovery. It is written in hendecasyllabic *ottava rima*, and is divided into ten cantos containing in all 1102 stanzas. Its argument is briefly as follows. After an exordium proposing the subject, invoking the Tagus muses and addressing King Sebastian, Vasco da Gama's ships are shown sailing up the East African coast on their way to India. At a council of the gods the fate of the fleet is discussed, and Bacchus promises to thwart the voyage, while Venus and Mars favour the navigators. They arrive at Mozambique, where the governor endeavours to destroy them by stratagem, and, this failing, Bacchus tries other plots against them at Quiloa and Mombasa which are foiled by Venus. In answer to her appeal, Jupiter foretells the glorious feats of the Portuguese in the East, and sends Mercury to direct the voyagers to Melinde, where they are hospitably received and get a pilot to guide them to India. The local ruler visits the fleet and asks Gama about his country and its history, and in response the latter gives an account of the origin of the kingdom of Portugal, its kings and principal achievements, ending with the incidents of the voyage out. This recital occupies cantos 3, 4 and 5, and includes some of the most admired and most powerful episodes in the poem, *e.g.* those of Ignez de Castro, King Manoel's dream of the rivers Ganges and Indus, the speech of the old man of Belem and the apparition of Adamastor off the Cape of Good Hope. Canto 6 describes the crossing of the Indian Ocean from Melinde to Calicut and a fresh hostile attempt on the part of Bacchus. He descends to Neptune's palace, and at a council of the sea-gods it is resolved to order Aeolus to loose the winds against the Portuguese, but the tempest is quelled by Venus and her nymphs in answer to Gama's prayer, and the morning light reveals the Ghats of India. Just before the storm, occurs the night scene in which Velloso entertains his shipmates with the story of the Twelve of England, another of the famous episodes. Canto 7 is taken up with the arrival at Calicut, a description of the country and the details of Gama's reception by the raja. The governor of the city visits the fleet and inquires about the pictures on their banners, whereupon Paulo da Gama, Vasco's brother, tells him of the deeds of the early Portuguese kings. Meanwhile Bacchus, not to be baulked, appears to a priest in the guise of Mahomet, and stirs up the Moslems against the Christian adventurers, with the result that the raja charges Gama with being a leader of convicts and pirates. To this the captain makes a spirited reply and gets his despatch, but he has new snares to avoid and further difficulties to overcome before he is finally able to set sail on the return voyage. Pitying their toils, Venus determines to give the voyagers repose and pleasure on their way home, and directs their course to an enchanted island, which is described in canto 9, in the longest and perhaps the most beautiful episode in the poem. On landing they are received by the goddess and her nymphs, and general joy ensues, heightened by banquets and amorous play. In a prophetic song, the siren tells of the exploits of the Portuguese viceroys, governors and captains in India until the time of D. John de Castro, after which Tethys ascends a mountain with Gama, shows him the spheres after the system of Ptolemy and the globe of Asia and Africa, and describes the Indian life of St Thomas the apostle. Finally the navigators quit the island and reach Lisbon, and an epilogue contains a patriotic exhortation to King Sebastian and visions of glory, which ended so disastrously at the battle of Alcacer.

Though the influence of Camoens on Portuguese has been exaggerated, it was very considerable, and he so far fixed the written language that at the present day it is commonly and not inaccurately called "the language of Camoens." The *Lusiads* is the most successful modern epic cast in the ancient mould, and it has done much to preserve the corporate life of the Portuguese people and to keep alive the spirit of nationality in times of adversity like the "Spanish Captivity" and the Napoleonic invasion. Even now it forms a powerful bond between the mother-country and her potentially mighty daughter-nation across the Atlantic, the United States of Brazil. The men of the Renaissance saw nothing incongruous in that mixture of paganism and Christianity which is found in the *Lusiads* as in Ariosto, though some modern critics, like Voltaire, consider it a grave artistic defect in the poem. The fact that the *Lusiads* is written in a little-known language, and its intensely national and almost exclusively historical character, undoubtedly militate against a right estimate of its value, now that Portugal, once a world power, has long ceased to hold the East in fee or to guide the destinies of Europe. But though political changes may and do react on literary appreciations, the *Lusiads* remains none the less a great poem, breathing the purest religious fervour, love of country and spirit of chivalry, with splendid imaginative and descriptive passages full of the truest and deepest poetry. The structure is Virgilian, but the whole conception is the author's own, while the style is natural and noble, the diction nearly always correct and elegant, and the verse, as a rule, sonorous and full of harmony.

In addition to his epic, Camoens wrote sonnets, canzons, odes, sextines, eclogues, elegies, octaves, roundels, letters and comedies. The roundels include *cartas*, *motes*, *voltas*, *cantigas*, *trovas*, *pastorals* and *endechas*. In the opinion of many competent judges Camoens only attains his true stature in his lyrics; and a score of his sonnets, two or three of the canzons, eclogues and elegies, and the Babylonian roundels will bear comparison with any composition of the same kind that other literatures can show. Referring to the *Lusiads*, A. von Humboldt calls Camoens a "great maritime painter," but in his best lyrics he is a thinker as well as a poet, and when free from the trammels of the epic and inherited respect for classical traditions, he reveals a personality so virile and deep, a philosophy so broad and human, a vision so wide, and a form and style so nearly perfect, as not only to make him the foremost of Peninsular bards but to entitle him to a place in that small company of universal poets of the first rank.

The oldest and most authentic portrait of Camoens appeared in 1624 with his life, by Manoel Severim de Faria. It is a kitcat and shows the poet in armour wearing a laurel crown; his right hand holds a pen, his left rests on a copy of the *Lusiads*, while a shield above shows the family arms, a dragon rising from between rocks. The likeness exhibits a Gothic or northern type, and the tradition of his red beard and blue eyes confirms it. Except for an ode, sonnet and elegy, all Camoens's lyrics were published posthumously.

AUTHORITIES.—The most modern and most critical biographies are those of Dr Theophilo Braga, *Camões, epoca e Vide* (Oporto, 1907), and of Dr Wilhelm Storck, *Luis de Camões Leben* (Paderborn, 1890), while the most satisfactory edition of the complete works is due to the Visconde de Juromenha (6 vols., Lisbon, 1860–1869), though it contains some spurious matter. While rejecting without good reason many of the traditions accepted by Juromenha in his life of the poet, Storck embroiders on his own account, and Braga must be preferred to him. Two volumes of Innocencio da Silva's *Diccionario Bibliographico Portuguez* (14 and 15) are entirely devoted to Camoens and Camoniana, the second of them dealing fully with the tercentenary celebrations. Among modern Portuguese studies of the national epic the most important are perhaps *Camões e a Renascença em Portugal*, by Oliveira Martins, and *Camões e o Sentimento Nacional*, by Dr T. Braga (Oporto, 1891). The latter volume contains useful information on the various editions of Camoens, with an account of the texts and remarks on his plagiarists. Very few poets have been so often translated, and a list and estimate of the English translations of the *Lusiads* from the time of Sir Richard Fanshawe (1655) downwards, will be found in Sir Richard Burton's *Camoens: His Life and His Lusiads*, which, notwithstanding some errors, is a most informing book, and the result of a curious similarity of temperament and experience between master and disciple. Burton translated the *Lusiads* (2 vols., London, 1880) and the *Lyricks* (sonnets, canzons, odes and sextines; 2 vols., London, 1884), and left a version of all the minor works in MS. The accurate and readable version of the epic by Mr J. J. Aubertin, with the Portuguese text opposite, has gone through two editions (2nd ed., 2 vols., London, 1884), and there is a version of seventy of the sonnets, accompanied by the Portuguese text, by the same author (London, 1881). (E. PR.)

CAMORRA, a secret society of Naples associated with robbery, blackmail and murder. The origin of the name is doubtful. Probably both the word and the association were introduced into Naples by Spaniards. There is a Spanish word *camorra* (a quarrel), and similar societies seem to have existed in Spain long before the appearance of the Camorra in Naples. It was in 1820 that the society first became publicly known. It was primarily social, not political, and originated in the Neapolitan prisons then filled with the victims of Bourbon misrule and oppression, its first purpose being the protection of prisoners. In or about 1830 the Camorra was carried into the city by prisoners who had served their terms. The members worked the streets in gangs. They had special methods of communicating with each other. They mewed like cats at the approach of the patrol, and crowed like cocks when a likely victim approached. A long sigh gave warning that the latter was not alone, a sneeze meant he was not "worth powder and shot," and so on. The society rapidly extended its power, and its operations included smuggling and blackmail of all kinds in addition to ordinary road-robberies. Its influence grew to be considerable. Princes were in league with and shared the profits of the smugglers: statesmen and dignitaries of the church, all classes in fact, were involved in the society's misdeeds. From brothels the Camorra drew huge fees, and it maintained illegal lottery offices. The general disorder of Naples was so great and the police so badly organized that merchants were glad to engage the Camorra to superintend the loading and unloading of merchandise. Being non-political, the government did not interfere with the society; indeed its members were taken into the police service and the Camorra sometimes detected crimes which baffled the authorities. After 1848 the society became political. In 1860, when the constitution was granted by Francis II., the *camorristi* then in gaol were liberated in great numbers. The association became all-powerful at elections, and general disorder reigned till 1862. Thereafter severe repressive measures were taken to curtail its power. In September 1877 there was a determined effort to exterminate it: fifty-seven of the most notorious camorristi being simultaneously arrested in the market-place. Though much of its power has gone, the Camorra has remained vigorous. It has grown upwards, and highly-placed and well-known camorristi have entered municipal administrations and political life. In 1900 revelations as to the Camorra's power were made in the course of a libel suit, and these led to the dissolution of the Naples municipality and the appointment of a royal commissioner. A government inquiry also took place. As the result of this investigation the Honest Government League was formed, which succeeded in 1901 in entirely defeating the Camorra candidates at the municipal elections.

The Camorra was divided into classes. There were the "swell mobsmen," the camorristi who dressed faultlessly and mixed with and levied fines on people of highest rank. Most of these were well connected. There were the lower order of blackmailers who preyed on shopkeepers, boatmen, &c.; and there were political and murdering camorristi. The ranks of the society were largely recruited from the prisons. A youth had to serve for one year an apprenticeship so to speak to a fully admitted camorrista when he was sometimes called *picciotto d' honore*, and after giving proof of courage and zeal became a *picciotto di sgarro*, one, that is, of the lowest grade of members. In some localities he was then called *tamurro*. The initiatory ceremony for full membership is now a mock duel in which the arm alone is wounded. In early times initiation was more severe. The camorristi stood round a coin laid on the ground, and at a signal all stooped to thrust at it with their knives while the novice had at the same time to pick the coin up, with the result that his hand was generally pierced through in several places. The noviciate as *picciotto di sgarro* lasted three years, during which the lad had to work for the camorrista who had been assigned to him as master. After initiation there was a ceremony of reception. The camorristi stood round a table on which were a dagger, a loaded pistol, a glass of water or wine supposed to be poisoned and a lancet. The *picciotto* was brought in and one of his veins opened. Dipping his hand in his own blood, he held it out to the camorristi and swore to keep the society's secrets and obey orders. Then he had to stick the dagger into the table, cock the pistol, and hold the glass to his mouth to show his readiness to die for the society. His master now bade him kneel before the dagger, placed his right hand on the lad's head while with the left he fired off the pistol into the air and smashed the poison-glass. He then drew the dagger from the table and presented it to the new comrade and embraced him, as did all the others. The Camorra was divided into centres, each under a chief. There were twelve at Naples. The society seems at one time to have always had a supreme chief. The last known was Aniello Ansiello, who finally disappeared and was never arrested. The chief of every centre was elected by the members of it. All the earnings of the centre were paid to and then distributed by him. The camorristi employ a whole vocabulary of cant terms. Their chief is *masto* or *sì masto*, "sir master." When a member meets him he salutes with the phrase *Masto, volite niente?* ("Master, do you want anything?"). The members are addressed simply as *sì*.

See Monnier, *La Camorra* (Florence, 1863); Umilta, *Camorra et Mafia* (Neuchâtel, 1878); Alongi, *La Camorra* (1890); C. W. Heckethorn, *Secret Societies of All Ages* (London, 1897); Blasio, *Usi e costumi dei Camorriste* (Naples, 1897).

CAMP (from Lat. *campus*, field), a term used more particularly in a military sense, but also generally for a temporarily organized place of food and shelter in open country, as opposed to ordinary housing (see CAMPING-OUT). The shelter of troops in the field has always been of the greatest importance to their well-being, and from the earliest times tents and other temporary shelters have been employed as much as possible when it is not feasible or advisable to quarter the troops in barracks or in houses. The applied sense of the word "camp" as a military post of any kind comes from the practice which prevailed in the Roman army of fortifying every encampment. In modern warfare the word is used in two ways. In the wider sense, "camp" is opposed to "billets," "cantonments" or "quarters," in which the troops are scattered amongst the houses of towns or villages for food and shelter. In a purely military camp the soldiers live and sleep in an area of open ground allotted for their sole use. They are thus kept in a state of concentration and readiness for immediate action, and are under better disciplinary control than when in quarters, but they suffer more from the weather and from the want of comfort and warmth. In the restricted sense "camp" implies tents for all ranks, and is thus opposed to "bivouac," in which the only shelter is that afforded by improvised screens, &c., or at most small *tentes d'abri* carried in sections by the men themselves. The weight of large regulation tents and the consequent increase in the number of horses and vehicles in the transport service are, however, disadvantages so grave that the employment of canvas camps in European warfare is almost a thing of the past. If the military situation permits, all troops are put into quarters, only the outpost troops bivouacking. This course was pursued by the German field armies in 1870–1871, even during the winter campaign.

Circumstances may of course require occasionally a whole army to bivouac, but in theatres of war in which quarters are not to be depended upon, tents must be provided, for no troops can endure many successive nights in bivouac, except in summer, without serious detriment to their efficiency. In a war on the Russo-German frontier, for instance, especially if operations were carried out in the autumn and winter, tents would be absolutely essential at whatever cost of transport. In this connexion it may be said that a good railway system obviates many of the disadvantages attending the use of tents. For training purposes in peace time, *standing camps* are formed. These may be considered simply as temporary barracks. An *entrenched camp* is an area of ground occupied by, or suitable for, the camps of large bodies of troops, and protected by fortifications.

Ancient Camps.—English writers use "camp" as a generic term for any remains of ancient military posts, irrespective of

their special age, size, purpose, &c. Thus they include under it various dissimilar things. We may distinguish (1) Roman "camps" (*castra*) of three kinds, large permanent fortresses, small permanent forts (both usually built of stone) and temporary earthen encampments (see ROMAN ARMY); (2) Pre-Roman; and (3) Post-Roman camps, such as occur on many English hilltops. We know far too little to be able to assign these to their special periods. Often we can say no more than that the "camp" is not Roman. But we know that enclosures fortified with earthen walls were thrown up as early as the Bronze Age and probably earlier still, and that they continued to be built down to Norman times. These consisted of hilltops or cliff-promontories or other suitable positions fortified with one or more lines of earthen ramparts with ditches, often attaining huge size. But the idea of an artificial elevation seems to have come in first with the Normans. Their *mottes* or earthen mounds crowned with wooden palisades or stone towers and surrounded by an enclosure on the flat constituted a new element in fortification and greatly aided the conquest of England. (See CASTLE.)

CAMPAGNA DI ROMA, the low country surrounding the city of Rome, bounded on the N.W. by the hills surrounding the lake of Bracciano, on the N.E. by the Sabine mountains, on the S.E. by the Alban hills, and on the S.W. by the sea. (See LATIUM, and ROME (province).)

CAMPAIGN, a military term for the continuous operations of an army during a war or part of a war. The name refers to the time when armies went into quarters during the winter and literally "took the field" at the opening of summer. The word is also used figuratively, especially in politics, of any continuous operations aimed at a definite object, as the "Plan of Campaign" in Ireland during 1886–1887. The word is derived from the Latin *Campania*, the plain lying south-west of the Tiber, c.f. Italian, *la Campagna di Roma*, from which came two French forms: (1) *Champagne*, the name given to the level province of that name, and hence the English "champaign," a level tract of country free from woods and hills; and (2) *Campagne*, and the English "campaign" with the restricted military meaning.

CAMPAN, JEANNE LOUISE HENRIETTE (1752–1822), French educator, the companion of Marie Antoinette, was born at Paris in 1752. Her father, whose name was Genest, was first clerk in the foreign office, and, although without fortune, placed her in the most cultivated society. At the age of fifteen she could speak English and Italian, and had gained so high a reputation for her accomplishments as to be appointed reader to the three daughters of Louis XV. At court she was a general favourite, and when she bestowed her hand upon M. Campan, son of the secretary of the royal cabinet, the king gave her an annuity of 5000 *livres* as dowry. She was soon afterwards appointed first lady of the bedchamber by Marie Antoinette; and she continued to be her faithful attendant till she was forcibly separated from her at the sacking of the Tuileries on the 20th of June 1792. Madame Campan survived the dangers of the Terror, but after the 9th Thermidor finding herself almost penniless, and being thrown on her own resources by the illness of her husband, she bravely determined to support herself by establishing a school at St Germain. The institution prospered, and was patronized by Hortense de Beauharnais, whose influence led to the appointment of Madame Campan as superintendent of the academy founded by Napoleon at Écouen for the education of the daughters and sisters of members of the Legion of Honour. This post she held till it was abolished at the restoration of the Bourbons, when she retired to Mantes, where she spent the rest of her life amid the kind attentions of affectionate friends, but saddened by the loss of her only son, and by the calumnies circulated on account of her connexion with the Bonapartes. She died in 1822, leaving valuable *Mémoires sur la vie privée de Marie Antoinette, suivis de souvenirs et anecdotes historiques sur les règnes de Louis XIV.-XV.* (Paris, 1823); a treatise *De l'Éducation des Femmes*; and one or two small didactic works, written in a clear and natural style. The most noteworthy thing in her educational system, and that which especially recommended it to Napoleon, was the place given to domestic economy in the education of girls. At Écouen the pupils underwent a complete training in all branches of housework.

See Jules Flammermont, *Les Mémoires de Madame de Campan* (Paris, 1886), and histories of the time.

CAMPANELLA, TOMMASO (1568–1639), Italian Renaissance philosopher, was born at Stilo in Calabria. Before he was thirteen years of age he had mastered nearly all the Latin authors presented to him. In his fifteenth year he entered the order of the Dominicans, attracted partly by reading the lives of Albertus Magnus and Aquinas, partly by his love of learning. He took a course in philosophy in the convent at Morgentia in Abruzzo, and in theology at Cosenza. Discontented with this narrow course of study, he happened to read the *De Rerum Natura* of Bernardino Telesio, and was delighted with its freedom of speech and its appeal to nature rather than to authority. His first work in philosophy (he was already the author of numerous poems) was a defence of Telesio, *Philosophia sensibus demonstrata* (1591). His attacks upon established authority having brought him into disfavour with the clergy, he left Naples, where he had been residing, and proceeded to Rome. For seven years he led an unsettled life, attracting attention everywhere by his talents and the boldness of his teaching. Yet he was strictly orthodox, and was an uncompromising advocate of the pope's temporal power. He returned to Stilo in 1598. In the following year he was committed to prison because he had joined those who desired to free Naples from Spanish tyranny. His friend Naudée, however, declares that the expressions used by Campanella were wrongly interpreted as revolutionary. He remained for twenty-seven years in prison. Yet his spirit was unbroken; he composed sonnets, and prepared a series of works, forming a complete system of philosophy. During the latter years of his confinement he was kept in the castle of Sant' Elmo, and allowed considerable liberty. Though, even then, his guilt seems to have been regarded as doubtful, he was looked upon as dangerous, and it was thought better to restrain him. At last, in 1626, he was nominally set at liberty; for some three years he was detained in the chambers of the Inquisition, but in 1629 he was free. He was well treated at Rome by the pope, but on the outbreak of a new conspiracy headed by his pupil, Tommaso Pignatelli, he was persuaded to go to Paris (1634), where he was received with marked favour by Cardinal Richelieu. The last few years of his life he spent in preparing a complete edition of his works; but only the first volume appears to have been published. He died on the 21st of May 1639.

In philosophy, Campanella was, like Giordano Bruno (*q.v.*), a follower of Nicolas of Cusa and Telesio. He stands, therefore, in the uncertain half-light which preceded the dawn of modern philosophy. The sterility of scholastic Aristotelianism, as he understood it, drove him to the study of man and nature, though he was never entirely free from the medieval spirit. Devoutly accepting the authority of Faith in the region of theology, he considered philosophy as based on perception. The prime fact in philosophy was to him, as to Augustine and Descartes, the certainty of individual consciousness. To this consciousness he assigned a threefold content, power, will and knowledge. It is of the present only, of things not as they are, but merely as they seem. The fact that it contains the idea of God is the one, and a sufficient, proof of the divine existence, since the idea of the Infinite must be derived from the Infinite. God is therefore a unity, possessing, in the perfect degree, those attributes of power, will and knowledge which humanity possesses only in part. Furthermore, since community of action presupposes homogeneity, it follows that the world and all its parts have a spiritual nature. The emotions of love and hate are in everything. The more remote from God, the greater the degree of imperfection (*i.e. Not-being*) in things. Of imperfect things, the highest are angels and human beings, who by virtue of the possession of reason are akin to the Divine and superior to the lower creation. Next comes the mathematical world of space, then the corporeal world, and finally the empirical world with its limitations of space and time. The impulse of self-

preservation in nature is the lowest form of religion; above this comes animal religion; and finally rational religion, the perfection of which consists in perfect knowledge, pure volition and love, and is union with God. Religion is, therefore, not political in origin; it is an inherent part of existence. The church is superior to the state, and, therefore, all temporal government should be in subjection to the pope as the representative of God.

In natural philosophy Campanella, closely following Telesio, advocates the experimental method and lays down heat and cold as the fundamental principles by the strife of which all life is explained. In political philosophy (the *Civitas Solis*) he sketches an ideal communism, obviously derived from the Platonic, based on community of wives and property with state-control of population and universal military training. In every detail of life the citizen is to be under authority, and the authority of the administrators is to be based on the degree of knowledge possessed by each. The state is, therefore, an artificial organism for the promotion of individual and collective good. In contrast to More's *Utopia*, the work is cold and abstract, and lacking in practical detail. On the view taken as to his alleged complicity in the conspiracy of 1599 depends the vexed question as to whether this system was a philosophic dream, or a serious attempt to sketch a constitution for Naples in the event of her becoming a free city. The *De Monarchia Hispanica* contains an able account of contemporary politics especially Spanish.

Thus Campanella, though neither an original nor a systematic thinker, is among the precursors, on the one hand, of modern empirical science, and on the other of Descartes and Spinoza. Yet his fondness for the antithesis of Being and Not-being (*Ens* and *Non-ens*) shows that he had not shaken off the spirit of scholastic thought.

Bibliography.—For his works see Quétif-Echard, appendix to E. S. Cypriano, *Vita Campanellae* (Amsterdam, 1705 and 1722); Al. d'Ancona's edition, with introduction (Turin, 1854). The most important are *De sensu rerum* (1620); *Realis philosophiae epilogisticae partes IV.* (with *Civitas Solis*) (1623); *Atheismus triumphatus* (1631); *Philos. rationalis* (1637); *Philos. universalis seu metaph.* (1637); *De Monarchia Hispanica* (1640). For his life, see Cypriano (above); M. Baldachini, *Vita e filos. di Tommaso Campanella* (Naples, 1840–1853, 1847–1857); Dom. Berti, *Lettere inedite di T. Campanella e catalogo dei suoi scritti* (1878); and *Nuovi documenti di T. C.* (1881); and especially L. Amabile, *Fra T. Campanella* (3 vols., Naples, 1882). For his philosophy H. Ritter, *History of Philos.*; M. Carrière, *Philos. Weltanschauung d. Reformationszeit*, pp. 542-608; C. Dareste, *Th. Morus et Campanella* (Paris, 1843); Chr. Sigwart, *Kleine Schriften*, i. 125 seq.; and histories of philosophy. For his political philosophy, A. Calenda, *Fra Tommaso Campanella e la sua dottrina sociale e politica di fronte al socialismo moderno* (Nocera Inferiore, 1895). His poems, first published by Tobias Adami (1622), were rediscovered and printed again (1834) by J. G. Orelli; the sonnets were rendered into English verse by J. A. Symonds (1878). For a full bibliography see *Dict. de théol. cath.*, col. 1446 (1904).

CAMPANIA, a territorial division of Italy. The modern district (II. below) is of much greater extent than that known by the name in ancient times.

I. *Campani* was the name used by the Romans to denote the inhabitants first of the town of Capua and the district subject to it, and then after its destruction in the Hannibalic war (211 B.C.), to describe the inhabitants of the Campanian plain generally. The name, however, is pre-Roman and appears with Oscan terminations on coins of the early 4th (or late 5th) century B.C. (R. S. Conway, *Italic Dialects*, p. 143), which were certainly struck for or by the Samnite conquerors of Campania, whom the name properly denotes, a branch of the great Sabelline stock (see Sabini); but in what precise spot the coins were minted is uncertain. We know from Strabo (v. 4. 8.) and others that the Samnites deprived the Etruscans of the mastery of Campania in the last quarter of the 5th century; their earliest recorded appearance being at the conquest of their chief town Capua, probably in 438 B.C. (or 445, according to the method adopted in interpreting Diodorus xii. 31; on this see under Cumae), or 424 according to Livy (iv. 37). Cumae was taken by them in 428 or 421, Nola about the same time, and the Samnite language they spoke, henceforward known as Oscan, spread over all Campania except the Greek cities, though small communities of Etruscans remained here and there for at least another century (Conway, *op. cit.* p. 94). The hardy warriors from the mountains took over not merely the wealth of the Etruscans, but many of their customs; the haughtiness and luxury of the men of Capua was proverbial at Rome. This town became the ally of Rome in 338 B.C. (Livy viii. 14) and received the *civitas sine suffragio*, the highest status that could be granted to a community which did not speak Latin. By the end of the 4th century Campania was completely Roman politically. Certain towns with their territories (Neapolis, Nola, Abella, Nuceria) were nominally independent in alliance with Rome. These towns were faithful to Rome throughout the Hannibalic war. But Capua and the towns dependent on it revolted (Livy xxiii.-xxvi.); after its capture in 211 Capua was utterly destroyed, and the jealousy and dread with which Rome had long regarded it were both finally appeased (cf. Cicero, *Leg. Agrar.* ii. 88). We have between thirty and forty Oscan inscriptions (besides some coins) dating, probably, from both the 4th and the 3rd centuries (Conway, *Italic Dialects*, pp. 100-137 and 148), of which most belong to the curious cult described under Jovilae, while two or three are curses written on lead; see Osca Lingua.

See further Conway, *op. cit.* p. 99 ff.; J. Beloch, *Campanien* (2nd ed.), c. "Capua"; Th. Mommsen, *C.I.L.* x. p. 365. (R. S. C.)

The name Campania was first formed by Greek authors, from Campani (see above), and did not come into common use until the middle of the 1st century A.D. Polybius and Diodorus avoid it entirely. Varro and Livy use it sparingly, preferring *Campanus ager*. Polybius (2nd century B.C.) uses the phrase τὰ πεδία τὰ κατὰ Καπύην to express the district bounded on the north by the mountains of the Aurunci, on the east by the Apennines of Samnium, on the south by the spur of these mountains which ends in the peninsula of Sorrento, and on the south and west by the sea, and this is what Campania meant to Pliny and Ptolemy. But the geographers of the time of Augustus (in whose division of Italy Campania, with Latium, formed the first region) carried the north boundary of Campania as far south as Sinuessa, and even the river Volturnus, while farther inland the modern village of San Pietro in Fine preserves the memory of the north-east boundary which ran between Venafrum and Casinum. On the east the valley of the Volturnus and the foot-hills of the Apennines as far as Abellinum formed the boundary; this town is sometimes reckoned as belonging to Campania, sometimes to Samnium. The south boundary remained unchanged. From the time of Diocletian onwards the name Campania was extended much farther north, and included the whole of Latium. This district was governed by a *corrector*, who about A.D. 333 received the title of *consularis*. It is for this reason that the district round Rome still bears the name of Campagna di Roma, being no doubt popularly connected with Ital. *campo*, Lat. *campus*. This district (to take its earlier extent), consisting mainly of a very fertile plain with hills on the north, east and south, and the sea on the south and west, is traversed by two great rivers, the Liris and Volturnus, divided by the Mons Massicus, which comes right down to the sea at Sinuessa. The plain at the mouth of the former is comparatively small, while that traversed by the Volturnus is the main plain of Campania. Both of these rivers rise in the central Apennines, and only smaller streams, such as the Sarnus, Sebethus, Savo, belong entirely to Campania.

The road system of Campania was extremely well developed and touched all the important towns. The main lines are followed (though less completely) by the modern railways. The most important road centre of Campania was Capua, at the east edge of the plain. At Casilinum, 3 m. to the north-west, was the only bridge over the Volturnus until the construction of the Via Domitiana; and here met the Via Appia, passing through Minturnae, Sinuessa and Pons Campanus (where it crossed the Savo) and the Via Latina which ran through Teanum Sidicinum and Cales. At Calatia, 6 m. south-east of Capua, the Via Appia began to turn east and to approach the mountains on its way to Beneventum, while the Via Popillia went straight on to Nola (whence a road ran to Abella and Abellinum) and thence to

Nuceria Alfaterna and the south, terminating at Regium. From Capua itself a road ran north to Vicus Dianae, Caiatia and Telesia, while to the south the so-called Via Campana (there is no ancient warrant for the name) led to Puteoli, with a branch to Cumae, Baiae and Misenum; there was also connexion between Cumae, Puteoli and Neapolis (see below), and another road to Atella and Neapolis. Neapolis could also be reached by a branch from the Via Popillia at Suessula, which passed through Acerrae. From Suessula, too, there was a short cut to the Via Appia before it actually entered the mountains. Domitian further improved the communications of this district with Rome, by the construction of the Via Domitiana, which diverged from the Via Appia at Sinuessa, and followed the low sandy coast; it crossed the river Volturnus at Volturnum, near its mouth, by a bridge, which must have been a considerable undertaking, and then ran, still along the shore, past Liternum to Cumae and thence to Puteoli. Here it fell into the existing roads to Neapolis, the older Via Antiniana over the hills, at the back, and the newer, dating from the time of Agrippa, through the tunnel of Pausilypon and along the coast. The mileage in both cases was reckoned from Puteoli. Beyond Naples a road led along the coast through Herculaneum to Pompeii, where there was a branch for Stabiae and Surrentum, and thence to Nuceria, where it joined the Via Popillia. From Nuceria, which was an important road centre, a direct road ran to Stabiae, while from Salernum, 11 m. farther south-east but outside the limits of Campania proper, a road ran due north to Abellinum and thence to Aeclanum or Beneventum. Teanum was another important centre: it lay at the point where the Via Latina was crossed at right angles by a road leaving the Via Appia at Minturnae, and passing through Suessa Aurunca, while east of Teanum it ran on to Allifae, and there fell into the road from Venafrum to Telesia. Five miles north of Teanum a road branched off to Venafrum from the straight course of the Via Latina, and rejoined it near Ad Flexum (San Pietro in Fine). It is, indeed, probable that the original road made the détour by Venafrum, in order to give a direct communication between Rome and the interior of Samnium (inasmuch as roads ran from Venafrum to Aesernia and to Telesia by way of Allifae), and Th. Mommsen (*Corp. Inscrip. Lat.* x., Berlin, 1883, p. 699) denies the antiquity of the short cut through Rufrae (San Felice a Ruvo), though it is shown in Kiepert's map at the end of the volume, with a milestone numbered 93 upon it. This is no doubt an error both in placing and in numbering, and refers to one numbered 96 found on the road to Venafrum; but it is still difficult to believe that the short cut was not used in ancient times. The 4th and 3rd century coins of Telesia, Allifae and Aesernia are all of the Campanian type.

Of the harbours of Campania, Puteoli was by far the most important from the commercial point of view. Its period of greatest comparative importance was the 2nd–1st century B.C. The harbours constructed by Augustus by connecting the Lacus Avernus and Lacus Lucrinus with the sea, and that at Misenum (the latter the station of one of the chief divisions of the Roman navy, the other fleet being stationed at Ravenna), were mainly naval. Naples also had a considerable trade, but was less important than Puteoli.

The fertility of the Campanian plain was famous in ancient as in modern times;[1] the best portion was the Campi Laborini or Leborini (called Phlegraei by the Greeks and Terra di Lavoro in modern times, though the name has now extended to the whole province of Caserta) between the roads from Capua to Puteoli and Cumae (Pliny, *Hist. Nat.* xviii. 111). The loose black volcanic earth (*terra pulla*) was easier to work than the stiffer Roman soil, and gave three or four crops a year. The spelt, wheat and millet are especially mentioned, as also fruit and vegetables; and the roses supplied the perfume factories of Capua. The wines of the Mons Massicus and of the Ager Falernus (the flat ground to the east and south-east of it) were the most sought after, though other districts also produced good wine; but the olive was better suited to the slopes than to the plain, though that of Venafrum was good.

[1] The name Osci—earlier Opsci, Opusci (Gr. Ὀπικοί)—presumably meant "tillers of the soil."

The Oscan language remained in use in the south of Campania (Pompeii, Nola, Nuceria) at all events until the Social War, but at some date soon after that Latin became general, except in Neapolis, where Greek was the official language during the whole of the imperial period.

See J. Beloch, *Campanien* (2nd ed., Breslau, 1890); Conway, *Italic Dialects*, pp. 51-57; Ch. Hülsen in Pauly-Wissowa, *Realencyklopädie*, iii. (Stuttgart, 1899), 1434.

II. Campania in the modern sense includes a considerably larger area than the ancient name, inasmuch as to the *compartimento* of Campania belong the five provinces of Caserta, Benevento, Naples, Avellino and Salerno.

It is bounded on the north by the provinces of Rome, Aquila (Abruzzi) and Campobasso (Molise), on the north-east by that of Foggia (Apulia), on the east by that of Potenza (Basilicata) and on the south and west by the Tyrrhenian Sea. The area is 6289 sq. m. It thus includes the whole of the ancient Campania, a considerable portion of Samnium (with a part of the main chain of the Apennines) and of Lucania, and some of *Latium adjectum*, consisting thus of a mountainous district, the greater part of which lies on the Mediterranean side of the watershed, with the extraordinarily fertile and populous Campanian plain (Terra di Lavoro, with 473 inhabitants to the square mile) between the mountains and the sea. The principal rivers are the Garigliano or Liri (anc. Liris), which rises in the Abruzzi (105 m. in length); the Volturno (94 m. in length), with its tributary the Calore; the Sarno, which rises near Sarno and waters the fertile plain south-east of Vesuvius; and the Sele, whose main tributary is the Tanagro, which is in turn largely fed by another Calore. The headwaters of the Sele have been tapped for the great aqueduct for the Apulian provinces.

The coast-line begins a little east of Terracina at the lake of Fondi with a low-lying, marshy district (the ancient *Ager Caecubus*), renowned for its wine (see FONDI). The mountains (of the ancient Aurunci) then come down to the sea, and on the east side of the extreme promontory to the south-east is the port of Gaeta, a strongly fortified naval station. The east side of the Gulf of Gaeta is occupied by the marshes at the mouth of the Liri, and the low sandy coast, with its unhealthy lagoons, continues (interrupted only by the Monte Massico, which reaches the sea at Mondragone) past the mouth of the Volturno, as far as the volcanic district (no longer active) with its several extinct craters (now small lakes, the Lacus Avernus, &c.) to the west of Naples, which forms the north-west extremity of the Bay of Naples. Here the scenery completely changes: the Bay of Naples, indeed, is one of the most beautiful in the world. The island of Procida lies 2½ m. south-west of the Capo Miseno, and 3 m. south-west of Procida is that of Ischia. In consequence of the volcanic character of the district there are several important mineral springs which are used medicinally, especially at Pozzuoli, Castellammare di Stabia, and on the island of Ischia.

Pozzuoli (anc. Puteoli), the most important harbour of Italy in the 1st century B.C., is now mainly noticeable for the large armour-plate and gun works of Messrs Armstrong, and for the volcanic earth (*pozzolana*) which forms so important an element in concrete and cement, and is largely quarried near Rome also. Naples, on the other hand, is one of the most important harbours of modern Italy. Beyond it, Torre del Greco and Torre Annunziata at the foot of Vesuvius, are active trading ports for smaller vessels, especially in connexion with macaroni, which is manufactured extensively by all the towns along the bay. Castellammare di Stabia, on the west coast of the gulf, has a large naval shipbuilding yard and an important harbour. Beyond Castellammare the promontory of Sorrento, ending in the Punta della Campanella (from which Capri is 3 m. south-west) forms the south-west extremity of the gulf. The highest point of this mountain ridge, which is connected with the main Apennine chain, is the Monte S. Angelo (4735 ft.). It extends as far east as Salerno, where the coast plain of the Sele begins. As in the low marshy ground at the mouths of the Liri and Volturno, malaria is very prevalent. The south-east extremity of the Gulf of Salerno is formed by another mountain group, culminating

in the Monte Cervati (6229 ft.); and on the east side of this is the Gulf of Policastro, where the province of Salerno, and with it Campania, borders on the province of Potenza.

The population of Campania was 3,080,503 in 1901; that of the province of Caserta was 705,412, with a total of 187 communes, the chief towns being Caserta (32,709), Sta Maria Capua Vetere (21,825), Maddaloni (20,682), Sessa Aurunca (21,844); that of the province of Benevento was 256,504, with 73 communes, the only important town being Benevento itself (24,647); that of the province of Naples 1,151,834, with 69 communes, the most important towns being Naples (563,540), Torre del Greco (33,299), Castellammare di Stabia (32,841), Torre Annunziata (28,143), Pozzuoli (22,907); that of the province of Avellino (Principato Ulteriore in the days of the Neapolitan kingdom) 402,425, with 128 communes, the chief towns being Avellino (23,760) and Ariano di Puglia (17,650); that of the province of Salerno (Principato Citeriore) 564,328, with 158 communes, the chief towns being Salerno (42,727), Cava dei Tirreni (23,681), Nocera Inferiore (19,796). Naples is the chief railway centre: a main line runs from Rome through Roccasecca (whence there is a branch via Sora to Avezzano, on the railway from Rome to Castellammare Adriatico), Caianello (junction for Isernia, on the line between Sulmona and Campobasso or Benevento), Sparanise (branch to Formia and Gaeta) and Caserta to Naples. From Caserta, indeed, there are two independent lines to Naples, while a main line runs to Benevento and Foggia across the Apennines. From Benevento railways run north to Vinchiaturo (for Isernia or Campobasso) and south to Avellino. From Cancello, a station on one of the two lines from Caserta to Naples, branches run to Torre Annunziata, and to Nola, Codola, Mercato, San Severino and Avellino. Naples, besides the two lines to Caserta (and thence either to Rome or Benevento), has local lines to Pozzuoli and Torregaveta (for Ischia) and two lines to Sarno, one via Ottaiano, the other via Pompeii, which together make up the circum-Vesuvian electric line, and were in connexion with the railway to the top of Vesuvius until its destruction in April 1906. The main line for southern Italy passes through Torre Annunziata (branch for Castellammare di Stabia and Gragnano), Nocera (branch for Codola), Salerno (branch for Mercato San Severino), and Battipaglia. Here it divides, one line going east-south-east to Sicignano (branch to Lagonegro), Potenza and Metaponto (for Taranto and Brindisi or the line along the east coast of Calabria to Reggio), the other going south-south-east along the west coast of Calabria to Reggio.

Industrial activity is mainly concentrated in Naples, Pozzuoli and the towns between Naples and Castellammare di Stabia (including the latter) on the north-east shores of the Bay of Naples. The native peasant industries are (besides agriculture, for which see ITALY) the manufacture of pottery and weaving with small hand-looms, both of which are being swept away by the introduction of machinery; but a government school of textiles has been established at Naples for the encouragement of the trade. (T. As.)

CAMPANI-ALIMENIS, MATTEO, Italian mechanician and natural philosopher of the 17th century, was born at Spoleto. He held a curacy at Rome in 1661, but devoted himself principally to scientific pursuits. As an optician he is chiefly celebrated for the manufacture of the large object-glasses with which G. D. Cassini discovered two of Saturn's satellites, and for an attempt to rectify chromatic aberration by using a triple eye-glass; and in clock-making, for his invention of the illuminated dial-plate, and that of noiseless clocks, as well as for an attempt to correct the irregularities of the pendulum which arise from variations of temperature. Campani published in 1678 a work on horology, and on the manufacture of lenses for telescopes. His younger brother Giuseppe was also an ingenious optician (indeed the attempt to correct chromatic aberration has been ascribed to him instead of to Matteo), and is, besides, noteworthy as an astronomer, especially for his discovery, by the aid of a telescope of his own construction, of the spots in Jupiter, the credit of which was, however, also claimed by Eustachio Divini.

CAMPANILE, the bell tower attached to the churches and town-halls in Italy (from *campana*, a bell). Bells are supposed to have been first used for announcing the sacred offices by Pope Sabinian (604), the immediate successor to St Gregory; and their use by the municipalities came with the rights granted by kings and emperors to the citizens to enclose their towns with fortifications, and assemble at the sound of a great bell. It is to the Lombard architects of the north of Italy that we are indebted for the introduction and development of the campanile, which, when used in connexion with a sacred building, is a feature peculiar to Christian architecture—Christians alone making use of the bell to gather the multitude to public worship. The campanile of Italy serves the same purpose as the tower or steeple of the churches in the north and west of Europe, but differs from it in design and position with regard to the body of the church. It is almost always detached from the church, or at most connected with it by an arcaded passage. As a rule also there is never more than one campanile to a church, with a few exceptions, as in S. Ambrogio, Milan; the cathedral of Novara; S. Abbondio, Como; S. Antonio, Padua; and some of the churches in south Italy and Sicily. The design differs entirely from the northern type; it never has buttresses, is very tall and thin in proportion to its height, and as a rule rises abruptly from the ground without base or plinth mouldings undiminished to the summit; it is usually divided by string-courses into storeys of nearly equal height, and in north and central Italy the wall surface is decorated with pilaster strips and arcaded corbel strings. Later, the square tower was crowned with an octagonal turret, sometimes with a conical roof, as in Cremona and Modena cathedrals. As a rule the openings increase in number and dimensions as they rise, those at the top therefore giving a lightness to the structure, while the lower portions, with narrow slits only, impart solidity to the whole composition.

The earliest examples are those of the two churches of S. Apollinare in Classe (see BASILICA, fig. 8) and S. Apollinare Nuovo at Ravenna, dating from the 6th century. They are circular, of considerable height, and probably were erected as watch towers or depositories for the treasures of the church. The next in order are those in Rome, of which there are a very large number in existence, dating from the 8th to the 11th century. These towers are square and in several storeys, the lower part quite plain till well above the church to which they are attached. Above this they are divided into storeys by brick cornices carried on stone corbels, generally taken from ancient buildings, the lower storeys with blind arcades and the upper storeys with open arcades. The earliest on record was one connected with St Peter's, to the atrium of which, in the middle of the 8th century, a bell-tower overlaid with gold was added. One of the finest is that of S. Maria-in-Cosmedin, ascribed to the 8th or 9th century. In the lower part of it are embedded some ancient columns of the Composite Order belonging to the Temple of Ceres. The tower is 120 ft. high, the upper part divided into seven storeys, the four upper ones with open arcades, the bells being hung in the second from the top. The arches of the arcades, two or three in number, are recessed in two orders and rest on long impost blocks (their length equal to the thickness of the wall above), carried by a mid-wall shaft. This type of arcade or window is found in early German work, except that, as a rule, there is a capital under the impost block. Rome is probably the source from which the Saxon windows were derived, the example in Worth church being identically the same as those in the Roman campanili. In the campanile of S. Alessio there are two arcades in each storey, each divided with a mid-wall shaft. Among others, those of SS. Giovanni e Paolo, S. Lorenzo in Lucina, S. Francesca Romana, S. Croce in Gerusalemme, S. Giorgio in Velabro (fig. 1), S. Cecilia, S. Pudenziana, S. Bartolommeo in Isola (982), S. Silvestro in Capite, are characteristic examples. On some of the towers are encrusted plaques of marble or of red or green porphyry, enclosed in a tile or moulded brick border; sometimes these plaques are in majolica with Byzantine patterns.

The early campanili of the north of Italy are of quite another type, the north campanile of S. Ambrogio, Milan (1129), being

decorated with vertical flat pilaster strips, four on each face, and horizontal arcaded corbel strings. Of earlier date (879), the campanile of S. Satiro at Milan is in perfect preservation; it is divided into four storeys by arched corbel tables, the upper storey having a similar arcade with mid-wall shaft to those in Rome. One of the most notable examples in north Italy is the campanile of Pomposa near Ferrara. It is of immense height and has nine storeys crowned with a lofty conical spire, the wall face being divided vertically with pilaster strips and horizontally

From a photograph by Alinari.

FIG. 1.—Campanile of S. Giorgio in Velabro, Rome.

with arcaded corbel tables,—this campanile, the two towers of S. Antonio, Padua, and that of S. Gottardo, Milan, of octagonal plan, being among the few which are thus terminated. In the campanile at Torcello we find an entirely different treatment: doubly recessed pilaster-strips divide each face into two lofty blind arcades rising from the ground to the belfry storey, over 100 ft. high, with small slits for windows, the upper or belfry storey having an arcade of four arches on each front. This is the type generally adopted in the campanili of Venice, where there are no string-courses. The campanile of St Mark's was of similar design, with four lofty blind arcades on each face. The lower portion, built in brick, 162 ft. high, was commenced in 902 but not completed till the middle of the 12th century. In 1510 a belfry storey was added with an open arcade of four arches on each face, and slightly set back from the face of the tower above was a mass of masonry with pyramidal roof, the total height being 320 ft. On the 14th of July 1902 the whole structure collapsed; its age, the great weight of the additions made in 1510, and probably the cutting away inside of the lower part, would seem to have been the principal contributors to this disaster, as the pile foundations were found to be in excellent condition.

In central Italy the two early campanili at Lucca return to the Lombard type of the north, with pilaster strips and arcaded corbel strings, and the same is found in S. Francesco (Assisi), S. Frediano (Lucca), S. Pietro-in-Grado and S. Michele-in-Orticaia (Pisa), and S. Maria-Novella (Florence). The campanile of S. Niccola, Pisa, is octagonal on plan, with a lofty blind arcade on each face like those in Venice, but with a single string-course half-way up. The gallery above is an open eaves gallery like those in north Italy.

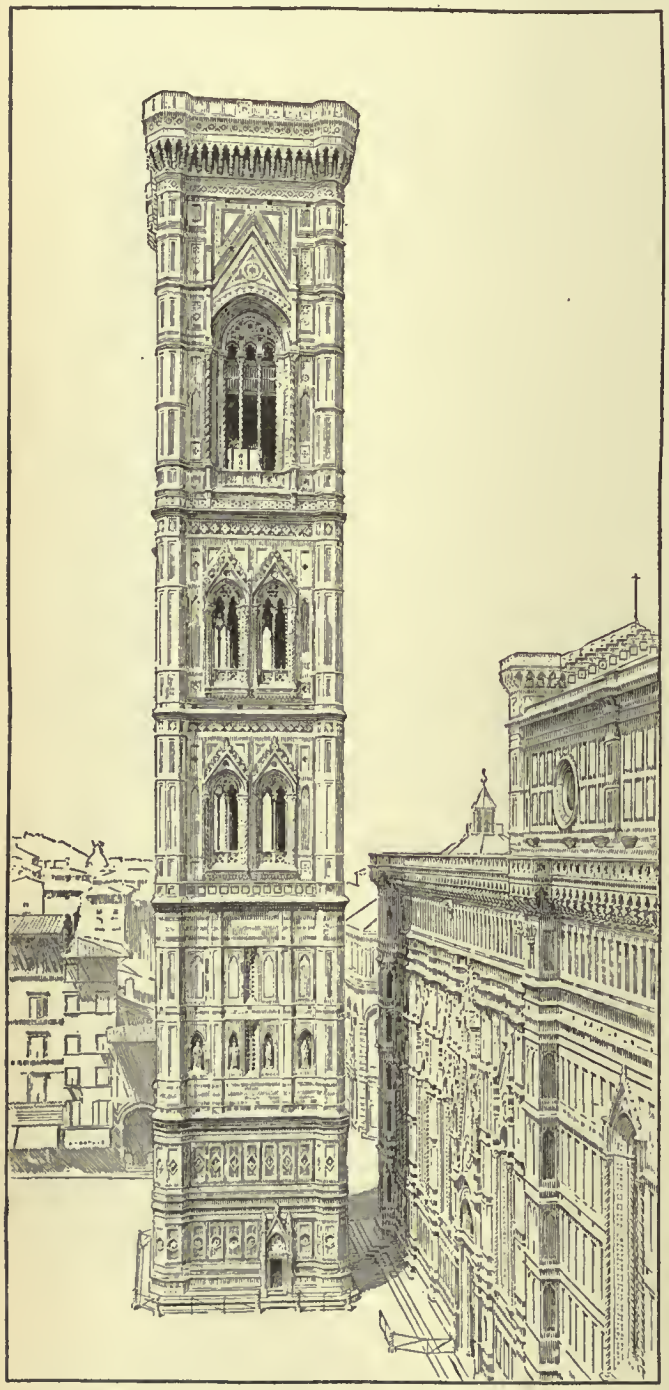
In southern Italy the design of the campanile varies again. In the two more important examples at Bari and Molfetta, there are two towers in each case attached to the east end of the cathedrals. The campanili are in plain masonry, the storeys being suggested only by blind arches or windows, there being neither pilaster strips nor string-courses. The same treatment is found at Barletta and Caserta Vecchia; in the latter the upper storey has been made octagonal with circular turrets at each angle, and this type of design is followed at Amalfi, the centre portion being circular instead of octagonal and raised much higher. In Palermo the campanile of the Martorana, of which the two lower storeys, decorated with three concentric blind pointed arches on each face, probably date from the Saracenic occupation, has angle turrets on the two upper storeys. The upper portions of the campanile of the cathedral have similar angle turrets, which, crowned with conical roofs, group well with the central octagonal spires of the towers. The two towers of the west front of the cathedral at Cefalu resemble those of Bari and Molfetta as regards their treatment.

From a photograph by Brogi.

FIG. 2.—Campanile of St Mark's, Venice.

The campanili of S. Zenone, Verona, and the cathedrals of Siena and Prato, differ from those already mentioned in that they owe their decoration to the alternating courses of black and white marble. Of this type by far the most remarkable so

far as its marble decoration is concerned is Giotto's campanile at Florence, built in 1334. It measures 275 ft. high, 45 ft. square, and is encased in black, white and red marble, with occasional sculptured ornament. The angles are emphasized by octagonal projections, the panelling of which seems to have ruled that of the whole structure. There are five storeys, of which the three upper ones are pierced with windows; twin arcades side by side



From a photograph by Alinari.

FIG. 3.—Giotto's Campanile, Florence.

in the two lower, and a lofty triplet window with tracery in the belfry stage. A richly corbelled cornice crowns the structure, above which a spire was projected by Giotto, but never carried out.

The loftiest campanile in Italy is that of Cremona, 396 ft. high. Though built in the second half of the 13th century, and showing therefore Gothic influence in the pointed windows of the belfry and two storeys below, and the substitution of the pointed for the semicircular arch of the arcaded corbel string-courses, it follows the Lombard type in its general design, and the same is found in the campanile of S. Andrea, Mantua. In the 16th century an octagonal lantern in two strings crowned with a conical roof was added. Owing to defective foundations, some of the Italian campanili incline over considerably; of these leaning towers, those of the Garisendi and Asinelli palaces at Bologna form conspicuous objects in the town; the two more remarkable examples are the campanile of S. Martino at Este, of early Lombard type, and the leaning tower at Pisa, which was built by the citizens in 1174 to rival that of Venice. The Pisa tower is circular on plan, about 51 ft. in diameter and 172 ft. high. Not including the belfry storey, which is set back on the inner wall, it is divided into seven storeys all surrounded with an open gallery or arcade. (See ARCHITECTURE, Plate I. fig. 62.) Owing to the sinking of the piles on the south side, the inclination was already noticed when the tower was about 30 ft. high, and slight additions in the height of the masonry on that side were introduced to correct the level, but without result, so that the works were stopped for many years and taken up again in 1234 under the direction of William of Innsbruck; he also attempted to rectify the levels by increasing the height of the masonry on the south side. At a later period the belfry storey was added. The inclination now approaches 14 ft. out of the perpendicular. The outside is built entirely in white marble and is of admirable workmanship, but it is a question whether the equal subdivision of the several storeys is not rather monotonous. The campanili of the churches of S. Nicolas and S. Michele in Orticaia, both in Pisa, are also inclined to a slight extent.

From a photograph by Alinari.

FIG. 4.—Campanile of the Palazzo del Signore, Verona.

The campanili hitherto described are all attached to churches, but there are others belonging to civic buildings some of which are of great importance. The campanile of the town hall of Siena rises to an enormous height, being 285 ft., and only 22 ft. wide; it is built in brick and crowned with a battlemented

parapet carried on machicolation corbels, 16 ft. high, all in stone, and a belfry storey above set back behind the face of the tower. The campanile of the Palazzo Vecchio at Florence is similarly crowned, but it does not descend to the ground, being balanced in the centre of the main wall of the town hall. A third example is the fine campanile of the Palazzo-del-Signore at Verona, fig. 4, the lower portion built in alternate courses of brick and stone and above entirely in brick, rising to a height of nearly 250 ft., and pierced with putlog holes only. The belfry window on each face is divided into three lights with coupled shafts. An octagonal tower of two storeys rises above the corbelled eaves.

In the campanili of the Renaissance in Italy the same general proportions of the tower are adhered to, and the style lent itself easily to its decoration; in Venice the lofty blind arcades were adhered to, as in the campanile of the church of S. Giorgio dei Greci. In that of S. Giorgio Maggiore, however, Palladio returned to the simple brickwork of Verona, crowned with a belfry storey in stone, with angle pilasters and columns of the Corinthian order in antis, and central turret with spire above. In Genoa there are many examples; the quoins are either decorated with rusticated masonry or attenuated pilasters, with or without horizontal string-courses, always crowned with a belfry storey in stone and classic cornices, which on account of their greater projection present a fine effect. (R. P. S.)

CAMPANULA (Bell-flower), in botany, a genus of plants containing about 230 species, found in the temperate parts of the northern hemisphere, chiefly in the Mediterranean region. The name is taken from the bell-shaped flower. The plants are perennial, rarely annual or biennial, herbs with spikes or racemes of white, blue or lilac flowers. Several are native in Britain; *Campanula rotundifolia* is the harebell (*q.v.*) or Scotch bluebell, a common plant on pastures and heaths,—the delicate slender stem bears one or a few drooping bell-shaped flowers; *C. Rapunculus*, rampion or ramps, is a larger plant with a panicle of broadly campanulate red-purple or blue flowers, and occurs on gravelly roadsides and hedgebanks, but is rare. It is cultivated, but not extensively, for its fleshy roots, which are used, either boiled or raw, as salad. Many of the species are grown in gardens for their elegant flowers; the dwarf forms are excellent for pot culture, rockeries or fronts of borders. *C. Medium*, Canterbury bell, with large blue, purple and white flowers, is a favourite and handsome biennial, of which there are numerous varieties. *C. persicifolia*, a perennial with more open flowers, is also a well-known border plant, with numerous forms, including white and blue-flowered and single and double. *C. glomerata*, which has sessile flowers crowded in heads on the stems and branches, found native in Britain in chalky and dry pastures, is known in numerous varieties as a border plant. *C. pyramidalis*, with numerous flowers forming a tall pyramidal inflorescence, is a handsome species. There are also a number of alpine species suitable for rockeries, such as *C. alpina*, *caucasica*, *caespitosa* and others. The plants are easily cultivated. The perennials are propagated by dividing the roots or by young cuttings in spring, or by seeds.

CAMPBELL, ALEXANDER (1788–1866), American religious leader, was born near Ballymena, Co. Antrim, Ireland, on the 12th of September 1788, and was the son of Thomas Campbell (1763–1854), a schoolmaster and clergyman of the Presbyterian "Seceders." Alexander in 1809, after a year at Glasgow University, joined his father in Washington, Pennsylvania, where the elder Campbell had just formed the Christian Association of Washington, "for the sole purpose of promoting simple evangelical Christianity." With his father's desire for Church unity the son agreed. He began to preach in 1810, refusing any salary; in 1811 he settled in what is now Bethany, West Virginia, and was licensed by the Brush Run Church, as the Christian Association was now called. In 1812, urging baptism by immersion upon his followers by his own example, he took his father's place as leader of the Disciples of Christ (*q.v.*, popularly called Christians, Campbellites and Reformers). He seemed momentarily to approach the doctrinal position of the Baptists, but by his statement, "I will be baptized only into the primitive Christian faith," by his iconoclastic preaching and his editorial conduct of *The Christian Baptist* (1823–1830), and by the tone of his able debates with Paedobaptists, he soon incurred the disfavour of the Redstone Association of Baptist churches in western Pennsylvania, and in 1823 his followers transferred their membership to the Mahoning Association of Baptist churches in eastern Ohio, only to break absolutely with the Baptists in 1830. Campbell, who in 1829 had been elected to the Constitutional Convention of Virginia by his anti-slavery neighbours, now established *The Millennial Harbinger* (1830–1865), in which, on Biblical grounds, he opposed emancipation, but which he used principally to preach the imminent Second Coming, which he actually set for 1866, in which year he died, on the 4th of March, at Bethany, West Virginia, having been for twenty-five years president of Bethany College. He travelled, lectured, and preached throughout the United States and in England and Scotland; debated with many Presbyterian champions, with Bishop Purcell of Cincinnati and with Robert Owen; and edited a revision of the New Testament.

See Thomas W. Grafton's *Alexander Campbell, Leader of the Great Reformation of the Nineteenth Century* (St Louis, 1897).

CAMPBELL, BEATRICE STELLA (Mrs Patrick Campbell) (1865–), English actress, was born in London, her maiden name being Tanner, and in 1884 married Captain Patrick Campbell (d. 1900). After having appeared on the provincial stage she first became prominent at the Adelphi theatre, London, in 1892, and next year created the chief part in Pinero's *Second Mrs Tanqueray* at the St James's, her remarkable impersonation at once putting her in the first rank of English actresses. For some years she displayed her striking dramatic talent in London, playing notably with Mr Forbes Robertson in Davidson's *For the Crown*, and in *Macbeth*; and her *Magda* (Royalty, 1900) could hold its own with either Bernhardt or Duse. In later years she paid successful visits to America, but in England played chiefly on provincial tours.

CAMPBELL, GEORGE (1719–1796), Scottish theologian, was born at Aberdeen on the 25th of December 1719. His father, the Rev. Colin Campbell, one of the ministers of Aberdeen, the son of George Campbell of Westhall, who claimed to belong to the Argyll branch of the family, died in 1728, leaving a widow and six children in somewhat straitened circumstances. George, the youngest son, was destined for the legal profession, and after attending the grammar school of Aberdeen and the arts classes at Marischal College, he was sent to Edinburgh to serve as an apprentice to a writer to the Signet. While at Edinburgh he attended the theological lectures, and when the term of his apprenticeship expired, he was enrolled as a regular student in the Aberdeen divinity hall. After a distinguished career he was, in 1746, licensed to preach by the presbytery of Aberdeen. From 1748 to 1757 he was minister of Banchory Ternan, a parish on the Dee, some 20 m. from Aberdeen. He then transferred to Aberdeen, which was at the time a centre of considerable intellectual activity. Thomas Reid was professor of philosophy at King's College; John Gregory (1724–1773), Reid's predecessor, held the chair of medicine; Alexander Gerard (1728–1795) was professor of divinity at Marischal College; and in 1760 James Beattie (1735–1803) became professor of moral philosophy in the same college. These men, with others of less note, formed themselves in 1758 into a society for the discussions of questions in philosophy. Reid was its first secretary, and Campbell one of its founders. It lasted till about 1773, and during this period numerous papers were read, particularly those by Reid and Campbell, which were afterwards expanded and published.

In 1759 Campbell was made principal of Marischal College. In 1763 he published his celebrated *Dissertation on Miracles*, in which he seeks to show, in opposition to Hume, that miracles are capable of proof by testimony, and that the miracles of Christianity are sufficiently attested. There is no contradiction, he argues, as Hume said there was, between what we know by testimony and the evidence upon which a law of nature is based; they are of a different description indeed, but we can without inconsistency believe that both are true. The *Dissertation* is not

a complete treatise upon miracles, but with all deductions it was and still is a valuable contribution to theological literature. In 1771 Campbell was elected professor of theology at Marischal College, and resigned his city charge, although he still preached as minister of Greyfriars, a duty then attached to the chair. His *Philosophy of Rhetoric*, planned at Banchory Ternan years before, appeared in 1776, and at once took a high place among books on the subject. In 1778 his last and in some respects his greatest work appeared, *A New Translation of the Gospels*. The critical and explanatory notes which accompanied it gave the book a high value.

In 1795 he was compelled by increasing weakness to resign the offices he held in Marischal College, and on his retirement he received a pension of £300 from the king. He died on the 31st of March 1796.

His *Lectures on Ecclesiastical History* were published after his death with a biographical notice by G. S. Keith; there is a uniform edition of his works in 6 vols.

CAMPBELL, JOHN (1708–1775), Scottish author, was born at Edinburgh on the 8th of March 1708. Being designed for the legal profession, he was sent to Windsor, and apprenticed to an attorney; but his tastes soon led him to abandon the study of law and to devote himself entirely to literature. In 1736 he published the *Military History of Prince Eugene and the Duke of Marlborough*, and soon after contributed several important articles to the *Ancient Universal History*. In 1742 and 1744 appeared the *Lives of the British Admirals*, in 4 vols., a popular work which has been continued by other authors. Besides contributing to the *Biographia Britannica* and Dodsley's *Preceptor*, he published a work on *The Present State of Europe*, consisting of a series of papers which had appeared in the *Museum*. He also wrote the histories of the Portuguese, Dutch, Spanish, French, Swedish, Danish and Ostend settlements in the East Indies, and the histories of Spain, Portugal, Algarve, Navarre and France, from the time of Clovis till 1656, for the *Modern Universal History*. At the request of Lord Bute, he published a vindication of the peace of Paris concluded in 1763, embodying in it a descriptive and historical account of the New Sugar Islands in the West Indies. By the king he was appointed agent for the provinces of Georgia in 1755. His last and most elaborate work, *Political Survey of Britain*, 2 vols. 4to, was published in 1744, and greatly increased the author's reputation. Campbell died on the 28th of December 1775. He received the honorary degree of LL.D. from the university of Glasgow in 1745.

CAMPBELL, JOHN CAMPBELL, Baron (1779–1861), lord chancellor of England, the second son of the Rev. George Campbell, D.D., was born on the 17th of September 1779 at Cupar, Fife, where his father was for fifty years parish minister. For a few years Campbell studied at the United College, St Andrews. In 1800 he was entered as a student at Lincoln's Inn, and, after a short connexion with the *Morning Chronicle*, was called to the bar in 1806, and at once began to report cases decided at *nisi prius* (*i.e.* on jury trial). Of these *Reports* he published altogether four volumes, with learned notes; they extend from Michaelmas 1807 to Hilary 1816. Campbell also devoted himself a good deal to criminal business, but in spite of his unceasing industry he failed to attract much attention behind the bar; he had changed his circuit from the home to the Oxford, but briefs came in slowly, and it was not till 1827 that he obtained a silk gown and found himself in that "front rank" who are permitted to have political aspirations. He unsuccessfully contested the borough of Stafford in 1826, but was elected for it in 1830 and again in 1831. In the House he showed an extraordinary, sometimes an excessive zeal for public business, speaking on all subjects with practical sense, but on none with eloquence or spirit. His main object, however, like that of Brougham, was the amelioration of the law, more by the abolition of cumbrous technicalities than by the assertion of new and striking principles.

Thus his name is associated with the Fines and Recoveries Abolition Act 1833; the Inheritance Act 1833; the Dower Act 1833; the Real Property Limitation Act 1833; the Wills Act 1837; one of the Copyhold Tenure Acts 1841; and the Judgments Act 1838. All these measures were important and were carefully drawn; but their merits cannot be explained in a biographical notice. The second was called for by the preference which the common law gave to a distant collateral over the brother of the half-blood of the first purchaser; the fourth conferred an indefeasible title on adverse possession for twenty years (a term shortened by Lord Cairns in 1875 to twelve years); the fifth reduced the number of witnesses required by law to attest wills, and removed the vexatious distinction which existed in this respect between freeholds and copyholds; the last freed an innocent debtor from imprisonment only before final judgment (or on what was termed *mesne* process), but the principle stated by Campbell that only fraudulent debtors should be imprisoned was ultimately given effect to for England and Wales in 1869.[1] In one of his most cherished objects, however, that of Land Registration (*q.v.*), which formed the theme of his maiden speech in parliament, Campbell was doomed to disappointment. His most important appearance as member for Stafford was in defence of Lord John Russell's first Reform Bill (1831). In a temperate and learned speech, based on Fox's declaration against constitution-mongering, he supported both the enfranchising and the disfranchising clauses, and easily disposed of the cries of "corporation robbery," "nabob representation," "opening for young men of talent," &c. The following year (1832) found Campbell solicitor-general, a knight and member for Dudley, which he represented till 1834. In that year he became attorney-general and was returned by Edinburgh, for which he sat till 1841.[2]

His political creed declared upon the hustings there was that of a moderate Whig. He maintained the connexion of church and state, and opposed triennial parliaments and the ballot. In parliament he continued to lend the most effective help to the Liberal party. His speech in 1835 in support of the motion for inquiry into the Irish Church temporalities with a view to their partial appropriation for national purposes (for disestablishment was not then dreamed of as possible) contains much terse argument, and no doubt contributed to the fall of Peel and the formation of the Melbourne cabinet. The next year Campbell had a fierce encounter with Lord Stanley in the debate which followed the motion of T. Spring Rice (afterwards Lord Monteagle) on the repair and maintenance of parochial churches and chapels. The legal point in the dispute (which Campbell afterwards made the subject of a separate pamphlet) was whether the churchwardens of the parish, in the absence of the vestry, had any means of enforcing a rate except the antiquated interdict or ecclesiastical censure. It was not on legal technicalities, however, but on the broad principle of religious equality, that Campbell supported the abolition of church rates, in which he included the Edinburgh annuity-tax.

In the same year he spoke for Lord Melbourne in the action (thought by some to be a political conspiracy[3]) which the Hon. G. C. Norton brought against the Whig premier for criminal conversation with his wife. At this time also he exerted himself for the reform of justice in the ecclesiastical courts, for the uniformity of the law of marriage (which he held should be a purely civil contract) and for giving prisoners charged with felony the benefit of counsel. His defence of *The Times* newspaper, which had accused Sir John Conroy, equerry to the duchess of Kent, of misappropriation of money (1838), is chiefly remarkable for the confession—"I despair of any definition of libel which shall exclude no publications which ought to be suppressed, and include none which ought to be permitted." His own definition of blasphemous libel was enforced in the

[1] Two of his later acts, allowing the defendant in an action for libel to prove *veritas*, and giving a right of action to the representatives of persons killed through negligence, also deserve mention.

[2] Greville in his *Memoirs* says that Campbell got this post on condition that he should not expect the ordinary promotion to the bench, a condition which, it if were so, he immediately violated by claiming the vice-chancellorship on the death of Sir John Leach. Pepys (Lord Cottenham) and Bickersteth (Lord Langdale) were both promoted to the bench in preference to Campbell.

[3] "There can be no doubt that old Wynton was at the bottom of it all, and persuaded Lord Grantley to urge it on for mere political purposes."—Greville, iii. 351.

prosecution which, as attorney-general, he raised against the bookseller H. Hetherington, and which he justified on the singular ground that "the vast bulk of the population believe that morality depends entirely on revelation; and if a doubt could be raised among them that the ten commandments were given by God from Mount Sinai, men would think they were at liberty to steal, and women would consider themselves absolved from the restraints of chastity." But his most distinguished effort at the bar was undoubtedly the speech for the House of Commons in the famous case of *Stockdale* v. *Hansard*, 1837, 7 C. and P. 731. The Commons had ordered to be printed, among other papers, a report of the inspectors of prisons on Newgate, which stated that an obscene book, published by Stockdale, was given to the prisoners to read. Stockdale sued the Commons' publisher, and was met by the plea of parliamentary privilege, to which, however, the judges did not give effect, on the ground that they were entitled to define the privileges of the Commons, and that publication of papers was not essential to the functions of parliament. The matter was settled by an act of 1840.

In 1840 Campbell conducted the prosecution against John Frost, one of the three Chartist leaders who attacked the town of Newport, all of whom were found guilty of high treason. We may also mention, as matter of historical interest, the case before the high steward and the House of Lords which arose out of the duel fought on Wimbledon Common between the earl of Cardigan and Captain Harvey Tuckett. The law of course was clear that the "punctilio which swordsmen falsely do call honour" was no excuse for wilful murder. To the astonishment of everybody, Lord Cardigan escaped from a capital charge of felony because the full name of his antagonist (Harvey Garnett Phipps Tuckett) was not legally proved. It is difficult to suppose that such a blunder was not preconcerted. Campbell himself made the extraordinary declaration that to engage in a duel which could not be declined without infamy (*i.e.* social disgrace) was "an act free from moral turpitude," although the law properly held it to be wilful murder. Next year, as the Melbourne administration was near its close, Plunkett, the venerable chancellor of Ireland, was forced by discreditable pressure to resign, and the Whig attorney-general, who had never practised in equity, became chancellor of Ireland, and was raised to the peerage with the title of Baron Campbell of St Andrews, in the county of Fife. His wife, Mary Elizabeth Campbell, the eldest daughter of the first Baron Abinger by one of the Campbells of Kilmorey, Argyllshire, whom he had married in 1821, had in 1836 been created Baroness Stratheden in recognition of the withdrawal of his claim to the mastership of the rolls. The post of chancellor Campbell held for only sixteen days, and then resigned it to his successor Sir Edward Sugden (Lord St Leonards). The circumstances of his appointment and the erroneous belief that he was receiving a pension of £4000 per annum for his few days' court work brought Campbell much unmerited obloquy.[1] It was during the period 1841–1849, when he had no legal duty, except the self-imposed one of occasionally hearing Scottish appeals in the House of Lords, that the unlucky dream of literary fame troubled Lord Campbell's leisure.[2]

Following in the path struck out by Miss Strickland in her *Lives of the Queens of England*, and by Lord Brougham's *Lives of Eminent Statesmen*, he at last produced, in 1849, *The Lives of the Lord Chancellors and Keepers of the Great Seal of England, from the earliest times till the reign of King George IV.*, 7 vols. 8vo. The conception of this work is magnificent; its execution wretched. Intended to evolve a history of jurisprudence from the truthful portraits of England's greatest lawyers, it merely exhibits the ill-digested results of desultory learning, without a trace of scientific symmetry or literary taste, without a spark of that divine imaginative sympathy which alone can give flesh and spirit to the dead bones of the past, and without which the present becomes an unintelligible maze of mean and selfish ideas. A charming style, a vivid fancy, exhaustive research, were not to be expected from a hard-worked barrister; but he must certainly be held responsible for the frequent plagiarisms, the still more frequent inaccuracies of detail, the colossal vanity which obtrudes on almost every page, the hasty insinuations against the memory of the great departed who were to him as giants, and the petty sneers which he condescends to print against his own contemporaries, with whom he was living from day to day on terms of apparently sincere friendship.

These faults are painfully apparent in the lives of Hardwicke, Eldon, Lyndhurst and Brougham, and they have been pointed out by the biographers of Eldon and by Lord St Leonards.[1] And yet the book is an invaluable repertory of facts, and must endure until it is superseded by something better. It was followed by the *Lives of the Chief Justices of England, from the Norman Conquest till the death of Lord Mansfield*, 8vo, 2 vols., a book of similar construction but inferior merit.

It must not be supposed that during this period the literary lawyer was silent in the House of Lords. He spoke frequently. The 3rd volume of the *Protests of the Lords*, edited by Thorold Rogers (1875), contains no less than ten protests by Campbell, entered in the years 1842–1845. He protests against Peel's Income Tax Bill of 1842; against the Aberdeen Act 1843, as conferring undue power on church courts; against the perpetuation of diocesan courts for probate and administration; against Lord Stanley's absurd bill providing compensation for the destruction of fences to dispossessed Irish tenants; and against the Parliamentary Proceedings Bill, which proposed that all bills, except money bills, having reached a certain stage or having passed one House, should be continued to next session. The last he opposed because the proper remedy lay in resolutions and orders of the House. He protests in favour of Lord Monteagle's motion for inquiry into the sliding scale of corn duties; of Lord Normanby's motion on the queen's speech in 1843, for inquiry into the state of Ireland (then wholly under military occupation); of Lord Radnor's bill to define the constitutional powers of the home secretary, when Sir James Graham opened Mazzini's letters. In 1844 he records a solitary protest against the judgment of the House of Lords in *R.* v. *Millis*, 1844, 10 Cla. and Fin. 534, which affirmed that a man regularly married according to the rites of the Irish Presbyterian Church, and afterwards regularly married to another woman by an episcopally ordained clergyman, could not be convicted of bigamy, because the English law required for the validity of a marriage that it should be performed by an ordained priest.

On the resignation of Lord Denman in 1850, Campbell was appointed chief justice of the queen's bench. For this post he was well fitted by his knowledge of common law, his habitual attention to the pleadings in court and his power of clear statement. On the other hand, at *nisi prius* and on the criminal circuit, he was accused of frequently attempting unduly to influence juries in their estimate of the credibility of evidence. It is also certain that he liked to excite applause in the galleries by some platitude about the "glorious Revolution" or the "Protestant succession." He assisted in the reforms of special pleading at Westminster, and had a recognized place with Brougham and Lyndhurst in legal discussions in the House of Lords. But he had neither the generous temperament nor the breadth of view which is required in the composition of even a mediocre statesman. In 1859 he was made lord chancellor of Great Britain, probably on the understanding that Bethell should succeed as soon as he could be spared from the House of Commons. His short tenure of this office calls for no remark. In the same year he published in the form of a letter to Payne Collier an amusing and extremely inconclusive essay on Shakespeare's legal acquirements. One passage will show the conjectural

[1] See thereon J. B. Atlay, *The Victorian Chancellors* (1908), vol. ii. p. 174.

[2] In 1842 he published the *Speeches of Lord Campbell at the Bar and in the House of Commons, with an Address to the Irish Bar as Lord Chancellor of Ireland* (Edin., Black).

[1] It was of this book that Sir Charles Wetherell said, referring to its author, "and then there is my noble and biographical friend who has added a new terror to death." See *Misrepresentations in Campbell's "Lives of Lyndhurst and Brougham" corrected by St Leonards* (London, 1869).

process which runs through the book: "If Shakespeare was really articled to a Stratford attorney, in all probability, during the five years of his clerkship, he visited London several times on his master's business, and he may then have been introduced to the green-room at Blackfriars by one of his countrymen connected with that theatre." The only positive piece of evidence produced is the passage from Thomas Nash's "Epistle to the Gentlemen of the Two Universities," prefixed to Greene's *Arcadia*, 1859, in which he upbraids somebody (not known to be Shakespeare) with having left the "trade of Noverint" and busied himself with "whole Hamlets" and "handfuls of tragical speeches." The knowledge of law shown in the plays is very much what a universal observer must have picked up. Lawyers always underestimate the legal knowledge of an intelligent layman. Campbell died on the 23rd of June 1861. It has been well said of him in explanation of his success, that he lived eighty years and preserved his digestion unimpaired. He had a hard head, a splendid constitution, tireless industry, a generally judicious temper. He was a learned, though not a scientific lawyer, a faithful political adherent, thoroughly honest as a judge, dutiful and happy as a husband. But there was nothing admirable or heroic in his nature. On no great subject did his principles rise above the commonplace of party, nor had he the magnanimity which excuses rather than aggravates the faults of others. His life was the triumph of steady determination unaided by a single brilliant or attractive quality.

AUTHORITIES.—*Life of Lord Campbell, a Selection from his Autobiography, Diary and Letters*, ed. by Hon. Mrs Hardcastle (1881); E. Foss, *The Judges of England* (1848–1864); W. H. Bennet, *Select Biographical Sketches from Note-books of a Law Reporter* (1867); E. Manson, *Builders of our Law* (ed. 1904); J. B. Atlay, *The Victorian Chancellors*, vol. ii. (1908).

CAMPBELL, JOHN FRANCIS, of Islay (1822–1885), Gaelic scholar, was born on the 29th of December 1822, heir to the beautiful Isle of Islay, on the west coast of Argyllshire. Of this inheritance he never became possessed, as the estate had to be sold by his father, and he began life under greatly changed conditions. Educated at Eton and at Edinburgh University, he occupied at various times several minor government posts. His leisure was largely employed in collecting, translating and editing the folklore of the western Highlands, taken down from the lips of the natives. The results of his investigations were published in four volumes under the title *Popular Tales of the West Highlands* (1860–1862), and form a most important contribution to the subject, the necessary precursor to the subsequent Gaelic revival in Great Britain. Campbell was also devoted to geology and other scientific pursuits, and he invented the sunshine recorder, used in most of the British meteorological stations. He died at Cannes on the 17th of February 1885.

CAMPBELL, JOHN McLEOD (1800–1872), Scottish divine, son of the Rev. Donald Campbell, was born at Kilninver, Argyllshire, in 1800. Thanks to his father he was already a good Latin scholar when he went to Glasgow University in 1811. Finishing his course in 1817, he became a student at the Divinity Hall, where he gained some reputation as a Hebraist. After further training at Edinburgh he was licensed as preacher by the presbytery of Lorne in 1821. In 1825 he was appointed to the parish of Row on the Gareloch. About this time the doctrine of Assurance of Faith powerfully influenced him. He began to give so much prominence to the universality of the Atonement that his parishioners went so far as to petition the presbytery in 1829. This petition was withdrawn, but a subsequent appeal in March 1830 led to a presbyterial visitation followed by an accusation of heresy. The General Assembly by which the charge was ultimately considered found Campbell guilty of teaching heretical doctrines and deprived him of his living. Declining an invitation to join Edward Irving in the Catholic Apostolic Church, he worked for two years as an evangelist in the Highlands. Returning to Glasgow in 1843, he was minister for sixteen years in a large chapel erected for him, but he never attempted to found a sect. In 1856 he published his famous book on *The Nature of the Atonement*, which has profoundly influenced all writing on the subject since his time. His aim is to view the Atonement in the light of the Incarnation. The divine mind in Christ is the mind of perfect sonship towards God and perfect brotherhood towards men. By the light of this divine fact the Incarnation is seen to develop itself naturally and necessarily as an atonement; the penal element in the sufferings of Christ is minimized. Subsequent critics have pointed out that Campbell's position was not self-consistent in the place assigned to the penal and expiatory element in the sufferings of Christ, nor adequate in its recognition of the principle that the obedience of Christ perfectly affirms all righteousness and so satisfies the holiness of God. In 1859 his health gave way, and he advised his congregation to join the Barony church, where Norman McLeod was pastor. In 1862 he published *Thoughts on Revelation*. In 1868 he received the degree of D.D. from Glasgow University. In 1870 he removed to Roseneath, and there began his *Reminiscences and Reflections*, an unfinished work published after his death by his son. Campbell was greatly loved and esteemed by a circle of friends, which included Thomas Erskine, Norman McLeod, Bishop Alexander Ewing, F. D. Maurice, D. J. Vaughan, and he lived to be recognized and honoured as a man whose opinion on theological subjects carried great weight. In 1871 a testimonial and address were presented to him by representatives of most of the religious bodies in Scotland. He died on the 27th of February 1872, and was buried in Roseneath churchyard. (D. MN.)

CAMPBELL, LEWIS (1830–1908), British classical scholar, was born at Edinburgh on the 3rd of September 1830. His father, Robert Campbell, R.N., was a first cousin of Thomas Campbell, the poet. He was educated at Edinburgh Academy, and Glasgow and Oxford universities. He was fellow and tutor of Queen's College, Oxford (1855–1858), vicar of Milford, Hants (1858–1863), and professor of Greek and Gifford lecturer at the university of St Andrews (1863–1894). In 1894 he was elected an honorary fellow of Balliol. As a scholar he is best known by his work on Sophocles and Plato. His published works include: Sophocles (2nd ed., 1879); Plato, *Sophistes* and *Politicus* (1867), *Theaetetus* (2nd ed., 1883), *Republic* (with Jowett, 1894); *Life and Letters of Benjamin Jowett* (with E. Abbott, 1897), *Letters of B. Jowett* (1899); *Life of James Clerk Maxwell* (with W. Garnett, new ed., 1884); *A Guide to Greek Tragedy for English Readers* (1891); *Religion in Greek Literature* (1898); *On the Nationalisation of the Old English Universities* (1901); Verse translations of the plays of Aeschylus (1890); Sophocles (1896); *Tragic Drama in Aeschylus, Sophocles and Shakespeare* (1904); *Paralipomena Sophoclea* (1907). He died on the 25th of October 1908.

CAMPBELL, REGINALD JOHN (1867–), British Congregationalist divine, son of a United Free Methodist minister of Scottish descent, was born in London, and educated at schools in Bolton and Nottingham, where his father successively removed, and in Belfast, the home of his grandfather. At an early age he taught in the high school at Ashton, Cheshire, and was already married when in 1891 he went to Christchurch, Oxford, where he graduated in 1895 in the honours school of modern history. He had gone to Oxford with the intention of becoming a clergyman in the Church of England, but in spite of the influence of Bishop Gore, then head of the Pusey House, and of Dean Paget (afterwards bishop of Oxford), his Scottish and Irish Nonconformist blood was too strong, and he abandoned the idea in order to take up work in the Congregational ministry. He accepted a call, on leaving Oxford, to the small Congregational church in Union Street, Brighton, and quickly became famous there as a preacher, so much so that on Joseph Parker's death he was chosen as his successor (1903) at the City Temple, London. Here he notably enhanced his popularity as a preacher, and became one of the recognized leaders of Nonconformist opinion. At the end of 1906 he attracted widespread attention by his vigorous propagation of what was called the "New Theology," a restatement of Christian beliefs to harmonize with modern critical views and beliefs, and published a book with this title which gave rise to considerable discussion.

CAMPBELL, THOMAS (1777–1844), Scottish poet, eighth son of Alexander Campbell, was born at Glasgow on the 27th of

July 1777. His father, who was a cadet of the family of Campbell of Kirnan, Argyllshire, belonged to a Glasgow firm trading in Virginia, and lost his money in consequence of the American war. Campbell was educated at the grammar school and university of his native town. He won prizes for classics and for verse-writing, and the vacations he spent as a tutor in the western Highlands. His poem "Glenara" and the ballad of "Lord Ullin's Daughter" owe their origin to a visit to Mull. In May 1797 he went to Edinburgh to attend lectures on law. He supported himself by private teaching and by writing, towards which he was helped by Dr Robert Anderson, the editor of the *British Poets*. Among his contemporaries in Edinburgh were Sir Walter Scott, Henry Brougham, Francis Jeffrey, Dr Thomas Brown, John Leyden and James Grahame. To these early days in Edinburgh may be referred "The Wounded Hussar," "The Dirge of Wallace" and the "Epistle to Three Ladies." In 1799, six months after the publication of the *Lyrical Ballads* of Wordsworth and Coleridge, *The Pleasures of Hope* was published. It is a rhetorical and didactic poem in the taste of his time, and owed much to the fact that it dealt with topics near to men's hearts, with the French Revolution, the partition of Poland and with negro slavery. Its success was instantaneous, but Campbell was deficient in energy and perseverance and did not follow it up. He went abroad in June 1800 without any very definite aim, visited Klopstock at Hamburg, and made his way to Regensburg, which was taken by the French three days after his arrival. He found refuge in a Scottish monastery. Some of his best lyrics, "Hohenlinden," "Ye Mariners of England" and "The Soldier's Dream," belong to his German tour. He spent the winter in Altona, where he met an Irish exile, Anthony McCann, whose history suggested "The Exile of Erin."[1] He had at that time the intention of writing an epic on Edinburgh to be entitled "The Queen of the North." On the outbreak of war between Denmark and England he hurried home, the "Battle of the Baltic" being drafted soon after. At Edinburgh he was introduced to the first Lord Minto, who took him in the next year to London as occasional secretary. In June 1803 appeared a new edition of the *Pleasures of Hope*, to which some lyrics were added.

In 1803 Campbell married his second cousin, Matilda Sinclair, and settled in London. He was well received in Whig society, especially at Holland House. His prospects, however, were slight when in 1805 he received a government pension of £200. In that year the Campbells removed to Sydenham. Campbell was at this time regularly employed on the *Star* newspaper, for which he translated the foreign news. In 1809 he published a narrative poem in the Spenserian stanza, "Gertrude of Wyoming," with which were printed some of his best lyrics. He was slow and fastidious in composition, and the poem suffered from over-elaboration. Francis Jeffrey wrote to the author: "Your timidity or fastidiousness, or some other knavish quality, will not let you give your conceptions glowing, and bold, and powerful, as they present themselves; but you must chasten, and refine, and soften them, forsooth, till half their nature and grandeur is chiselled away from them. Believe me, the world will never know how truly you are a great and original poet till you venture to cast before it some of the rough pearls of your fancy." In 1812 he delivered a series of lectures on poetry in London at the Royal Institution; and he was urged by Sir Walter Scott to become a candidate for the chair of literature at Edinburgh University. In 1814 he went to Paris, making there the acquaintance of the elder Schlegel, of Baron Cuvier and others. His pecuniary anxieties were relieved in 1815 by a legacy of £4000. He continued to occupy himself with his *Specimens of the British Poets*, the design of which had been projected years before. The work was published in 1819. It contains on the whole an admirable selection with short lives of the poets, and prefixed to it an essay on poetry containing much valuable criticism. In 1820 he accepted the editorship of the *New Monthly Magazine*, and in the same year made another tour in Germany. Four years later appeared his "Theodric," a not very successful poem of domestic life. He took an active share in the foundation of the university of London, visiting Berlin to inquire into the German system of education, and making recommendations which were adopted by Lord Brougham. He was elected lord rector of Glasgow University three times (1826–1829). In the last election he had Sir Walter Scott for a rival. Campbell retired from the editorship of the *New Monthly Magazine* in 1830, and a year later made an unsuccessful venture with the *Metropolitan Magazine*. He had championed the cause of the Poles in *The Pleasures of Hope*, and the news of the capture of Warsaw by the Russians in 1831 affected him as if it had been the deepest of personal calamities. "Poland preys on my heart night and day," he wrote in one of his letters, and his sympathy found a practical expression in the foundation in London of the Association of the Friends of Poland. In 1834 he travelled to Paris and Algiers, where he wrote his *Letters from the South* (printed 1837).

The small production of Campbell may be partly explained by his domestic calamities. His wife died in 1828. Of his two sons, one died in infancy and the other became insane. His own health suffered, and he gradually withdrew from public life. He died at Boulogne on the 15th of June 1844, and was buried in Westminster Abbey.

Campbell's other works include a *Life of Mrs Siddons* (1842), and a narrative poem, "The Pilgrim of Glencoe" (1842). See *The Life and Letters of Thomas Campbell* (3 vols., 1849), edited by William Beattie, M.D.; *Literary Reminiscences and Memoirs of Thomas Campbell* (1860), by Cyrus Redding; *The Poetical Works of Thomas Campbell* (1875), in the Aldine Edition of the British Poets, edited by the Rev. W. Alfred Hill, with a sketch of the poet's life by William Allingham; and the "Oxford Edition" of the *Complete Works of Thomas Campbell* (1908), edited by J. Logie Robertson. See also *Thomas Campbell* in the Famous Scots Series, by J. C. Hadden, and a selection by Lewis Campbell (1904) for the Golden Treasury Series.

CAMPBELL-BANNERMAN, SIR HENRY (1836–1908), English prime minister, was born on the 7th of September 1836, being the second son of Sir James Campbell, Bart., of Stracathro, Forfarshire, lord provost of Glasgow. His elder brother James, who just outlived him, was Conservative M.P. for Glasgow and Aberdeen Universities from 1880 to 1906. Both his father and his uncle William Campbell, who had together founded an important drapery business in Glasgow, left him considerable fortunes; and he assumed the name of Bannerman in 1872, in compliance with the provisions of the will of his maternal uncle, Henry Bannerman, from whom he inherited a large property in Kent. He was educated at Glasgow University and at Trinity College, Cambridge (senior optime, and classical honours); was returned to parliament for Stirling as a Liberal in 1868 (after an unsuccessful attempt at a by-election); and became financial secretary at the war office (1871–1874; 1880–1882), secretary to the admiralty (1882–1884), and chief secretary for Ireland (1884–1885). When Mr Gladstone suddenly adopted the cause of Home Rule for Ireland, he "found salvation," to use his own phrase, and followed his leader. In Mr Gladstone's 1886 ministry he was secretary for war, and filled the same office in the Liberal ministry of 1892–1895. In the latter year he was knighted (G.C.B.). It fell to his lot as war minister to obtain the duke of Cambridge's resignation of the office of commander-in-chief; but his intended appointment of a chief of the staff in substitution for that office was frustrated by the resignation of the ministry. It was an imputed omission on the part of the war office, and therefore of the war minister, to provide a sufficient supply of small-arms ammunition for the army which on the 21st of June 1895 led to the defeat of the Rosebery government. Wealthy, popular and possessed of a vein of oratorical humour (Mr T. Healy had said that he tried to govern Ireland with Scottish jokes), Sir Henry had already earned the general respect of all parties, and in April 1895, when Mr Speaker Peel retired, his claims for the vacant post were prominently canvassed; but his colleagues were averse from his retirement from active politics and Mr Gully was selected. Though a prominent member of the inner Liberal circle and a stanch party man, it was not supposed by the public at this time that any ambition

[1] The original authorship of this poem was by many people assigned to G. Nugent Reynolds. Campbell's claim is established in *Literary Remains of the United Irishmen*, by R. R. Madden (1887).

for the highest place could be associated with Sir Henry Campbell-Bannerman; but the divisions among the Liberals, and the rivalry between Lord Rosebery and Sir William Harcourt, made the political situation an anomalous one. The very fact that he was apparently unambitious of personal supremacy combined with his honourable record and experience to make him a safe man; and in December 1898, on Sir W. Harcourt's formal resignation of the leadership of the Opposition, he was elected to fill the position in the House of Commons with the general assent of the party. In view of its parliamentary impotence, and its legacy of an unpopular Home Rule programme, Sir Henry had a difficult task to perform, but he prudently interpreted his duty as chiefly consisting in the effort to keep the Radical party together in the midst of its pronounced differences. In this he was successful, although the advent of the Boer War of 1899–1902 created new difficulties with the Liberal Imperialists. The leader of the Opposition from the first denounced the diplomatic steps taken by Lord Milner and Mr Chamberlain, and objected to all armed intervention or even preparation for hostilities. Sir Henry's own tendency to favour the anti-war section, his refusal to support the government in any way, and his allusion to "methods of barbarism" in connexion with the conduct of the British army (June 14, 1901), accentuated the crisis within the party; and in 1901 the Liberal Imperialists, who looked to Lord Rosebery (*q.v.*) and Mr Asquith (*q.v.*) for their political inspiration, showed pronounced signs of restiveness. But a party meeting was called on the 9th of July, and Sir Henry was unanimously confirmed in the leadership.

The end of the war in 1902 showed the value of his persistency throughout the years of Liberal unpopularity and disunion. The political conflict once more resumed its normal condition, for the first time since 1892. The blunders of the government were open to a united attack, and Mr Chamberlain's tariff-reform movement in 1903 provided a new rallying point in defence of the existing fiscal system. In the Liberal campaign on behalf of free trade the real leader, however, was Mr Asquith. Sir Henry's own principal contribution to the discussion was rather unfortunate, for while insisting on the blessings derived by England from its free-trade policy, he coupled this with the rhetorical admission (at Bolton in 1903) that "12,000,000 British citizens were underfed and on the verge of hunger." But Lord Salisbury's retirement, Unionist divisions, the staleness of the ministry, and the accumulating opposition in the country to the Education Act of 1902 and to the continued weight of taxation, together with the growth of the Labour movement, and the antagonism to the introduction of Chinese coolies (1904) into South Africa under conditions represented by Radical spokesmen as those of "slavery," made the political pendulum swing back. A Liberal majority at the dissolution was promised by all the signs at by-elections. The government held on, but collapse was only a question of time (see the articles on BALFOUR, A. J., and CHAMBERLAIN, J.). On the 4th of December 1905 the Unionist government resigned, and the king sent for Sir Henry Campbell-Bannerman, who in a few days formed his cabinet. Lord Rosebery, who until a short time before had seemed likely to co-operate, alone held aloof. In a speech at Stirling on the 23rd of November, Sir Henry appeared to him to have deliberately flouted his well-known susceptibilities by once more writing Home Rule in large letters on the party programme, and he declared at Bodmin that he would "never serve under that banner." Sir Henry's actual words, which undoubtedly influenced the Irish vote, were that he "desired to see the effective management of Irish affairs in the hands of a representative Irish assembly. If an instalment of representative control was offered to Ireland, or any administrative improvement, he would advise the Nationalists to accept it, provided it was consistent and led up to their larger policy." But if Lord Rosebery once more separated himself from the official Liberals, his principal henchmen in the Liberal League were included in the cabinet, Mr Asquith becoming chancellor of the exchequer, Sir Edward Grey foreign secretary, and Mr Haldane war minister. Other sections of the party were strongly represented by Mr John Morley as secretary for India, Mr Bryce (afterwards ambassador at Washington) as chief secretary for Ireland, Sir R. T. Reid (Lord Loreburn) as lord chancellor, Mr Augustine Birrell as education minister (afterwards Irish secretary), Mr Lloyd-George as president of the Board of Trade, Mr Herbert Gladstone as home secretary, and Mr John Burns—a notable rise for a Labour leader—as president of the Local Government Board. Lord Ripon became leader in the House of Lords; and Lord Elgin (colonial secretary), Lord Carrington (agriculture), Lord Aberdeen (lord lieutenant of Ireland), Sir Henry Fowler (chancellor of the duchy of Lancaster), Mr Sidney Buxton (postmaster-general), Mr L. V. Harcourt (first commissioner of works), and Captain John Sinclair (secretary for Scotland) completed the ministry, a place of prominence outside the cabinet being found for Mr Winston Churchill as under-secretary for the colonies. In 1907 Mr R. McKenna was brought into the cabinet as education minister. There had been some question as to whether Sir Henry Campbell-Bannerman should go to the House of Lords, but there was a decided unwillingness in the party, and he determined to keep his seat in the Commons.

At the general election in January 1906 an overwhelming Liberal majority was returned, irrespective of the Labour and Nationalist vote, and Sir Henry himself was again elected for Stirling. The Liberals numbered 379, the Labour members 51, the Nationalists 83, and the Unionists only 157. His premiership was the reward of undoubted services rendered to his party; it may be said, however, that, in contradistinction to the prime ministers for some time previous, he represented the party, rather than that the party represented him. It was not his ideas or his commanding personality, nor any positive programme, that brought the Liberals back to power, but the country's weariness of their predecessors and the successful employment at the elections of a number of miscellaneous issues. But as the man who had doggedly, yet unpretentiously, filled the gap in the days of difficulty, and been somewhat contemptuously criticized by the Unionist press for his pains, Sir Henry was clearly marked out for the post of prime minister when his party got its chance; and, as the head of a strongly composed cabinet, he satisfied the demands of the situation and was accepted as leader by all sections. Once prime minister, his personal popularity proved to be a powerful unifying influence in a somewhat heterogeneous party; and though the illness and death (August 30, 1906) of his wife (daughter of General Sir Charles Bruce), whom he had married in 1860, made his constant attendance in the House of Commons impossible, his domestic sorrow excited widespread sympathy and appealed afresh to the affection of his political followers. This became all the more apparent as his own health failed during 1907; for, though he was obliged to leave much of the leadership in the Commons to Mr Asquith, his possible resignation of the premiership was strongly deprecated; and even after November, when it became clear that his health was not equal to active work, four or five months elapsed before the necessary change became a *fait accompli*. Personal affection and political devotion had in these two years made him appear indispensable to the party, although nobody ever regarded him as in the front line of English statesmen so far as originality of ideas or brilliance of debating power were concerned. It is not the fortune of many more brilliant statesmen to earn this testimonial to character. From the beginning of the session of 1908 it was evident, however, that Mr Asquith, who was acting as deputy prime minister, would before long succeed to the Liberal leadership; and on the 5th of April Sir Henry Campbell-Bannerman's resignation was formally announced. He died on the 22nd of the same month. He had spoken in the House of Commons on the 13th of February, but since then had been prostrated and unable to transact business, his illness dating really from a serious heart attack in the night of the 13th of November at Bristol, after a speech at the Colston banquet.

From a party-political point of view the period of Sir Henry Campbell-Bannerman's premiership was chiefly marked by the continued controversies remaining from the general election of 1906,—tariff reform and free trade, the South African question

and the allied Liberal policy for abolishing Chinese labour, the administration of Ireland, and the amendment of the Education Act of 1902 so as to remove its supposed denominational character. In his speech at the Albert Hall on the 21st of December 1905 it was noticeable that, before the elections, the prime minister laid stress on only one subject which could be regarded as part of a constructive programme—the necessity of doing something for canals, which was soon shelved to a royal commission. But in spite of the fiasco of the Irish Councils Bill (1907), the struggles over education (Mr Birrell's bill of 1906 being dropped on account of the Lords' amendments), the rejection by the peers of the Plural Voting Abolition Bill (1906), and the failure (again due to the Lords) of the Scottish Small Holdings Bill and Valuation Bill (1907), which at the time made his premiership appear to be a period of bitter and unproductive debate, a good many reforming measures of some moment were carried. A new Small Holdings Act (1907) for England was passed; the Trades Disputes Act (1906) removed the position of trades unions from the controversy excited over the Taff Vale decision; Mr Lloyd-George's Patents Act (1907) and Merchant Shipping Act (1906) were welcomed by the tariff reformers as embodying their own policy; a long-standing debate was closed by the passing of the Deceased Wife's Sister Act (1907); and acts for establishing a public trustee, a court of criminal appeal, a system of probation for juvenile offenders, and a census of production, were passed in 1907. Meanwhile, though the Colonial Conference (re-named Imperial) of 1907 showed that there was a wide difference of opinion on the tariff question between the free-trade government and the colonial premiers, in one part of the empire the ministry took a decided step—in the establishment of a self-governing constitution for the Transvaal and Orange River colonies—which, for good or ill, would make the period memorable. Mr Haldane's new army scheme was no less epoch-making in Great Britain. In foreign affairs, the conclusion of a treaty with Russia for delimiting the British and Russian spheres of influence in the Middle East laid the foundations of entirely new relations between the British and Russian governments. On the other hand, so far as concerned the ultimate fortunes of the Liberal party, Sir Henry Campbell-Bannerman's premiership can only be regarded as a period of marking time. He had become its leader as a conciliator of the various sections, and it was as a conciliator, ready to sympathize with the strong views of all sections of his following, that he kept the party together, while his colleagues went their own ways in their own departments. His own special "leads" were few, owing to the personal reasons given above; his declaration at the Queen's Hall, London, early in 1907, in favour of drastic land reform, served only to encourage a number of extremists; and the Liberal enthusiasm against the House of Lords, violently excited in 1906 by the fate of the Education Bill and Plural Voting Bill, was rather damped than otherwise, when his method of procedure by resolution of the House of Commons was disclosed in 1907. The House passed by an enormous majority a resolution (introduced on June 25) "that in order to give effect to the will of the people, as expressed by their representatives, it is necessary that the power of the other House to alter or reject bills passed by this House should be so restricted by law as to secure that within the limits of a single parliament the final decision of the Commons shall prevail"; but the prime minister's explanation that statutory provision should be made for two or three successive private conferences between the two Houses as to any bill in dispute at intervals of about six months, and that, only after that, the bill in question should be finally sent up by the Commons with the intimation that unless passed in that form it would become law over their heads, was obviously not what was wanted by enthusiastic opponents of the second chamber. The problem still remained, how to get the House of Lords to pass a "law" to restrict their own powers. After the passing of this resolution the cry against the House of Lords rapidly weakened, since it became clear at the by-elections (culminating at Peckham in March 1908) that the "will of the people" was by no means unanimously on the side of the bills which had failed to pass.

The result of the two years was undoubtedly to revive the confidence of the Opposition, who found that they had outlived the criticisms of the general election, and both on the question of tariff reform and on matters of general politics were again holding their own. The failure of the government in Ireland (where the only success was Mr Birrell's introduction of the Universities Bill in April 1908), their internal divisions as regards socialistic legislation, their variance from the views of the self-governing colonies on Imperial administration, the admission after the general election that the alleged "slavery" of the Chinese in the Transvaal was, in Mr Winston Churchill's phrase, a "terminological inexactitude," and the introduction of extreme measures such as the Licensing Bill of 1908, offered excellent opportunities of electioneering attack. Moreover, the Liberal promises of economy had been largely falsified, the reductions in the navy estimates being dangerous in themselves, while the income tax still remained at practically the war level. For much of all this the prime minister's colleagues were primarily responsible; but he himself had given a lead to the anti-militarist section by prominently advocating international disarmament, and the marked rebuff to the British proposals at the Hague conference of 1907 exposed alike the futility of this Radical ideal and the general inadequacy of the prime minister's policy of pacificism. Sir Henry's rather petulant intolerance of Unionist opposition, shown at the opening of the 1906 session in his dismissal of a speech by Mr Balfour with the words "Enough of this foolery!" gradually gave way before the signs of Unionist reintegration. His resignation took place at a moment when the Liberal, Irish and Labour parties were growing restive under their obligations, government policy stood in need of concentration against an Opposition no longer divided and making marked headway in the country, and the ministry had to be reconstituted under a successor, Mr Asquith, towards whom, so far, there was no such feeling of personal devotion as had been the chief factor in Sir Henry Campbell-Bannerman's leadership. (H. Cu.)

CAMPBELTOWN, a royal, municipal and police burgh, and seaport of Argyllshire, Scotland. Pop. (1901) 8286. It is situated on a fine bay, towards the S.E. extremity of the peninsula of Kintyre, 11 m. N.E. of the Mull and 83 m. S.W. of Glasgow by water. The seat of the Dalriad monarchy in the 6th or 7th century, its importance declined when the capital was transferred to Forteviot. No memorial of its antiquity has survived, but the finely sculptured granite cross standing on a pedestal in the market-place belongs to the 12th century, and there are ruins of some venerable chapels and churches. Through the interest of the Campbells, who are still the overlords and from whom it takes its name, it became a royal burgh in 1700. It was the birthplace of the Rev. Dr Norman Macleod (1812). The chief public buildings are the churches (one of which occupies the site of a castle of the Macdonalds), the town house, the Academy and the Athenaeum. The staple industry is whisky distilling, of which the annual output is 2,000,000 gallons, more than half for export. The port is the head of a fishery district and does a thriving trade. Shipbuilding, net and rope-making, and woollen manufacturing are other industries, and coal is mined in the vicinity. There are three piers and a safe and capacious harbour, the bay, called Campbeltown Loch, measuring 2 m. in length by 1 in breadth. At its entrance stands a lighthouse on the island of Davaar. On the Atlantic shore is the splendid golf-course of Machrihanish, 5 m. distant. Machrihanish is connected with Campbeltown by a light railway. Near the village of Southend is Machrircoch, the duke of Argyll's shooting-lodge, an old structure modernized, commanding superb views of the Firth of Clyde and its islands, and of Ireland. On the rock of Dunaverty stood the castle of Macdonald of the Isles, who was dispossessed by the Campbells in the beginning of the 17th century. At this place in 1647 General David Leslie is said to have ordered 300 of the Macdonalds to be slain after their surrender. Of the ancient church founded here by Columba, only the walls remain. Campbeltown unites with Ayr, Inveraray, Irvine and Oban in sending one member (for the "Ayr Burghs") to parliament.

CAMPE, JOACHIM HEINRICH (1746–1818), German educationist, was born at Deensen in Brunswick in 1746. He studied theology at the university of Halle, and after acting for some time as chaplain at Potsdam, he accepted a post as director of studies in the Philanthropin at Dessau (see BASEDOW). He soon after set up an educational establishment of his own at Trittow, near Hamburg, which he was obliged to give up to one of his assistants within a few years, in consequence of feeble health. In 1787 he proceeded to Brunswick as counsellor of education, and purchased the *Schulbuchhandlung*, which under his direction became a most prosperous business. He died in 1818. His numerous educational works were widely used throughout Germany. Among the most popular were the *Kleine Kinderbibliothek* (11th ed., 1815); *Robinson der Jüngere* (59th ed., 1861), translated into English and into nearly every European language; and *Sämmtliche Kinder- und Jugendschriften*, 37 vols.

CAMPECHE (CAMPEACHY), a southern state of Mexico, comprising the western part of the peninsula of Yucatan, bounded N. and E. by Yucatan, S. by Guatemala, S.W. by Tabasco and N.W. by that part of the Gulf of Mexico designated on English maps as the Bay of Campeachy. Pop. (1895) 87,264; (1900) 86,542, mostly Indians and mestizos. Area, 18,087 sq. m. The name of the state is derived from its principal forest product, *palo de campeche* (logwood). The surface, like that of Yucatan, consists of a vast sandy plain, broken by a group of low elevations in the north, heavily forested in the south, but with open tracts in the north adapted to grazing. The northern part is insufficiently watered, the rains filtering quickly through the soil. In the south, however, there are some large rivers, and the forest region is very humid. The climate is hot and unhealthy. In the north-west angle of the state is the Laguna de Términos, a large tide-water lake, which receives the drainage of the southern districts. Among the products and exports are logwood, fustic, lignum-vitae, mahogany, cedar, hides, tortoise-shell and *chicle*, the last extracted from the *zapote chico* trees (*Achras sapota*, L.). Stock-raising engages some attention. One railway crosses the state from the capital, Campeche, to Merida, Yucatan, but there are no other means of transportation except the rivers and mule-paths. The port of Carmen (pop. in 1900, about 6000), on a sand key between the Laguna de Términos and the Gulf, has an active trade in dyewoods and other forest products, and owing to its inland water communications with the forest areas of the interior is the principal port of the state and of Tabasco.

CAMPECHE, or CAMPECHE DE BARANDA, a fortified city and port of Mexico, and capital of a state of the same name, situated on the Bay of Campeche, 825 m. E. of the city of Mexico and 90 m. S.W. of Merida, in lat. 20° 5′ N., long. 90° 16′ W. Pop. (1900) 17,109. Campeche was one of the three open ports of this coast under the Spanish régime, and its walls, general plan, fine public edifices, shady squares and comfortable stone residences are evidence of the wealth it once possessed. It is still one of the most attractive towns on the Gulf coast of Mexico. It had a monopoly of the Yucatan trade and enjoyed large profits from its logwood exports, both of which have been largely lost. It was formerly the principal port for the state and for a part of Yucatan, but the port of Carmen at the entrance to Laguna de Términos is now the chief shipping port for logwood and other forest products, and a considerable part of the trade of Campeche has been transferred to Progreso, the port of Merida. The port of Campeche is a shallow roadstead defended by three forts and protected by a stone pier or wharf 160 ft. long, but vessels drawing more than 9 ft. are compelled to lie outside and discharge cargo into lighters. The exports include logwood, cotton, hides, wax, tobacco, salt and cigars of local manufacture. The principal public buildings are the old citadel, some old churches, the town hall, a handsome theatre, hospital and market. The streets are traversed by tramways, and a railway runs north-eastward to Merida. Campeche stands on the site of an old native town, of which there are interesting remains in the vicinity, and which was first visited by Hernández de Córdoba in 1517. The Spanish town was founded in 1540, and was sacked by the British in 1659 and by buccaneers in 1678 and 1685. During the revolution of 1842 Campeche was the scene of many engagements between the Mexicans and people of Yucatan.

CAMPEGGIO, LORENZO (1464–1532), Italian cardinal, was born at Milan of a noble Bolognese family. At first he followed a legal career at Pavia and Bologna, and when in 1499 he took his doctorate he was esteemed the most learned canonist in Europe. In 1500 he married Francesca de' Gualtavillani, by whom he had five children, one of whom, Allessandro, born in 1504, became cardinal in 1551, and another, Gianbaptista, became bishop of Minorca. His wife dying in 1510, he went into the church; on account of his services during the rebellion of Bologna, he was made by Julius II. auditor of the Rota in 1511, and sent to Maximilian and to Vienna as nuncio. Raised to the see of Feltre in 1512, he went on another embassy to Maximilian in 1513, and was created cardinal priest of San Tommaso in Pavione, 27th of June 1517. Leo X., needing a subsidy from the English clergy, sent Campeggio to England on the ostensible business of arranging a crusade against the Turks. Wolsey, then engaged in beginning his reform of the English church, procured that he himself should be joined to the legation as senior legate; thus the Italian, who arrived in England on the 23rd of July 1518, held a subordinate position and his special legatine faculties were suspended. Campeggio's mission failed in its immediate object; but he returned to Rome, where he was received in Consistory on the 28th of November 1519, with the gift from the king of the palace of Cardinal Adriano Castellesi (*q.v.*), who had been deposed, and large gifts of money and furniture. He was made protector of England in the Roman curia; and in 1524 Henry VIII. gave him the rich see of Salisbury, and the pope the archbishopric of Bologna. After attending the diet of Regensburg, he shared the captivity of Clement VII. during the sack of Rome in 1527 and did much to restore peace. On the 1st of October 1528 he arrived in England as co-legate with Wolsey in the matter of Henry's divorce. He brought with him a secret document, the Decretal, which defined the law and left the legates to decide the question of fact; but this important letter was to be shown only to Henry and Wolsey. "Owing to recent events," that is, the loss of the temporal power, Clement was in no way inclined to offend the victorious Charles V., Catherine's nephew, and Campeggio had already received (16th of September 1528) distinct instructions "not to proceed to sentence under any pretext without express commission, but protract the matter as long as possible." After using all means of persuasion to restore peace between the king and queen, Campeggio had to resist the pressure brought upon him to give sentence. The legatine court opened at Blackfriars on the 18th of June 1529, but the final result was certain. Campeggio could not by the terms of his commission give sentence; so his only escape was to prorogue the court on the 23rd of July on the plea of the Roman vacation. Having failed to satisfy the king, he left England on the 26th of October 1529, after his baggage had been searched at Dover to find the Decretal, which, however, had been burnt. Returning to Bologna, the cardinal assisted at the coronation of Charles V. on the 24th of February 1530, and went with him to the diet of Augsburg. He was deprived by Henry of the English protectorate; and when sentence was finally given against the divorce, Campeggio was deprived of the see of Salisbury as a non-resident alien, by act of parliament (11th of March 1535); but his rich benefices in the Spanish dominions made ample amends. In 1537 he became cardinal bishop of Sabina, and died in Rome on the 25th of July 1539. His tomb is in the church of S. Maria in Trastevere. (E. TN.)

CAMPER, PETER (1722–1789), Dutch anatomist and naturalist, was born at Leiden on the 11th of May 1722. He was educated at the university there, and in 1746 graduated in philosophy and medicine. After the death of his father in 1748 he spent more than a year in England, and then visited Paris, Lyons and Geneva, and returned to Franeker, where in 1750 he had been appointed to the professorship of philosophy, medicine

and surgery. He visited England a second time in 1752, and in 1755 he was called to the chair of anatomy and surgery at the Athenaeum in Amsterdam. He resigned this post after six years, and retired to his country house near Franeker, in order uninterruptedly to carry on his studies. In 1763, however, he accepted the professorship of medicine, surgery and anatomy at Groningen, and continued in the chair for ten years. He then returned to Franeker, and after the death of his wife in 1776 spent some time in travelling. In 1762 he had been returned as one of the deputies in the assembly of the province of Friesland, and the latter years of his life were much occupied with political affairs. In 1787 he was nominated to a seat in the council of state, and took up his residence at the Hague, where he died on the 7th of April 1789.

Camper's works, mainly memoirs and detached papers, are very numerous; the most important of those bearing on comparative anatomy were published in 3 vols. at Paris in 1803, under the title *Œuvres de P. Camper qui ont pour objet l'histoire naturelle, la physiologie, et l'anatomie comparée.* His *Dissertation physique sur les différences réelles que présentent les traits du visage chez les hommes de différents pays et de différents âges; sur le beau qui caractérise les statues antiques et les pièces gravées*, &c., which was published in 1781 both in Dutch and in French, contains an account of the facial angle which he used as a cranial characteristic. (See also ANATOMY.)

CAMPHAUSEN, OTTO VON (1812–1896), Prussian statesman, was born at Hünshoven in the Rhine Provinces on the 21st of October 1812. Having studied jurisprudence and political economy at the universities of Bonn, Heidelberg, Munich and Berlin, he entered the legal career at Cologne, and immediately devoted his attention to financial and commercial questions. Nominated assessor in 1837, he acted for five years in this capacity at Magdeburg and Coblenz, became in 1845 counsellor in the ministry of finance, and was in 1849 elected a member of the second chamber of the Prussian diet, joining the Moderate Liberal party. In 1869 he was appointed minister of finance. On taking office, he was confronted with a deficit in the revenue, which he successfully cleared off by effecting a conversion of a greater part of the state loans. The French war indemnity enabled him to redeem a considerable portion of the state debt and to remit certain taxes. He was, however, a too warm adherent of free trade principles to enjoy the confidence either of the Agrarian party or of Prince Bismarck, and his antagonism to the tobacco monopoly and the general economic policy of the latter brought about his retirement. Camphausen's great services to Prussia were recognized by his sovereign in the bestowal of the order of the Black Eagle in 1895, a dignity carrying with it a patent of nobility. He died at Berlin on the 18th of May 1896.

CAMPHAUSEN, WILHELM (1818–1885), German painter, was born at Düsseldorf, and studied under A. Rethel and F. W. von Schadow. As an historical and battle painter he rapidly became popular, and in 1859 was made professor of painting at the Düsseldorf academy, together with other later distinctions. His "Flight of Tilly" (1841), "Prince Eugene at the Battle of Belgrade" (1843; in the Cologne museum), "Flight of Charles II. after the Battle of Worcester" (Berlin National Gallery), "Cromwell's Cavalry" (Munich Pinakothek), are his principal earlier pictures; and his "Frederick the Great at Potsdam," "Frederick II. and the Bayreuth Dragoons at Hohenfriedburg," and pictures of the Schleswig-Holstein campaign and the war of 1866 (notably "Lines of Düppel after the Battle," at the Berlin National Gallery), made him famous in Germany as a representative of patriotic historical art. He also painted many portraits of German princes and celebrated soldiers and statesmen. He died at Düsseldorf on the 16th of June 1885.

CAMPHORS, organic chemical compounds, the alcohols and ketones of the hydrocarbons known as terpenes, occurring associated with volatile oils in many plants. They are extracted together with volatile oils by distilling certain plants with steam, the volatile oils being subsequently separated by fractional distillation. The term "camphor" is generally applied to the solid products so obtained, and hence includes the "stearoptenes," or solid portions of the volatile oils. They are mostly white crystalline solids, possessing a characteristic odour; they are sparingly soluble in water, but readily dissolve in alcohol and ether. Chemically, the camphors may be divided into two main groups, according to the nature of the corresponding hydrocarbon or terpene. In this article only the camphors of commercial importance will be treated; details as to the chemical structure, syntheses and relations will be found in the article TERPENES.

Menthol, mentha or peppermint camphor, $C_{10}H_{19}OH$, 5-methyl-2-isopropyl hexahydrophenol, an oxyhexahydrocymene, occurs in the volatile oils of *Mentha piperita* and *M. arvensis* (var. *piperascens* and *glabrata*), from which it is obtained by cooling and subsequently pressing the separated crystals; or by fractional distillation. It crystallizes in prisms, having the odour and taste of peppermint; it melts at 42° and boils at 212°. It is very slightly soluble in water, but readily dissolves in alcohol and ether. It is optically active, being laevo-rotatory. Menthol is used in medicine to relieve pain, as in rheumatism, neuralgia, throat affections and toothache. It acts also as a local anaesthetic, vascular stimulant and disinfectant.

Thymol, thyme camphor, $C_{10}H_{13}OH$, 3-methyl-6-isopropyl phenol, an oxycymene, occurs in the volatile oil of Ajowan, *Carum ajowan*, garden thyme, *Thymus vulgaris*, wild thyme, *T. Serpyllum* and horse mint, *Monarda punctata*. Thymol crystallizes in large colourless plates which melt at 44° and boil at 230°. It has the odour of thyme, is sparingly soluble in water, but very soluble in alcohol, ether and in alkaline solutions. In medicine it is used as an antiseptic, being more active than phenol. Iodine and potash convert it into di-iodthymol, which has been introduced in surgery under the names *aristol* and *annidalin*, as a substitute for iodoform.

Borneol, Borneo camphor or camphol, also known as Malayan, Barus or Dryobalanops camphor, $C_{10}H_{17}OH$, occurs in fissures in the wood of *Dryobalanops aromatica*, a majestic tree flourishing in the East Indies. This product is dextro-rotatory; the laevo and inactive modifications occur in the so-called baldrianic camphor. Borneol melts at 203° and boils at 212°. It is very similar to common or Japan camphor, but has a somewhat peppery odour. Sodium and alcohol reduce common camphor to a mixture of *d*- and *l*-borneol.

Common camphor, Japan or Laurel camphor, $C_{10}H_{16}O$, which constitutes the bulk of the camphor of commerce, is the product of the camphor laurel, *Cinnamonum camphora*, a tree flourishing in Japan, Formosa and central China. It also occurs in various volatile oils, *e.g.* lavender, rosemary, sage and spike. To extract the camphor, chips of the tree are steamed, and the mixed vapours of camphor, volatile oils and water are conducted to a condensing plant, where most of the camphor separates out. This is filtered, and the remainder, about 20 % of the total, which is retained in solution, is extracted by fractional distillation and cooling the distillate. The crude camphor so obtained is exported from Japan in two grades—Samuel A and Samuel B. It is purified by mixing with a little charcoal, sand, iron filings or quicklime and subliming, by steam distillation or by crystallization. Common camphor forms a translucent mass of hexagonal prisms, melting at 175° and boiling at 204°. It sublimes very readily. In alcoholic solution it is dextro-rotatory; the laevo form, Matricaria camphor, occurs in the oil of *Matricaria parthenium* and closely resembles the *d* form. Camphor is chiefly used in the celluloid industry. The so-called "artificial camphor" is pinene hydrochloride (see TERPENES).

Externally applied it acts medicinally as a counter-irritant, and, in some degree, as a local anaesthetic, being also a definite antiseptic. It is, therefore, largely used in liniments for the relief of myalgia, sciatica, lumbago, etc. Combined with chloroform, thymol or carbolic acid, it is a valuable local application for neuralgia and for toothache due to dental caries. Taken internally, camphor is a nerve stimulant, a diaphoretic and a feeble antipyretic. It is excreted by the kidneys as various substances, including campho-glycuric acid (Schmiedeberg). In large doses it causes marked nervous symptoms, exhilaration being followed by abdominal pain, violent epileptiform convulsions, coma and death. Its internal uses are in hysteria, and

in such conditions as diarrhoea, dysentery and cholera. It is a popular remedy for "cold in the head," but it is not to be relied upon as a prophylactic against infection either by an ordinary cold or true influenza.

CAMPHUYSEN, DIRK RAFELSZ (1586–1627), Dutch painter, poet and theologian, was the son of a surgeon at Gorcum. As he manifested great artistic talent, his brother, in whose charge he was left on the death of his parents, placed him under the painter Govaerts. But at that time there was intense interest in theology; and Camphuysen, sharing in the prevailing enthusiasm, deserted the pursuit of art, to become first a private tutor and afterwards minister of Vleuten near Utrecht(1616). As, however, he had embraced the doctrines of Arminius with fervour, he was deprived of this post and driven into exile (1619). His chief solace was poetry; and he has left a translation of the Psalms, and a number of short pieces, remarkable for their freshness and depth of poetic feeling. He is also the author of several theological works of fair merit, among which is a *Compendium Doctrinae Sociniorum*; but his fame chiefly rests on his pictures, which, like his poems, are mostly small, but of great beauty; the colouring, though thin, is pure; the composition and pencilling are exquisite, and the perspective above criticism. The best of his works are his sunset and moonlight scenes and his views of the Rhine and other rivers. The close of his life was spent at Dokkum. His nephew Raphael (b. 1598) is by some considered to have been the author of several of the works ascribed to him; and his son Govaert (1624–1674), a follower or imitator of Paul Potter, is similarly credited.

CAMPI, GIULIO (1500–1572), the founder of a school of Italian painters, was born at Cremona. He was son of a painter, Galeazzo Campi (1475–1536), under whom he took his first lessons in art. He was then taught by Giulio Romano; and he made a special study of Titian, Correggio and Raphael. His works are remarkable for their correctness, vigour and loftiness of style. They are very numerous, and the church of St Margaret in his native town owes all its paintings to his hand. Among the earliest of his school are his brothers, Vincenzo and Antonio, the latter of whom was also of some mark as a sculptor and as historian of Cremona.

Giulio's pupil, BERNARDINO CAMPI (1522–1592), in some respects superior to his master, began life as a goldsmith. After an education under Giulio Campi and Ippolito Corta, he attained such skill that when he added another to the eleven Caesars of Titian, it was impossible to say which was the master's and which the imitator's. He was also much influenced by Correggio and Raphael. His principal work is seen in the frescoes of the cupola at San Sigismondo, at Cremona.

CAMPILLO, JOSÉ DEL (1695–1743), Spanish statesman, was of very obscure origin. From his own account of his youth, written to Antonio de Mier in 1726, we only know that he was born in "a house equally poor and honest," that he studied Latin by his own wish, that he entered the service of Don Antonio Maldonado, prebendary of Córdoba, who wished apparently to train him as a priest, and that he declined to take orders. He left the service of Maldonado in 1713, being then eighteen years of age. In 1715 he became "page" to D. Francisco de Ocio, superintendent general of customs, who doubtless employed him as a clerk. In 1717 he attracted the favourable notice of Patiño, the head of the newly-organized navy, and was by him transferred to the naval department. Under the protection of Patiño, who became prime minister in 1726, Campillo was constantly employed on naval administrative work both at home and in America. It was Patiño's policy to build up a navy quietly at home and in America, without attracting too much attention abroad, and particularly in England. Campillo proved an industrious and honest subordinate. Part of his experience was to be present at a shipwreck in Central America in which he was credited with showing spirit and practical ability in saving the lives of the crew. In 1726 he was denounced to the Inquisition for the offence of reading forbidden books. The proceedings against him were not carried further, but the incident is an example of the vexatious tyranny exercised by the Holy Office, and the effect it must have had even in its decadence in damping all intellectual activity. It was not until in 1741, when Spain was entangled in a land war in Italy and a naval war with England, that Campillo was summoned by the king to take the place of prime minister. He had to find the means of carrying on a policy out of all proportion to the resources of Spain, with an empty treasury. His short tenure of power was chiefly notable for his vigorous attempt to sweep away the system of farming the taxes, which left the state at the mercy of contractors and financiers. Campillo's predecessors were constantly compelled to apply to capitalists to provide funds to meet the demands of the king for his buildings and his foreign policy. A whole year's revenue was frequently forestalled. Campillo persuaded the king to allow him to establish a system of direct collection, by which waste and pilfering would be avoided. Some progress was made towards putting the national finances on a sound footing, though Campillo could not prevent the king from disposing, without his knowledge, of large sums of money needed for the public service. He died suddenly on the 11th of April 1743. Campillo was the author of a treatise on a *New System of Government for America* printed at Madrid 1789. He also left a MS. treatise with the curious title, *What is superfluous and is wanting in Spain, in order that it may be what it ought to be, and not what it is*.

See D. Antonio Rodriquez Villa, *Patiño y Campillo* (Madrid, 1882).

CAMPINAS, an inland city of the state of São Paulo, Brazil, 65 m. by rail N.W. of the city of São Paulo and 114 m. from the port of Santos, with which it is connected by the Paulista & São Paulo railway. Pop. (1890) of the city and municipality, 33,921. Campinas is the commercial centre of one of the oldest coffee-producing districts of the state and the outlet for a rich and extensive agricultural region lying farther inland. The Mogyana railway starts from this point and extends north to Uberaba, Minas Geraes, while the Paulista lines extend northwest into new and very fertile regions. Coffee is the staple production, though Indian corn, mandioca and fruit are produced largely for local consumption. The city is built in a bowl-like depression of the great central plateau, and the drainage from the surrounding hillsides has produced a dangerously insanitary condition, from which one or two virulent fever epidemics have resulted.

CAMPING OUT. The sport of abandoning ordinary house-life, and living in tents, touring in vans, boats, &c., has been elaborately developed in modern times, and a considerable literature has been devoted to it, to which the curious may be referred.

See, for Europe, A. A. Macdonell's *Camping-out* (1892) and *Voyages on German Rivers* (1890); G. R. Lowndes, *Gipsy Tents* (1890).

For Australia and Africa, W. B. Lord, *Shifts and Expedients of Camp Life* (1871); the articles by F. J. Jackson in the *Big Game Shooting* volume of the "Badminton Library"; the articles on "Camping out" in *The Encyclopaedia of Sport*; F. C. Selous, *A Hunter's Wanderings in Africa* (1881), and *Travel and Adventure in South Africa* (1893); A. W. Chanler, *Through Jungle and Desert* (1896); A. B. Rathbone, *Camping and Tramping in Malaya* (1898).

For America, G. O. Shields, *Camping and Camp Outfits* (1890); W. W. Pascoe, *Canoe and Camp Cookery* (1893); *Woodcraft*, by "Nessmuk" (1895); W. S. Rainsford, *Camping and Hunting in the Shoshone* (1896); S. E. White, *The Forest* (1903), and *The Mountains* (1904); *Suggestions as to Outfit for Tramping and Camping* (1904), published by "The Appalachian Mountain Club," Boston. Valuable information will be found in the sporting periodicals, and in the catalogues of outfitters and dealers in sporting goods.

CAMPION, EDMUND (1540–1581), English Jesuit, was born in London, received his early education at Christ's Hospital, and, as the best of the London scholars, was chosen in their name to make the complimentary speech when Queen Mary visited the city on the 3rd of August 1553. He went to Oxford and became fellow of St John's College in 1557, taking the oath of supremacy on the occasion of his degree in 1564, in which year he was orator in the schools. He had already shown his talents as a speaker at the funeral of Amy Robsart in 1560; and when Sir Thomas White, the founder of the college, was buried in 1564, the Latin oration fell to the lot of Campion. Two years later he welcomed Queen Elizabeth to the university, and won a regard, which the queen

preserved until the end. Religious difficulties now began to beset him; but at the persuasion of Edward Cheyney, bishop of Gloucester, although holding Catholic doctrines, he took deacon's orders in the English Church. Inwardly "he took a remorse of conscience and detestation of mind." Rumours of his opinions began to spread and, giving up the office of proctor, he left Oxford in 1569 and went to Ireland to take part in a proposed restoration of the Dublin University. The suspicion of papistry followed him; and orders were given for his arrest. For some three months he eluded pursuit, hiding among friends and occupying himself by writing a history of Ireland (first published in Holinshed's *Chronicles*), a superficial work of no real value. At last he escaped to Douai, where he joined William Allen (*q.v.*) and was reconciled to the Roman Church. After being ordained subdeacon, he went to Rome and became a Jesuit in 1573, spending some years at Brünn, Vienna and Prague. In 1580 the Jesuit mission to England was begun, and he accompanied Robert Parsons (*q.v.*) who, as superior, was intended to counterbalance Campion's fervour and impetuous zeal. He entered England in the characteristic guise of a jewel merchant, arrived in London on the 24th of June 1580, and at once began to preach. His presence became known to the authorities and an indiscreet declaration, "Campion Brag," made the position more difficult. The hue and cry was out against him; henceforth he led a hunted life, preaching and ministering to Catholics in Berkshire, Oxfordshire, Northamptonshire and Lancashire. During this time he was writing his *Decem Rationes*, a rhetorical display of reasons against the Anglican Church. The book was printed in a private press at Stonor Park, Henley, and 400 copies were found on the benches of St Mary's, Oxford, at the Commencement, on the 27th of June 1581. The sensation was immense, and the pursuit became keener. On his way to Norfolk he stopped at Lyford in Berkshire, where he preached on the 14th of July and the following day, yielding to the foolish importunity of some pious women. Here he was captured by a spy and taken to London, bearing on his hat a paper with the inscription, "Campion, the Seditious Jesuit." Committed to the Tower, he was examined in the presence of Elizabeth, who asked him if he acknowledged her to be really queen of England, and on his replying straightly in the affirmative, she made him offers, not only of life but of wealth and dignities, on conditions which his conscience could not allow. He was kept a long time in prison, twice racked by order of the council, and every effort was made to shake his constancy. Despite the effect of a false rumour of retraction and a forged confession, his adversaries in despair summoned him to four public conferences (1st, 18th, 23rd and 27th of September), and although still suffering, and allowed neither time nor books for preparation, he bore himself so easily and readily that he won the admiration of most of the audience. Racked again on the 31st of October, he was indicted at Westminster that he with others had conspired at Rome and Reims to raise a sedition in the realm and dethrone the queen. On the 20th of November he was brought in guilty before Lord Chief Justice Wray; and in reply to him said: "If our religion do make traitors we are worthy to be condemned; but otherwise are and have been true subjects as ever the queen had." He received the sentence of the traitor's death with the *Te Deum laudamus*, and, after spending his last days in pious exercises, was led with two companions to Tyburn (1st of December 1581) and suffered the barbarous penalty. Of all the Jesuit missionaries who suffered for their allegiance to the ancient religion, Campion stands the highest. His life and his aspirations were pure, his zeal true and his loyalty unquestionable. He was beatified by Leo XIII. in 1886.

An admirable biography is to be found in Richard Simpson's *Edmund Campion* (1867): and a complete list of his works in De Backer's *Bibliothèque de la compagnie de Jésus*. (E. Tn.)

CAMPION, THOMAS (1567–1620), English poet and musician, was born in London on the 12th of February 1567, and christened at St Andrew's, Holborn. He was the son of John Campion of the Middle Temple, who was by profession one of the cursitors of the chancery court, the clerks "of course," whose duties were to draft the various writs and legal instruments in correct form. His mother was Lucy Searle, daughter of Laurence Searle, one of the queen's serjeants-at-arms. Upon the death of Campion's father in 1576, his mother married Augustine Steward and died herself soon after. Steward acted for some years as guardian of the orphan, and sent him in 1581, together with Thomas Sisley, his stepson by his second wife Anne, relict of Clement Sisley, to Peterhouse, Cambridge, as a gentleman pensioner. He studied at Cambridge for four years, and left the university, it would appear, without a degree, but strongly imbued with those tastes for classical literature which exercised such powerful influence upon his subsequent work. In April 1587 he was admitted to Gray's Inn, possibly with the intention of adopting a legal profession, but he had little sympathy with legal studies and does not appear to have been called to the bar. His subsequent movements are not certain, but in 1591 he appears to have taken part in the French expedition under Essex, sent for the assistance of Henry IV. against the League; and in 1606 he first appears with the degree of doctor of physic, though the absence of records does not permit us to ascertain where this was obtained. The rest of his life was probably spent in London, where he practised as a physician until his death on the 1st of March 1620, leaving behind him, it would appear, neither wife nor issue. He was buried the same day at St Dunstan's-in-the-West, Fleet Street.

The body of his works is considerable, the earliest known being a group of five anonymous poems included in the *Songs of Divers Noblemen and Gentlemen*, appended to Newman's surreptitious edition of Sidney's *Astrophel and Stella*, which appeared in 1591. In 1595 appeared under his own name the *Poemata*, a collection of Latin panegyrics, elegies and epigrams, which evince much skill in handling, and won him considerable reputation. This was followed in 1601 by *A Booke of Ayres*, one of the song-books so fashionable in his day, the music of which was contributed in equal proportions by himself and Philip Rosseter, while the words were almost certainly all written by him. The following year he published his *Observations in the Art of English Poesie*, "against the vulgar and unartificial custom of riming," in favour of rhymeless verse on the model of classical quantitative poetry. Its appearance at this stage was important as the final statement of the crazy prejudice by one of its sanest and best equipped champions, but the challenge thus thrown down was accepted by Daniel, who in his *Defence of Ryme*, published the same year, finally demolished the movement.

In 1607 he wrote and published a masque for the occasion of the marriage of Lord Hayes, and in 1613 he issued a volume of *Songs of Mourning* (set to music by Coperario or John Cooper) for the loss of Prince Henry, which was sincerely lamented by the whole English nation. The same year he wrote and arranged three masques, the *Lords' Masque* for the marriage of Princess Elizabeth, an entertainment for the amusement of Queen Anne at Caversham House, and a third for the marriage of the earl of Somerset to the infamous Frances Howard, countess of Essex. If, moreover, as appears quite likely, his *Two Bookes of Ayres* (both words and music written by himself) belongs also to this year, it was indeed his *annus mirabilis*.

Some time in or after 1617 appeared his *Third and Fourth Booke of Ayres*; while to that year probably also belongs his *New Way of making Foure Parts in Counter-point*, a technical treatise which was for many years the standard text-book on the subject. It was included, with annotations by Christopher Sympson, in Playfair's *Brief Introduction to the Skill of Musick*, and two editions appear to have been bought up by 1660. In 1618 appeared *The Ayres that were sung and played at Brougham Castle* on the occasion of the king's entertainment there, the music by Mason and Earsden, while the words were almost certainly by Campion; and in 1619 he published his *Epigrammatum Libri II. Umbra Elegiarum liber unus*, a reprint of his 1595 collection with considerable omissions, additions (in the form of another book of epigrams) and corrections.

While Campion had attained a considerable reputation in his own day, in the years that followed his death his works sank into complete oblivion. No doubt this was due to the nature of the media in which he mainly worked, the masque and the

song-book. The masque was an amusement at any time too costly to be popular, and with the Rebellion it was practically extinguished. The vogue of the song-books was even more ephemeral, and, as in the case of the masque, the Puritan ascendancy, with its distaste for all secular music, effectively put an end to the madrigal. Its loss involved that of many hundreds of dainty lyrics, including those of Campion, and it is due to the enthusiastic efforts of Mr A. H. Bullen, who first published a collection of the poet's works in 1889, that his genius has been recognized and his place among the foremost rank of Elizabethan lyric poets restored to him.

Campion set little store by his English lyrics; they were to him "the superfluous blossoms of his deeper studies," but we may thank the fates that his precepts of rhymeless versification so little affected his practice. His rhymeless experiments are certainly better conceived than many others, but they lack the spontaneous grace and freshness of his other poetry, while the whole scheme was, of course, unnatural. He must have possessed a very delicate musical ear, for not one of his songs is unmusical; moreover, the fact of his composing both words and music gave rise to a metrical fluidity which is one of his most characteristic features. Rarely indeed are his rhythms uniform, while they frequently shift from line to line. His range was very great both in feeling and expression, and whether he attempts an elaborate epithalamium or a simple country ditty, the result is always full of unstudied freshness and tuneful charm. In some of his sacred pieces he is particularly successful, combining real poetry with genuine religious fervour.

Bibliography.—*Works*, &c., ed. A. H. Bullen (1889) excluding *A New Way*, &c.; *Songs and Masques*, ed. A. H. Bullen (1903), with an introduction on Campion's music by Janet Dodge; *Poems*, &c. (in English), ed. P. Vivian (1907); *Complete Works*, ed. P. Vivian (Clarendon Press, 1908). The "Observations in the Art of English Poesie" are also published in Haslewood's *Ancient Critical Essays* and Gregory Smith's *Elizabethan Critical Essays*, vol. ii. (1903).

(P. Vn.)

CAMPISTRON, JEAN GALBERT DE (1656–1723), French dramatist, was born at Toulouse of noble family in 1656. At the age of seventeen he was wounded in a duel and sent to Paris. Here he became an ardent disciple of Racine. If he copied his master's methods of construction with some success, in the execution of his plans he never advanced beyond mediocrity, nor did he ever approach the secret of the musical lines of *Athalie* and *Phèdre*. He secured the patronage of the influential duchesse de Bouillon by dedicating *Arminius* to her, and in 1685 he scored his first success with *Andronic*, which disguised under other names the tragic story of Don Carlos and Elizabeth of France. The piece made a great sensation, but Campistron's treatment is weak, and he failed to avail himself of the possibilities inherent in his subject. Racine was asked by Louis Joseph, duc de Vendôme, to write the book of an opera to be performed at a fête given in honour of the Dauphin. He handed on the commission to Campistron, who produced *Acis et Galathée* for Lulli's music. Campistron had another success in *Tiridate* (1691), in which he treated, again under changed names, the biblical story of Amnon's passion for his sister Tamar. He wrote many other tragedies and two comedies, one of which, *Le Jaloux désabusé*, has been considered by some judges to be his best work. In 1686 he had been made intendant to the duc de Vendôme and followed him to Italy and Spain, accompanying him on all his campaigns. If he was not a good poet he was an honest man under circumstances in which corruption was easy and usual. Many honours were conferred on him. The king of Spain bestowed on him the order of St James of the Sword; the duke of Mantua made him marquis of Penango in Montferrat; and in 1701 he was received into the Academy. After thirty years of service with Vendôme he retired to his native place, where he died on the 11th of May 1723.

CAMPOAMOR Y CAMPOOSORIO, RAMON DE (1817–1901), Spanish poet, was born at Navia (Asturias) on the 24th of September 1817. Abandoning his first intention of entering the Jesuit order, he studied medicine at Madrid, found an opening in politics as a supporter of the Moderate party, and, after occupying several subordinate posts, became governor of Castellón de la Plana, of Alicante and of Valencia. His conservative tendencies grew more pronounced with time, and his *Polémicas con la Democracia* (1862) may be taken as the definitive expression of his political opinions. His first appearance as a poet dated from 1840, when he published his *Ternezas y flores*, a collection of idyllic verses, remarkable for their technical excellence. His *Ayes del Alma* (1842) and his *Fábulas morales y políticas* (1842) sustained his reputation, but showed no perceptible increase of power or skill. An epic poem in sixteen cantos, *Colón* (1853), is no more successful than modern epics usually are. Campoamor's theatrical pieces, such as *El Palacio de la Verdad* (1871), *Dies Irae* (1873), *El Honor* (1874) and *Glorias Humanas* (1885), are interesting experiments; but they are totally lacking in dramatic spirit. He always showed a keen interest in metaphysical and philosophic questions, and defined his position in *La Filosofía de las leyes* (1846), *El Personalismo* (1855), *Lo Absoluto* (1865) and *El Ideísmo* (1883). These studies are chiefly valuable as embodying fragments of self-revelation, and as having led to the composition of those *doloras*, *humoradas* and *pequeños poemas*, which the poet's admirers consider as a new poetic species. The first collection of *Doloras* was printed in 1846, and from that date onwards new specimens were added to each succeeding edition. It is difficult to define a *dolora*. One critic has described it as a didactic, symbolic stanza which combines the lightness and grace of the epigram, the melancholy of the *endecha*, the concise narrative of the ballad, and the philosophic intention of the apologue. The poet himself declared that a *dolora* is a dramatic *humorada*, and that a *pequeño poema* is a *dolora* on a larger scale. These definitions are unsatisfactory. The humoristic, philosophic epigram is an ancient poetic form to which Campoamor has given a new name; his invention goes no further. It cannot be denied that in the *Doloras* Campoamor's special gifts of irony, grace and pathos find their best expression. Taking a commonplace theme, he presents in four, eight or twelve lines a perfect miniature of condensed emotion. By his choice of a vehicle he has avoided the fatal facility and copiousness which have led many Spanish poets to destruction. It pleased him to affect a vein of melancholy, and this affectation has been reproduced by his followers. Hence he gives the impression of insincerity, of trifling with grave subjects and of using mysticism as a mask for frivolity. The genuine Campoamor is a poet of the sunniest humour who, under the pretence of teaching morality by satire, is really seeking to utter the gay scepticism of a genial, epicurean nature. His influence has not been altogether for good. His formula is too easily mastered, and to his example is due a plague of *doloras* and *humoradas* by poetasters who have caricatured their model. Campoamor, as he himself said, did not practise art for art's sake; he used art as the medium of ideas, and in ideas his imitators are poor. He died at Madrid on the 12th of February 1901. Of late years a deep silence had fallen upon him, and we are in a position to judge him with the impartiality of another generation. The overwhelming bulk of his work will perish; we may even say that it is already dead. His pretensions, or the pretensions put forward in his name, that he discovered a new poetic *genre* will be rejected later, as they are rejected now by all competent judges. The title of a philosophic poet will be denied to him. But he will certainly survive, at least in extract, as a distinguished humorist, an expert in epigrammatic and sententious aphorism, an artist of extremely finished execution. (J. F.-K.)

CAMPOBASSO, a city of Molise, Italy, the capital of the province of Campobasso, 172 m. E.S.E. of Rome by rail, situated 2132 ft. above sea-level. Pop. (1901) town 11,273; commune 14,491. The town itself contains no buildings of antiquarian interest, but it has some fine modern edifices. Its chief industry is the manufacture of arms and cutlery. Above the town are the picturesque ruins of a castle of the 15th century. The date of the foundation of Campobasso is unknown. The town, with the territory surrounding it, was under the feudal rule of counts until 1739, when it passed to the Neapolitan crown, in consideration of a payment of 108,000 ducats.

CAMPODEA, a small whitish wingless insect with long flexible antennae and a pair of elongated caudal appendages. The best-known species (*Campodea staphylinus*) has a wide distribution and is equally at home in the warm valleys of south Europe, in the subarctic conditions of mountain tops, in caves and in woods and gardens in England. It lives in damp places under stones, fallen trees or in rotten wood and leaves. Although blind, it immediately crawls away on exposure to the light into the nearest crevice or other sheltered spot, feeling the way with its antennae. Its action is characteristically serpentine, recalling that of a centipede. Campodea is one of the bristle-tailed or thysanurous insects of the order Aptera (*q.v.*).

CAMPOMANES, PEDRO RODRIGUEZ, Conde de (1723–1802), Spanish statesman and writer, was born at Santa Eulalia de Sorribia, in Asturias, on the 1st of July 1723. From 1788 to 1793 he was president of the council of Castile; but on the accession of Charles IV. he was removed from his office, and retired from public life, regretted by the true friends of his country. His first literary work was *Antiquidad maritima de la republica de Cartago*, with an appendix containing a translation of the *Voyage of Hanno* the Carthaginian, with curious notes. This appeared in a quarto volume in 1756. His principal works are two admirable essays, *Discurso sobre el fomento de la industria popular*, 1774, and *Discurso sobre la educacion popular de los artesanos y su fomento*, 1775. As a supplement to the last, he published four appendices, each considerably larger than the original essay. The first contains reflections on the origin of the decay of arts and manufactures in Spain during the last century. The second points out the steps necessary for improving or re-establishing the old manufactures, and contains a curious collection of royal ordinances and rescripts regarding the encouragement of arts and manufactures, and the introduction of foreign raw materials. The third treats of the gild laws of artisans, contrasted with the results of Spanish legislation and the municipal ordinances of towns. The fourth contains eight essays of Francisco Martinez de Mata on national commerce, with some observations adapted to present circumstances. These were all printed at Madrid in 1774 and 1777, in five volumes. Count Campomanes died on the 3rd of February 1802.

Don A. Rodriguez Villa has placed a biographical notice of Campomanes as an introduction to the first edition of his *Cartas politico-economicas*, published in 1878.

CAMPOS, ARSENIO MARTINEZ DE (1831–1900), Spanish marshal, senator and knight of the Golden Fleece, was born at Segovia on the 14th of December 1831. He graduated as a lieutenant in 1852, and for some years was attached to the staff college as an assistant professor. He took part in the Morocco campaign of 1859–1860, and distinguished himself in sixteen actions, obtaining the cross of San Fernando, and the rank of lieutenant-colonel. He then returned to the staff college as a professor. Afterwards he joined the expedition to Mexico under Prim. In 1869 he was sent to Cuba, where he was promoted to the rank of general in 1872. On his return to the Peninsula, the Federal Republican government in 1873 confided to General Campos several high commands, in which he again distinguished himself against the Cantonal Republicans and the Carlists. About that time he began to conspire with a view to restore the son of Queen Isabella. Though Campos made no secret of his designs, Marshal Serrano, in 1874, appointed him to the command of a division which took part in the relief of Bilbao on the 2nd of May of that year, and in the operations around Estella in June. On both occasions General Campos tried in vain to induce the other commanders to proclaim Alphonso XII. He then affected to hold aloof, and would have been arrested, had not the minister of war, Ceballos, answered for his good behaviour, and quartered him in Avila under surveillance. He managed to escape, and after hiding in Madrid, joined General Daban at Sagunto on the 29th of December 1874, where he proclaimed Alphonso XII. king of Spain. From that date he never ceased to exercise great influence in the politics of the restoration. He was considered as a sort of supreme counsellor, being consulted by King Alphonso, and later by his widow, the queen-regent, in every important political crisis, and on every international or colonial question, especially when other generals or the army itself became troublesome. He took an important part in the military operations against the Carlists, and in the negotiations with their leaders, which put an end to the civil war in 1876. In the same way he brought about the pacification of Cuba in 1878. On his return from that island he presided over a Conservative cabinet for a few months, but soon made way for Canovas, whom he ever afterwards treated as the leader of the Conservative party. In 1881, with other discontented generals, he assisted Sagasta in obtaining office. After the death of King Alphonso, Campos steadily supported the regency of Queen Christina, and held high commands, though declining to take office. In 1893 he was selected to command the Spanish army at Melilla, and went to the court of Morocco to make an advantageous treaty of peace, which averted a war. When the Cuban rising in 1895 assumed a serious aspect, he was sent out by the Conservative cabinet of Canovas to cope with the rebellion, but he failed in the field, as well as in his efforts to win over the Creoles, chiefly because he was not allowed to give them local self-government, as he wished. Subsequently he remained aloof from politics, and only spoke in the senate to defend his Cuban administration and on army questions. After the war with America, and the loss of the colonies in 1899, when Señor Silvela formed a new Conservative party and cabinet, the old marshal accepted the presidency of the senate, though his health was failing fast. He held this post up to the time of his death. This took place in the summer recess of 1900 at Zarauz, a village on the coast of Guipuzcoa, where he was buried.

CAMPOS, an inland city of the state of Rio de Janeiro, Brazil, on the Parahyba river, 30 m. from the sea, and about 143 m. N.E. of the city of Rio de Janeiro. Pop. (1890) of the city, 22,518; of the municipality, 78,036. The river is navigable for small steamers above and below the city, but is closed to coast-wise navigation by dangerous sandbars at its mouth. The shipping port for Campos is Imbetiba (near Macahé), 60 m. south-west, with which it is connected by rail. There is also water communication between the two places by means of coastal lakes united by canals. Campos has indirect railway communication with Rio de Janeiro by way of Macahé, and is the starting point for several small independent lines. The elevation of the city is only 69 ft. above sea level, and it stands near the western margin of a highly fertile alluvial plain devoted to the production of sugar. The climate is hot and humid, and many kinds of tropical fruit are produced in abundance.

CÂMPULUNG (also written Campu Lung and Kimpulung), the capital of the department of Muscel, Rumania, and the seat of a suffragan bishop; situated among the outlying hills of the Carpathian Mountains, at the head of a long well-wooded glen traversed by the river Tîrgului, a tributary of the Argesh. Pop. (1900) 13,033. Its pure air and fine scenery render Câmpulung a popular summer resort. In the town are more than twenty churches, besides a monastery and a cathedral, which both claim to have been founded, in the 13th century, by Radul Negru, first prince of Walachia. The Tirgului supplies water-power for several paper-mills; annual fairs are held on the 20th of July and the 24th of October; and there is a considerable traffic with Transylvania, over the Torzburg Pass, 15 m. north, and with the south by a branch railway to Ploesci. Near Câmpulung are the remains of a Roman camp; and, just beyond the gates, vestiges of a Roman colony, variously identified with Romula, Stepenium and Ulpia Traiana, but now called Gradistea or Jidovi.

CAMUCCINI, VINCENZO (1773–1844), Italian historical painter, was born at Rome. He was educated by his brother Pietro, a picture-restorer, and Borubelli, an engraver, and, up to the age of thirty, attempted nothing higher than copies of the great masters, his especial study being Raphael. As an original painter, Camuccini belongs to the school of the French artist David. His works are rather the fruits of great cleverness and patient care than of fresh and original genius; and his style was essentially imitative. He enjoyed immense popularity, both personally, and as an artist, and received many honours and

preferments from the papal and other Italian courts. He was appointed director of the Academy of San Luca and of the Neapolitan Academy at Rome, and conservator of the pictures of the Vatican. He was also made chevalier of nearly all the orders in Italy, and member of the Legion of Honour. His chief works are the classical paintings of the "Assassination of Caesar," the "Death of Virginia," the "Devotion of the Roman Women," "Young Romulus and Remus," "Horatius Cocles," the "St Thomas," which was copied in mosaic for St Peter's, the "Presentation of Christ in the Temple" and a number of excellent portraits. He became a rich man, and made a fine collection of pictures which in 1856 were sold, a number of them (including Raphael's "Madonna with the Pink") being bought by the duke of Northumberland.

CAMULODUNUM, also written CAMALODŪNUM (mod. Colchester, *q.v.*), a British and Roman town. It was the capital of the British chief Cunobelin and is named on his coins: after his death and the Roman conquest of south Britain, the Romans established (about A.D. 48) a *colonia* or municipality peopled with discharged legionaries, and intended to serve both as an informal garrison and as a centre of Roman civilization. It was stormed and burnt A.D. 61 in the rising of Boadicea (*q.v.*), but soon recovered and became one of the chief towns in Roman Britain. Its walls and some other buildings still stand and abundant Roman remains enrich the local museum. The name denotes "the fortress of Camulos," the Celtic Mars.

CAMUS, ARMAND GASTON (1740–1804), French revolutionist, was a successful advocate before the Revolution. In 1789 he was elected by the third estate of Paris to the states general, and attracted attention by his speeches against social inequalities. Elected to the National Convention by the department of Haute-Loire, he was named member of the committee of general safety, and then sent as one of the commissioners charged with the surveillance of General C. F. Dumouriez. Delivered with his colleagues to the Austrians on the 3rd of April 1793, he was exchanged for the daughter of Louis XVI. in November 1795. He played an inconspicuous rôle in the council of the Five Hundred. On the 14th of August 1789 the Constituent Assembly made Camus its archivist, and in that capacity he organized the national archives, classified the papers of the different assemblies of the Revolution and drew up analytical tables of the *procès-verbaux*. He was restored to the office in 1796 and became absorbed in literary work. He remained an austere republican, refusing to take part in the Napoleonic régime.

CAMUS, CHARLES ÉTIENNE LOUIS (1699–1768), French mathematician and mechanician, was born at Crécy-en-Brie, near Meaux, on the 25th of August 1699. He studied mathematics, civil and military architecture, and astronomy, and became associate of the Académie des Sciences, professor of geometry, secretary to the Academy of Architecture and fellow of the Royal Society of London. In 1736 he accompanied Pierre Louis Maupertuis and Alexis Claude Clairaut in the expedition to Lapland for the measurement of a degree of the meridian. He died on the 2nd of February 1768. He was the author of a *Cours de mathématiques* (Paris, 1766), and a number of essays on mathematical and mechanical subjects (see Poggendorff, *Biog.-lit. Handwörterbuch*).

CAMUS, FRANÇOIS JOSEPH DES (1672–1732), French mechanician, was born near St Mihiel, on the 14th of September 1672. After studying for the church, he devoted himself to mechanical inventions, a number of which he described in his *Traité des forces mouvantes pour la pratique des arts et métiers*, Paris, 1722. He died in England in 1732.

CAMUS DE MÉZIÈRES, NICOLAS LE (1721–1789), French architect, was born at Paris on the 26th of March 1721, and died at the same city on the 27th of July 1789. He published several works on architectural and related subjects.

CANA, of Galilee, a village of Palestine remarkable as the home of Nathanael, and the scene of Christ's "beginning of miracles" (John ii. 1-11, iv. 46-54). Its site is unknown, but it is evident from the biblical narrative that it was in the neighbourhood of, and higher than, Capernaum. Opinion as to identification is fairly divided between Kefr Kenna and Kana-el-Jelil. The former, about 4 m. N.N.E. of Nazareth, contains a ruined church and a small Christian population; the latter is an uninhabited village about 9 m. N. of Nazareth, with no remains but a few cisterns.

CANAAN, CANAANITES. These geographical and ethnic terms have a shifting reference, which doubtless arises out of the migrations of the tribes to which the term "Canaanites" belongs. Thus in Josh. v. 1 the term seems to be applied to a population on the coast of the Mediterranean, and in Josh. xi. 3, Num. xiii. 29 (cf. also Gen. xiii. 12) not only to these, but to a people in the Jordan Valley. In Isa. xxiii. 11 it seems to be used of Phoenicia, and in Zeph. ii. 5 (where, however, the text is disputed) of Philistia. Most often it is applied comprehensively to the population of the entire west Jordan land and its pre-Israelitish inhabitants. This usage is characteristic of the writer called the Yahwist (J); see *e.g.* Gen. xii. 5, xxxiii. 18; Ex. xv. 15; Num. xxxiii. 51; Josh. xxii. 9; Judg. iii. 1; Ps. cvi. 38, and elsewhere. It was also, as Augustine tells us,[1] a usage of the Phoenicians to call their land "Canaan." This is confirmed by coins of the city of Laodicea by the Lebanon, which bear the legend, "Of Laodicea, a metropolis in Canaan"; these coins are dated under Antiochus IV. (175–164 B.C.), and his successors, Greek writers, too, tell us a fact of much interest, viz. that the original name of Phoenicia was χνα, *i.e.* Kĕna, a short, collateral form of Kena'an or Kan'an. The form Kan'an is favoured by the Egyptian usage. Seti I. is said to have conquered the Shasu, or Arabian nomads, from the fortress of Taru (Shūr?) to "the Ka-n-'-na," and Rameses III. to have built a temple to the god Amen in "the Ka-n-'-na." By this geographical name is probably meant all western Syria and Palestine with Raphia—"the (first) city of the Ka-n-'-na"—for the south-west boundary towards the desert.[2] In the letters sent by governors and princes of Palestine to their Egyptian overlord[3]—commonly known as the Tel-el-Amarna tablets—we find the two forms Kinaḫḫi and Kinaḫna, corresponding to Kena' and Kena'an respectively, and standing, as Ed. Meyer has shown, for Syria in its widest extent.

On the name "Canaan" Winckler remarks,[4] "There is at present no prospect of an etymological explanation." From the fact that Egyptian (though not Hebrew) scribes constantly prefix the article, we may suppose that it originally meant "the country of the Canaanites," just as the Hebrew phrase "the Lebanon" may originally have meant "the highlands of the Libnites"; and we are thus permitted to group the term "Canaan" with clan-names such as Achan, Akan, Jaakan, Anak (generally with the article prefixed), Kain, Kēnan. Nor are scholars more unanimous with regard to the region where the terms "Canaanite" and "Canaan" arose. It may be true that the term Kinaḫḫi in the Amarna letters corresponds to Syria and Palestine in their entirety. But this does not prove that the terms "Canaanite" and "Canaan" arose in that region, for they are presumably much older than the Amarna tablets. Let us refer at this point to a document in Genesis which is perhaps hardly estimated at its true value, the so-called Table of Peoples in Gen. x. Here we find "Canaan" included among the four sons of Ḥam. If Cush in *v.* 6 really means Ethiopia, and M-ṣ-r-i-m Egypt, and Puṭ the Libyans, and if Ḥam is really a Hebraized form of the old Egyptian name for Egypt, Kam-t (black),[5] the passage is puzzling in the extreme. But if, as has recently been suggested,[6] Cush, M-ṣ-r-i-m, and Puṭ are in north Arabia, and Ḥam is the short for Yarḥam or Yeraḥme'el (see 1 Chr. ii. 25-27, 42), a north Arabian name intimately associated with Caleb, all becomes clear, and Canaan in particular is shown to be an Arabian name. Now it is no mere hypothesis that beginning

[1] *Enarratio in Psalm civ.*
[2] W. M. Müller, *Asien und Europa*, p. 205.
[3] The letters are written in the official and diplomatic language—Babylonian, though "Canaanitish" words and idioms are not wanting.
[4] *Die Keilinschriften und das Alte Testament*, p. 181.
[5] These explanations are endorsed by Driver (*Genesis*, on Gen. x.).
[6] See the relevant articles in *Ency. Bib.* and Cheyne's *Genesis and Exodus.*

from about 4000 B.C.[1] a wave of Semitic migration poured out of Arabia, and flooded Babylonia certainly, and possibly, more or less, Syria and Palestine also. Also that between 2800 and 2600 B.C. a second wave from Arabia took the same course, covering not only Babylonia, but also Syria and Palestine and probably also Egypt (the Hyksos). It is soon after this that we meet with the great empire-builder and civilizer, Khammurabi (2267–2213), the first king of a united Babylonia. It is noteworthy that the first part of his name is identical with the name of the father of Canaan in Genesis (Ḥam or Kham), indicating his Arabian origin.[2] It was he, too, who restored the ancient supremacy of Babylonia over Syria and Palestine, and so prevented the Babylonizing of these countries from coming to an abrupt end.

We now understand how the Phoenicians, whose ancestors arrived in the second Semitic migration, came to call their land "Canaan." They had in fact the best right to do so. The first of the Canaanite immigrants were driven seawards by the masses which followed them. They settled in Phoenicia, and in after times became so great in commerce that "Canaanite" became a common Hebrew term for "merchant" (*e.g.* Isa. xxiii. 8). It is a plausible theory that in the conventional language of their inscriptions they preserved a number of geographical and religious phrases which, for them, had no clear meaning, and belonged properly to the land of their distant ancestors, Arabia.[3] For their own traditions as to their origin see PHOENICIA; we cannot venture to reject these altogether. The masses of immigrants which followed them may have borne the name of Amorites. A few words on this designation must here be given. Both within and without Palestine the name was famous.

First, as regards the Old Testament. We find "the Amorite" (a collective term) mentioned in the Table of Peoples (Gen. x. 16-18a) among other tribal names, the exact original reference of which had probably been forgotten. No one in fact would gather from this and parallel passages how important a part was played by the Amorites in the early history of Palestine. In Gen. xiv. 7 f., Josh. x. 5 f., Deut. i. 19 ff., 27, 44 we find them located in the southern mountain country, while in Num. xxi. 13, 21 f., Josh.ii.10, ix.10, xxiv.8, 12,&c. we hear of two great Amorite kings, residing respectively at Heshbon and Ashtaroth on the east of the Jordan. Quite different, however, is the view taken in Gen. xv. 16, xlviii. 22, Josh.xxiv.15, Judg. i. 34, Am. ii.9, 10, &c., where the name of Amorite is synonymous with "Canaanite," except that "Amorite" is never used for the population on the coast. Next, as to the extra-Biblical evidence. In the Egyptian inscriptions and in the Amarna tablets Amar and Amurru have a more limited meaning, being applied to the mountain-region east of Phoenicia, extending to the Orontes. Later on, Amurru became the Assyrian term for the interior of south as well as north Palestine, and at a still more recent period the term "the land of Ḫatti" (conventionally = Hittites) displaced "Amurru" so far as north Palestine is concerned (see HITTITES).

Thus the Phoenicians and the Amorites belong to the first stage of the second great Arabian migration. In the interval preceding the second stage Syria with Palestine became an Egyptian dependency, though the links with the sovereign power were not so strong as to prevent frequent local rebellions. Under Thothmes III. and Amen-hotep II. the pressure of a strong hand kept the Syrians and Canaanites sufficiently loyal to the Pharaohs. The reign of Amen-hotep III., however, was not quite so tranquil for the Asiatic province. Turbulent chiefs began to seek their opportunities, though as a rule they did not find them because they could not obtain the help of a neighbouring king.[4] The boldest of the disaffected was Aziru, son of Abd-ashirta, a prince of Amurru, who even before the death of Amen-hotep III. endeavoured to extend his power into the plain of Damascus. Akizzi, governor of Katna (near Homs or Hamath), reported this to the Pharaoh who seems to have frustrated the attempt. In the next reign, however, both father and son caused infinite trouble to loyal servants of Egypt like Rib-Addi, governor of Gubla (Gebal).

It was, first, the advance of the Ḫatti (Hittites) into Syria, which began in the time of Amen-hotep III., but became far more threatening in that of his successor, and next, the resumption of the second Arabian migration, which most seriously undermined the Egyptian power in Asia. Of the former we cannot speak here (see HITTITES), except so far as to remark the Abd-Ashirta and his son Aziru, though at first afraid of the Ḫatti, was afterwards clever enough to make a treaty with their king, and, with other external powers, to attack the districts which remained loyal to Egypt. In vain did Rib-Addi send touching appeals for aid to the distant Pharaoh, who was far too much engaged in his religious innovations to attend to such messages. What most interests us is the mention of troublesome invaders called sometimes *sa-gas* (a Babylonian ideogram meaning "robber"), sometimes Ḫabiri. Who are these Ḫabiri? Not, as was at first thought by some, specially the Israelites, but all those tribes of land-hungry nomads ("Hebrews") who were attracted by the wealth and luxury of the settled regions, and sought to appropriate it for themselves. Among these we may include not only the Israelites or tribes which afterwards became Israelitish, but the Moabites, Ammonites and Edomites. We meet with the Ḫabiri in north Syria. Itakkama writes thus to the Pharaoh,[5] "Behold, Namyawaza has surrendered all the cities of the king, my lord, to the SA-GAS in the land of Kadesh and in Ubi. But I will go, and if thy gods and thy sun go before me, I will bring back the cities to the king, my lord, from the Ḫabiri, to show myself subject to him; and I will expel the SA-GAS." Similarly Zimrida, king of Sidon, declares, "All my cities which the king has given into my hand, have come into the hand of the Ḫabiri."[6] Nor had Palestine any immunity from the Arabian invaders. The king of *Jerusalem*, Abd-Ḫiba, the second part of whose name has been thought to represent the Hebrew Yahweh,[7] reports thus to the Pharaoh, "If (Egyptian) troops come this year, lands and princes will remain to the king, my lord; but if troops come not, these lands and princes will not remain to the king, my lord.[8] Abd-Ḫiba's chief trouble arose from persons called Milkili and the sons of Lapaya, who are said to have entered into a treasonable league with the Ḫabiri. Apparently this restless warrior found his death at the siege of Gina.[9] All these princes, however, malign each other in their letters to the Pharaoh, and protest their own innocence of traitorous intentions. Namyawaza, for instance, whom Itakkama (see above) accuses of disloyalty, writes thus to the Pharaoh, "Behold, I and my warriors and my chariots, together with my brethren and my SA-GAS, and my Suti[10] are at the disposal of the (royal) troops, to go whithersoever the king, my lord, commands."[11] This petty prince, therefore, sees no harm in having a band of Arabians for his garrison, as indeed Hezekiah long afterwards had his Urbi to help him against Sennacherib.

From the same period we have recently derived fresh and important evidence as to pre-Israelitish Palestine. As soon as the material gathered is large enough to be thoroughly classified and critically examined, a true history of early Palestine will be within measurable distance. At present, there are five places whence the new evidence has been obtained: 1. Tell-el-Hasy, generally identified with the Lachish of the Old Testament. Excavations were made here in 1890–1892 by Flinders Petrie and Bliss. 2. Gezer, plausibly identified with the Gezer of 1 Kings ix. 16. Here R. A. S. Macalister began excavating in 1902. 3. Tell-eṣ-Ṣafy, possibly the Gath of the Old Testament, 6 m.from Eleutheropolis. Here F. J. Bliss and R. A. S. Macalister made

[1] For the grounds of these dates see Winckler, *Gesch. Isr.* i. 127 f.; Paton, *Early Hist. of Syria and Palestine* (1902), pp. 6-8, 25-28.

[2] It is true the Babylonians themselves interpreted the name differently (5 R. 44 a b 21), *kimta rapashtum*, "wide family." That, however, is only a natural protest against what we may call Canaanism or Arabism.

[3] See Cheyne, *Genesis and Exodus* (on Gen. i. 26), and cf. G. A. Cooke, *N. Sem. Inscriptions* (*e.g.* pp. 30-40, on Eshmunazar's inscription).

[4] See *Amarna Letters*, Winckler's edition, No. 7.

[5] *Op. cit.* No. 146.

[6] *Op. cit.* No. 147.

[7] Johns, *Assyrian Deeds*, iii. p. 16.

[8] *Amarna Letters*, No. 180 (xi. 20-24).

[9] *Ibid.* No. 164 (xi. 15-18).

[10] Nomads of the Syrian desert.

[11] *Amarna Letters*, No. 144 (xi. 24-32).

some discoveries in 1899–1900. A complete examination of the site, however, was impossible. 4. Tell-el-Mutasellim, near Lejjūn (Megiddo-Legio). Schumacher began working here in 1903 for the German Palestine Society. 5. Taannek, on the south of the plain of Esdraelon. Here Prof. Ernst Sellin of Vienna was able to do much in a short time (1902–1904). It may be mentioned here that on the first of these sites a cuneiform tablet belonging to the Amarna series was discovered; at Gezer, a deed of sale; at Tell-el-Hasy the remains of a Babylonian stele, three seals, and three cylinders with Babylonian mythological representations; at Tell-el-Mutasellim, a seal bearing a Babylonian legend, and at Taannek, twelve tablets and fragments of tablets were found near the fragments of the terra-cotta box in which they were stored. It is a remarkable fact that the kings or chiefs of the neighbourhood should have used Babylonian cuneiform in their own official correspondence. But much beside tablets has been found on these sites; primitive sanctuaries, for instance. The splendid alignment of monoliths at Gezer is described in detail in *P.E.F. Quart. Statement*, January 1903, p. 23, and July 1903, p. 219. There is reason, as Macalister thinks, to believe that it is the result of a gradual development, beginning with two small pillars, and gradually enlarging by later additions. There is a smaller one at Tell-eṣ-Ṣafy. The Semitic cult of sacred standing stones is thus proved to be of great antiquity; Sellin's discoveries at Taannek and those of Bliss at Tell-eṣ-Ṣafy fully confirm this. Rock-hewn altars have also been found, illustrating the prohibition in Ex. xx. 25, 26, and numerous jars with the skeletons of infants. We cannot doubt that the sacrificing of children was practised on a large scale among the Canaanites. Their chief deity was Ashtart (Astarte), the goddess of fertility. Numerous images of her have been found, but none of the god Baal. The types of the divine form vary in the different places. The other images which have been found represent Egyptian deities. We must not, however, infer that there was a large Egyptian element in the Canaanitish Pantheon. What the images do prove is the large amount of intercourse between Egypt and Canaan, and the presence of Egyptians in the subject country.

See the *Tell-el-Amarna Letters*, ed. by Winckler, with translation (1896); the reports of Macalister in the Pal. Expl. Fund Statements from 1903 onwards; Sellin's report of excavations at Tell Ta'annek; also H. W. Hogg, "Recent Assyriology," &c., in *Inaugural Lectures* ed. by Prof. A. S. Peake (Manchester University, 1905). On Biblical questions, see Dillmann's commentaries and the Bible dictionaries. See further articles PALESTINE; JEWS. (T. K. C.)

CANACHUS, a sculptor of Sicyon in Achaea, of the latter part of the 6th century B.C. He was especially noted as the author of two great statues of Apollo, one in bronze made for the temple at Miletus, and one in cedar wood made for Thebes. The coins of Miletus furnish us with copies of the former and show the god to have held a stag in one hand and a bow in the other. The rigidity of these works naturally impressed later critics.

CANADA. The Dominion of Canada comprises the northern half of the continent of North America and its adjacent islands, excepting Alaska, which belongs to the United States, and Newfoundland, still a separate colony of the British empire. Its boundary on the south is the parallel of latitude 49°, between the Pacific Ocean and Lake-of-the-Woods, then a chain of small lakes and rivers eastward to the mouth of Pigeon river on the north-west side of Lake Superior, and the Great Lakes with their connecting rivers to Cornwall, on the St Lawrence. From this eastward to the state of Maine the boundary is an artificial line nearly corresponding to lat. 45°; then an irregular line partly determined by watersheds and rivers divides Canada from Maine, coming out on the Bay of Fundy. The western boundary is the Pacific on the south, an irregular line a few miles inland from the coast along the "pan handle" of Alaska to Mount St Elias, and the meridian of 141° to the Arctic Ocean. A somewhat similar relationship cuts off Canada from the Atlantic on the east, the north-eastern coast of Labrador belonging to Newfoundland.

Physical Geography.—In spite of these restrictions of its natural coast line on both the Atlantic and the Pacific, Canada is admirably provided with harbours on both oceans. The Gulf of St Lawrence with its much indented shores and the coast of Nova Scotia and New Brunswick supply endless harbours, the northern ones closed by ice in the winter, but the southern ones open all the year round; and on the Pacific British Columbia is deeply fringed with islands and fjords with well-sheltered harbours everywhere, in strong contrast with the unbroken shore of the United States to the south. The long stretches of sheltered navigation from the Straits of Belle Isle north of Newfoundland to Quebec, and for 600 m. on the British Columbian coast, are of great advantage for the coasting trade. The greatly varied Arctic coast line of Canada with its large islands, inlets and channels is too much clogged with ice to be of much practical use, but Hudson Bay, a mediterranean sea 850 m. long from north to south and 600 m. wide, with its outlet Hudson Strait, has long been navigated by trading ships and whalers, and may become a great outlet for the wheat of western Canada, though closed by ice except for four months in the summer. Of the nine provinces of Canada only two have no coast line on salt water, the western prairie provinces of Alberta and Saskatchewan; but Manitoba and Ontario have a seaboard only on Hudson Bay and its southern extension James Bay respectively, and there is no probability that the shallow harbours of the latter bay will ever be of much importance for shipping, though Churchill Harbour on the west side of Hudson Bay may become an important grain port. What Ontario lacks in salt water navigation is, however, made up by the busy traffic of the Great Lakes.

The physical features of Canada are comparatively simple, and drawn on a large scale, more than half of its surface sloping gently inwards towards the shallow basin of Hudson Bay, with higher margins to the south-east and south-west. In the main it is a broad trough, wider towards the north than towards the south, and unsymmetrical, Hudson Bay occupying much of its north-eastern part, while to the west broad plains rise gradually to the foot-hills of the Rocky Mountains, the eastern member of the Cordillera which follows the Pacific coast of America. The physical geography of Canada is so closely bound up with its geology that at least an outline of the geological factors involved in its history is necessary to understand the present physiography. The mountain structures originated in three great orogenic periods, the earliest in the Archean, the second at the end of the Palaeozoic and the third at the end of the Mesozoic.

Geology.

The Archean mountain chains, which enclosed the present region of Hudson Bay, were so ancient that they had already been worn down almost to a plain before the early Palaeozoic sediments were laid down. This ruling geological and physical feature of the North American continent has been named by E. Suess the "Canadian Shield." Round it the Palaeozoic sands and clays, largely derived from its own waste, were deposited as nearly horizontal beds, in many places still almost undisturbed. Later the sediments lying to the south-east of this "protaxis," or nucleus of the continent, were pushed against its edge and raised into the Appalachian chain of mountains, which, however, extends only a short distance into Canada. The Mesozoic sediments were almost entirely laid down to the west and south-west of the protaxis, upon the flat-lying Palaeozoic rocks, and in the prairie region they are still almost horizontal; but in the Cordillera they have been thrust up into the series of mountain chains characterizing the Pacific coast region. The youngest of these mountain chains is naturally the highest, and the oldest one in most places no longer rises to heights deserving the name of mountains. Owing to this unsymmetric development of North America the main structural watershed is towards its western side, on the south coinciding with the Rocky Mountains proper, but to the northward falling back to ranges situated further west in the same mountain region. The great central area of Canada is drained towards Hudson Bay, but its two largest rivers have separate watersheds, the Mackenzie flowing north-west to the Arctic Ocean and the St Lawrence north-east towards the Atlantic, the one to the south-west and the other to the south-east of the Archean protaxis. While

these ancient events shaped the topography in a broad way, its final development was comparatively recent, during the glacial period, when the loose materials were scoured from some regions and spread out as boulder clay, or piled up as moraines in others; and the original water-ways were blocked in many places. The retreat of the ice left Canada much in its present condition except for certain post-glacial changes of level which seem to be still in progress. For this reason the region has a very youthful topography with innumerable lakes and waterfalls as evidence that the rivers have not long been at work. The uneven carving down of the older mountain systems, especially that of the Archean protaxis, and the disorderly scattering of glacial material provide most of the lake basins so characteristic of Canada.

Lakes and Rivers.—As a result of the geological causes just mentioned many parts of Canada are lavishly strewn with lakes of all sizes and shapes, from bodies of water hundreds of miles long and a thousand feet deep to ponds lost to sight in the forest. Thousands of these lakes have been mapped more or less carefully, and every new survey brings to light small lakes hitherto unknown to the white man. For numbers they can be compared only with those of Finland and Scandinavia in Europe, and for size with those of eastern Africa; but for the great extent of lake-filled country there is no comparison. From the map it will be noticed that the largest and most thickly strewn lakes occur within five hundred or a thousand miles of Hudson Bay, and belong to the Archean protaxis or project beyond its edges into the Palaeozoic sedimentary rocks which lean against it. The most famous of the lakes are those of the St Lawrence system, which form part of the southern boundary of Canada and are shared with the United States; but many others have the right to be called "Great Lakes" from their magnitude. There are nine others which have a length of more than 100 m., and thirty-five which are more than 50 m. long. Within the Archean protaxis they are of the most varied shapes, since they represent merely portions of the irregular surface inundated by some morainic dam at the lowest point. Comparatively few have simple outlines and an unbroken surface of water, the great majority running into long irregular bays and containing many islands, sometimes even thousands in number, as in Georgian Bay and Lake-of-the-Woods. In the Cordilleran region on the other hand the lakes are long, narrow and deep, in reality sections of mountain valleys occupied by fresh water, just as the fjords of the adjoining coast are valleys occupied by the sea. The lakes of the different regions present the same features as the nearest sea coasts but on a smaller scale. The majority of the lakes have rocky shores and islands and great variety of depth, many of the smaller ones, however, are rimmed with marshes and are slowly filling up with vegetable matter, ultimately becoming peat bogs, the *muskegs* of the Indian. Most of Canada is so well watered that the lakes have outlets and are kept fresh, but there are a few small lakes in southern Saskatchewan, *e.g.* the Quill and Old Wives lakes, in regions arid enough to require no outlets. In such cases the waters are alkaline, and contain various salts in solution which are deposited as a white rim round the basin towards the end of the summer when the amount of water has been greatly reduced by evaporation. It is interesting to find maritime plants, such as the samphire, growing on their shores a thousand miles from the sea and more than a thousand feet above it. In many cases the lakes of Canada simply spill over at the lowest point from one basin into the next below, making chains of lakes with no long or well-defined channels between, since in so young a country there has not yet been time for the rivers to have carved wide valleys. Thus canoe navigation may be carried on for hundreds of miles, with here and there a waterfall or a rapid requiring a portage of a few hundred yards or at most a mile or two. The river systems are therefore in many cases complex and tortuous, and very often the successive connecting links between the lakes receive different names. The best example of this is the familiar one of the St Lawrence, which may be said to begin as Nipigon river and to take the names St Mary's, St Clair, Detroit and Niagara, before finally flowing from Lake Ontario to the sea under its proper name. As these lakes are great reservoirs and settling basins, the rivers which empty them are unusually steady in level and contain beautifully clear water. The St Lawrence varies only a few feet in the year and always has pellucid bluish-green water, while the Mississippi, whose tributaries begin only a short distance south of the Great Lakes, varies 40 ft. or more between high- and low-water and is loaded with mud. The St Lawrence is far the most important Canadian river from the historic and economic points of view, since it provided the main artery of exploration in early days, and with its canals past rapids and between lakes still serves as a great highway of trade between the interior of the continent and the seaports of Montreal and Quebec. It is probable that politically Canada would have followed the course of the States to the south but for the planting of a French colony with widely extended trading posts along the easily ascended channel of the St Lawrence and the Great Lakes, so that this river was the ultimate bond of union between Canada and the empire.

North of the divide between the St Lawrence system and Hudson Bay there are many large rivers converging on that inland sea, such as Whale river, Big river, East Main, Rupert and Nottaway rivers coming in from Ungava and northern Quebec; Moose and Albany rivers with important tributaries from northern Ontario; and Severn, Nelson and Churchill rivers from the south-west. All of these are rapid and shallow, affording navigation only for canoes; but the largest of them, Nelson river, drains the great Manitoban lakes, Winnipeg, Winnipegosis and Manitoba, which are frequented by steamers, and receive the waters of Lake-of-the-Woods, Lake Seul and many others emptying into Winnipeg river from Ontario; of Red river coming in from the United States to the south; and of the southern parts of the Rocky Mountains and the western prairie provinces drained by the great Saskatchewan river. The parallel of 49° approximately separates the Saskatchewan waters from the streams going south to the Missouri, though a few small tributaries of the latter river begin on Canadian territory.

The northern part of Alberta and Saskatchewan and much of northern British Columbia are drained through the Athabasca and Peace rivers, first north-eastwards towards Athabasca Lake, then north through Slave river to Great Slave Lake, and finally north-west through Mackenzie river to the Arctic Ocean. If measured to the head of Peace river the Mackenzie has a length of more than 2000 m., and it provides more than 1000 m. of navigation for stern-wheel steamers. Unfortunately, like other northward-flowing rivers, it does not lead down to a frequented sea, and so bears little traffic except for the northern fur-trading posts. The Mackenzie forms a large but little-known delta in lat. 69°, and in its flood season the head-waters pour down their torrents before the thick ice of the lower part with its severer climate has yet given way, piling up the ice in great barriers and giving rise to widespread floods along the lower reaches. Similar flooding takes place in several other important northward-flowing rivers in Canada, the St Lawrence at Montreal affording the best-known instance. Second among the great north-western rivers is the Yukon, which begins its course about 18 m. from tide-water on an arm of the Pacific, 2800 ft. above the sea and just within the Canadian border. It flows first to the north, then to the north-west, passing out of the Yukon territory into Alaska, and then south-west, ending in Bering Sea, the northward projection of the Pacific, 2000 m. from its head-waters. Of its course 1800 m. are continuously navigable for suitable steamers, so that most of the traffic connected with the rich Klondike gold-fields passes over its waters. The rest of the rivers flowing into the Pacific pass through British Columbia and are much shorter, though the two southern ones carry a great volume of water owing to the heavy precipitation of snow and rain in the Cordilleran region. The Columbia is the largest, but after flowing north-west and then south for about 400 m., it passes into the United States. With its expansions, the narrow and deep Arrow lakes, it is an important waterway in the Kootenay region. The Fraser, next in size but farther north, follows a similar course, entering the sea at Vancouver; while the Skeena and Stikine in northern British Columbia are much

shorter and smaller, owing to the encroachments of Peace and Liard rivers, tributaries of the Nelson, on the Cordilleran territory. All of these rivers are waterways of some importance in their lower course, and are navigated by powerful stern-wheel boats supplying the posts and mining camps of the interior with their requirements. In most cases they reach the coast through deep valleys or profound canyons, and the transcontinental railways find their way beside them, the Canadian Pacific following at first tributaries of the Columbia near its great bend, and afterwards Thompson river and the Fraser; while the Grand Trunk Pacific makes use of the valley of the Skeena and its tributaries. The divide between the rivers flowing west and those flowing east and north is very sharp in the southern Rocky Mountains, but there are two lakes, the Committee's Punch Bowl and Fortress Lake, right astride of it, sending their waters both east and west; and there is a mountain somewhat south of Fortress Lake whose melting snows drain in three directions into tributaries of the Columbia, the Saskatchewan and the Athabasca, so that they are distributed between the Pacific, the Atlantic (Hudson Bay) and the Arctic Oceans. The divide between the St Lawrence and Hudson Bay in eastern Canada also presents one or two lakes draining each way, but in a much less striking position, since the water-parting is flat and boggy instead of being a lofty range of mountains. The rivers of Canada, except the St Lawrence, are losing their importance as means of communication from year to year, as railways spread over the interior and cross the mountains to the Pacific; but from the point of view of the physical geographer there are few things more remarkable than the intricate and comprehensive way, in which they drain the country. As most of the Canadian rivers have waterfalls on their course, they must become of more and more importance as sources of power. The St Lawrence system, for instance, generates many thousand horse-power at Sault Ste Marie, Niagara and the Lachine rapids. All the larger cities of Canada make use of water power in this way, and many new enterprises of the kind are projected in eastern Canada; but the thousands of feet of fall of the rivers in the Rocky Mountain region are still almost untouched, though they will some day find use in manufactures like those of Switzerland.

The Archean Protaxis.—The broad geological and geographical relationships of the country have already been outlined, but the more important sub-divisions may now be taken up with more detail, and for that purpose five areas may be distinguished, much the largest being the Archean protaxis, covering about 2,000,000 sq. m. It includes Labrador, Ungava and most of Quebec on the east, northern Ontario on the south; and the western boundary runs from Lake-of-the-Woods north-west to the Arctic Ocean near the mouth of Mackenzie river. The southern parts of the Arctic islands, especially Banksland, belong to it also. This vast area, shaped like a broad-limbed V or U, with Hudson Bay in the centre, is made up chiefly of monotonous and barren Laurentian gneiss and granite; but scattered through it are important stretches of Keewatin and Huronian rocks intricately folded as synclines in the gneiss, as suggested earlier, the bases of ancient mountain ranges. The Keewatin and Huronian, consisting of greenstones, schists and more or less metamorphosed sedimentary rocks, are of special interest for their ore deposits, which include most of the important metals, particularly iron, nickel, copper and silver. The southern portion of the protaxis is now being opened up by railways, but the far greater northern part is known only along the lakes and rivers which are navigable by canoe. Though once consisting of great mountain ranges there are now no lofty elevations in the region except along the Atlantic border in Labrador, where summits of the Nachvak Mountains are said to reach 6000 ft. or more. In every other part the surface is hilly or mammilated, the harder rocks, such as granite or greenstone, rising as rounded knobs, or in the case of schists forming narrow ridges, while the softer parts form valleys generally floored with lakes. From the summit of any of the higher hills one sees that the region is really a somewhat dissected plain, for all the hills rise to about the same level with a uniform skyline at the horizon. The Archean protaxis is sometimes spoken of as a plateau, but probably half of it falls below 1000 ft. The lowland part includes from 100 to 500 m. all round the shore of Hudson Bay, and extends south-west to the edge of the Palaeozoic rocks on Lake Winnipeg. Outwards from the bay the level rises slowly to an average of about 1500 ft., but seldom reaches 2000 ft. except at a few points near Lake Superior and on the eastern coast of Labrador. In most parts the Laurentian hills are bare *roches moutonnées* scoured by the glaciers of the Ice Age, but a broad band of clay land extends across northern Quebec and Ontario just north of the divide. The edges of the protaxis are in general its highest parts, and the rivers flowing outwards often have a descent of several hundred feet in a few miles towards the Great Lakes, the St Lawrence or the Atlantic, and in some cases they have cut back deep gorges or canyons into the tableland. The waterfalls are utilized at a few points to work up into wood pulp the forests of spruce which cover much of Labrador, Quebec and Ontario. Most of the pine that formerly grew on the Archean at the northern fringe of the settlements has been cut, but the lumberman is still advancing northwards and approaching the northern limit of the famous Canadian white pine forests, beyond which spruces, tamarack (larch) and poplar are the prevalent trees. As one advances northward the timber grows smaller and includes fewer species of trees, and finally the timber line is reached, near Churchill on the west coast of Hudson Bay and somewhat farther south on the Labrador side. Beyond this to the north are the "barren grounds" on which herds of caribou (reindeer) and musk ox pasture, migrating from north to south according to the season. There are no permanent ice sheets known on the mainland of north-eastern Canada, but some of the larger islands to the north of Hudson Bay and Straits are partially covered with glaciers on their higher points. Unless by its mineral resources, of which scarcely anything is known, the barren grounds can never support a white population and have little to tempt even the Indian or Eskimo, who visit it occasionally in summer to hunt the deer in their migrations.

The Acadian Region.—The "maritime provinces" of eastern Canada, including Nova Scotia, New Brunswick and Prince Edward Island, may be considered together; and to these provinces as politically bounded may be added, from a physical point of view, the analogous south-eastern part of Quebec—the entire area being designated the Acadian region. Taken as a whole, this eastern part of Canada, with a very irregular and extended coast-line on the Gulf of St Lawrence and the Atlantic, may be regarded as a northern continuation of the Appalachian mountain system that runs parallel to the Atlantic coast of the United States. The rocks underlying it have been subjected to successive foldings and crumplings by forces acting chiefly from the direction of the Atlantic Ocean, with alternating prolonged periods of waste and denudation. The main axis of disturbance and the highest remaining land runs through the south-eastern part of Quebec, forming the Notre Dame Mountains, and terminates in the Gaspé peninsula as the Shickshock Mountains. The first-named seldom exceed 1500 ft. in height, but the Shickshocks rise above 3000 ft. The province of New Brunswick exhibits approximately parallel but subordinate ridges, with wide intervening areas of nearly flat Silurian and Carboniferous rocks. The peninsula of Nova Scotia, connected by a narrow neck with New Brunswick, is formed by still another and more definite system of parallel ridges, deeply fretted on all sides by bays and harbours. A series of quartzites and slates referred to the Cambrian, and holding numerous and important veins of auriferous quartz, characterize its Atlantic or south-eastern side, while valuable coal-fields occur in Cape Breton and on parts of its shores on the Gulf of St Lawrence. In New Brunswick the Carboniferous rocks occupy a large area, but the coal seams so far developed are thin and unimportant. Metalliferous ores of various kinds occur both in Nova Scotia and in this province, but with the exception of the gold already mentioned, have not yet become the objects of important industries. Copper and asbestos are the principal mineral products of that part of Quebec included in the region now under

description, although many other minerals are known and already worked to some extent. Extensive tracts of good arable land exist in many parts of the Acadian region. Its surface was originally almost entirely wooded, and the products of the forest continue to hold a prominent place. Prince Edward Island, the smallest province of Canada, is low and undulating, based on Permo-Carboniferous and Triassic rocks affording a red and very fertile soil, much of which is under cultivation.

The St Lawrence Plain.—As the St Lawrence invited the earliest settlers to Canada and gave the easiest communication with the Old World, it is not surprising to find the wealthiest and most populous part of the country on its shores and near the Great Lakes which it leads up to; and this early development was greatly helped by the flat and fertile plain which follows it inland for over 600 m. from the city of Quebec to Lake Huron. This affords the largest stretch of arable land in eastern Canada, including the southern parts of Ontario and Quebec with an area of some 38,000 sq. m. In Quebec the chief portion is south of the St Lawrence on the low plain extending from Montreal to the mountains of the "Eastern Townships," while in Ontario it extends from the Archean on the north to the St Lawrence and Lakes Ontario, Erie and Huron. The whole region is underlain by nearly horizontal and undisturbed rocks of the Palaeozoic from the Devonian downward. Superimposed on these rocks are Pleistocene boulder clay, and clay and sand deposited in post-glacial lakes or an extension of the Gulf of St Lawrence. Though petroleum and salt occur in the south-west peninsula of Ontario, metalliferous deposits are wanting, and the real wealth of this district lies in its soil and climate, which permit the growth of all the products of temperate regions. Georgian Bay and the northern part of Lake Huron with the whole northern margin of Lake Superior bathe the foot of the Laurentian plateau, which rises directly from these lakes; so that the older fertile lands of the country with their numerous cities and largely-developed manufactures are cut off by an elevated, rocky and mostly forest-covered tract of the Archean from the newer and far more extensive farm lands of the west. For many years this southern projection of the northern wilderness was spanned by only one railway, and offered a serious hindrance to the development of the regions beyond; but settlements are now spreading to the north and rapidly filling up the gap between east and west.

The Interior Continental Plain.—Passing westward by rail from the forest-covered Archean with its rugged granite hills, the flat prairie of Manitoba with its rich grasses and multitude of flowers comes as a very striking contrast, introducing the Interior Continental plain in its most typical development. This great plain runs north-westward between the border of the Archean protaxis and the line of the Rocky Mountains, including most of Manitoba, the southern part of Saskatchewan and most of Alberta. At the international boundary in lat. 49° it is 800 m. wide, but in lat. 56° it has narrowed to 400 m. in width, and to the north of lat. 62° it is still narrower and somewhat interrupted, but preserves its main physical features to the Arctic Ocean about the mouth of the Mackenzie. This interior plain of the continent represents the area of the ancient sea by which it was occupied in Mesozoic times, with a more ancient margin towards the north-west against the Archean, where undisturbed limestones and other rocks of the Silurian and Devonian rest upon the downward slope of the Laurentian Shield. Most of the plains are underlain by Cretaceous and early Tertiary shales and sandstones lying nearly unaltered and undisturbed where they were deposited, although now raised far above sea-level, particularly along the border of the Rocky Mountains where they were thrust up into foot-hills when the range itself was raised. These strata have been subjected to great denudation, but owing to their comparatively soft character this has been, in the main, nearly uniform, and has produced no very bold features of relief. Coal and lignitic coal are the principal economic minerals met with in this central plain, though natural gas occurs and is put to use near Medicine Hat, and "tar sands" along the north-eastern edge of the Cretaceous indicate the presence of petroleum. Its chief value lies in its vast tracts of fertile soil, now rapidly filling up with settlers from all parts of the world, and the grassy uplands in the foot-hill region affording perennial pasturage for the cattle, horses and sheep of the rancher. Though the region is spoken of as a plain there are really great differences of level between the highest parts in south-western Alberta, 4500 ft. above the sea, and the lowest in the region of Lake Winnipeg, where the prairie is at an elevation of only 800 ft. The very flat and rich prairie near Winnipeg is the former bed of the glacial Lake Agassiz; but most of the prairie to the west is of a gently rolling character and there are two rather abrupt breaks in the plain, the most westerly one receiving the name of the Missouri Coteau. The first step represents a rise to 1600 ft., and the second to 3000 ft. on an average. In so flat a country any elevation of a few hundred feet is remarkable and is called a mountain, so that Manitoba has its Duck and Riding mountains. More important than the hills are the narrow and often rather deep river valleys cut below the general level, exposing the soft rocks of the Cretaceous and in many places seams of lignite. When not too deep the river channels may be traced from afar across the prairie by the winding band of trees growing beside the water. The treeless part of the plains, the prairie proper, has a triangular shape with an area twice as large as that of Great Britain. North of the Saskatchewan river groves or "bluffs" of trees begin, and somewhat farther north the plains are generally wooded, because of the slightly more humid climate. It has been proved, however, that certain kinds of trees if protected will grow also on the prairie, as may be seen around many of the older farmsteads. In the central southern regions the climate is arid enough to permit of "alkaline" ponds and lakes, which may completely dry up in summer, and where a supply of drinking-water is often hard to obtain, though the land itself is fertile.

The Cordilleran Belt.—The Rocky Mountain region as a whole, best named the Cordillera or Cordilleran belt, includes several parallel ranges of mountains of different structures and ages, the eastern one constituting the Rocky Mountains proper. This band of mountains 400 m. wide covers towards the south almost all of British Columbia and a strip of Alberta east of the watershed, and towards the north forms the whole of the Yukon Territory. While it is throughout essentially a mountainous country, very complicated in its orographic features and interlocking river systems, two principal mountain axes form its ruling features—the Rocky Mountains proper, above referred to, and the Coast Ranges. Between them are many other ranges shorter and less regular in trend, such as the Selkirk Mountains, the Gold Ranges and the Caribou Mountains. There is also in the southern inland region an interior plateau, once probably a peneplain, but now elevated and greatly dissected by river valleys, which extends north-westward for 500 m. with a width of about 100 m. and affords the largest areas of arable and pasture land in British Columbia. Similar wide tracts of less broken country occur, after a mountainous interruption, in northern British Columbia and to some extent in the Yukon Territory, where wide valleys and rolling hills alternate with short mountain ranges of no great altitude. The Pacific border of the coast range of British Columbia is ragged with fjords and channels, where large steamers may go 50 or 100 m. inland between mountainous walls as on the coast of Norway; and there is also a bordering mountain system partly submerged forming Vancouver Island and the Queen Charlotte Islands. The highest mountains of the Cordillera in Canada are near the southern end of the boundary separating Alaska from the Yukon Territory, the meridian of 141°, and they include Mount Logan (19,540 ft.) and Mount St Elias (18,000 ft.), while the highest peak in North America, Mount McKinley (20,000 ft.), is not far to the north-west in Alaska. This knot of very lofty mountains, with Mount Fairweather and some others, all snowy and glacier-clad for almost their whole height, are quite isolated from the highest points of the Rocky Mountains proper, which are 1000 m. to the south-east.. Near the height of land between British Columbia and Alberta there are many peaks which rise from 10,000 to 12,000 ft. above sea-level, the highest which has been

carefully measured being Mount Robson (13,700 ft.). The next range to the east, the Selkirks, has several summits that reach 10,000 ft. or over, while the Coast Ranges scarcely go beyond 9000 ft. The snow line in the south is from 7500 to 9000 ft. above sea-level, being lower on the Pacific side where the heaviest snowfall comes in winter than on the drier north-eastern side. The snow line gradually sinks as one advances north-west, reaching only 2000 or 3000 ft. on the Alaskan coast. The Rockies and Selkirks support thousands of glaciers, mostly not very large, but having some 50 or 100 sq. m. of snowfield. All the glaciers are now in retreat, with old tree-covered moraines, hundreds or thousands of feet lower down the valley. The timber line is at about 7500 ft. in southern British Columbia and 4000 ft. in the interior of the Yukon Territory. On the westward slopes, especially of the Selkirks and Coast Ranges, vegetation is almost tropical in its density and luxuriance, the giant cedar and the Douglas fir sometimes having diameters of 10 ft. or more and rising to the height of 150 ft. On the eastern flanks of the ranges the forest is much thinner, and on the interior plateau and in many of the valleys largely gives way to open grass land. The several ranges of the Cordillera show very different types of structure and were formed at different ages, the Selkirks with their core of pre-Cambrian granite, gneiss and schists coming first, then the Coast Ranges, which seem to have been elevated in Cretaceous times, formed mainly by a great upwelling of granite and diorite as batholiths along the margin of the continent and sedimentary rocks lying as remnants on their flanks; and finally the Rocky Mountains in the Laramie or early Eocene, after the close of the Cretaceous. This latest and also highest range was formed by tremendous thrusts from the Pacific side, crumpling and folding the ancient sedimentary rocks, which run from the Cambrian to the Cretaceous, and faulting them along overturned folds. The outer ranges in Alberta have usually the form of tilted blocks with a steep cliff towards the north-east and a gentler slope, corresponding to the dip of the beds, towards the south-west. Near the centre of the range there are broader foldings, carved into castle and cathedral shapes. The most easterly range has been shown to have been actually pushed 7 m. out upon the prairies. In the Rocky Mountains proper no eruptive rocks have broken through, so that no ore deposits of importance are known from them, but in the Cretaceous synclines which they enclose valuable coal basins exist. Coal of a bituminous and also semi-anthracite kind is produced, the best mined on the Pacific slope of the continent, the coking coals of the Fernie region supplying the fuel of the great metal mining districts of the Kootenays in British Columbia, and of Montana and other states to the south. The Selkirks and Gold Ranges west of the Rockies, with their great areas of eruptive rocks, both ancient and modern, include most of the important mines of gold, silver, copper and lead which give British Columbia its leadership among the Canadian provinces as a producer of metals. In early days the placer gold mines of the Columbia, Fraser and Caribou attracted miners from everywhere, but these have declined, and lode mines supply most of the gold as well as the other metals. The Coast Ranges and islands also include many mines, especially of copper, but up to the present of less value than those inland. Most of the mining development is in southern British Columbia, where a network of railways and waterways gives easy access; but as means of communication improve to the north a similar development may be looked for there. The Atlin and White Horse regions in northern British Columbia and southern Yukon have attracted much attention, and the Klondike placers still farther north have furnished many millions of dollars' worth of gold. Summing up the economic features of the Cordilleran belt, it includes many of the best coal-mines and the most extensive deposits of gold, copper, lead and zinc of the Dominion, while in silver, nickel and iron Ontario takes the lead. When its vast area stretching from the international boundary to beyond the Arctic circle is opened up, it may be expected to prove the counterpart of the great mining region of the Cordillera in the United States to the south.

Climate.—In a country like Canada ranging from lat. 42° to the Arctic regions and touching three oceans, there must be great variations of climate. If placed upon Europe it would extend from Rome to the North Cape, but latitude is of course only one of the factors influencing climate, the arrangement of the ocean currents and of the areas of high and low pressure making a very wide difference between the climates of the two sides of the Atlantic. In reality the Pacific coast of Canada, rather than the Atlantic coast, should be compared with western Europe, the south-west corner of British Columbia, in lat. 48° to 50°, having a climate very similar to the southern coast of England. In Canada the isotherms by no means follow parallels of latitude, especially in summer when in the western half of the country they run nearly north-west and south-east; so that the average temperature of 55° is found about on the Arctic circle in the Mackenzie river valley, in lat. 50° near the Lake-of-the-Woods, in lat. 55° at the northern end of James Bay, and in lat. 49° on Anticosti in the Gulf of St Lawrence. The proximity of the sea or of great lakes, the elevation and the direction of mountain chains, the usual path of storms and of prevalent winds, and the relative length of day and amount of sunshine in summer and winter all have their effect on different parts of Canada. One cannot even describe the climate of a single province, like Ontario or British Columbia, as a unit, as it varies so greatly in different parts. Details should therefore be sought in articles on the separate provinces. In eastern Canada Ungava and Labrador are very chill and inhospitable, owing largely to the iceberg-laden current sweeping down the coast from Davis Strait, bringing fogs and long snowy winters and a temperature for the year much below the freezing-point. South of the Gulf of St Lawrence, however, the maritime provinces have much more genial temperatures, averaging 40° F. for the year and over 60° for the summer months. The amount of rain is naturally high so near the sea, 40 to 56 in., but the snowfall is not usually excessive. In Quebec and northern Ontario the rainfall is diminished, ranging from 20 to 40 in., while the snows of winter are deep and generally cover the ground from the beginning of December to the end of March. The winters are brilliant but cold, and the summers average from 60° to 65° F., with generally clear skies and a bracing atmosphere which makes these regions favourite summer resorts for the people of the cities to the south. The winter storms often sweep a little to the north of southern Ontario, so that what falls as snow in the north is rain in the south, giving a much more variable winter, often with too little snow for sleighing. The summers are warm, with an average temperature of 65° and an occasional rise to 90°. As one goes westward the precipitation diminishes to 17·34 in. in Manitoba and 13·35 for the other two prairie provinces, most of this, however, coming opportunely from May to August, the months when the growing grain most requires moisture. There is a much lighter snowfall in winter than in northern Ontario and Quebec, with somewhat lower temperatures. The snow and the frost in the ground are considered useful as furnishing moisture to start the wheat in spring. The precipitation in southern Saskatchewan and Alberta is much more variable than farther east and north, so that in some seasons crops have been a failure through drought, but large areas are now being brought under irrigation to avoid such losses. The prairie provinces have in most parts a distinctly continental climate with comparatively short, warm summers and long, cold winters, but with much sunshine in both seasons. In southern Alberta, however, the winter cold is often interrupted by chinooks, westerly winds which have lost their moisture by crossing the mountains and become warmed by plunging down to the plains, where they blow strongly, licking up the snow and raising the temperature, sometimes in a few hours, from 20° to 40° F. In this region cattle and horses can generally winter on the grass of the ranges without being fed, though in hard seasons there may be heavy losses. Northwards chinooks become less frequent and the winter's cold increases, but the coming of spring is not much later, and the summer temperatures, with sunshine for twenty hours out of twenty-four in June, are almost the same

as for hundreds of miles to the south, so that most kinds of grain and vegetables ripen far to the north in the Peace river valley. Though the climate of the plains is one of extremes and often of rather sudden changes, it is brisk and invigorating and of particular value for persons affected with lung troubles.

The climate of the Cordilleran region presents even more variety than that of the other provinces because of the ranges of mountains which run parallel to the Pacific. Along the coast itself the climate is insular, with little frost in winter and mild heat in summer, and with a very heavy rainfall amounting to 100 in. on the south-west side of Vancouver Island and near Port Simpson. Within 100 m. inland beyond the Coast Range the precipitation and general climate are, like those of Ontario, comparatively mild and with moderate snowfall towards the south, but with keen winters farther north. The interior plateau may be described as arid, so that irrigation is required if crops are to be raised. The Selkirk Mountains have a heavy rainfall and a tremendous snowfall on their western flanks, but very much less precipitation on their eastern side. The Rocky Mountains have the same relationships but the whole precipitation is much less than in the Selkirks. The temperature depends largely, of course, on altitude, so that one may quickly pass from perpetual snow above 8000 ft. in the mountains to the mild, moist climate of Vancouver or Victoria, which is like that of Devonshire. In the far north of the territories of Yukon, Mackenzie and Ungava the climate has been little studied, as the region is uninhabited by white men except at a few fur-trading posts. North-west and north-east of Hudson Bay it becomes too severe for the growth of trees as seen on the "barren grounds," and there may be perpetual ice beneath the coating of moss which serves as a non-conducting covering for the "tundras." There is, however, so little precipitation that snow does not accumulate on the surface to form glaciers, the summer's sun having warmth enough to thaw what falls in the winter. Leaving out the maritime provinces, southern Ontario, southern Alberta and the Pacific coast region on the one hand, and the Arctic north, particularly near Hudson Bay, on the other, Canada has snowy and severe winters, a very short spring with a sudden rise of temperature, short warm summers, and a delightful autumn with its "Indian summer." There is much sunshine, and the atmosphere is bracing and exhilarating.

Flora.—The general flora of the Maritime Provinces, Quebec and Eastern Ontario is much the same, except that in Nova Scotia a number of species are found common also to Newfoundland that are not apparent inland. Professor Macoun gives us a few notable species—*Calluna vulgaris*, Salisb., *Alchemilla vulgaris*, L., *Rhododendron maximum*, L., *Ilex glabia*, Gray, *Hudsonia ericoides*, L., *Gaylussacia dumosa*, F. and G., and *Schezaea pusilla*, Pursh. In New Brunswick the western flora begins to appear as well as immigrants from the south, while in the next eastern province, Quebec, the flora varies considerably. In the lower St Lawrence country and about the Gulf many Arctic and sub-Arctic species are found. On the shores of the lower reaches *Thalictrum alpinum*, L., *Vesicaria arctica*, Richards, *Arapis alpina*, L., *Saxifraga oppositifolia*, L., *Cerastium alpinum*, L., *Saxifraga caespitosa*, L. and S. have been gathered, and on the Shickshock Mountains of Eastern Canada *Silene acaulis*, L., *Lychnis alpina*, L., *Cassiope hypnoides*, Don., *Rhododendron laponicum*, Wahl, and many others. On the summit of these hills (4000 ft.) have been collected *Aspidium aculeatum*, Swartz var., *Scopulinum*, D. C. Eaton, *Pellaea densa*, Hook, *Gallium kamtschaticum*, Sletten. From the city of Quebec westwards there is a constantly increasing ratio of southern forms, and when the mountain (so called) at Montreal is reached the representative Ontario flora begins. In Ontario the flora of the northern part is much the same as that of the Gulf of St Lawrence, but from Montreal along the Ottawa and St Lawrence valleys the flora takes a more southern aspect, and trees, shrubs and herbaceous plants not found in the eastern parts of the Dominion become common. In the forest regions north of the lakes the vegetation on the shores of Lake Erie requires a high winter temperature, while the east and north shores of Lake Superior have a boreal vegetation that shows the summer temperature of this enormous water-stretch to be quite low. Beyond the forest country of Ontario come the prairies of Manitoba and the North-West Territories. In the ravines the eastern flora continues for some distance, and then disappearing gives place to that of the prairie, which is found everywhere between the Red river and the Rocky Mountains except in wooded and damp localities. Northwards, in the Saskatchewan country, the flora of the forest and that of the prairies intermingle. On the prairies and the foot-hills of the Rocky Mountains a great variety of grasses are found, several years' collection resulting in 42 genera and 156 species. Of the best hay and pasture grasses, *Agropyrum Elymus*, *Stipa*, *Bromus*, *Agrostis*, *Calamagrostes* and *Poa*, there are 59 species. Besides the grasses there are leguminous plants valuable for pasture—*Astragalus*, *Vicia* (wild vetch), *Lathyrus* (wild pea) of which there are many species. The rose family is represented by *Prunus*, *Potentilla*, *Fragaria*, *Rosa*, *Rubus* and *Amelanchier*.

About the saline lakes and marshes of the prairie country are found *Ruppia maritima*, L., *Heliotropium curassavicum*, L., natives of the Atlantic coast, and numerous species of *Chenopodium*, *Atriplex* and allied genera. The flora of the forest belt of the North-West Territories differs little from that of northern Ontario. At the beginning of the elevation of the Rocky Mountains there is a luxurious growth of herbaceous plants, including a number of rare umbellifers. At the higher levels the vegetation becomes more Arctic. Northwards the valleys of the Peace and other rivers differ little from those of Quebec and the northern prairies. On the western slope of the mountains, that is, the Selkirk and Coast ranges as distinguished from the eastern or Rocky Mountains range, the flora differs, the climate being damp instead of dry. In some of the valleys having an outlet to the south the flora is partly peculiar to the American desert, and such species as *Purshia tridentata*, D.C., and *Artemisia tridentata*, Nutt., and species of *Gilia*, *Aster* and *Erigonum* are found that are not met with elsewhere. Above Yale, in the drier part of the Fraser valley, the absence of rain results in the same character of flora, while in the rainy districts of the lower Fraser the vegetation is so luxuriant that it resembles that of the tropics. So in various parts of the mountainous country of British Columbia, the flora varies according to climatic conditions. Nearer the Pacific coast the woods and open spaces are filled with flowers and shrubs. Liliaceous flowers are abundant, including *Erythoniums*, *Trilliums*, *Alliums*, *Brodeaeas*, *Fritillarias*, *Siliums*, *Camassias* and others.

Fauna.—The larger animals of Canada are the musk ox and the caribou of the barren lands, both having their habitat in the far north; the caribou of the woods, found in all the provinces except in Price Edward Island; the moose, with an equally wide range in the wooded country; the Virginia deer, in one or other of its varietal forms, common to all the southern parts; the black-tailed deer or mule deer and allied forms, on the western edge of the plains and in British Columbia; the pronghorn antelope on the plains, and a small remnant of the once plentiful bison found in northern Alberta and Mackenzie, now called "wood buffalo." The wapiti or American elk at one time abounded from Quebec to the Pacific, and as far north as the Peace river, but is now found only in small numbers from Manitoba westwards. In the mountains of the west are the grizzly bear, black bear and cinnamon bear. The black bear is also common to most other parts of Canada; the polar bear everywhere along the Arctic littoral. The large or timber wolf is found in the wooded districts of all the provinces, and on the plains there is also a smaller wolf called the coyote. In British Columbia the puma or cougar, sometimes called the panther and the American lion, still frequently occurs; and in all parts the common fox and the silver fox, the lynx, beaver, otter, marten, fisher, wolverene, mink, skunk and other fur-bearing animals. Mountain and plain and Arctic hares and rabbits are plentiful or scarce in localities, according to seasons or other circumstances. In the mountains of British Columbia are the bighorn or Rocky Mountain sheep and the Rocky Mountain goat, while the

saddleback and white mountain sheep have recently been discovered in the northern Cordillera. The birds of Canada are mostly migratory, and are those common to the northern and central states of the United States. The wildfowl are, particularly in the west, in great numbers; their breeding-grounds extending from Manitoba and the western prairies up to Hudson Bay, the barren lands and Arctic coasts. The several kinds of geese—including the Canada goose, the Arctic goose or wavey, the laughing goose, the brant and others—all breed in the northern regions, but are found in great numbers throughout the several provinces, passing north in the spring and south in the autumn. There are several varieties of grouse, the largest of which is the grouse of British Columbia and the pennated grouse and the prairie chicken of Manitoba and the plains, besides the so-called partridge and willow partridge, both of which are grouse. While the pennated grouse (called the prairie chicken in Canada) has always been plentiful, the prairie hen (or chicken) proper is a more recent arrival from Minnesota and Dakota, to which states it had come from Illinois and the south as settlement and accompanying wheatfields extended north. In certain parts of Ontario the wild turkey is occasionally found and the ordinary quail, but in British Columbia is found the California quail, and a larger bird much resembling it called the mountain partridge. The golden eagle, bald-headed eagle, osprey and a large variety of hawks are common in Canada, as are the snowy owl, the horned owl and others inhabiting northern climates. The raven frequently remains even in the colder parts throughout the winter; these, with the Canada jay, waxwing, grosbeak and snow bunting, being the principal birds seen in Manitoba and northern districts in that season. The rook is not found, but the common crow and one or two other kinds are there during the summer. Song-birds are plentiful, especially in wooded regions, and include the American robin, oriole, thrushes, the cat-bird and various sparrows; while the English sparrow, introduced years ago, has multiplied excessively and become a nuisance in the towns. The smallest of the birds, the ruby throat humming-bird, is found everywhere, even up to timber line in the mountains. The sea-birds include a great variety of gulls, guillemots, cormorants, albatrosses (four species), fulmars and petrels, and in the Gulf of St Lawrence the gannet is very abundant. Nearly all the sea-birds of Great Britain are found in Canadian waters or are represented by closely allied species. (A. P. C.)

Area and Population.—The following table shows the division of the Dominion into provinces and districts, with the capital, population and estimated area of each.

	Area in sq.m.	Population.		Official Capital.
		1881.	1901.	
Provinces—				
Ontario	260,862	1,926,922	2,182,947	Toronto
Quebec	351,873	1,359,027	1,648,898	Quebec
Nova Scotia	21,428	440,572	459,574	Halifax
New Brunswick	27,985	321,233	331,120	Fredericton
Manitoba	73,732	62,260	255,211[1]	Winnipeg
British Columbia	372,630	49,459	178,657	Victoria
Prince Edward Island	2,184	108,891	103,259	Charlottetown
Saskatchewan	250,650	25,515	91,460[1]	Regina
Alberta	253,540		72,841[1]	Edmonton
Districts—				
Keewatin	516,571		8,800	..
Yukon	196,976		27,219	Dawson City
Mackenzie	562,182	30,931	5,216	..
Ungava	354,961		5,113	..
Franklin	500,000		..	..
The Dominion	3,745,574[2]	4,324,810	5,371,315	Ottawa

[1] The census is taken every ten years, save in these three provinces, where it is taken every five. Their population in 1906 was:—Manitoba, 360,000; Saskatchewan, 257,000; Alberta, 184,000.

[2] The areas assigned to Prince Edward Island, Nova Scotia, New Brunswick and British Columbia are exclusive of the territorial seas, that to Quebec is exclusive of the Gulf of St Lawrence (though including the islands lying within it), and that to Ontario is exclusive of the Canadian portion of the Great Lakes. About 500,000 sq. m. belong to the Arctic region and 125,755 sq. m. are water.

In 1867 the Dominion was formed by the union of the provinces of Nova Scotia, New Brunswick, Quebec (Lower Canada) and Ontario (Upper Canada). In 1869 the North-west Territories were purchased from the Hudson's Bay Company, from a corner of which Manitoba was carved in the next year. In 1871 British Columbia and in 1873 Prince Edward Island joined the Dominion.

The islands and other districts within the Arctic circle became a portion of the Dominion only in 1880, when all British possessions in North America, excepting Newfoundland, with its dependency, the Labrador coast, and the Bermuda islands, were annexed to Canada. West of the province of Ontario, then inaccurately defined, the provinces of Manitoba and British Columbia were the only organized divisions of the western territory, but in 1882 the provisional districts of Assiniboia, Athabasca, Alberta and Saskatchewan were formed, leaving the remainder of the north-west as unorganized territories, a certain portion of the north-east, called Keewatin, having previously been placed under the lieutenant-governor of Manitoba. In 1905 these four districts were formed into the two provinces of Alberta and Saskatchewan, and Keewatin was placed directly under the federal government. In 1898, owing to the influx of miners, the Yukon territory was constituted and granted a limited measure of self-government. The unorganized territories are sparsely inhabited by Indians, the people of the Hudson's Bay Company's posts and a few missionaries.

Population.—The growth of population is shown by the following figures:—1871, 3,485,761; 1881, 4,324,810; 1891, 4,833,239; 1901, 5,371,315. Since 1901 the increase has been more rapid, and in 1905 alone 144,621 emigrants entered Canada, of whom about two-fifths were from Great Britain and one-third from the United States.

The density of population is greatest in Prince Edward Island, where it is 51·6 to the sq. m.; in Nova Scotia it is 22·3; New Brunswick, 11·8; Ontario, 9·9; Manitoba, 4·9; Quebec, 4·8; Saskatchewan, 1·01; Alberta, 0·72; British Columbia, 0·4; the Dominion, 1·8. This is not an indication of the density in settled parts; as in Quebec, Ontario and the western provinces there are large unpopulated districts, the area of which enters into the calculation. The population is composed mainly of English- or French-speaking people, but there are German settlements of some extent in Ontario, and of late years there has been a large immigration into the western provinces and territories from other parts of Europe, including Russians, Galicians, Polish and Russian Jews, and Scandinavians. These foreign elements have been assimilated more slowly than in the United States, but the process is being hastened by the growth of a national consciousness. English, Irish and Scots and their descendants form the bulk of the population of Ontario, French-Canadians of Quebec, Scots of Nova Scotia, the Irish of a large proportion of New Brunswick. In the other provinces the latter race tends to confine itself to the cities. Manitoba is largely peopled from Ontario, together with a decreasing number of half-breeds—*i.e.* children of white fathers (chiefly French or Scottish) and Indian mothers—who originally formed the bulk of its inhabitants. Alberta and Saskatchewan, particularly the ranching districts, are chiefly peopled by English immigrants, though since 1900 there has also been a large influx from the United States. British Columbia contains a mixed population, of which in the mining districts a large proportion is American. Since 1871 a great change has taken place throughout the west, *i.e.* from Lake Superior to the Pacific. Then Manitoba was principally inhabited by English and French half-breeds (or Métis), descendants of Hudson's Bay Company's employés, or

adventurous pioneers from Quebec, together with Scottish settlers, descendants of those brought out by Lord Selkirk (*q.v.*), some English army pensioners and others, and the van of the immigration that shortly followed from Ontario. Beyond Manitoba buffalo were still running on the plains, and British Columbia having lost its mining population of 1859 and 1860 was largely inhabited by Indians, its white population which centred in the city of Victoria being principally English.

French is the language of the province of Quebec, though English is much spoken in the cities; both languages are officially recognized in that province, and in the federal courts and parliament. Elsewhere, English is exclusively used, save by the newly-arrived foreigners. The male sex is slightly the more numerous in all the provinces except Quebec, the greatest discrepancy existing in British Columbia.

The birth-rate is high, especially in Quebec, where families of twelve to twenty are not infrequent, but is decreasing in Ontario. In spite of the growth of manufactures since 1878, there are few large cities, and the proportion of the urban population to the rural is small. Herein it differs noticeably from Australia. Between 1891 and 1901 the number of farmers in Ontario, Quebec and the Maritime provinces decreased, and there seemed a prospect of the country being divided into a manufacturing east and an agricultural west, but latterly large tracts in northern Ontario and Quebec have proved suitable for cultivation and are being opened up.

Religion.—There is no established church in Canada, but in the province of Quebec certain rights have been allowed to the Roman Catholic church ever since the British conquest. In that province about 87% of the population belongs to this church, which is strong in the others also, embracing over two-fifths of the population of the Dominion. The Protestants have shown a tendency to subdivision, and many curious and ephemeral sects have sprung up; of late years, however, the various sections of Presbyterians, Methodists and Baptists have united, and a working alliance has been formed between Presbyterians, Methodists and Congregationalists. The Methodists are the strongest, and in Ontario form over 30% of the population. Next come the Presbyterians, the backbone of the maritime provinces. The Church of England is strong in the cities, especially Toronto. Save among the Indians, active disbelief in Christianity is practically non-existent, and even among them 90% are nominally Christian.

Indians.—The Indian population numbers over 100,000 and has slightly increased since 1881. Except in British Columbia and the unorganized territories, nearly all of these are on reservations, where they are under government supervision, receiving an annuity in money and a certain amount of provisions; and where, by means of industrial schools and other methods, civilized habits are slowly superseding their former mode of life. British Columbia has about 25,000, most of whom are along the coast, though one of the important tribes, the Shuswaps, is in the interior. An almost equal number are found in the three prairie provinces. Those of Ontario, numbering about 20,000, are more civilized than those of the west, many of them being good farmers. In all the provinces they are under the control of the federal government which acts as their trustee, investing the money which they derive chiefly from the sale of lands and timber, and making a large annual appropriation for the payment of their annuities, schools and other expenses. While unable to alienate their reservations, save to the federal government, they are not confined to them, but wander at pleasure. As they progress towards a settled mode of life, they are given the franchise; this process is especially far advanced in Ontario. A certain number are found in all the provinces. They make incomparable guides for fishing, hunting and surveying parties, on which they will cheerfully undergo the greatest hardships, though tending to shrink from regular employment in cities or on farms.

Orientals.—The Chinese and Japanese numbered in 1906 about 20,000, of whom, three-quarters were in British Columbia, though they were spreading through the other provinces, chiefly as laundrymen. They are as a rule frugal, industrious and law-abiding, and are feared rather for their virtues than for their vices. Since 1885 a tax has been imposed on all Chinese entering Canada, and in 1903 this was raised to £100 ($500). British Columbia endeavoured in 1905 to lay a similar restriction on the Japanese, but the act was disallowed by the federal legislature.

Finance.—Since 1871 the decimal system of coinage, corresponding to that of the United States, has been the only one employed. One dollar is divided into one hundred cents (£1 = $4·86⅔). The money in circulation consists of a limited number of notes issued by the federal government, and the notes of the chartered banks, together with gold, silver and copper coin. Previous to 1906 this coin was minted in England, but in that year a branch of the royal mint was established at Ottawa. Though the whole financial system rests on the maintenance of the gold standard, gold coin plays a much smaller part in daily business than in England, France or Germany. United States' notes and silver are usually received at par; those of other nations are subject to a varying rate of exchange.

The banking system, which retains many features of the Scotch system, on which it was originally modelled, combines security for the note-holders and depositors with prompt increase and diminution of the circulation in accordance with the varying conditions of trade. This is especially important in a country where the large wheat crop renders an additional quantity of money necessary on very short notice during the autumn and winter. There has been no successful attempt to introduce the "wild cat" banking, which had such disastrous effects in the early days of the western states. Since federation no chartered bank has been compelled to liquidate without paying its note-holders in full. The larger banks are chartered by the federal government; in the smaller towns a number of private banks remain, but their importance is small, owing to the great facilities given to the chartered banks by the branch system. In 1906 there were 34 chartered banks, of which the branches had grown from 619 in 1900 to 1565 in 1906, and the number since then has rapidly increased. The banks are required by law to furnish to the finance minister detailed monthly statements which are published in the official gazette. Once in every ten years the banking act is revised and weaknesses amended. Clearing-houses have been established in the chief commercial centres. In October 1906 the chartered banks had an aggregate paid-up capital of over $94,000,000 with a note circulation of $83,000,000 and deposits of over $553,000,000.

There are four kinds of savings banks in Canada:—(1) the post-office savings banks; (2) the government savings banks of the Maritime provinces taken over at federation and being gradually merged with the former; (3) two special savings banks in the cities of Montreal and Quebec; (4) the savings bank departments of the chartered banks. The rate of interest allowed by the government is now 3%, and the chartered banks usually follow the government rate. The amount on deposit in the first three increased from $5,057,607 in 1868 to $89,781,546 in October 1906. The returns from the chartered banks do not specify the deposits in these special accounts.

The numerous loan and trust companies also possess certain banking privileges.

The federal revenue is derived mainly from customs and excise duties, with subsidiary amounts from mining licences, timber dues, post-office, &c. Both the revenue and the expenditure have in recent years increased greatly, the revenue rising from $46,743,103 in 1899 to $71,186,073 in 1905 and the expenditure keeping pace with it. The debt of the Dominion in 1873 and in 1905 was:—

	1873.	1905.
Gross debt . .	$129,743,432	$377,678,580
Assets . .	30,894,970	111,454,413
Net debt . .	98,848,462	266,224,167

While the debt had thus increased faster than the population, it weighed less heavily on the people, not only on account of the

great increase in commercial prosperity, but of the much lower rate of interest paid, and of the increasing revenue derived from assets. Whereas in 1867 the rate of interest was over 4%, and interest was being paid on former provincial loans of over 6%, Canada could in 1906 borrow at 3%.

The greater part of the debt arises from the assumption of the debts of the provinces as they entered federation, expenditure on canals and assistance given to railways. It does not include the debts incurred by certain provinces since federation, a matter which concerns themselves alone. A strong prejudice against direct taxation exists, and none is imposed by the federal government, though it has been tentatively introduced in the provinces, especially in Quebec, in the form of liquor licences, succession duties, corporation taxes, &c. British Columbia has a direct tax on property and on income. The cities, towns and municipalities resort to it to supply their local needs, and there is a tendency, especially pronounced in Ontario on account of the excellence of her municipal system, to devolve the burden of educational payments, and others more properly provincial, upon the municipal authorities on the plea of decentralization.

Commerce and Manufactures.—Since 1867 the opening up of the fertile lands in the north-west, the increase of population, the discovery of new mineral fields, the construction of railways and the great improvement of the canal system have changed the conditions, methods and channels of trade. The great extension during the same period of the use of water-power has been of immense importance to Canada, most of the provinces possessing numerous swift-flowing streams or waterfalls, capable of generating a practically unlimited supply of power.

In 1878 the introduction of the so-called "National Policy" of protection furthered the growth of manufactures. Protection still remains the trade policy of Canada, though modified by a preference accorded to imports from Great Britain and from most of the British colonies. The tariff, though moderate as compared with that of the United States, amounted in 1907 to about 28% on dutiable imports and to about 16% on total imports. Tentative attempts at export duties have also been made. Inter-provincial commerce is free, and the home market is greatly increasing in importance. The power to make commercial treaties relating to Canada rests with the government of Great Britain, but in most cases the official consent of Canada is required, and for many years no treaty repugnant to her interests has been signed. The denunciation by the British government in 1897 of commercial treaties with Belgium and Germany, at the request of Canada, was a striking proof of her increasing importance, and attempts have at various times been made to obtain the full treaty-making power for the federal government. The great proportion of the foreign trade of the Dominion is with the United States and Great Britain. From the former come most of the manufactured goods imported and large quantities of raw materials; to the latter are sent food-stuffs. Farm products are the most important export, and with the extension of this industry in the north-west provinces and in northern Ontario will probably continue to be so. Gold, silver, copper and other minerals are largely exported, chiefly in an unrefined state and almost entirely to the United States. The exports of lumber are about equally divided between the two. Formerly, the logs were shipped as square timber, but now almost always in the form of deals, planks or laths; such square timber as is still shipped goes almost entirely to Great Britain. Wood pulp for the manufacture of paper is exported chiefly to the United States. To that country fresh fish is sent in large quantities, and there is an important trade in canned salmon between British Columbia and Great Britain. Few of the manufacturers do more than compete with the foreigner for an increasing share of the home market. In this they have won increased success, at least five-sixths of the manufactured goods used being produced within the country, but a desire for further protection is loudly expressed. Though the chief foreign commerce is with Great Britain and the United States, the Dominion has trade relations with all the chief countries of the world and maintains commercial agents among them. Her total foreign trade (import and export) was in 1906 over £100,000,000.

Shipping.—The chief seaports from east to west are Halifax, N.S., Sydney, N.S., St John, N.B., Quebec and Montreal on the Atlantic; and Vancouver, Esquimalt and Victoria, B.C.; on the Pacific. Halifax is the ocean terminus of the Intercolonial railway; St John, Halifax and Vancouver of the Canadian Pacific railway. Prince Rupert, the western terminus of the Grand Trunk Pacific railway, was in 1906 only an uninhabited harbour, but was being rapidly developed into a flourishing city. Though Halifax and St John are open in winter, much of the winter trade eastwards is done through American harbours, especially Portland, Maine, owing to the shorter railway journey. Esquimalt, Halifax, Kingston (Ont.) and Quebec have well-equipped graving-docks. The coast, both of the ocean and of the Great Lakes, is well lighted and protected. The decay of the wooden shipbuilding industry has lessened the comparative importance of the mercantile marine, but there has been a great increase in the tonnage employed in the coasting trade and upon inland waters. Numerous steamship lines ply between Canada and Great Britain; direct communication exists with France, and the steamers of the Canadian Pacific railway run regularly to Japan and to Australia.

Internal Communications.—Her splendid lakes and rivers, the development of her canal system, and the growth of railways have made the interprovincial traffic of Canada far greater than her foreign, and the portfolio of railways and canals is one of the most important in the cabinet. There are, nominally, about 200 railways, but about one-half of these, comprising five-sixths of the mileage, have been amalgamated into four great systems: the Grand Trunk, the Canadian Pacific, the Canadian Northern and the Intercolonial; most of the others have been more or less consolidated. With the first of the four large systems is connected the Grand Trunk Pacific. The Intercolonial, as also a line across Prince Edward Island, is owned and operated by the federal government. Originally built chiefly as a military road, and often the victim of political exigencies, it has not been a commercial success. With the completion of the Grand Trunk Pacific (planned for 1911) and the Canadian Northern, the country would possess three trans-continental railways, and be free from the reproach, so long hurled at it, of possessing length without breadth.

At numerous points along the frontier, connexion is made with the railways of the United States. Liberal aid is given by the federal, provincial and municipal governments to the construction of railways, amounting often to more than half the cost of the road. The government of Ontario has constructed a line to open up the agricultural and mining districts of the north of the province, and is operating it by means of a commission. Practically all the cities[1] and large towns have electric tramways, and electricity is also used as a motive power on many lines uniting the larger cities with the surrounding towns and villages. Since 1903 the Dominion government has instituted a railway commission of three members with large powers of control over freight and passenger rates and other such matters. Telephone and express companies are also subject to its jurisdiction. From its decisions an appeal may be made to the governor-general in council, *i.e.* to the federal cabinet. It has exercised a beneficial check on the railways and has been cheerfully accepted by them. In Ontario a somewhat similar commission, appointed by the local government, exercises extensive powers of control over railways solely within the province, especially over the electric lines.

Despite the increase in railway facilities, the waterways remain important factors in the transportation of the country. Steamers ply on lakes and rivers in every province, and even in the far northern districts of Yukon and Mackenzie. Where necessary obstacles are surmounted by canals, on which over £22,000,000 have been spent, chiefly since federation. The St Lawrence

[1] In Canada a city must have over 10,000 inhabitants, a town over 2000.

river canal system from Lake Superior to tide water overcomes a difference of about 600 ft., and carries large quantities of grain from the west to Montreal, the head of summer navigation on the Atlantic. These canals have a minimum depth of 14 ft. on the sills, and are open to Canadian and American vessels on equal terms; the equipment is in every respect of the most modern character. So great, however, is the desire to shorten the time and distance necessary for the transportation of grain from Lake Superior to Montreal that an increasing quantity is taken by water as far as the Lake Huron and Georgian Bay ports, and thence by rail to Montreal. Numerous smaller canals bring Ottawa into connexion with Lake Champlain and the Hudson river via Montreal; by this route the logs and sawn lumber of Ontario, Quebec and New Brunswick find their destination. It has long been a Canadian ideal to shorten the distance from Lake Superior to the sea. With this object in view, the Trent Valley system of canals has been built, connecting Lake Ontario with the Georgian Bay (an arm of Lake Huron) via Lake Simcoe. In 1899 and subsequently surveys were made with a view to connecting the Georgian Bay through the intervening water stretches, with the Ottawa river system, and thence to Montreal. In 1903 all tolls were taken off the Canadian canals, greatly to the benefit of trade.

Mining.—The mineral districts occur from Cape Breton to the islands in the Pacific and the Yukon district. Nova Scotia, British Columbia and the Yukon are still the most productive, but the northern parts of Ontario are proving rich in the precious metals. Coal, chiefly bituminous, occurs in large quantities in Nova Scotia, British Columbia and in various parts of the north-west (lignite), though most of the anthracite is imported from the United States, as is the greater part of the bituminous coal used in Ontario. Under the stimulus of federal bounties, the production of pig iron and of steel, chiefly from imported ore, is rapidly increasing. Bounties on certain minerals and metals are also given by some of the provinces. The goldfields of the Yukon, though still valuable, show a lessening production. Sudbury, in Ontario, is the centre of the nickel production of the world, the mines being chiefly in American hands, and the product exported to the United States. Of the less important minerals, Canada is the world's chief producer of asbestos and corundum. Copper, lead, silver and all the important metals are mined in the Rocky Mountain district. From Quebec westwards, vast regions are still partly, or completely, unexplored.

Lumber.—In spite of great improvidence, and of loss by fire, the forest wealth of Canada is still the greatest in the world. Measures have been taken, both by the provincial and the federal governments, for its preservation, and for re-forestation of depleted areas. Certain provinces prohibit the exportation of logs to the United States, in order to promote the growth of saw-mills and manufactures of wooden-ware within the country, and the latter have of late years developed with great rapidity. The lumber trade of British Columbia has suffered from lack of an adequate market, but is increasing with the greater demand from the provinces of Alberta and Saskatchewan. A great development has also taken place in Ontario and the eastern provinces, through the use of spruce and other trees, long considered comparatively useless, in the manufacture of wood-pulp for paper-making.

Crown Lands.—Large areas of unoccupied land remain in all the provinces (except Prince Edward Island). In Manitoba, Saskatchewan, Alberta, the so-called railway belt of British Columbia and the territories, these crown lands are chiefly owned by the federal parliament; in the other provinces, by the local legislatures. So great is their extent that, in spite of the immigration of recent years, the Dominion government gives a freehold of 160 acres to every *bona fide* settler, subject to certain conditions of residence and the erection of buildings during the first three years. Mining and timber lands are sold or leased at moderate rates. All crown lands controlled by the provinces must be paid for, save in certain districts of Ontario, where free grants are given, but the price charged is low. The Canadian Pacific railway controls large land areas in the two new provinces; and large tracts in these provinces are owned by land companies. Both the Dominion and the provincial governments have set apart certain areas to be preserved, largely in their wild state, as national parks. Of these the most extensive are the Rocky Mountains Park at Banff, Alberta, owned by the Dominion government, and the "Algonquin National Park," north-east of Lake Simcoe, the property of Ontario.

Fisheries.—The principal fisheries are those on the Atlantic coast, carried on by the inhabitants of Nova Scotia, New Brunswick, Prince Edward Island, and the eastern section of Quebec. Cod, herring, mackerel and lobsters are the fish chiefly caught, though halibut, salmon, anchovies and so-called sardines are also exported. Bounties to encourage deep-sea fishing have been given by the federal government since 1882. In British Columbian waters the main catch is of salmon, in addition to which are halibut, oolachan, herring, sturgeon, cod and shell-fish. The lakes of Ontario and Manitoba produce white fish, sturgeon and other fresh-water fish. About 80,000 persons find more or less permanent employment in the fishing industry, including the majority of the Indians of British Columbia.

The business of fur-seal catching is carried on to some extent in the North Pacific and in Bering Sea by sealers from Victoria, but the returns show it to be a decreasing industry, as well as one causing friction with the United States. Indeed, no department of national life has caused more continual trouble between the two peoples than the fisheries, owing to different laws regarding fish protection, and the constant invasion by each of the territorial waters of the other.

Education.—The British North America Act imposes on the provincial legislatures the duty of legislating on educational matters, the privileges of the denominational and separate schools in Ontario and Quebec being specially safeguarded. In 1871, the New Brunswick legislature abolished the separate school system, and a contest arose which was finally settled by the authority of the legislature being sustained, though certain concessions were made to the Roman Catholic dissentients. Subsequently a similar difficulty arose in Manitoba, where the legislature in 1890 abolished the system of separate schools which had been established in 1871. After years of bitter controversy, in which a federal ministry was overthrown, a compromise was arranged in 1897, in which the Roman Catholic leaders have never fully acquiesced. In the provinces of Alberta and Saskatchewan, formed in 1905, certain educational privileges (though not amounting to a separate school system) were granted to the Roman Catholics.

All the provinces have made sacrifices to insure the spread of education. In 1901, 76% of the total population could read and write, and 86% of those over five years of age. These percentages have gradually risen ever since federation, especially in the province of Quebec, which was long in a backward state. The school systems of all the provinces are, in spite of certain imperfections, efficient and well-equipped, that of Ontario being especially celebrated. A fuller account of their special features will be found under the articles on the different provinces.

Numerous residential schools exist and are increasing in number with the growth of the country in wealth and culture. In Quebec are a number of so-called classical colleges, most of them affiliated with Laval University.

Higher education was originally organized by the various religious bodies, each of which retains at least one university in more or less integral connexion with itself. New Brunswick, Ontario and Manitoba support provincial universities at Fredericton, Toronto and Winnipeg. Those of most importance[1] are:—Dalhousie University, Halifax, N.S. (1818); the University of New Brunswick, Fredericton, N.B. (1800); McGill University, Montreal, Que. (1821); Laval University, Quebec, and Montreal, Que. (1852); Queen's University, Kingston, Ont. (1841); the University of Toronto, Toronto, Ont. (1827);

[1] The date of foundation is given in brackets.

Trinity University, Toronto, Ont. (1852); Victoria University, Toronto, Ont. (1836); the University of Ottawa, Ottawa, Ont. (1848); the University of Manitoba, Winnipeg, Man. (1877).

Of these McGill (see MONTREAL) is especially noted for the excellence of its training in practical and applied science. Many of the students, especially in the departments of medicine and theology, complete their education in the United States, Britain or Europe.

Most of the larger towns and cities contain public libraries, that of Toronto being especially well-equipped.

Of the numerous learned and scientific societies, the chief is the Royal Society of Canada, founded in 1881.

Defence.—The command in chief of all naval and military forces is vested in the king, but their control rests with the federal parliament. The naval forces, consisting of a fisheries protection service, are under the minister of marine and fisheries, the land forces under the minister of militia and defence. Prior to 1903, command of the latter was vested in a British officer, but since then has been entrusted to a militia council, of which the minister is president. The fortified harbours of Halifax (N.S.) and Esquimalt (B.C.) were till 1905 maintained and garrisoned by the imperial government, but have since been taken over by Canada. This has entailed the increase of the permanent force to about 5000 men. Previously, it had numbered about 1000 (artillery, dragoons, infantry) quartered in various schools, chiefly to aid in the training of the militia. In this all able-bodied citizens between the ages of 18 and 60 are nominally enrolled, but the active militia consists of about 45,000 men of all ranks, in a varying state of efficiency. These cannot be compelled to serve outside the Dominion, though special corps may be enlisted for this purpose, as was done during the war in South Africa (1899–1902). At Quebec is a Dominion arsenal, rifle and ammunition factories. Cadet corps flourish in most of the city schools. At Kingston (Ont.) is the Royal Military College, to the successful graduates of which a certain number of commissions in the British service is annually awarded.

Justice and Crime.—Justice is well administered throughout the country, and even in the remotest mining camps there has been little of the lawlessness seen in similar districts of Australia and the United States. For this great credit is due to the "North-west mounted police," the "Riders of the Plains," a highly efficient body of about seven hundred men, under the control of the federal government. Judges are appointed for life by the Dominion parliament, and cannot be removed save by impeachment before that body, an elaborate process never attempted since federation, though more than once threatened. From the decisions of the supreme court of Canada appeal may be made to the judicial committee of the imperial privy council.

AUTHORITIES.—The Canadian Geological Survey has published (Ottawa, since 1845) a series of reports covering a great number of subjects. Several provinces have bureaus or departments of mines, also issuing reports. The various departments of the federal and the provincial governments publish annual reports and frequent special reports, such as the decennial report on the census, from which a vast quantity of information may be obtained. Most of this is summed up in the annual *Statistical Year Book of Canada* and in the *Official Handbook of the Dominion of Canada*, issued at frequent intervals by the Department of the Interior. See also J. W. White (the Dominion geographer), *Atlas of Canada* (1906); J. Castell Hopkins, *Canada: an Encyclopaedia* (6 vols., 1898–1900); *The Canadian Annual Review* (yearly since 1902), replacing H. J. Morgan's *Canadian Annual Register* (1878–1886); Sir J. W. Dawson, *Handbook of Canadian Geology* (1889); George Johnson, *Alphabet of First Things in Canada* (3rd ed., 1898); A. G. Bradley, *Canada in the Twentieth Century* (1903); *Transactions of the Royal Society of Canada* (yearly since 1883); R. C. Breckenridge, *The Canadian Banking System* (1895); A. Shortt, *History of Canadian Banking* (1902–1906); Sir S. Fleming, *The Intercolonial* (1876); John Davidson, "Financial Relations of Canada and the Provinces" (*Economic Journal*, June 1905); *Transactions of the Royal Society of Canada, passim*, for valuable papers by H. M. Ami, A. P. Coleman, G. M. Dawson, W. F. Ganong, B. J. Harrington and others; also articles in *Canadian Economics* and in the *Handbook of Canada*, published on the occasion of visits of the British Association.

(W. L. G.)

AGRICULTURE

Canada is pre-eminently an agricultural country. Of the total population (estimated in 1907 at 6,440,000) over 50% are directly engaged in practical agriculture. In addition large numbers are engaged in industries arising out of agriculture; among these are manufacturers of agricultural implements, millers of flour and oatmeal, curers and packers of meat, makers of cheese and butter, and persons occupied in the transportation and commerce of grain, hay, live stock, meats, butter, cheese, milk, eggs, fruit and various other products. The country is splendidly formed for the production of food. Across the continent there is a zone about 3500 m. long and as wide as or wider than France, with (over a large part of this area) a climate adapted to the production of foods of superior quality. Since the opening of the 20th century, great progress has been made in the settlement and agricultural development of the western territories between the provinces of Manitoba and British Columbia. The three "North-West Provinces" (Manitoba, Saskatchewan, Alberta) have a total area of 369,869,898 acres, of which 12,853,120 acres are water. In 1906 their population was 808,863, nearly double what it was in 1901. The land in this vast area varies in virginal fertility, but the best soils are very rich in the constituents of plant food. Chemical analyses made by Mr F. T. Shutt have proved that soils from the North-West Provinces contain an average of 18,000 lb of nitrogen, 15,580 lb of potash and 6,700 lb of phosphoric acid per acre, these important elements of plant food being therefore present in much greater abundance than they are in ordinary cultivated European soils of good quality. The prairie lands of Manitoba and Saskatchewan produce wheat of the finest quality. Horse and cattle ranching is practised in Alberta, where the milder winters allow of the outdoor wintering of live stock to a greater degree than is possible in the colder parts of Canada. The freezing of the soil in winter, which at first sight seems a drawback, retains the soluble nitrates which might otherwise be drained out. The copious snowfall protects vegetation, supplies moisture, and contributes nitrogen to the soil. The geographical position of Canada, its railway systems and steamship service for freight across the Atlantic and Pacific oceans, are favourable to the extension of the export trade in farm products to European and oriental countries. Great progress has been made in the development of the railway systems of Canada, and the new transcontinental line from the Atlantic to the Pacific, passing through Saskatchewan via Saskatoon, and Alberta via Edmonton, renders possible of settlement large areas of fertile wheat-growing soil. The canal system of Canada, linking together the great natural waterways, is also of much present and prospective importance in cheapening the transportation of agricultural produce.

Crops.

Of *wheat* many varieties are grown. The methods of cultivation do not involve the application of so much hand labour per acre as in Europe. The average yield of wheat for the whole of Canada is nearly 20 bushels per acre. In 1901 the total production of wheat in Canada was 55½ million bushels. In 1906 the estimated total production was 136 million bushels. The total wheat acreage, which at the census of 1901 was 4,224,000, was over 6,200,000 in 1906, an increase of nearly two million acres in five years.

Up to the close of the 19th century, Ontario was the largest wheat-growing province in Canada. In 1900 the wheat acreage in Ontario was 1,487,633, producing 28,418,907 bushels, an average yield of 19·10 bushels per acre. Over three-quarters of this production was of fall or winter wheat, the average yield of which in Ontario over a series of years since 1883 had been about 20 bushels per acre. But the predominance in wheat-growing has now shifted to the new prairie regions of the west. A census taken in 1906 shows that the total acreage of wheat in the North-West Provinces was 5,062,493, yielding 110,586,824 bushels, an average in a fairly normal season of 21·84 bushels per acre. Of this total wheat acreage, 2,721,079 acres were in Manitoba, 2,117,484 acres in Saskatchewan, and 223,930 acres

in Alberta, with average yields per acre at the rates of 20·02 bushels in Manitoba, 23·70 in Saskatchewan and 26·49 in Alberta. In these provinces spring wheat is almost universally sown, except in Alberta where fall or winter wheat is also sown to a considerable extent. Summer fallowing for wheat is a practice that has gained ground in the North-West Provinces. Land ploughed and otherwise tilled, but left unseeded during the summer, is sown with wheat in the succeeding autumn or spring. Wheat on summer fallow land yielded, according to the North-West census of 1906, from 2 to 8 bushels per acre more than that sown on other land. Summer fallowing is, however, subject to one drawback: the strong growth which it induces is apt to retard the ripening of the grain. Canada is clearly destined to rank as one of the most important grain-producing countries of the world. The northern limits of the wheat-growing areas have not been definitely ascertained; but samples of good wheat were grown in 1907 at Fort Vermilion on the Peace river, nearly 600 m. north of Winnipeg in lat. 58·34 and at Fort Simpson on the Mackenzie river in lat. 61·52, more than 800 m. north of Winnipeg and about 1000 m. north of the United States boundary. As a rule the weather during the harvesting period permits the grain to be gathered safely without damage from sprouting. Occasionally in certain localities in the north-west the grain is liable to injury from frost in late summer; but as the proportion of land under cultivation increases the climate becomes modified and the danger from frost is appreciably less. The loss from this cause is also less than formerly, because any grain unfit for export is now readily purchased for the feeding of animals in Ontario and other parts of eastern Canada.

Suitable machinery for cleaning the grain is everywhere in general use, so that weed seeds are removed before the wheat is ground. This gives Canadian wheat excellent milling properties, and enables the millers to turn out flour uniform in quality and of high grade as to keeping properties. Canadian flour has a high reputation in European markets. It is known as flour from which bakers can make the best quality of bread, and also the largest quantity per barrel, the quantity of albuminoids being greater in Canadian flour than in the best brands of European. Owing to its possession of this characteristic of what millers term "strength," *i.e.* the relative capacity of flour to make large loaves of good quality, Canadian flour is largely in demand for blending with the flour of the softer English wheats. For this reason some of the strong Canadian wheats have commanded in the home market 5s. and 6s. a quarter more than English-grown wheat. At the general census of 1901 the number of flouring and grist mill establishments, each employing five persons and over, was returned at 400, the number of employés being 4251 and the value of products $31,835,873. A special census of manufactures in 1906 shows that these figures had grown in 1905 to 832 establishments, 5619 employés and $56,703,269 value of the products. There is room for a great extension in the cultivation of wheat and the manufacture and exportation of flour.

In the twelve months of 1907 Canada exported 37,503,057 bushels of wheat of the value of $34,132,759 and 1,858,485 barrels of flour of the value of $7,626,408. The corresponding figures in 1900 were—wheat, 16,844,650 bushels, value, $11,995,488, and flour, 768,162 bushels, value, $2,791,885.

Oats of fine quality are grown in large crops from Prince Edward Island on the Atlantic coast to Vancouver Island on the Pacific coast. Over large areas the Canadian soil and climate are admirably adapted for producing oats of heavy weight per bushel. In all the provinces of eastern Canada the acreage under oats greatly exceeds that under wheat. The annual average oat crop in all Canada is estimated at about 248 million bushels. As the total annual export of oats is now less than three million bushels the home consumption is large, and this is an advantage in maintaining the fertility of the soil. In 1907 the area under oats in Ontario was 2,932,509 acres and yielded 83,524,301 bushels, the area being almost as large as that of the acreage under hay and larger than the combined total of the other principal cereals grown in the province. Canadian oatmeal is equal in quality to the best. It is prepared in different forms, and in various degrees of fineness.

Barley was formerly grown for export to the United States for malting purposes. After the raising of the duty on barley under the McKinley and Dingley tariffs that trade was practically destroyed and Canadian farmers were obliged to find other uses for this crop. Owing to the development of the trade with the mother-country in dairying and meat products, barley as a home feeding material has become more indispensable than ever. Before the adoption of the McKinley tariff about nine million bushels of barley were exported annually, involving the loss of immense stores of plant food. In 1907, with an annual production of nearly fifty million bushels, only a trifling percentage was exported, the rest being fed at home and exported in the form of produce without loss from impoverishment of the soil. The preparation of pearl or pot barley is an incidental industry.

Rye is cultivated successfully, but is seldom used for human food. Flour from wheat, meal from oats, and meal from Indian corn are preferred.

Buckwheat flour is used in considerable quantities in some districts for the making of buckwheat cakes, eaten with maple syrup. These two make an excellent breakfast dish, characteristic of Canada and some of the New England states. There are also numerous forms of preparations from cereals, sold as breakfast foods, which, owing to the high quality of the grains grown in Canada and the care exercised in their manufacture, compare favourably with similar products in other countries.

Peas in large areas are grown free from serious trouble with insect pests. Split peas for soup, green peas as vegetables and sweet peas for canning are obtained of good quality.

Vegetables are grown everywhere, and form a large part of the diet of the people. There is a comparatively small export, except in the case of turnips and potatoes and of vegetables which have been canned or dried. Besides potatoes, which thrive well and yield large quantities of excellent quality, there are turnips, carrots, parsnips and beets. The cultivation of sugar beets for the manufacture of sugar has been established in Ontario and in southern Alberta, where in 1906 an acreage under this crop of 3344 yielded 27,211 tons, an average of 8·13 tons per acre. Among the common vegetables used in the green state are peas, beans, cabbage, cauliflowers, asparagus, Indian corn, onions, leeks, tomatoes, lettuce, radish, celery, parsley, cucumbers, pumpkins, squash and rhubarb. Hay, of good quality of timothy (*Phleum pratense*), and also of timothy and clover, is grown over extensive areas. For export it is put up in bales of about 150 lb each. Since 1899 a new form of pressing has been employed, whereby the hay is compressed to stow in about 70 cub. ft. per ton. This has been a means of reducing the ocean freight per ton. The compact condition permits the hay to be kept with less deterioration of quality than under the old system of more loose baling. Austrian brome grass (*Bromus inermis*) and western rye grass (*Agropyrum tenerum*) are both extensively grown for hay in the North-West Provinces.

Live stock.

The almost universal adoption of electrical traction in towns has not led to the abandonment of the breeding of horses to the extent that was at one time anticipated. Heavy draught horses are reared in Ontario, and to a less but increasing extent in the North-West Provinces, the breeds being mainly the Clydesdale and the Shire. Percherons are also bred in different parts of Canada, and a few Belgian draught horses have been introduced. Good horses suitable for general work on farms and for cabs, omnibuses, and grocery and delivery wagons, are plentiful for local markets and for export. Thoroughbred and pure bred hackney stallions are maintained in private studs and by agricultural associations throughout the Dominion, and animals for cavalry and mounted infantry remounts are produced in all the provinces including those of the North-West. Useful carriage horses and saddle horses are bred in many localities. Horse ranching is practised largely in Alberta. There are no government

stud farms. The total number of horses in the Dominion was estimated on the basis of census returns at 2,019,824 for the year 1907, an increase of 609,309 since 1901.

Cattle, sheep, swine and poultry are reared in abundance. The bracing weather of Canadian winters is followed by the warmth and humidity of genial summers, under which crops grow in almost tropical luxuriance, while the cool evenings and nights give the plants a robustness of quality which are not to be found in tropical regions, and also make life for the various domestic animals wholesome and comfortable. In the North-West Provinces there are vast areas of prairie land, over which cattle pasture, and from which thousands of fat bullocks are shipped annually. Throughout other parts bullocks are fed on pasture land, and also in stables on nourishing and succulent feed such as hay, Indian corn fodder, Indian corn silage, turnips, carrots, mangels, ground oats, barley, peas, Indian corn, rye, bran and linseed oil cake. The breeding of cattle, adapted for the production of prime beef and of dairy cows for the production of milk, butter and cheese, has received much attention. There is government control of the spaces on the steamships in which the cattle are carried, and veterinary inspection prevents the exportation of diseased animals.

A considerable trade has been established in the exportation of dressed beef in cold storage, and also in the exportation of meat and other foods in hermetically sealed receptacles. By the Meat and Canned Foods Act of 1907 of the Dominion parliament and regulations thereunder, the trade is carried on under the strictest government supervision, and no canned articles of food may be exported unless passed as absolutely wholesome and officially marked as such by government inspectors. There is a considerable trade in "lunch tongues."

The cattle breeds are principally those of British origin. For beef, shorthorns, Herefords, Galloways and Aberdeen-Angus cattle are bred largely, whilst for dairying purposes, shorthorns, Ayrshires, Jerseys, Guernseys and Holstein-Friesians prevail. The French-Canadian cattle are highly esteemed in eastern Canada, especially by the farmers of the French provinces. They are a distinct breed of Jersey and Brittany type, and are stated to be descended from animals imported from France by the early settlers. The estimated number of cattle in Canada in 1907 was 7,439,051, an increase of 2,066,547 over the figures of the census of 1901.

All parts of the Dominion are well adapted for sheep; but various causes, amongst which must be reckoned the prosperity of other branches of agriculture, including wheat-growing and dairying, have in several of the provinces contributed to prevent that attention to this branch which its importance deserves, though there are large areas of rolling, rugged yet nutritious pastures well suited to sheep-farming. In the maritime provinces and in Prince Edward Island sheep and lambs are reared in large numbers. In Ontario sheep breeding has reached a high degree of perfection, and other parts of the American continent draw their supplies of pure bred stock largely from this province. All the leading British varieties are reared, the Shropshire, Oxford Down, Leicester and Cotswold breeds being most numerous. There are also excellent flocks of Lincolns and South-downs. The number of sheep and lambs in Canada was estimated for the year 1907 at 2,830,785, as compared with 2,465,565 in 1901.

Pigs, mostly of the Yorkshire, Berkshire and Tamworth breeds, are reared and fattened in large numbers, and there is a valuable export trade in bacon. Canadian hogs are fed, as a rule, on feeds suited for the production of what are known as "fleshy sides." Bacon with an excess of fat is not wanted, except in the lumber camps; consequently the farmers of Canada have cultivated a class of swine for bacon having plenty of lean and firm flesh. The great extension of the dairy business has fitted in with the rearing of large numbers of swine. Experimental work has shown that swine fattened with a ration partly of skim-milk were lustier and of a more healthy appearance than swine fattened wholly on grains. Slaughtering and curing are carried on chiefly at large packing houses. The use of mechanical refrigerating plants for chilling the pork has made it practicable to cure the bacon with the use of a small percentage of salt, leaving it mild in flavour when delivered in European markets. Regular supplies are exported during every week of the year. Large quantities of lard, brawn and pigs' feet are exported. In 1907 the number of pigs in Canada was estimated at 3,530,060, an increase of 1,237,385 over the census record of 1901. Turkeys thrive well, grow to a fine size and have flesh of tender quality. Chickens are raised in large numbers, and poultry-keeping has developed greatly since the opening of the 20th century. Canadian eggs are usually packed in cases containing thirty dozens each. Card-board fillers are used which provide a separate compartment for each egg. There are cold storage warehouses at various points in Canada, at which the eggs are collected, sorted and packed before shipment. These permit the eggs to be landed in Europe in a practically fresh condition as to flavour, with the shells quite full.

Dairy products.

Canada has been called the land of milk and honey. Milk is plentiful, and enters largely into the diet of the people. With a climate which produces healthy, vigorous animals, notably free from epizootic diseases, with a fertile soil for the growth of fodder crops and pasture, with abundance of pure air and water, and with a plentiful supply of ice, the conditions in Canada are ideal for the dairying industry. Large quantities of condensed milk, put up in hermetically sealed tins, are sold for use in mining camps and on board steamships. The cheese is chiefly of the variety known as "Canadian Cheddar." It is essentially a food cheese rather than a mere condiment, and 1 lb of it will furnish as much nourishing material as $2\frac{1}{4}$ lb of the best beefsteak. The industry is largely carried on by co-operative associations of farmers. The dairy factory system was introduced into Canada in 1864, and from that time the production and exportation of cheese grew rapidly. Legislation was passed to protect Canadian dairy produce from dishonest manipulation, and soon Canadian cheese obtained a deservedly high reputation in the British markets. In 1891 cheese factories and creameries numbered 1733, and in 1899 there were 3649. In 1908 there were 4355 of these factories, of which 1284 were in Ontario, 2806 in Quebec, and 265 in the remaining seven provinces of Canada. Those in Ontario are the largest in size. Amongst the British imports of cheese the Canadian product ranks first in quality, whilst in quantity it represents about 72% of the total value of the cheese imports, and 84% of the total value of the imports of that kind of cheese which is classed as Cheddar. In 1906 the total exports of cheese to all countries from Canada reached 215,834,543 lb of the value of $24,433,169.

Butter for export is made in creameries, where the milk, cream and butter are handled by skilled makers. The creameries are provided with special cold storage rooms, into which the butter is placed on the same day in which it is made. From them it is carried in refrigerator railway cars and in cold storage chambers on steamships to its ultimate destination. For the export trade it is packed in square boxes made of spruce or some other odourless wood. These are lined with parchment paper, and contain each 56 lb net of butter. The total export of butter from Canada in 1906 was 34,031,525 lb, of the value of $7,075,539. According to a census of manufactures taken in 1906, the total value of factory cheese and butter made in Canada during that year was $32,402,265.

Fruits.

There are large districts lying eastward of the Great Lakes and westward of the Rocky Mountains, where apples of fine quality can be grown; and there are other smaller areas in which pears, peaches and grapes are grown in quantities in the open air. The climate is favourable to the growth of plums, cherries, strawberries, raspberries, currants, gooseberries, etc. There are many localities in which cranberries are successfully grown, and in which blueberries also grow wild in great profusion.

Apples and pears are the chief sorts of fruit exported. The

high flavour, the crisp, juicy flesh and the long-keeping qualities of the Canadian apples are their chief merits. Apples are exported in barrels and also in boxes containing about one bushel each. Large quantities are also evaporated and exported. Establishments for evaporating fruit are now found in most of the larger apple-growing districts, and canning factories and jam factories have been established in many parts of Canada, and are conducted with advantage and profit.

The chief fruit-growing districts have long been in southern and western Ontario and in Nova Scotia; but recently much attention has been devoted to fruit-growing in British Columbia, where large areas of suitable land are available for the cultivation of apples, pears and other fruits. In some parts of the semi-arid districts in the interior of the province irrigation is being successfully practised for the purpose of bringing land under profitable cultivation for fruit. Collections of fruit grown in British Columbia have received premier honours at the competitive exhibitions of the Royal Horticultural Society in London, where their high quality and fine colour have been greatly appreciated.

Wine is made in considerable quantities in the principal vine-growing districts, and in several localities large vineyards have been planted for this purpose. An abundance of cider is also made in all the large apple-growing districts.

Honey is one of the minor food-products of Canada, and in many localities bees have abundance of pasturage. Canadian honey for colour, flavour and substance is unsurpassed. Maple sugar and syrup are made in those areas of the country where the sugar-maple tree flourishes. The syrup is used chiefly as a substitute for jam or preserved fruits, and the sugar is used in country homes for sweetening, for cooking purposes and for the making of confectionery. The processes of manufacture have been improved by the introduction of specially constructed evaporators, and quantities of maple sugar and syrup are annually exported.

Tobacco is a new crop which has been grown in Canada since 1904. Its cultivation promises to be successful in parts of Ontario, Quebec and British Columbia.

The department of agriculture of the Dominion government renders aid to agriculture in many ways, maintaining the experimental farms and various effective organizations for assisting the live-stock, dairying and fruit-growing industries, for testing the germination and purity of agricultural seeds, and for developing the export trade in agricultural and dairy produce. The health of animals branch, through which are administered the laws relating to the contagious diseases of animals, and the control of quarantine and inspection stations for imported animals, undertakes also valuable experiments on the diseases of farm live-stock, including glanders in horses, tuberculosis in cattle, &c. The policy of slaughtering horses reacting to the mallein test has been successfully initiated by Canada, the returns for 1908 from all parts of the country indicating a considerable decrease from the previous year in the number of horses destroyed and the amount of compensation paid. A disease of cattle in Nova Scotia, known as the Pictou cattle disease, long treated as contagious, has now been demonstrated by the veterinary officers of the department to be due to the ingestion of a weed, the ragwort, *Senecio Jacobea*. Hog cholera or swine fever has been almost eradicated. A laboratory is maintained for bacteriological and pathological researches and for the preparation of preventive vaccines. Canada is entirely free from rinderpest, pleuro-pneumonia and foot-and-mouth disease.

State aid.

The work of the live-stock branch is directed towards the improvement of the stock-raising industry, and is carried on through the agencies of expert teachers and stock judges, the systematic distribution of pure-bred breeding stock, the yearly testing of pure-bred dairy herds, the supervision of the accuracy of the registration of pure-bred animals and the nationalization of live-stock records. The last two objects are secured by act of the Dominion parliament passed in 1905. Under this act a record committee, appointed annually by the pedigree stud, herd and flock book associations of Canada, perform the duties of accepting the entries of pure-bred animals for the respective pedigree registers, and are provided with an office and with stationery and franking privileges by the government. Pedigree certificates are certified as correct by an officer of the department of agriculture, so that in Canada there exist national registration and government authority for the accuracy of pedigree live-stock certificates. The government promotes the extension of markets for farm products; it maintains officers in the United Kingdom who make reports from time to time on the condition in which Canadian goods are delivered from the steamships, and also on what they can learn from importing and distributing merchants regarding the preferences of the market for different qualities of farm goods and different sorts of packages. Through this branch of the public service a complete chain of cold-storage accommodation between various points in Canada and markets in Europe, particularly in Great Britain, has been arranged. The government offered a bonus to those owners of creameries who would provide cold-storage accommodation at them and keep the room in use for a period of three years. It also arranged with the various railway companies to run refrigerator cars weekly on the main lines leading to Montreal and other export points. The food-products from any shippers are received into these cars at the various railway stations at the usual rates, without extra charge for icing or cold-storage service. The government offered subventions to those who would provide cold-storage warehouses at various points where these were necessary, and also arranged with the owners of ocean steamships to provide cold-storage chambers on them by means of mechanical refrigerators. The policy of encouraging the provision of ample cold-storage accommodation has been developed still further by the Cold Storage Act of the Dominion parliament passed in 1907, under which subsidies are granted in part payment of the cost of erecting and equipping cold-storage warehouses in Canada for the preservation of perishable food-products.

Besides furnishing technical and general information as to the carrying on of dairying operations, the government has established and maintained illustration cheese factories and creameries in different places for the purpose of introducing the best methods of co-operative dairying in both the manufacturing and shipping of butter and cheese. Inspectors are employed to give information regarding the packing of fruit, and also to see to the enforcement of the Fruit Marks Acts, which prohibit the marking of fruit with wrong brands and packing in any fraudulent manner.

The seed branch of the department of agriculture was established in 1900 for the purpose of encouraging the production and use of seeds of superior quality, thereby improving all kinds of field and garden crops grown in Canada. Seeds are tested in the laboratory for purity and germination on behalf of farmers and seed merchants, and scientific investigations relating to seeds are conducted and reported upon. In the year 1906–1907 6676 samples of seeds were tested. Encouragement to seed-growing is given by the holding of seed fairs, and bulletins are issued on weeds, the methods of treating seed-wheat against smut and on other subjects. Collections of weed seeds are issued to merchants and others to enable them readily to identify noxious weed seeds. The Seed Control Act of 1905 brings under strict regulations the trade in agricultural seeds, prohibiting the sale for seeding of cereals, grasses, clovers or forage plants unless free from weeds specified, and imposing severe penalties for infringements.

The census and statistics office, reorganized as a branch of the department of agriculture in 1905, undertakes a complete census of population, of agriculture, of manufactures and of all the natural products of the Dominion every ten years, a census of the population and agriculture of the three North-West Provinces every five years, and various supplemental statistical inquiries at shorter intervals.

Experimental farms were established in 1887 in different parts of the Dominion, and were so located as to render efficient help

to the farmers in the more thickly settled districts, and at the same time to cover the varied climatic and other conditions which influence agriculture in Canada. The central experimental farm is situated at Ottawa, near the boundary line between Quebec and Ontario, where it serves as an aid to agriculture in these two important provinces. One of the four branch farms then established is at Nappan, Nova Scotia, near the boundary between that province and New Brunswick, where it serves the farmers of the three maritime provinces. A second branch experimental farm is at Brandon in Manitoba, a third is at Indian Head in Saskatchewan and the fourth is at Agassiz in the coast climate of British Columbia. In 1906–1907 two new branch farms were established. One is situated at Lethbridge, southern Alberta, where problems will be investigated concerning agriculture upon irrigated land and dry farming under conditions of a scanty rainfall. The other is at Lacombe, northern Alberta, about 70 m. south of Edmonton, in the centre of a good agricultural district on the Canadian Pacific railway. Additional branch farms in different parts of the Dominion are in process of establishment. At all these farms experiments are conducted to gain information as to the best methods of preparing the land for crop and of maintaining its fertility, the most useful and profitable crops to grow, and how the various crops grown can be disposed of to the greatest advantage. To this end experiments are conducted in the feeding of cattle, sheep and swine for flesh, the feeding of cows for the production of milk, and of poultry both for flesh and eggs. Experiments are also conducted to test the merits of new or untried varieties of cereals and other field crops, of grasses, forage plants, fruits, vegetables, plants and trees; and samples, particularly of the most promising cereals, are distributed freely among farmers for trial, so that those which promise to be most profitable may be rapidly brought into general cultivation. Annual reports and occasional bulletins are published and widely distributed, giving the results of this work. Farmers are invited to visit these experimental farms, and a large correspondence is conducted with those interested in agriculture in all parts of the Dominion, who are encouraged to ask advice and information from the officers of the farms.

Experimental farms.

The governments of the several provinces each have a department of agriculture. Among other provincial agencies for imparting information there are farmers' institutes, travelling dairies, live-stock associations, farmers', dairymen's, seed-growers', and fruit-growers' associations, and agricultural and horticultural societies. These are all maintained or assisted by the several provinces. Parts of the proceedings and many of the addresses and papers presented at the more important meetings of these associations are published by the provincial governments, and distributed free to farmers who desire to have them. There are also annual agricultural exhibitions of a highly important character, where improvements in connexion with agricultural and horticultural products, live-stock, implements, &c., are shown in competition. The Dominion government makes in turn to one of the chief local agricultural exhibition societies a grant of $50,000 for the purposes of the national representation of agriculture and live-stock. The exhibition receiving the grant loses its local character, and thus becomes the Dominion exhibition or fair for that year.

Agricultural organizations and education.

There are several important agricultural colleges for the practical education of young men in farming, foremost amongst them being the Ontario Agricultural College at Guelph. Agricultural colleges are also maintained at Truro, Nova Scotia, and Winnipeg, Manitoba. In most of the provinces are dairy schools where practical instruction and training are given. Since the beginning of the 20th century agricultural education and rural training in Canada have been greatly stimulated by the munificence of Sir William C. Macdonald of Montreal. A donation by him of $10,000, distributed to boys and girls on Canadian farms for prizes in a competition for the selection of seed grain, as recommended by Professor J. W. Robertson, led to the Macdonald-Robertson Seed Growers' Association. This soon assumed national proportions in the Canadian Seed Growers' Association, which, with the seed branch of the department of agriculture mentioned above, has done much to raise to a uniform standard of excellence the grain grown over large areas of the Canadian wheat-fields. The Macdonald Institute at Guelph, Ontario, the buildings and equipment of which Sir William provided at a cost of $182,500, and the Macdonald College at Ste Anne de Bellevue, 20 m. west of Montreal, have been established to promote the cause of rural education upon the lines of nature study, with school gardens, manual training, domestic science, &c., which on both sides of the Atlantic are now being found so effective in the hands of properly trained and enthusiastic teachers. The property of the Macdonald College at Ste Anne de Bellevue comprises 561 acres, of which 74 acres are devoted to campus and field-research plots, 100 acres to a *petite culture* farm and 387 acres to a live-stock and grain farm. The college includes a school for teachers, a school of theoretical and practical agriculture and a school of household science for the training of young women. The land, buildings and equipment of the college, which cost over $2,500,000, were presented by Sir William Macdonald, who in addition has provided for the future maintenance of the work by a trust fund of over $2,000,000. In connexion with the public elementary schools throughout Canada, where the principles of agriculture are taught to some extent, manual training centres, provided out of funds supplied by the same public-spirited donor, are now maintained by local and provincial public school authorities. (E. H. G.)

History

About A.D. 1000 Leif Ericson, a Norseman, led an expedition from Greenland to the shores probably of what is now Canada, but the first effective contact of Europeans with Canada was not until the end of the 15th century. John Cabot (*q.v.*), sailing from Bristol, reached the shores of Canada in 1497. Soon after fishermen from Europe began to go in considerable numbers to the Newfoundland banks, and in time to the coasts of the mainland of America. In 1534 a French expedition under Jacques Cartier, a seaman of St Malo, sent out by Francis I., entered the Gulf of St Lawrence. In the following year Cartier sailed up the river as far as the Lachine Rapids, to the spot where Montreal now stands. During the next sixty years the fisheries and the fur trade received some attention, but no colonization was undertaken.

Discovery.

At the beginning of the 17th century we find the first great name in Canadian history. Samuel de Champlain (*q.v.*), who had seen service under Henry IV. of France, was employed in the interests of successive fur-trading monopolies and sailed up the St Lawrence in 1603. In the next year he was on the Bay of Fundy and had a share in founding the first permanent French colony in North America —that of Port Royal, now Annapolis, Nova Scotia. In 1608 he began the settlement which was named Quebec. From 1608 to his death in 1635 Champlain worked unceasingly to develop Canada as a colony, to promote the fur trade and to explore the interior. He passed southward from the St Lawrence to the beautiful lake which still bears his name and also westward, up the St Lawrence and the Ottawa, in the dim hope of reaching the shores of China. He reached Lake Huron and Lake Ontario, but not the great lakes stretching still farther west.

French colony.

The era was that of the Thirty Years' War (1618–48), and during that great upheaval England was sometimes fighting France. Already, in 1613, the English from Virginia had almost completely wiped out the French settlement at Port Royal, and when in 1629 a small English fleet appeared at Quebec, Champlain was forced to surrender. But in 1632 Canada was restored to France by the treaty of St Germain-en-Laye. Just at this time was formed under the aegis of Cardinal Richelieu the "Company of New France," known popularly as "The Company of One Hundred Associates." With 120 members it was granted the whole St Lawrence valley; for fifteen years from 1629 it was to have a complete monopoly of trade; and products from its territory were to enter France

free of duty. In return the company was to take to New France 300 colonists a year; only French Catholics might go; and for each settlement the company was to provide three priests. Until 1663 this company controlled New France.

It was an era of missionary zeal in the Roman Catholic church, and Canada became the favourite mission. The Society of Jesus was only one of several orders—Franciscans (Recollets), Sulpicians, Ursulines, &c.—who worked in New France. The Jesuits have attracted chief attention, not merely on account of their superior zeal and numbers, but also because of the tragic fate of some of their missionaries in Canada. In the voluminous *Relations* of their doings the story has been preserved. Among the Huron Indians, whose settlements bordered on the lake of that name, they secured a great influence. But there was relentless war between the Hurons and the Iroquois occupying the southern shore of Lake Ontario, and when in 1649 the Iroquois ruined and almost completely destroyed the Hurons, the Jesuit missionaries also fell victims to the conquerors' rage. Missionaries to the Iroquois themselves met with a similar fate and the missions failed. Commercial life also languished. The company planned by Richelieu was not a success. It did little to colonize New France, and in 1660, after more than thirty years of its monopoly, there were not more than 2000 French in the whole country. In 1663 the charter of the company was revoked. No longer was a trading company to discharge the duties of a sovereign. New France now became a royal province, with governor, intendant, &c., on the model of the provinces of France.

In 1664 a new "Company of the West Indies" (*Compagnie des Indes Occidentales*) was organized to control French trade and colonization not only in Canada but also in West Africa, South America and the West Indies. At first it promised well. In 1665 some 2000 emigrants were sent to Canada; the European population was soon doubled, and Louis XIV. began to take a personal interest in the colony. But once more, in contrast with English experience, the great trading company proved a failure in French hands as a colonizing agent, and in 1674 its charter was summarily revoked by Louis XIV. Henceforth in name, if not in fact, monopoly is ended in Canada.

By this time French explorers were pressing forward to unravel the mystery of the interior. By 1659 two Frenchmen, Radisson and Groseillers, had penetrated beyond the great lakes to the prairies of the far West; they were probably the first Europeans to see the Mississippi. By 1666 a French mission was established on the shores of Lake Superior, and in 1673 Joliet and Marquette, explorers from Canada, reached and for some distance descended the Mississippi. Five years later Cavelier de la Salle was making his toilsome way westward from Quebec to discover the true character of the great river and to perform the feat, perilous in view of the probable hostility of the natives, of descending it to the sea. In 1682 he accomplished his task, took possession of the valley of the Mississippi in the name of Louis XIV. and called it Louisiana. Thus from Canada as her basis was France reaching out to grasp a continent.

There was a keen rivalry between church and state for dominance in this new empire. In 1659 arrived at Quebec a young prelate of noble birth, François Xavier de Laval-Montmorency, who had come to rule the church in Canada. An ascetic, who practised the whole cycle of medieval austerities, he was determined that Canada should be ruled by the church, and he desired for New France a Puritanism as strict as that of New England. His especial zeal was directed towards the welfare of the Indians. These people showed, to their own ruin, a reckless liking for the brandy of the white man. Laval insisted that the traders should not supply brandy to the natives. He declared excommunicate any one who did so and for a time he triumphed. More than once he drove from Canada governors who tried to thwart him. In 1663 he was actually invited to choose a governor after his own mind and did so, but with no cessation of the old disputes. In 1672 Louis de Buade, comte de Frontenac (*q.v.*), was named governor of New France, and in him the church found her match. Yet not at once; for, after a bitter struggle, he was recalled in 1682. But Canada needed him. He knew how to control the ferocious Iroquois, who had cut off France from access to Lake Ontario; to check them he had built a fort where now stands the city of Kingston. With Frontenac gone, these savages almost strangled the colony. On a stormy August night in 1689 1500 Iroquois burst in on the village of Lachine near Montreal, butchered 200 of its people, and carried off more than 100 to be tortured to death at their leisure. Then the strong man Frontenac was recalled to face the crisis.

It was a critical era. James II. had fallen in England, and William III. was organizing Europe against French aggression. France's plan for a great empire in America was now taking shape and there, as in Europe, a deadly struggle with England was inevitable. Frontenac planned attacks upon New England and encouraged a ruthless border warfare that involved many horrors. Him, in return, the English attacked. Sir William Phips sailed from Boston in 1690, conquered Acadia, now Nova Scotia, and then hazarded the greater task of leading a fleet up the St Lawrence against Quebec. On the 16th of October 1690 thirty-four English ships, some of them only fishing craft, appeared in its basin and demanded the surrender of the town. When Frontenac answered defiantly, Phips attacked the place; but he was repulsed and in the end sailed away unsuccessful.

Struggles with England.

Each side had now begun to see that the vital point was control of the interior, which time was to prove the most extensive fertile area in the world. La Salle's expedition had aroused the French to the importance of the Mississippi, and they soon had a bold plan to occupy it, to close in from the rear on the English on the Atlantic coast, seize their colonies and even deport the colonists. The plan was audacious, for the English in America outnumbered the French by twenty to one. But their colonies were democracies, disunited because each was pursuing its own special interests, while the French were united under despotic leadership. Frontenac attacked the Iroquois mercilessly in 1696 and forced these proud savages to sue for peace. But in the next year was made the treaty of Ryswick, which brought a pause in the conflict, and in 1698 Frontenac died.

After Frontenac the Iroquois, though still hostile to France, are formidable no more, and the struggle for the continent is frankly between the English and the French. The peace of Ryswick proved but a truce, and when in 1701, on the death of the exiled James II., Louis XIV. flouted the claims of William III. to the throne of England by proclaiming as king James's son, renewed war was inevitable. In Europe it saw the brilliant victories of Marlborough; in America it was less decisive, but France lost heavily. Though the English, led by Sir Hovenden Walker, made in 1711 an effort to take Quebec which proved abortive, they seized Nova Scotia; and when the treaty of Utrecht was made in 1713, France admitted defeat in America by yielding to Britain her claims to Hudson Bay, Newfoundland and Nova Scotia. But she still held the shores of the St Lawrence, and she retained, too, the island of Cape Breton to command its mouth. There she built speedily the fortress of Louisbourg, and prepared once more to challenge British supremacy in America. With a sound instinct that looked to future greatness, France still aimed, more and more, at the control of the interior of the continent. The danger from the Iroquois on Lake Ontario had long cut her off from the most direct access to the West, and from the occupation of the Ohio valley leading to the Mississippi, but now free from this savage scourge she could go where she would. In 1701 she founded Detroit, commanding the route from Lake Erie to Lake Huron. Her missionaries and leaders were already at Sault Ste Marie commanding the approach to Lake Superior, and at Michilimackinac commanding that to Lake Michigan. They had also penetrated to what is now the Canadian West, and it was a French Canadian, La Vérendrye, who, by the route leading past the point where now stands the city of Winnipeg,

pressed on into the far West until in 1743, first recorded of white men, he came in sight of the Rocky Mountains. In the south of the continent France also crowned La Salle's work by founding early in the 18th century New Orleans at the mouth of the Mississippi. It was a far cry from New Orleans to Quebec. If France could link them by a chain of settlements and shut in the English to their narrow strip of Atlantic seaboard there was good promise that North America would be hers.

The project was far-reaching, but France could do little to make it effective. Louis XV. allowed her navy to decline and her people showed little inclination for emigration to the colonies. In 1744, when the war of the Austrian Succession broke out, the New England colonies planned and in 1745 effected the capture of Louisbourg, the stronghold of France in Cape Breton Island, which menaced their commerce. But to their disgust, when the peace of Aix-la-Chapelle was made in 1748, this conquest was handed back to France. She continued her work of building a line of forts on the great lakes—on the river Niagara, on the Ohio, on the Mississippi; and the English colonies, with the enemy thus in their rear, grew ever more restive. In 1753 Virginia warned the French on the Ohio that they were encroaching on British territory. The next year, in circumstances curiously like those which were repeated when the French expedition under Marchand menaced Britain in Egypt by seeking to establish a post on the Upper Nile, George Washington, a young Virginian officer, was sent to drive the French from their Fort Duquesne on the Ohio river, where now stands Pittsburgh. The result was sharp fighting between English and French in a time of nominal peace. In 1755 the British took the stern step of deporting the Acadian French from Nova Scotia. Though this province had been ceded to Great Britain in 1713 many of the Acadians had refused to accept British sovereignty. In 1749 the British founded Halifax, began to colonize Nova Scotia, and, with war imminent, deemed it prudent to disperse the Acadians, chiefly along the Atlantic seaboard (see NOVA SCOTIA: *History*). In 1756 the Seven Years' War definitely began. France had no resources to cope with those of Britain in America, and the British command of the sea proved decisive. On the 13th of September 1759 Wolfe won his great victory before Quebec, which involved the fall of that place, and a year later at Montreal the French army in Canada surrendered. By the peace of Paris, 1763, the whole of New France was finally ceded to Great Britain.

With only about 60,000 French in Canada at the time of the conquest it might have seemed as if this population would soon be absorbed by the incoming British. Some thought that, under a Protestant sovereign, the Canadian Catholics would be rapidly converted to Protestantism. But the French type proved stubbornly persistent and to this day dominates the older Canada. The first English settlers in the conquered country were chiefly petty traders, not of a character to lead in social or public affairs. The result was that the government of the time co-operated rather with the leaders among the French.

English possession.

After peace was concluded in 1763, Canada was governed under the authority of a royal proclamation, but sooner or later a constitution specially adapted to the needs of the country was inevitable. In 1774 this was provided by the Quebec Act passed by the Imperial parliament. Under this act the western territory which France had claimed, extending as far as the Mississippi and south to the Ohio, was included with Canada in what was called the Province of Quebec. This vast territory was to be governed despotically from Quebec; the Roman Catholic church was given its old privileges in Canada; and the French civil law was established permanently side by side with the English criminal law. The act linked the land-owning class in Canada and the church by ties of self-interest to the British cause. The *habitant*, placed again under their authority, had less reason to be content.

In 1775 began the American Revolution. Its leaders tried to make the revolt continental, and invaded Canada, hoping that the French would join them. They took Montreal and besieged Quebec during the winter of 1775–1776; but the prudent leadership of Sir Guy Carleton, afterwards Lord Dorchester, saved Quebec and in 1776 the revolutionary army withdrew unsuccessful from Canada. Since that time any prospect of Canada's union to the United States has been very remote.

But the American Revolution profoundly influenced the life of Canada. The country became the refuge of thousands of American loyalists who would not desert Great Britain. To Nova Scotia, to what are now New Brunswick (*q.v.*) and Ontario (*q.v.*) they fled in numbers not easily estimated, but probably reaching about 40,000. Until this time the present New Brunswick and Ontario had contained few European settlers; now they developed, largely under the influence of the loyalists of the Revolution. This meant that the American type of colonial life would be reproduced in Canada; but it meant also bitter hostility on the part of these colonists to the United States, which refused in any way to compensate the loyalists for their confiscated property. Great Britain did something; the loyalists received liberal grants of land and cash compensation amounting to nearly £4,000,000.

A prevailingly French type of government was now no longer adequate in Canada, and in 1791 was passed by the British parliament the Constitutional Act, separating Canada at the Ottawa river into two parts, each with its own government; Lower Canada, chiefly French, retaining the old system of laws, with representative institutions now added, and Upper Canada, on the purely British model. (For the history of Lower and Upper Canada, now Quebec and Ontario, the separate articles must be consulted.) Each province had special problems; the French in Lower Canada aimed at securing political power for their own race, while in Upper Canada there was no race problem, and the great struggle was for independence of official control and in all essential matters for government by the people. It may be doubted whether at this time it would have been safe to give these small communities complete self-government. But this a clamorous radical element demanded insistently, and the issue was the chief one in Canada for half a century.

But before this issue matured war broke out between Great Britain and the United States in 1812 from causes due chiefly to Napoleon's continental policy. The war seemed to furnish a renewed opportunity to annex Canada to the American Union, and Canada became the chief theatre of conflict. The struggle was most vigorous on the Niagara frontier. But in the end the American invasion failed and the treaty made at Ghent in 1814 left the previous status unaltered.

In 1837 a few French Canadians in Lower Canada, led by Louis Joseph Papineau (*q.v.*), took up arms with the wild idea of establishing a French republic on the St Lawrence. In the same year William Lyon Mackenzie (*q.v.*) led a similar armed revolt in Upper Canada against the domination of the ruling officialdom called, with little reason, the "Family Compact." Happening, as these revolts did, just at the time of Queen Victoria's accession, they attracted wide attention, and in 1838 the earl of Durham (*q.v.*) was sent to govern Canada and report on the affairs of British North America. Clothed as he was with large powers, he undertook in the interests of leniency and reconciliation to banish, without trial, some leaders of the rebellion in Lower Canada. For this reason he was censured at home and he promptly resigned, after spending only five months in the country. But his *Report*, published in the following year, is a masterly survey of the situation and included recommendations that profoundly influenced the later history of Canada. He recommended the union of the two Canadian provinces at once, the ultimate union of all British North America and the granting to this large state of full self-government. The French element he thought a menace to Canada's future, and partly for this reason he desired all the provinces to unite so that the British element should be dominant.

Lord Durham.

To carry out Lord Durham's policy the British government passed in 1840 an Act of Union joining Upper and Lower Canada, and sent out as governor Charles Poulett Thompson, who was made Baron Sydenham and Toronto. In the single

parliament each province was equally represented. By this time there was more than a million people in Canada, and the country was becoming important. Lord Sydenham died in 1841 before his work was completed, and he left Canada still in a troubled condition. The French were suspicious of the Union, aimed avowedly at checking their influence, and the complete self-government for which the "Reformers" in English-speaking Canada had clamoured was not yet conceded by the colonial office. But rapidly it became obvious that the provinces united had become too important to be held in leading strings. The issue was finally settled in 1849 when the earl of Elgin was governor and the Canadian legislature, sitting at Montreal, passed by a large majority the Rebellion Losses Bill, compensating citizens, some of them French, in Lower Canada, for losses incurred at the hands of the loyal party during the rebellion a decade earlier. The cry was easily raised by the Conservative minority that this was to vote reward for rebellion. They appealed to London for intervention. The mob in Montreal burned the parliament buildings and stoned Lord Elgin himself because he gave the royal assent to the bill. He did so in the face of this fierce opposition, on the ground that, in Canadian domestic affairs, the Canadian parliament must be supreme.

The union of the two provinces did not work well. Each was jealous of the other and deadlocks frequently occurred. Commercially, after 1849, Canada was prosperous. In 1854 Lord Elgin negotiated a reciprocity treaty with the United States which gave Canadian natural products free entrance to the American market. The outbreak of the Civil War in the United States in 1861 increased the demand for such products, and Canada enjoyed an extensive trade with her neighbour. But, owing largely to the unfriendly attitude of Great Britain to the northern side during the war, the United States cancelled the treaty, when its first term of ten years ended in 1865, and it has never been renewed.

Under the party system in Canada cabinets changed as often as, until recently, they did in France, and the union of the two provinces did not give political stability. The French and English were sufficiently equal in strength to make the task of government well nigh impossible. In 1864 came the opportunity for change, when New Brunswick, Nova Scotia and Prince Edward Island were considering a federal union. Canada suggested a wider plan to include herself and, in October 1864, a conference was held at Quebec. The conference outlined a plan of federation which subsequently, with slight modifications, passed the imperial parliament as "The British North America Act," and on the 1st of July 1867, the Dominion of Canada came into existence. It was born during the era of the American Civil War, and was planned to correct defects which time had revealed in the American federation. The provinces in Canada were conceded less power than have the states in the American union; the federal government retaining the residuum of power not conceded. (G.M.W.)

Canada since federation.

When federation was accomplished in 1867 the Dominion of Canada comprised only the four provinces of Ontario, Quebec, New Brunswick and Nova Scotia. Lord Monck was appointed the first governor-general, and at his request the Hon. John Alexander Macdonald undertook the formation of an administration. A coalition cabinet was formed, including the foremost Liberals and Conservatives drawn from the different provinces. Under a proclamation issued from Windsor Castle by Queen Victoria on the 22nd of May the new constitution came into effect on the 1st of July. This birthday of the Dominion has been fixed by statute as a public holiday, and is annually observed under the name of "Dominion Day." Seventy-two senators—half Conservatives and half Liberals—were appointed, and lieutenant-governors were named for the four provinces. The prime minister was created a K.C.B., and minor honours were conferred on other ministers in recognition of their services in bringing about the union.

Nova Scotia question.

The first general election for the Dominion House of Commons was held during the month of August, and except in the province of Nova Scotia was favourable to the administration, which entered upon its parliamentary work with a majority of thirty-two. The first session of parliament was opened on the 8th of November, but adjourned on the 21st of December till the 12th of March 1868, chiefly on account of the fact that members of the Dominion parliament were allowed, in Ontario and Quebec, to hold seats in the local legislatures, so that it was difficult for the different bodies to be in session simultaneously. It was not till 1873 that an act was passed making members of the local legislatures ineligible for seats in the House of Commons. Immediately after the completion of federation a serious agitation for repeal of the union arose in Nova Scotia, which had been brought into the federal system by a vote of the existing legislature, without any direct preliminary appeal to the people. Headed by Joseph Howe (*q.v.*), the advocates of repeal swept the province at the Dominion election. Out of 19 members then elected 18 were pledged to repeal, Dr Tupper, the minister responsible for carrying the Act of Union, alone among the supporters of federation securing a seat. The local assembly, in which 36 out of 38 members were committed to repeal, passed an address to Her Majesty praying her not to "reduce this free, happy and hitherto self-governed province to the degraded condition of a servile dependency of Canada," and sent Howe with a delegation to London to lay the petition at the foot of the throne. Howe enlisted the support of John Bright and other members of parliament, but the imperial government was firm, and the duke of Buckingham, as colonial secretary, soon informed the governor-general in a despatch that consent could not be given for the withdrawal of Nova Scotia from the Dominion. Meanwhile Howe, convinced of the impossibility of effecting separation, and fearing disloyal tendencies which had manifested themselves in some of its advocates, entered into negotiations with Dr Tupper in London, and later with the Dominion government, for better financial terms than those originally arranged for Nova Scotia in the federal system. The estimated amount of provincial debt assumed by the general government was increased by $1,186,756, and a special annual subsidy of $82,698 was granted for a period of ten years. These terms having been agreed to, Howe, as a pledge of his approval and support, accepted a seat as secretary of state in the Dominion cabinet. By taking this course he sacrificed much of his remarkable popularity in his native province, but confirmed the work of consolidating the Dominion. It was many years before the bitterness of feeling aroused by the repeal agitation entirely subsided in Nova Scotia.

A gloom was cast over the first parliament of the Dominion by the assassination in 1868 of one of the most brilliant figures in the politics of the time, D'Arcy McGee (*q.v.*). His murderer, a Fenian acting under the instructions of the secret society to which he belonged, was discovered, and executed in 1869.

The reorganization of the various departments of state, in view of the wider interests with which they had to deal, occupied much of the attention of the first parliament of the Dominion. In 1867 the postal rates were reduced and unified. In 1868 a militia system for the whole Dominion was organized, the tariff altered and systematized, and a Civil Service Act passed. The banking system of the country was put on a sound footing by a series of acts culminating in 1871, and in the same year a uniform system of decimal currency was established for the whole Dominion. While the new machinery of state was thus being put in operation other large questions presented themselves.

Inter-Colonial railway.

The construction of the Inter-Colonial railway as a connecting link between the provinces on the seaboard and those along the St Lawrence and the Great Lakes was a part of the federation compact, a clause of the British North America Act providing that it should be begun within six months after the date of union. The guarantee of the imperial government made easy the provision

of the necessary capital, but as this was coupled with a voice in the decision of the route, it complicated the latter question, about which a keen contest arose. The most direct and therefore commercially most promising line of construction passed near the boundary of the United States. Recent friction with that country made this route objected to by the imperial and many Canadian authorities. Ultimately the longer, more expensive, but more isolated route along the shores of the Gulf of St Lawrence was adopted. The work was taken in hand at once, and pressed steadily forward to completion. It has since been supplemented by other lines built for more distinctly commercial ends. Though not for many years a financial success, the Inter-Colonial railway, which was opened in 1876, has in a marked way fulfilled its object by binding together socially and industrially widely separated portions of the Dominion.

Hudson's Bay Company territories.

Within a month of the meeting of the first parliament of the Dominion a question of vast importance to the future of the country was brought forward by the Hon. W. McDougall in a series of resolutions which were adopted, and on which was based an address to the queen praying that Her Majesty would unite Rupert's Land and the North-West Territories to Canada. A delegation consisting of Sir G. E. Cartier and the Hon. W. McDougall was in 1868 sent to England to negotiate with the Hudson's Bay Company (*q.v.*) for the extinction of its claims, and to arrange with the imperial government for the transfer of the territory. After prolonged discussions the company agreed to surrender to the crown, in consideration of a payment of £300,000, the rights and interests in the north-west guaranteed by its charter, with the exception of a reservation of one-twentieth part of the fertile belt, and 45,000 acres of land adjacent to the trading posts of the company. For the purposes of this agreement the "fertile belt" was to be bounded as follows:—"On the south by the U.S. boundary, on the west by the Rocky Mountains, on the north by the northern branch of the Saskatchewan river, on the east by Lake Winnipeg, the Lake of the Woods, and the waters connecting them." An act authorizing the change of control was passed by the imperial parliament in July 1868; the arrangement made with the Hudson's Bay Company was accepted by the Canadian parliament in June 1869; and the deed of surrender from the Hudson's Bay Company to Her Majesty is dated November 19th, 1869. In anticipation of the formal transfer to the Dominion an act was passed by the Canadian parliament in the same month providing for the temporary government of Rupert's Land and the North-West Territories. On the 28th of September the Hon. W. McDougall was appointed the first governor, and left at once to assume control on the 1st of December, when it had been understood that the formal change of possession would take place.

Red river rebellion.

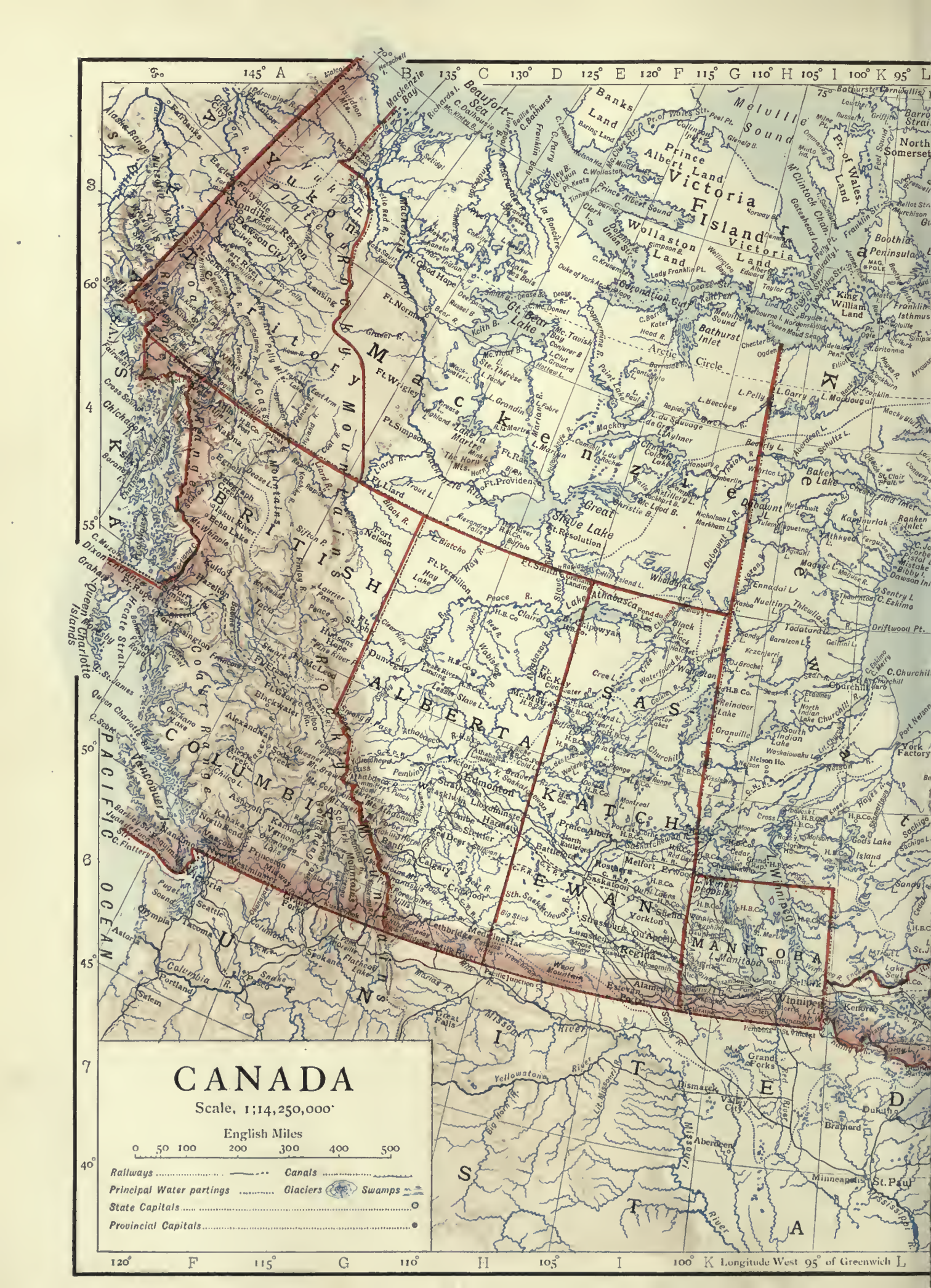
Meanwhile a serious condition of affairs was developing in the Red river settlement, the most considerable centre of population in the newly acquired territory. The half-breeds regarded with suspicion a transfer of control concerning which they had not been consulted. They resented the presence of the Canadian surveyors sent to lay out roads and townships, and the tactless way in which some of these did their work increased the suspicion that long-established rights to the soil would not be respected. A population largely Roman Catholic in creed, and partly French in origin and language, feared that an influx of new settlers would overthrow cherished traditions. Some were afraid of increased taxation. A group of immigrants from the United States fomented disturbance in the hope that it would lead to annexation. Louis Riel, a fanatical half-breed, placed himself at the head of the movement. His followers established what they called a "provisional government" of which he was chosen president, and when the newly appointed governor reached the boundary line he was prevented from entering the territory. Several of the white settlers who resisted this rebellious movement were arrested and kept in confinement. One of these, a young man named Thomas Scott, having treated Riel with defiance, was court-martialled for treason to the provisional government, condemned, and on the 4th of March 1870, shot in cold blood under the walls of Fort Garry. This crime aroused intense excitement throughout the country, and the Orange body, particularly, to which Scott belonged, demanded the immediate punishment of his murderer and the suppression of the rebellion. An armed force, composed partly of British regulars and partly of Canadian volunteers, was made ready and placed under the command of Colonel Garnet Wolseley, afterwards Lord Wolseley. As a military force could not pass through the United States, the expedition was compelled to take the route up Lake Superior, and from the head of that lake through 500 m. of unbroken and difficult wilderness. In August 1870, the force reached Fort Garry, to find the rebels scattered and their leader, Riel, a fugitive in the neighbouring states. Meanwhile, during the progress of the expedition, an act had been passed creating Manitoba a province, with full powers of self-government, and the arrival of the military was closely followed by that of the first governor, Mr (later Sir) Adams G. Archibald, who succeeded in organizing the administration on a satisfactory basis. Fort Garry became Winnipeg, and there were soon indications that it was destined to be a great city, and the commercial doorway to the vast prairies that lay beyond. Meanwhile, till adequate means of transportation were provided, it was seen that city and prairie alike must wait for any large inflow of population.

New provinces.

Provision was made in the British North America Act to receive new provinces into the Dominion. Manitoba was the first to be constituted; in 1871 British Columbia, which had hitherto held aloof, determined, under the persuasion of a sympathetic governor, Mr (later Sir) Antony Musgrave, to throw in its lot with the Dominion. Popular feeling in British Columbia itself was not strongly in favour of union, and the terms under which the new province was to be received were the subject of much negotiation with the provincial authorities, and were keenly debated in parliament before the bill in which they were embodied was finally carried. The clause on which there was the widest divergence of opinion was one providing that a trans-continental railway, connecting the Pacific province with the eastern part of the Dominion, should be begun within two, and completed within ten years. To a province which at the time contained a population of only 36,000, and but half of this white, the inducement thus held out was immense. The Opposition in parliament claimed that the contract was one impossible for the Dominion to fulfil. The government of Sir John Macdonald felt, however, that the future of the Dominion depended upon linking together the Atlantic and the Pacific, and in view of the vast unoccupied spaces lying between the Great Lakes and the Rocky Mountains, open to immigration from the United States, their audacity in undertaking the work was doubtless justified. The construction of the Canadian Pacific railway, thus inaugurated, became for several years the chief subject of political contention between opposing parties.

Anticipating the order of chronology slightly, it may be mentioned here that in 1873 Prince Edward Island (*q.v.*), which had in 1865 decisively rejected proposals of the Quebec conference and had in the following year repeated its rejection of federation by a resolution of the legislature affirming that no terms Canada could offer would be acceptable, now decided to throw in its lot with the Dominion. The island had become involved in heavy railway expenditure, and financial necessities led the electors to take a broader view of the question. In the end the federal government assumed the railway debt, arrangements were made for extinguishing certain proprietary rights which had long been a source of discontent, and on the 1st of July 1873 the Dominion was rounded off by the accession of the new province.

Finally in 1878, in order to remove all doubts about unoccupied territory, an imperial order in council was passed in response to an address of the Canadian parliament, annexing to the Dominion all British possessions in North America, except Newfoundland. That small colony, which had been represented at the Quebec conference, also rejected the proposals


CANADA
Scale, 1:14,250,000
English Miles
0 50 100 200 300 400 500
Railways
Canals
Principal Water partings
Glaciers
Swamps
State Capitals
Provincial Capitals
Longitude West of Greenwich
Yukon Territory
Mackenzie
Keewatin
Alberta
Saskatchewan
Manitoba
British Columbia
Prince Albert Land
Victoria Island
Wollaston Land
Banks Land
Melville Sound
Great Slave Lake
Great Bear Lake
Athabasca
Lake Winnipeg
Hudson Bay
Pacific Ocean
Vancouver
Victoria
Seattle
Portland
Edmonton
Calgary
Regina
Winnipeg
Saskatoon
Prince Albert
Yellowknife
Dawson City
Whitehorse
Fort Simpson
Fort Nelson
Fort Smith
Fort Resolution
Fort Chipewyan
Fort McMurray
Peace River
Grande Prairie
Lethbridge
Medicine Hat
Moose Jaw
Brandon
Churchill
Thompson
Flin Flon
The Pas
Norman Wells
Inuvik
Aklavik
Tuktoyaktuk
Coppermine
Cambridge Bay
Resolute
Pond Inlet
Baffin Island
Hudson Strait
Foxe Basin
Southampton Island
Melville Peninsula
Boothia Peninsula
King William Land
Somerset Island
Devon Island
Ellesmere Island
Queen Elizabeth Islands
Queen Charlotte Islands
Vancouver Island
Great Bear Lake
Great Slave Lake
Lake Athabasca
Lake Winnipeg
Lake Manitoba
Lake Winnipegosis
Lake Athabasca
Peace River
Mackenzie River
Yukon River
Fraser River
Columbia River
Saskatchewan River
Red River
Nelson River
Churchill River
Missouri River
Yellowstone River
Milk River
Arctic Circle
Mackenzie Mountains
Rocky Mountains
Selkirk Mountains
Cassiar Mountains
Richardson Mountains
Alaska
Yukon
Northwest Territories
United States
Montana
North Dakota
Minnesota

Lancaster Sound
Baffin Bay
Cockburn Land
Baffin Land
Spicer Is.
Fox Channel
Fox Land
Southampton Island
Hudson Strait
Penny Land
Cumberland Sound
Davis Strait
North Inspectorate
South Inspectorate
GREENLAND (Danish)
Denmark Strait
Angmagssalik
Holstenborg
Sukkertoppen
Godthaab
Frederikshaab
Julianehaab
Lichtenau
Frederiksdal
C. Farewell
Resolution I.
Hatton Headland
Frobisher B.
Ungava Bay
Labrador (To Newfoundland)
Labrador
Ungava
Hudson Bay
Ottawa Is.
Portland Promontory
King George Is
Bakers Dozen Is.
Belcher Is.
James Bay
Lake Mistassini
Lake Mistassinis
Peninsula
Gulf of St. Lawrence
Anticosti
NEWFOUNDLAND
St. Johns
Placentia
C. Breton I.
NEW BRUNSWICK
PRINCE EDWARD I.
NOVA SCOTIA
Halifax
Sydney
Quebec
Montreal
Ottawa
Toronto
Buffalo
Erie
L. Ontario
L. Huron
L. Michigan
Superior
Portland
Boston
Providence
Albany
Syracuse
Oswego
Montpelier
Augusta
Bangor
Fredericton
Newcastle
Halifax
Liverpool
Lunenburg
Pt. Medway
Pt. Mouton
Clyde River
Sable I.
Sable
Nantucket Sound
Nantucket I.
Massachusetts Bay
C. Cod
C. Ann
ATLANTIC OCEAN

of 1865, and, in spite of various efforts to arrange satisfactory terms, has steadily held aloof, and so has proved the only obstacle to the complete political unification of British North America.

A signal proof was soon furnished of the new standing in the empire which federation had given to the Canadian provinces.

Difficulties with the United States.

A heritage of differences and difficulties had been left to be settled between England, Canada and the American Union as the result of the Civil War. In retaliation for the supposed sympathy of Canadians with the South in this struggle the victorious North took steps to abrogate in 1866 the reciprocity treaty of 1854, which had conferred such great advantages on both countries. It followed that the citizens of the United States lost the right which they had received under the treaty to share in the fisheries of Canada. American fishermen, however, showed so little inclination to give up what they had enjoyed so long, that it was found necessary to take vigorous steps to protect Canadian fishing rights, and frequent causes of friction consequently arose. During the progress of the Civil War American feeling had been greatly exasperated by the losses inflicted on commerce by the cruiser "Alabama," which, it was claimed, was allowed to leave a British port in violation of international law. On the other hand, Canadian feeling had been equally exasperated by the Fenian raids, organized on American soil, which had cost Canada much expenditure of money and some loss of life. In addition to these causes of difference there was an unsettled boundary dispute in British Columbia, and questions about the navigation of rivers common to the United States and Canada. In 1869 the government of Canada sent a deputation to England to press upon the imperial government the necessity of asserting Canada's position in regard to the fisheries, and the desirability of settling other questions in dispute with the republic. The outcome of this application was the appointment of a commission to consider and if possible settle outstanding differences between the three countries. The prime minister of the Dominion, Sir John Macdonald, was asked to act as one of the imperial commissioners in carrying on these negotiations. This was the first time that a colonist had been called upon to assist in the settlement of international disputes. The commission assembled at the American capital in February 1871, and after discussions extending over several weeks signed what is known as the treaty of Washington. By the terms of this treaty the "Alabama" claims and the San Juan boundary were referred to arbitration; the free navigation of the St Lawrence was granted to the United States in return for the free use of Lake Michigan and certain Alaskan rivers; and it was settled that a further commission should decide the excess of value of the Canadian fisheries thrown open to the United States over and above the reciprocal concessions made to Canada. Much to the annoyance of the people of the Dominion the claims for the Fenian raids were withdrawn at the request of the British government, which undertook to make good to Canada any losses she had suffered. To some of these terms the representative of Canada made a strenuous opposition, and in finally signing the treaty stated that he did so chiefly for imperial interests, although in these he believed Canadian interests to be involved. The clauses relating to the fisheries and the San Juan boundary were reserved for the approval of the Canadian parliament, which, in spite of much violent opposition, ratified them by a large majority. Under the "Alabama" arbitration Great Britain paid to the United States damages to the amount of $15,500,000, while the German Emperor decided the San Juan boundary in favour of the United States. The Fishery Commission, on the other hand, which sat in Halifax, awarded Canada $5,500,000 as the excess value of its fisheries for twelve years, and after much hesitation this sum was paid by the United States into the Canadian treasury. An imperial guarantee of a loan for the construction of railways was the only compensation Canada received for the Fenian raids.

The second general election for the Dominion took place in 1872. It was marked by the complete defeat of the Anti-Unionist party in Nova Scotia, only one member of which secured his election, thus exactly reversing the vote of 1867. While Sir John Macdonald's administration was supported in Nova Scotia, it was weakened in Ontario on account of the clemency shown to Riel, and in Quebec by the refusal to grant a general amnesty to all who had taken part in the rebellion. Two important members of the cabinet, Sir G. Cartier and Sir F. Hincks, were defeated. Opposition to the Washington treaty and dread of the bold railway policy of the government also contributed to weaken its position. But a graver blow, ending in the complete overthrow of the administration, was soon to fall as the result of the election. In 1872 two companies had been formed and received charters to build the Canadian Pacific railway. Sir Hugh Allan of Montreal was at the head of the one, and the Hon. David Macpherson of Toronto was president of the other. The government endeavoured to bring about an amalgamation of these rival companies, believing that the united energies and financial ability of the whole country were required for so vast an undertaking. While negotiations to this end were still proceeding the election of 1872 came on with the result already mentioned. Soon after the meeting of parliament, a Liberal member of the House, Mr L. S. Huntingdon, formally charged certain members of the cabinet with having received large sums of money, for use in the election, from Sir Hugh Allan, on condition, as it was claimed, that the Canadian Pacific contract should be given to the new company, of which he became the head on the failure of the plan for amalgamation. These charges were investigated by a royal commission, which was appointed after it had been decided that the parliamentary committee named for that purpose could not legally take evidence under oath. Parliament met in October 1873, to receive the report of the commission. While members of the government were exonerated by the report from the charge of personal corruption, the payment of large sums of money by Sir Hugh Allan was fully established, and public feeling on the matter was so strong that Sir J. Macdonald, while asserting his own innocence, felt compelled to resign without waiting for the vote of parliament. Lord Dufferin, who had succeeded Lord Lisgar as governor-general in 1872, at once sent for the leader of the Opposition, Mr Alexander Mackenzie (*q.v.*), who succeeded in forming a Liberal administration which, on appealing to the constituencies, was supported by an overwhelming majority, and held power for the five following years.

Canadian Pacific railway question.

On the accession to power of the Liberal party, a new policy was adopted for the construction of the trans-continental railway. It was proposed to lessen the cost of construction by utilizing the water stretches along the route, while, on the ground that the contract made was impossible of fulfilment, the period of completion was postponed indefinitely. Meanwhile the surveys and construction were carried forward not by a company, but as a government work. Under this arrangement British Columbia became exceedingly restive, holding the Dominion to the engagement by which it had been induced to enter the union. A representative of the government, Mr (later Sir James) Edgar, sent out to conciliate the province by some new agreement, failed to accomplish his object, and all the influence of the governor-general, Lord Dufferin, who paid a visit at this time to the Pacific coast, was required to quiet the public excitement, which had shown itself in a resolution passed by the legislature for separation from the Dominion unless the terms of union were fulfilled.

Meanwhile a policy destined to affect profoundly the future of the Dominion had, along with that of the construction of the Canadian Pacific railway, become a subject of burning political discussion and party division. During the period of Mr Mackenzie's administration a profound business depression affected the whole continent of America. The Dominion revenue showed a series of deficits for several years in succession. The factories of

Economic "national policy."

the United States, unduly developed by an extreme system of protection, sought in Canada a slaughter market for their surplus products, to the detriment or destruction of Canadian industries. Meanwhile the republic, which had for many years drained Canada of hundreds of thousands of artisans to work its factories, steadily declined to consider any suggestion for improving trade relations between the two countries. In these circumstances Sir J. Macdonald brought forward a proposal to adopt what was called a "national policy," or, in other words, a system of protection for Canadian industries. Mr Mackenzie and his chief followers, whose inclinations were towards free trade, pinned their political fortunes to the maintenance of a tariff for revenue only. After some years of fierce discussion in parliament and throughout the country the question was brought to an issue in 1878, when, with a large majority of followers pledged to carry out protection, Sir John Macdonald was restored to power. The new system was laid before parliament in 1879 by the finance minister, Sir Leonard Tilley; and the tariff then agreed upon, although it received considerable modification from time to time, remained, under both Conservative and Liberal administrations, the basis of Canadian finance, and, as Canadians generally believed, the bulwark of their industry. It had almost immediately the effect of lessening the exodus of artisans to the United States, and of improving the revenue and so restoring the national credit.

In October 1878 Lord Dufferin's term of office expired, and his place as governor-general was taken by the marquess of Lorne, whose welcome to the Dominion was accentuated by the fact that he was the son-in-law of the queen, and that his viceroyalty was shared by the princess Louise. The election of 1878 marked the beginning of a long period of Conservative rule—the premiership of Sir J. Macdonald continuing from that time without a break until his death in 1891, while his party remained in power till 1896. This long-continued Conservative supremacy was apparently due to the policy of bold and rapid development which it had adopted, and which appealed to a young and ambitious country more strongly than the more cautious proposals of the Liberal leaders. As soon as the government had redeemed its pledge to establish a system of protection a vigorous railway policy was inaugurated. A contract was made with a new company to complete the Canadian Pacific railway within ten years, on condition of receiving a grant of $25,000,000 and 25,000,000 acres of land, together with those parts of the line already finished under government direction. After fierce debate in parliament these terms were ratified in the session of 1881. The financial difficulties encountered by the company in carrying out their gigantic task were very great, and in 1884 they were compelled to obtain from the Dominion government a loan of $20,000,000 secured on the company's property. This loan was repaid by 1887. Meanwhile the work was carried forward with so much energy that, five years before the stipulated period of completion, on the 7th of November 1886, the last spike was driven by Mr Donald A. Smith (Lord Strathcona), whose fortune had been largely pledged to the undertaking, along with those of other prominent Canadian business men, especially Mr George Stephen (Lord Mountstephen), Mr Duncan McIntyre, and Mr R. B. Angus. Under the energetic management of Mr (later Sir) W. C. Van Horne, who was appointed president of the company in 1888, the new railway soon became the most prominent feature in the development of the country; lines of steamships were established on the great lakes and the Pacific; a stream of immigration began to flow into the prairie region; and the increasing prosperity of the railway had a powerful influence in improving the public credit.

Completion of the Canadian Pacific railway.

Even before the Canadian Pacific railway was fully completed, it proved of great service in a national emergency which suddenly arose in the north-west. With the organization of Manitoba and the opening of improved communication immigrants began to move rapidly westward, and government surveyors were soon busy laying off lands in the Saskatchewan valley. The numbers of the half-breed settlers of this district had been increased by the migration of many of those who had taken part in the first uprising at Fort Garry. Influenced by somewhat similar motives, fearing from the advance of civilization the destruction of the buffalo, on which they chiefly depended for food, with some real grievances and others imaginary, the discontented population sent for Riel, who had been living, since his flight from Fort Garry, in the United States. He returned to put himself at the head of a second rebellion. At first he seemed inclined to act with moderation and on lines of constitutional agitation, but soon, carried away by fanaticism, ambition and vanity, he turned to armed organization against the government. To half-breed rebellion was added the imminent danger of an Indian uprising, to which Riel looked for support. The authorities at Ottawa were at first careless or sceptical in regard to the danger, the reality of which was only brought home to them when a body of mounted police, advancing to regain a small post at Duck Lake, of which the rebels had taken possession, was attacked and twelve of their number killed. Volunteers and militia were at once called out in all the old provinces of Canada, and were quickly conveyed by the newly constructed line of railway to the neighbourhood of the point of disturbance. Major-general Middleton, of the imperial army, who was then in command of the Canadian militia, led the expedition. Several minor engagements with half-breeds or Indians preceded the final struggle at Batoche, where Gabriel Dumont, Riel's military lieutenant, had skilfully entrenched his forces. After a cautious advance the eagerness of the troops finally overcame the hesitation of the commander in exposing his men, the rifle pits were carried with a rush, and the rebellion crushed at a single stroke. Dumont succeeded in escaping across the United States boundary; Riel was captured, imprisoned, and in due course tried for treason. This second rebellion carried on under his leadership had lasted about three months, had cost the country many valuable lives, and in money about five millions of dollars. Clear as was his guilt, Riel's trial, condemnation and execution on the 16th of November 1885, provoked a violent political storm which at one time threatened to overthrow the Conservative government. The balance of power between parties in parliament was held by the province of Quebec, and there racial and religious feeling evoked no slight sympathy for Riel. But while a section of Quebec was eager to secure the rebel's pardon, Ontario was equally bent on the execution of justice, so that in the final vote on the question in parliament the defection of French Conservatives was compensated for by the support of Ontario Liberals. In the end 25 out of 53 French members voted in justification of Riel's punishment. With him were executed several Indian chiefs who had been concerned in a massacre of whites. Painful as were the circumstances connected with this rebellion, it is certain that the united action of the different provinces in suppressing it tended to consolidate Canadian sentiment, and the short military campaign had the effect of fixing public attention upon the immense fertile territory then being opened up.

Riel's rebellion.

The general election of 1882 turned chiefly upon endorsement of the national policy of protection; in that of 1887 the electoral test was again applied to the same issue, while Sir John Macdonald also asked for approval of the government's action in exacting from Riel the full penalty of his guilt. On both issues the Conservative policy was upheld by the electors, and Macdonald was continued in power with a large parliamentary majority. From the election of 1887 the Riel agitation ceased to seriously influence politics, but the fiscal controversy continued under new forms. Between 1887 and 1891 a vigorous agitation was kept up under Liberal auspices in favour of closer trade relations with the United States, at first under the name of Commercial Union and later under that of Unrestricted Reciprocity. The object in both cases was to break down tariff barriers between the United States and Canada, even though that should be at the expense of discrimination against Great Britain. The Conservative party took the position that commercial union, involving as it would a common protective tariff against all other countries, including the motherland,

Macdonald's fiscal policy.

would inevitably lead to political unification with the United States. The question after long and vehement discussion was brought to a final issue in the election of 1891, and Sir John Macdonald's government was again sustained. From that time protection became the settled policy of the country. On their accession to power in 1896 it was adopted by the Liberals, who joined to it a preference for the products of the mother country. Under the protective policy thus repeatedly confirmed, Canada gradually became more independent of the American market than in earlier times, and enjoyed great commercial prosperity. Soon after the election of 1891 Sir John Macdonald (*q.v.*) died, after an active political career of more than forty years. Under his direction the great lines of policy which have governed the development of Canada as a confederated state within the empire were inaugurated and carried forward with great success, so that his name has become indissolubly connected with the history of the Dominion at its most critical stage.

During the years which succeeded the death of Sir John Macdonald a succession of losses weakened the position of the Conservative party which had held power so long. The Hon. J. C. C. Abbott, leader of the party in the Senate, became prime minister on Macdonald's death in 1891, but in 1892 was compelled by ill-health to resign, and in 1893 he died. His successor, Sir John Thompson, after a successful leadership of about two years, died suddenly of heart disease at Windsor Castle, immediately after being sworn of the imperial privy council. Charges of corruption in the administration of the department of public works, which led to the expulsion of one member of parliament, involved also the resignation from the cabinet of Sir Hector Langevin, leader of the French Conservatives, against whom carelessness at least in administration had been established. The brief premiership of Sir Mackenzie Bowell, between 1894 and 1896, was marked by much dissension in the Conservative ranks, ending finally in a reconstruction of the government in 1896 under Sir Charles Tupper. Breaks had been made in the Liberal ranks also by the death in 1892 of the Hon. Alexander Mackenzie and the withdrawal of the Hon. Edward Blake from Canadian politics to accept a seat in the British parliament as a member of the Home Rule party. But the appeal made to the electors in 1896 resulted in a decisive victory for the Liberal party, and marked the beginning of a long period of Liberal rule.

Macdonald's successors.

Sir Wilfrid Laurier (*q.v.*) became prime minister, and strengthened the cabinet which he formed by drawing into it from provincial politics the premiers of Ontario, New Brunswick and Nova Scotia. The administration thus established underwent many changes, but after winning three general elections it was still in power in 1909. The period of Sir Wilfrid Laurier's rule was one of striking progress in material growth, and a marked development of national feeling. While the federation of the provinces favoured the growth of a strong sentiment of Canadian individuality, the result of unification had been to strengthen decidedly the ties that bind the country to the empire. This was as true under Liberal as under Conservative auspices—as Canadians understood the meaning of these party names. The outbreak of the South African war in 1899 furnished an occasion for a practical display of Canadian loyalty to imperial interests. Three contingents of troops were despatched to the seat of war and took an active part in the events which finally secured the triumph of the British arms. These forces were supplemented by a regiment of Canadian horse raised and equipped at the sole expense of Lord Strathcona, the high commissioner of the Dominion in London. The same spirit was illustrated in other ways. In bringing about a system of penny postage throughout the empire; in forwarding the construction of the Pacific cable to secure close and safe imperial telegraphic connexion; in creating rapid and efficient lines of steamship communication with the motherland and all the colonies; in granting tariff preference to British goods and in striving for preferential treatment of inter-imperial trade; in assuming responsibility for imperial defence at the two important stations of Halifax and Esquimalt,—Canada, under the guidance of Sir Wilfrid Laurier and his party, took a leading part and showed a truly national spirit.

Laurier.

The opening years of the 20th century were marked by a prolonged period of great prosperity. A steady stream of emigrants from Europe and the United States, sometimes rising in number to 300,000 in a single year, began to occupy the vast western prairies. So considerable was the growth of this section of the Dominion that in 1905 it was found necessary to form two new provinces, Alberta and Saskatchewan, from the North-West Territories, the area of each being 275,000 sq. m. Each province has a lieutenant-governor and a single legislative chamber, with a representation of four members in the Senate and five in the House of Commons of the Dominion parliament. The control of the public lands is retained by the general government on the ground that it has been responsible for the development of the country by railway construction and emigration. With the rapid increase of population, production in Canada also greatly increased; exports, imports and revenue constantly expanded, and capital, finding abundant and profitable employment, began to flow freely into the country for further industrial development. New and great railway undertakings were a marked feature of this period. The Canadian Pacific system was extended until it included 12,000 m. of line. The Canadian Northern railway, already constructed from the Great Lakes westward to the neighbourhood of the Rockies, and with water and rail connexions reaching eastward to Quebec, began to transform itself into a complete transcontinental system, with an extension to the Hudson Bay. That this line owed its inception and construction chiefly to the joint enterprise of two private individuals, Messrs Mackenzie and Mann, was a striking proof of the industrial capacities of the country. To a still more ambitious line, the Grand Trunk Pacific, extending from the Atlantic to the Pacific, aiming at extensive steamship connexion on both oceans, and closely associated with the Grand Trunk system of Ontario and Quebec, the government of Canada gave liberal support as a national undertaking. The eastern section of 1875 m., extending from Winnipeg to Moncton, where connexion is secured with the winter ports of Halifax and St John, was, under the act of incorporation, to be built by the government, and then leased for fifty years, under certain conditions, to the Grand Trunk Pacific Company. The western portion, of 1480 m., from Winnipeg to the Pacific, was to be built, owned and operated by the company itself, the government guaranteeing bonds to the extent of 75 % of the whole cost of construction. The discovery of large deposits of nickel at Sudbury; of extremely rich gold mines on the head-waters of the Yukon, in a region previously considered well-nigh worthless for human habitation; of extensive areas of gold, copper and silver ores in the mountain regions of British Columbia; of immense coal deposits in the Crow's Nest Pass of the same province and on the prairies; of veins of silver and cobalt of extraordinary richness in northern Ontario —all deeply affected the industrial condition of the country and illustrated the vastness of its undeveloped resources. The use of wood-pulp in the manufacture of paper gave a greatly enhanced value to many millions of acres of northern forest country. The application of electricity to purposes of manufacture and transportation made the waterfalls and rapids in which the country abounds the source of an almost unlimited supply of energy capable of easy distribution for industrial purposes over wide areas.

Canadian expansion.

Since confederation a series of attempts has been made with varying degrees of success to settle the questions in dispute between the Dominion and the United States, naturally arising from the fact that they divide between them the control of nearly the whole of a large continent and its adjoining waters. Considering the vastness of the interests involved, there is much cause for satisfaction in the fact that these differences have been settled by peaceful arbitrament rather than by that recourse to force which has so often marked the delimitation of rights and territory on other continents.

Relations with the United States.

The Washington Treaty of 1871 has already been referred to. Its clauses dealing with the fisheries and trade lasted for fourteen years, and were then abrogated by the action of the United States. Various proposals on the part of Canada for a renewal of the reciprocity were not entertained. After 1885 Canada was therefore compelled to fall back upon the treaty of 1818 as the guarantee of her fishing rights. It became necessary to enforce the terms of that convention, under which the fishermen of the United States could not pursue their avocations within the three miles' limit, tranship cargoes of fish in Canadian ports, or enter them except for shelter, water, wood or repairs. On account of infractions of the treaty many vessels were seized and some were condemned. In 1887 a special commission was appointed to deal with the question. On this commission Mr Joseph Chamberlain, Sir Sackville West and Sir Charles Tupper represented British and Canadian interests; Secretary T. F. Bayard, Mr W. le B. Putnam and Mr James B. Angell acted for the United States. The commission succeeded in agreeing to the terms of a treaty, which was recommended to Congress by President Cleveland as supplying "a satisfactory, practical and final adjustment, upon a basis honourable and just to both parties, of the difficult and vexed questions to which it relates." This agreement, known as the Chamberlain-Bayard treaty, was rejected by the Senate, and as a consequence it became necessary to carry on the fisheries under a *modus vivendi* renewed annually.

In 1886 a difference about international rights on the high seas arose on the Pacific coast in connexion with the seal fisheries of Bering Sea. In that year several schooners, fitted out in British Columbia for the capture of seals in the North Pacific, were seized by a United States cutter at a distance of 60 m. from the nearest land, the officers were imprisoned and fined, and the vessels themselves subjected to forfeiture. The British government at once protested against this infraction of international right, and through long and troublesome negotiations firmly upheld Canada's claims in the matter. The dispute was finally referred to a court of arbitration, on which Sir John Thompson, premier of the Dominion, sat as one of the British arbitrators. It was decided that the United States had no jurisdiction in the Bering Sea beyond the three miles' limit, but the court also made regulations to prevent the wholesale slaughter of fur-bearing seals. The sum of $463,454 was finally awarded as compensation to the Canadian sealers who had been unlawfully seized and punished. This sum was paid by the United States in 1898.

As the result of communications during 1897 between Sir Wilfrid Laurier and Secretary Sherman, the governments of Great Britain and the United States agreed to the appointment of a joint high commission, with a view of settling all outstanding differences between the United States and Canada. The commission, which included three members of the Canadian cabinet and a representative of Newfoundland, and of which Lord Herschell was appointed chairman, met at Quebec on the 23rd of August 1898. The sessions continued in Quebec at intervals until the 10th of October, when the commission adjourned to meet in Washington on the 1st of November, where the discussions were renewed for some weeks. Mr Nelson Dingley, an American member of the commission, died during the month of January, as did the chairman, Lord Herschell, in March, as the result of an accident, soon after the close of the sittings of the commission. The Alaskan boundary, the Atlantic and inland fisheries, the alien labour law, the bonding privilege, the seal fishery in the Bering Sea and reciprocity of trade in certain products were among the subjects considered by the commission. On several of these points much progress was made towards a settlement, but a divergence of opinion as to the methods by which the Alaskan boundary should be determined put an end for the time to the negotiations.

In 1903 an agreement was reached by which the question of this boundary, which depended on the interpretation put upon the treaty of 1825 between Russia and England, should be submitted to a commission consisting of "six impartial jurists of repute," three British and three American. The British commissioners appointed were: Lord Alverstone, lord chief justice of England; Sir Louis Jette, K.C., of Quebec; and A. B. Aylesworth, K.C., of Toronto. On the American side were appointed: the Hon. Henry C. Lodge, senator for Massachusetts; the Hon. Elihu Root, secretary of war for the United States government; and Senator George Turner. Canadians could not be persuaded that the American members fulfilled the condition of being "impartial jurists," and protest was made, but, though the imperial government also expressed surprise, no change in the appointments was effected. The commission met in London, and announced its decision in October. This was distinctly unfavourable to Canada's claims, since it excluded Canadians from all ocean inlets as far south as the Portland Channel, and in that channel gave to Canada only two of the four islands claimed. A statement made by the Canadian commissioners, who refused to sign the report, of an unexplained change of opinion on the part of Lord Alverstone, produced a widespread impression for a time that his decision in favour of American claims was diplomatic rather than judicial. Later Canadian opinion, however, came to regard the decision of the commission as a reasonable compromise. The irritation caused by the decision gradually subsided, but at the moment it led to strong expressions on the part of Sir Wilfrid Laurier and others in favour of securing for Canada a fuller power of making her own treaties. While the power of making treaties must rest ultimately in the hands that can enforce them, the tendency to give the colonies chiefly interested a larger voice in international arrangements had become inevitable. The mission of a Canadian cabinet minister, the Hon. R. Lemieux, to Japan in 1907, to settle Canadian difficulties with that country, illustrated the change of diplomatic system in progress.

Education.

Under the British North American Act the control of education was reserved for the provincial governments, with a stipulation that all rights enjoyed by denominational schools at the time of confederation should be respected. Provincial control has caused some diversity of management; the interpretation of the denominational agreement has led to acute differences of opinion which have invaded the field of politics. In all the provinces elementary, and in some cases secondary, education is free, the funds for its support being derived from local taxation and from government grants. The highly organized school system of Ontario is directed by a minister of education, who is a member of the provincial cabinet. The other provinces have boards of education, and superintendents who act under the direction of the provincial legislatures. In Quebec the Roman Catholic schools, which constitute the majority, are chiefly controlled by the local clergy of that church. The Protestant schools are managed by a separate board. In Ontario as well as in Quebec separate schools are allowed to Roman Catholics. In Nova Scotia, New Brunswick, Prince Edward Island, Manitoba and British Columbia the public schools are strictly undenominational. This position was only established in New Brunswick and Manitoba after violent political struggles, and frequent appeals to the highest courts of the empire for decisions on questions of federal or provincial jurisdiction. The right of having separate schools has been extended to the newly constituted provinces of Alberta and Saskatchewan.

Secondary education is provided for by high schools and collegiate institutes in all towns and cities, and by large residential institutions at various centres, conducted on the principle of the English public schools. The largest of these is Upper Canada College at Toronto. Each province has a number of normal and model schools for the training of teachers. For higher education there are also abundant facilities. M'Gill University at Montreal has been enlarged and splendidly endowed by the munificence of a few private individuals; Toronto University by the provincial legislature of Ontario; Queen's University at Kingston largely by the support of its own graduates and friends. University work in the maritime provinces, instead of being concentrated, as it might well be, in one powerful institution, is distributed among five small, but within their range efficient universities. The agricultural college at Guelph and

the experimental farms maintained by the federal government give excellent training and scientific assistance to farmers. Sir William Macdonald in 1908 built and endowed, at an expenditure of at least £700,000, an agricultural college and normal school at St Anne's, near Montreal. While the older universities have increased greatly in influence and efficiency, the following new foundations have been made since confederation:—University of Manitoba, Winnipeg, 1877; Presbyterian College, Winnipeg, 1870; Methodist College, Winnipeg, 1888; Wesleyan College, Montreal, 1873; Presbyterian College, Montreal, 1868; School of Practical Science, Toronto, 1877; Royal Military College, Kingston, 1875; M'Master University, Toronto, 1888. All the larger universities have schools of medicine in affiliation, and have the power of conferring medical degrees. Since 1877 Canadian degrees have been recognized by the Medical Council of Great Britain.

Indian tribes.

In her treatment of the aboriginal inhabitants of the country (numbering 93,318 in 1901) Canada has met with conspicuous success. Since the advance of civilization and indiscriminate slaughter have deprived them of the bison, so long their natural means of subsistence, the north-west tribes have been maintained chiefly at the expense of the country. As a result of the great care now used in watching over them there has been a small but steady increase in their numbers. Industrial and boarding schools, established in several of the provinces, by separating the children from the degrading influences of their home life, have proved more effectual than day schools for training them in the habits and ideas of a higher civilization. (See INDIANS, NORTH AMERICAN.)

Constitution.

The constitution of the Dominion embodies the first attempt made to adapt British principles and methods of government to a federal system. The chief executive authority is vested in the sovereign, as is the supreme command of the military and naval forces. The governor-general represents, and fulfils the functions of, the crown, which appoints him. He holds office for five years, and his powers are strictly limited, as in the case of the sovereign, all executive acts being done on the advice of his cabinet, the members of which hold office only so long as they retain the confidence of the people as expressed by their representatives in parliament. The governor-general has, however, the independent right to withhold his assent to any bill which he considers in conflict with imperial interests. The following governors-general have represented the crown since the federation of the provinces, with the year of their appointment: Viscount Monck, 1867; Sir John Young (afterwards Baron Lisgar), 1868; the earl of Dufferin, 1872; the marquess of Lorne (afterwards duke of Argyll), 1878; the marquess of Lansdowne, 1883; Lord Stanley of Preston (afterwards earl of Derby), 1888; the earl of Aberdeen, 1893; the earl of Minto, 1898; Earl Grey, 1904. The upper house, or Senate, is composed of members who hold office for life and are nominated by the governor-general in council. It originally consisted of 72 members, 24 from Quebec, 24 from Ontario, and 24 from the maritime provinces, but this number has been from time to time slightly increased as new provinces have been added. The House of Commons consists of representatives elected directly by the people. The number of members, originally 196, is subject to change after each decennial census. The basis adopted in the British North America Act is that Quebec shall always have 65 representatives, and each of the other provinces such a number as will give the same proportion of members to its population as the number 65 bears to the population of Quebec at each census. In 1908 the number of members was 218.

Members of the Senate and of the House of Commons receive an annual indemnity of $2500, with a travelling allowance. Legislation brought forward in 1906 introduced an innovation in assigning a salary of $7000 to the recognized leader of the Opposition, and pensions amounting to half their official income to ex-cabinet ministers who have occupied their posts for five consecutive years. This pension clause has since been repealed. One principal object of the framers of the Canadian constitution was to establish a strong central government. An opposite plan was therefore adopted to that employed in the system of the United States, where the federal government enjoys only the powers granted to it by the sovereign states. The British North America Act assigns to the different provinces, as to the central parliament, their spheres of control, but all residuary powers are given to the general government. Within these limitations the provincial assemblies have a wide range of legislative power. In Nova Scotia and Quebec the bicameral system of an upper and lower house is retained; in the other provinces legislation is left to a single representative assembly. For purely local matters municipal institutions are organized to cover counties and townships, cities and towns, all based on an exceedingly democratic franchise.

The creation of a supreme court engaged the attention of Sir John Macdonald in the early years after federation, but was only finally accomplished in 1876, during the premiership of Alexander Mackenzie. This court is presided over by a chief justice, with five puisne judges, and has appellate civil and criminal jurisdiction for the Dominion. By an act passed in 1891 the government has power to refer to the supreme court any important question of law affecting the public interest. The right of appeal from the supreme court, thus constituted, to the judicial committee of the privy council marks, in questions judicial, Canada's place as a part of the British empire.

The appointment, first made in 1897, of the chief justice of Canada, along with the chief justices of Cape Colony and South Australia, as colonial members of the judicial committee still further established the position of that body as the final court of appeal for the British people. The grave questions of respective jurisdiction which have from time to time arisen between the federal and provincial governments have for the most part been settled by appeal to one or both of these judicial bodies. Some of these questions have played a considerable part in Canadian politics, but are of too complicated a nature to be dealt with in the present brief sketch. They have generally consisted in the assertion of provincial rights against federal authority. The decision of the courts has always been accepted as authoritative and final.

An excellent bibliography of Canadian history will be found in the volume *Literature of American History*, published by the American Library Association. The annual *Review of Historical Publications Relating to Canada*, published by the University of Toronto, gives a critical survey of the works on Canadian topics appearing from year to year. (G. R. P.)

LITERATURE

1. *English-Canadian Literature* is marked by the weaknesses as well as the merits of colonial life. The struggle for existence, the conquering of the wilderness, has left scant room for broad culture or scholarship, and the very fact that Canada is a colony, however free to control her own affairs, has stood in the way of the creation of anything like a national literature. And yet, while Canada's intellectual product is essentially an offshoot of the parent literature of England, it is not entirely devoid of originality, either in manner or matter. There is in much of it a spirit of freedom and youthful vigour characteristic of the country. It is marked by the wholesomeness of Canadian life and Canadian ideals, and the optimism of a land of limitless potentialities.

The first few decades of the period of British rule were lean years indeed so far as native literature is concerned. This period of unrest gave birth to little beyond a flood of political pamphlets, of no present value save as material for the historian. We may perhaps except the able though thoroughly partisan writings of Sir John Beverley Robinson and Bishop Strachan on the one side, and Robert Fleming Gourlay and William Lyon Mackenzie on the other. In the far West, however, a little group of adventurous fur-traders, of whom Sir Alexander Mackenzie, David Thompson, Alexander Henry and Daniel Williams Harmon may be taken as conspicuous types, were unfolding the vast expanse of the future dominion. They were men of action, not of words, and had no thought of literary

fame, but their absorbingly interesting journals are none the less an essential part of the literature of the country.

Barring the work of Francis Parkman, who was not a Canadian, no history of the first rank has yet been written in or of Canada. Canadian historians have not merely lacked so far the genius for really great historical work, but they have lacked the point of view; they have stood too close to their subject to get the true perspective. At the same time they have brought together invaluable material for the great historian of the future. Robert Christie's *History of Lower Canada* (1848–1854) was the first serious attempt to deal with the period of British rule. William Kingsford's (1819–1898) ambitious work, in ten volumes, comes down like Christie's to the Union of 1841, but goes back to the very beginnings of Canadian history. In the main it is impartial and accurate, but the style is heavy and sometimes slovenly. J. C. Dent's (1841–1888) *Last Forty Years* (1880) is practically a continuation of Kingsford. Dent also wrote an interesting though one-sided account of the rebellion of 1837. Histories of the maritime provinces have been written by Thomas Chandler Haliburton, Beamish Murdoch and James Hannay. Haliburton's is much the best of the three. The brief but stirring history of western Canada has been told by Alexander Begg (1840–1898); and George Bryce (b. 1844) and Beckles Willson (b. 1869) have written the story of the Hudson's Bay Company. Much scholarship and research have been devoted to local and special historical subjects, a notable example of which is Arthur Doughty's exhaustive work on the siege of Quebec. J. McMullen (b. 1820), Charles Roberts (b. 1860) and Sir John Bourinot (1837–1902) have written brief and popular histories, covering the whole field of Canadian history more or less adequately. Alpheus Todd's (1821–1884) *Parliamentary Government in England* (1867–1869) and *Parliamentary Government in the British Colonies* (1880) are standard works, as is also Bourinot's *Parliamentary Procedure and Practice* (1884).

Biography has been devoted mainly to political subjects. The best of these are Joseph Pope's *Memoirs of Sir John Macdonald* (1894), W. D. le Sueur's *Frontenac* (1906), Sir John Bourinot's *Lord Elgin* (1905), Jean McIlwraith's *Sir Frederick Haldimand* (1904), D. C. Scott's *John Graves Simcoe* (1905), A. D. de Celles' *Papineau and Cartier* (1904), Charles Lindsey's *William Lyon Mackenzie* (1862), J. W. Longley's *Joseph Howe* (1905) and J. S. Willison's *Sir Wilfrid Laurier* (1903).

In *belles lettres* very little has been accomplished, unless we may count Goldwin Smith (*q.v.*) as a Canadian. As a scholar, a thinker, and a master of pure English he has exerted a marked influence upon Canadian literature and Canadian life.

While mediocrity is the prevailing characteristic of most of what passes for poetry in Canada, a few writers have risen to a higher level. The conditions of Canadian life have not been favourable to the birth of great poets, but within the limits of their song such men as Archibald Lampman (1861–1891), William Wilfrid Campbell (b. 1861), Charles Roberts, Bliss Carman (b. 1861) and George Frederick Cameron have written lines that are well worth remembering. Lampman's poetry is the most finished and musical. He fell short of being a truly great poet, inasmuch as great poetry must, which his does not, touch life at many points, but his verses are marked by the qualities that belonged to the man—sincerity, purity, seriousness. Campbell's poetry, in spite of a certain lack of compression, is full of dramatic vigour; Roberts has put some of his best work into sonnets and short lyrics, while Carman has been very successful with the ballad, the untrammelled swing and sweep of which he has finely caught; the simplicity and severity of Cameron's style won the commendation of even so exacting a critic as Matthew Arnold. One remarkable drama—Charles Heavysege's (1816–1876) *Saul* (1857)—belongs to Canadian literature. Though unequal in execution, it contains passages of exceptional beauty and power. The sweetness and maturity of Isabella Valency Crawford's (1851–1887) verse are also very worthy of remembrance. The *habitant* poems of Dr W. H. Drummond (1854–1907) stand in a class by themselves, between English and French Canadian literature, presenting the simple life of the *habitant* with unique humour and picturesqueness.

The first distinctively Canadian novel was John Richardson's (1796–1852) *Wacousta* (1832), a stirring tale of the war of 1812. Richardson afterwards wrote half a dozen other romances, dealing chiefly with incidents in Canadian history. Susanna Moodie (1803–1885) and Katharine Parr Traill (1802–1899), sisters of Agnes Strickland, contributed novels and tales to one of the earliest and best of Canadian magazines, the *Literary Garland* (1838–1847). *The Golden Dog*, William Kirby's (1817–1906) fascinating romance of old Quebec, appeared in 1877, in a pirated edition. Twenty years later the first authorized edition was published. James de Mille (1833–1880) was the author of some thirty novels, the best of which is *Helena's Household* (1868), a story of Rome in the 1st century. *The Dodge Club* (1869), a humorous book of travel, appeared, curiously enough, a few months before *Innocents Abroad*. De Mille's posthumous novel, *A Strange Manuscript found in a Copper Cylinder* (1888), describes a singular race whose cardinal doctrine is that poverty is honourable and wealth the reverse. Sir Gilbert Parker (b. 1862) stands first among contemporary Canadian novelists. He has made admirable use in many of his novels of the inexhaustible stores of romantic and dramatic material that lie buried in forgotten pages of Canadian history. Of later Canadian novelists mention may be made of Sara Jeannette Duncan (Mrs Everard Cotes, b. 1862), Ralph Connor (Charles W. Gordon, b. 1866), Agnes C. Laut (b. 1872), W. A. Fraser (b. 1859) and Ernest Thompson Seton (b. 1860). Thomas Chandler Haliburton (*q.v.*) stands in a class by himself. In many respects his is the most striking figure in Canadian literature. He is best known as a humorist, and as a humorist he ranks with the creators of "My Uncle Toby" and "Pickwick." But there is more than humour in Haliburton's books. He lacked, in fact, but one thing to make him a great novelist: he had no conception of how to construct a plot. But he knew human nature, and knew it intimately in all its phases; he could construct a character and endow it with life; his people talk naturally and to the point; and many of his descriptive passages are admirable. Those who read Haliburton's books only for the sake of the humour will miss much of their value. His inimitable *Clockmaker* (1837), as well as the later books, *The Old Judge* (1849), *The Attaché* (1843), *Wise Saws and Modern Instances* (1853) and *Nature and Human Nature* (1855), are mirrors of colonial life and character.

For general treatment of English-Canadian literature, reference may be made to Sir John Bourinot's *Intellectual Development of the Canadian People* (1881); G. Mercer Adam's *Outline History of Canadian Literature* (1887); "Native Thought and Literature," in J. E. Collins's *Life of Sir John A. Macdonald* (1883); "Canadian Literature," by J. M. Oxley, in the *Encyclopaedia Americana*, vol. ix. (1904); A. MacMurchy's *Handbook of Canadian Literature* (1906); and articles by J. Castell Hopkins, John Reade, A. B. de Mille and Thomas O'Hagan, in vol. v. of *Canada: an Encyclopaedia of the Country* (1898–1900); also to Henry J. Morgan's *Bibliotheca Canadensis* (1867) and *Canadian Men and Women of the Time* (1898); W. D. Lighthall, *Songs of the Great Dominion*; Theodore Rand's *Treasury of Canadian Verse* (1900); C. C. James's *Bibliography of Canadian Verse* (1898); L. E. Horning's and L. J. Burpee's *Bibliography of Canadian Fiction* (1904); S. E. Dawson's *Prose Writers of Canada* (1901); "Canadian Poetry," by J. A. Cooper, in *The National*, 29, p. 364; "Recent Canadian Fiction," by L. J. Burpee, in *The Forum*, August 1899. For individual authors, see Haliburton's *A Centenary Chaplet* (1897), with a bibliography; "Haliburton," by F. Blake Crofton, in *Canada: an Encyclopaedia of the Country*; C. H. Farnham's *Life of Francis Parkman* and H. D. Sedgwick's *Francis Parkman* (1901); and articles on "Parkman," by E. L. Godkin, in *The Nation*, 71, p. 441; by Justin Winsor in *The Atlantic*, 73, p. 660; by W. D. Howells, *The Atlantic*, 34, p. 602; by John Fiske, *The Atlantic*, 73, p. 664; by J. B. Gilder in *The Critic*, 23, p. 322; "Goldwin Smith as a Critic," by H. Spencer, *Contemp. Review*, 41, p. 519; "Goldwin Smith's Historical Works," by C. E. Norton, *North American Review*, 99, p. 523; "Poetry of Charles Heavysege," by Bayard Taylor, *Atlantic*, 16, p. 412; "Charles Heavysege," by L. J. Burpee, in *Trans. Royal Society of Canada*, 1901; "Archibald Lampman," by W. D. Howells, *Literature* (N.Y.), 4, p. 217; "Archibald Lampman," by L. J. Burpee, in *North American Notes and Queries* (Quebec), August and September 1900; "Poetry of Bliss Carman," by J. P. Mowbray, *Critic*, 41,

p. 308; "Isabella Valency Crawford," in *Poet-Lore* (Boston), xiii. No. 4; *Roberts and the Influences of his Time* (1906), by James Cappon; "William Wilfred Campbell," *Sewanee Review*, October 1900; "Kingsford's History of Canada," by G. M. Wrong, *N. A. Review*, 1, p. 550; "Books of Gilbert Parker," by C. A. Pratt, *Critic*, 33. p. 271. (L. J. B.)

2. *French-Canadian Literature* at the opening of the 20th century might be described as entirely the work of two generations, and it was separated from the old régime by three more generations whose racial sentiment only found expression in the traditional songs and tales which their forefathers of the 17th century had brought over from the *mère patrie*. Folk-lore has always been the most essentially French of all imaginative influences in Canadian life; and the songs are the quintessence of the lore. Not that the folk-songs have no local variants. Indian words, like *moccasin* and *toboggan*, are often introduced. French forms are freely turned into pure Canadianisms, like *cageux*, raftsman, *boucane*, brushwood smoke, *portage*, &c. New characters, which appeal more directly to the local audience, sometimes supplant old ones, like the *quatre vieux sauvages* who have ousted the time-honoured *quatre-z-officiers* from the Canadian version of *Malbrouk*. There are even a few entire songs of transatlantic origin. But all these variants together are mere stray curios among the crowding souvenirs of the old home over sea. No other bridge can rival *le Pont d'Avignon*. "*Ici*" in *C'est le bon vin qui danse ici* can be nowhere else but in old France—*le bon vin* alone proves this. And the Canadian folk-singer, though in a land of myriad springs, still goes *à la claire fontaine* of his ancestral fancy; while the lullabies his mother sang him, like the love-songs with which he serenades his *blonde*, were nearly all sung throughout the Normandy of *le Grand Monarque*. The *habitant* was separated from old-world changes two centuries ago by difference of place and circumstances, while he has hitherto been safeguarded from many new-world changes by the segregative influences of race, religion, language and custom; and so his folk-lore still remains the intimate *alter et idem* of what it was in the days of the great pioneers. It is no longer a living spirit among the people at large; but in secluded villages and "back concessions" one can still hear some charming melodies as old and pure as the verses to which they are sung, and even a few quaint survivals of Gregorian tunes. The best collection, more particularly from the musical point of view, is *Les Chansons populaires du Canada*, started by Ernest Gagnon (1st ed. 1865).

Race-patriotism is the distinguishing characteristic of French-Canadian literature, which is so deeply rooted in national politics that L. J. Papineau, the most insistent demagogue of 1837, must certainly be named among the founders, for the sake of speeches which came before written works both in point of time and popular esteem. Only 360 volumes had been published during 80 years, when, in 1845, the first famous book appeared—François Xavier Garneau's (1809–1866) *Histoire du Canada*. It had immense success in Canada, was favourably noticed in France, and has influenced all succeeding men of letters. Unfortunately, the imperfect data on which it is based, and the too exclusively patriotic spirit in which it is written, prevent it from being an authoritative history: the author himself declares "*Vous verrez si la défaite de nos ancêtres ne vaut pas toutes les victoires.*" But it is of far-reaching importance as the first great literary stimulus to racial self-respect. "*Le Canada français avait perdu ses lettres de noblesse; Garneau les lui a rendues.*" F. X. Garneau is also remembered for his poems, and he was followed by his son Alfred Garneau (1836–1904).

A. Gérin-Lajoie was a mere lad when the exile of some compatriots inspired *Le Canadien errant*, which immediately became a universal folk-song. Many years later he wrote discriminatingly about those *Dix ans au Canada* (1888) that saw the establishment of responsible government. But his fame rests on *Jean Rivard* (1874), the prose bucolic of the *habitant*. The hero, left at the head of a fatherless family of twelve when nearly through college, turns from the glut of graduates swarming round the prospects of professional city-bred careers, steadfastly wrests a home from the wilderness, helps his brothers and sisters, marries a *habitante* fit for the wife of a pioneer, brings up a large family, and founds a settlement which grows into several parishes and finally becomes the centre of the electoral district of "Rivardville," which returns him to parliament. These simple and earnest *Scènes de la vie réelle* are an appealing revelation of that eternal secret of the soil which every people wishing to have a country of its own must early lay to heart; and *Jean Rivard, le défricheur*, will always remain the eponym of the new *colons* of the 19th century.

Philippe de Gaspé's historical novel, *Les Anciens Canadiens* (1863), is the complement of Garneau and Gérin-Lajoie. Everything about the author's life helped him to write this book. Born in 1784, and brought up among reminiscent eye-witnesses of the old régime, he was an eager listener, with a wonderful memory and whole-hearted pride in the glories of his race and family, a kindly *seigneur*, who loved and was loved by all his *censitaires*, a keen observer of many changing systems, down to the final Confederation of 1867, and a man who had felt both extremes of fortune (*Mémoires*, 1866). The story rambles rather far from its well-worn plot. But these very digressions give the book its intimate and abiding charm; for they keep the reader in close personal touch with every side of Canadian life, with songs and tales and homely forms of speech, with the best features of seigniorial times and the strong guidance of an ardent church, with *voyageurs*, *coureurs de bois*, Indians, soldiers, sailors and all the strenuous adventurers of a wild, new, giant world. The poet of this little band of authors was Octave Crémazie, a Quebec bookseller, who failed in business and spent his last years as a penniless exile in France. He is usually rather too derivative, he lacks the saving grace of style, and even his best Canadian poems hardly rise above fervent occasional verse. Yet he became a national poet, because he was the first to celebrate occasions of deeply felt popular emotion in acceptable rhyme, and he will always remain one because each occasion touched some lasting aspiration of his race. He sings what Garneau recounts—the love of mother country, mother church and Canada. The *Guerre de Crimée*, *Guerre d'Italie*, even *Castel-fidardo*, are duly chronicled. An ode on *Mgr. de Montmorency-Laval*, first bishop of Quebec, brings him nearer to his proper themes, which are found in full perfection in the *Chant du vieux soldat canadien*, composed in 1856 to honour the first French man-of-war that visited British Quebec, and *Le Drapeau de Carillon* (1858), a centennial paean for Montcalm's Canadians at Ticonderoga. Much of the mature work of this first generation, and of the juvenilia of the second, appeared in *Les Soirées canadiennes* and *Le Foyer canadien*, founded in 1862 and 1863 respectively. The abbé Ferland was an enthusiastic editor and historian, and Etienne Parent should be remembered as the first Canadian philosopher.

At Confederation many eager followers began to take up the work which the founders were laying down. The abbé Casgrain devoted a life-time to making the French-Canadians appear as the chosen people of new-world history; but, though an able advocate, he spoilt a really good case by trying to prove too much. His *Pèlerinage au pays d'Evangéline* (1888) is a splendid defence of the unfortunate Acadians; and all his books attract the reader by their charm of style and personality. But his *Montcalm et Lévis* (1891) and other works on the conquest, are all warped by a strong bias against both Wolfe and Montcalm, and in favour of Vandreuil, the Canadian-born governor; while they show an inadequate grasp of military problems, and practically ignore the vast determining factor of sea-power altogether. Benjamin Sulte's comprehensive *Histoire des Canadiens-français* (1882) is a well-written, many-sided work. Thomas Chapais' monographs are as firmly grounded as they are finely expressed; his *Jean Talon* (1904) is of prime importance; and his *Montcalm* (1901) is the generous *amende honorable* paid by French-Canadian literature to a much misrepresented, but admirably wrought, career. A. Gérin-Lajoie's cry of "back to the land" was successfully adapted to modern developments in *Le Saguenay* (1896) and *L'Outaouais supérieur*

(1889) by Arthur Buies, who showed what immense inland breadths of country lay open to suitable "Jean Rivards" from the older settlements along the St Lawrence. In oratory, which most French-Canadians admire beyond all other forms of verbal art, Sir Wilfrid Laurier has greatly surpassed L. J. Papineau, by dealing with more complex questions, taking a higher point of view, and expressing himself with a much apter flexibility of style.

Among later poets may be mentioned Pierre Chauveau (1820–1890), Louis Fiset, (b. 1827), and Adolphe Poisson (b. 1849). Louis Fréchette (1839–1908) has, however, long been the only poet with a reputation outside of Canada. In 1879 *Les Fleurs boréales* won the Prix Monthyon from the French Academy. In 1887 *La Légende d'un peuple* became the acknowledged epic of a race. He occasionally nods; is rather strident in the patriotic vein; and too often answers the untoward call of rhetoric when his subject is about to soar into the heights of poetry. But a rich vocabulary, a mastery of verse-forms quite beyond the range of Crémazie, real originality of conception, individual distinction of style, deep insight into the soul of his people, and, still more, the glow of warm-blooded life pulsing through the whole poem, all combine to give him the greatest place at home and an important one in the world at large. *Les Vengeances* (1875), by Leon Pamphile Le May, and *Les Aspirations* (1904), by W. Chapman, worthily represent the older and younger contemporaries. Dr Nérée Beauchemin keeps within somewhat narrow limits in *Les Floraisons matutinales* (1897); but within them he shows true poetic genius, a fine sense of rhythm, rhyme and verbal melody, a *curiosa felicitas* of epithet and phrase, and so sure an eye for local colour that a stranger could choose no better guide to the imaginative life of Canada.

A Canadian drama hardly exists; among its best works are the pleasantly epigrammatic plays of F. G. Marchand. Novels are not yet much in vogue; though Madame Conan's *L'Oublié* (1902) has been crowned by the Academy; while Dr Choquette's *Les Ribaud* (1898) is a good dramatic story, and his *Claude Paysan* (1899) is an admirably simple idyllic tale of the hopeless love of a soil-bound *habitant*, told with intense natural feeling and fine artistic reserve. Chief-Justice Routhier, a most accomplished occasional writer, is very French-Canadian when arraigning *Les Grands Drames* of the classics (1889) before his ecclesiastical court and finding them guilty of Paganism.

The best bibliographies are Philéas Gagnon's *Essai de bibliographie canadienne* (1895), and Dr N. E. Dionne's list of publications from the earliest times in the *Transactions of the Royal Society of Canada* for 1905. (W. Wo.)

CANAL (from Lat. *canalis*, "channel" and "kennel" being doublets of the word), an artificial water course used for the drainage of low lands, for irrigation (*q.v.*), or more especially for the purpose of navigation by boats, barges or ships. Probably the first canals were made for irrigation, but in very early times they came also to be used for navigation, as in Assyria and Egypt. The Romans constructed various works of the kind, and Charlemagne projected a system of waterways connecting the Main and the Rhine with the Danube, while in China the Grand Canal, joining the Pei-ho and Yang-tse-Kiang and constructed in the 13th century, formed an important artery of commerce, serving also for irrigation. But although it appears from Marco Polo that inclines were used on the Grand Canal, these early waterways suffered in general from the defect that no method being known of conveniently transferring boats from one level to another they were only practicable between points that lay on nearly the same level; and inland navigation could not become generally useful and applicable until this defect had been remedied by the employment of locks. Great doubts exist as to the person, and even the nation, that first introduced locks. Some writers attribute their invention to the Dutch, holding that nearly a century earlier than in Italy locks were used in Holland where canals are very numerous, owing to the favourable physical conditions. On the other hand, the contrivance has been claimed for engineers of the Italian school, and it is said that two brothers Domenico of Viterbo constructed a lock-chamber enclosed by a pair of gates in 1481, and that in 1487 Leonardo da Vinci completed six locks uniting the canals of Milan. Be that as it may, however, the introduction of locks in the 14th or 15th century gave a new character to inland navigation and laid the basis of its successful extension.

The Languedoc Canal (Canal du Midi) may be regarded as the pioneer of the canals of modern Europe. Joining the Bay of Biscay and the Mediterranean it is 148 m. long and rises 620 ft. above sea-level with 119 locks, its depth being about $6\frac{1}{2}$ ft. It was designed by Baron Paul Riquet de Bonrepos (1604–1680) and was finished in 1681. With it and the still earlier Briare canal (1605–1642) France began that policy of canal construction which has provided her with over 3000 m. of canals, in addition to over 4600 m. of navigable rivers. In Russia Peter the Great undertook the construction of a system of canals about the beginning of the 18th century, and in Sweden a canal with locks, connecting Eskilstuna with Lake Malar, was finished in 1606. In England the oldest artificial canal is the Foss Dyke, a relic of the Roman occupation. It extends from Lincoln to the river Trent near Torksey (11 m.), and formed a continuation of the Caer Dyke, also of Roman origin but now filled up, which ran from Lincoln to Peterborough (40 m.). Camden in his *Britannia* says that the Foss Dyke was deepened and to some extent rendered navigable in 1121. Little, however, was done in making canals in Great Britain until the middle of the 18th century, though before that date some progress had been made in rendering some of the larger rivers navigable. In 1759 the duke of Bridgewater obtained powers to construct a canal between Manchester and his collieries at Worsley, and this work, of which James Brindley was the engineer, and which was opened for traffic in 1761, was followed by a period of great activity in canal construction, which, however, came to an end with the introduction of railways. According to evidence given before the royal commission on canals in 1906 the total mileage of existing canals in the United Kingdom was 3901. In the United States the first canal was made in 1793 at South Hadley, Connecticut, and the canal-system, though its expansion was checked by the growth of railways, has attained a length of 4200 m., most of the canals being in the states of New York and Pennsylvania. The splendid inland navigation system of Canada mainly consists of natural lakes and rivers, and the artificial waterways are largely "lateral" canals, cut in order to enable vessels to avoid rapids in the rivers. (See the articles on the various countries for accounts of the canal-systems they possess.)

The canals that were made in the early days of canal-construction were mostly of the class known as *barge* or *boat canals*, and owing to their limited depth and breadth were only available for vessels of small size. But with the growth of commerce the advantage was seen of cutting canals of such dimensions as to enable them to accommodate sea-going ships. Such *ship-canals*, which from an engineering point of view chiefly differ from barge-canals in the magnitude of the works they involve, have mostly been constructed either to shorten the voyage between two seas by cutting through an intervening isthmus, or to convert important inland places into sea-ports. An early example of the first class is afforded by the Caledonian Canal (*q.v.*), while among later ones may be mentioned the Suez Canal (*q.v.*), the Kaiser Wilhelm, Nord-Ostsee or Kiel Canal, connecting Brunsbüttel at the mouth of the Elbe with Kiel (*q.v.*) on the Baltic, and the various canals that have been proposed across the isthmus that joins North and South America (see PANAMA CANAL). Examples of the second class are the Manchester Ship Canal and the canal that runs from Zeebrugge on the North Sea to Bruges (*q.v.*).

Construction.—In laying out a line of canal the engineer is more restricted than in forming the route of a road or a railway. Since water runs downhill, gradients are inadmissible, and the canal must either be made on one uniform level or must be adapted to the general rise or fall of the country through which it passes by being constructed in a series of level reaches at varying heights above a chosen datum line, each closed by a

lock or some equivalent device to enable vessels to be transferred from one to another. To avoid unduly heavy earthwork, the reaches must closely follow the bases of hills and the windings of valleys, but from time to time it will become necessary to cross a sudden depression by the aid of an embankment or aqueduct, while a piece of rising ground or a hill may involve a cutting or a tunnel. Brindley took the Bridgewater canal over the Irwell at Barton by means of an aqueduct of three stone arches, the centre one having a span of 63 ft., and T. Telford arranged that the Ellesmere canal should cross the Dee valley at Pont-y-Cysyllte partly by embankment and partly by aqueduct. The embankment was continued till it was 75 ft. above the ground, when it was succeeded by an aqueduct, 1000 ft. long and 127 ft. above the river, consisting of a cast iron trough supported on iron arches with stone piers. Occasionally when a navigable stream has to be crossed, a swing viaduct is necessary to allow shipping to pass. The first was that built by Sir E. Leader Williams to replace Brindley's aqueduct at Barton, which was only high enough to give room for barges (see MANCHESTER SHIP CANAL). One of the earliest canal tunnels was made in 1766–1777 by Brindley at Harecastle on the Trent and Mersey canal; it is 2880 yds. long, 12 ft. high and 9 ft. wide, and has no tow-path, the boats being propelled by men lying on their backs and pushing with their feet against the tunnel walls ("leggers"). A second tunnel, parallel to this but 16 ft. high and 14 ft. wide, with a tow-path, was finished by Telford in 1827. Standedge tunnel, on the Huddersfield canal, is over 3 m. long, and is also worked by leggers.

Dimensions.

The dimensions of a canal, apart from considerations of water-supply, are regulated by the size of the vessels which are to be used on it. According to J. M. Rankine, the depth of water and sectional area of waterway should be such as not to cause any material increase of the resistance to the motion of the boats beyond what would be encountered in open water, and he gives the following rules as fulfilling these conditions:—

Least breadth of bottom = 2 × greatest breadth of boat.
Least depth of water = 1½ ft. × greatest draught of boat.
Least area of waterway = 6 × greatest midship section of boat.

The ordinary inland canal is commonly from 25 to 30 ft. wide at the bottom, which is flat, and from 40 to 50 ft. at the water level, with a depth of 4 or 5 ft., the angle of slope of the sides varying with the nature of the soil. To retain the water in porous ground, and especially on embankments, a strong watertight lining of puddle or tempered clay must be provided on the bed and sides of the channel. Puddle is made of clay which has been finely chopped up with narrow spades, water being supplied until it is in a semi-plastic state. It is used in thin layers, each of which is worked so as to be firmly united with the lower stratum. The full thickness varies from 2 to 3 ft. To prevent the erosion of the sides at the water-line by the wash from the boats, it may be necessary to pitch them with stones or face them with brushwood. In some of the old canals the slopes have been cut away and vertical walls built to retain the towing-paths, with the result of adding materially to the sectional area of the waterway.

Water supply.

A canal cannot be properly worked without a supply of water calculated to last over the driest season of the year. If there be no natural lake available in the district for storage and supply, or if the engineer cannot draw upon some stream of sufficient size, he must form artificial reservoirs in suitable situations, and the conditions which must be attended to in selecting the positions of these and in constructing them are the same as those for drinking-water supply, except that the purity of the water is not a matter of moment. They must be situated at such an elevation that the water from them may flow to the summit-level of the canal, and if the expense of pumping is to be avoided, they must command a sufficient catchment area to supply the loss of water from the canal by evaporation from the surface, percolation through the bed, and lockage. If the supply be inadequate, the draught of the boats plying on the canal may have to be reduced in a dry season, and the consequent decrease in the size of their cargoes will both lessen the carrying capacity of the canal and increase the working expenses in relation to the tonnage handled. Again, since the consumption of water in lockage increases both with the size of the locks and the frequency with which they are used, the difficulty of finding a sufficient water supply may put a limit to the density of traffic possible on a canal or may prohibit its locks from being enlarged so as to accommodate boats of the size necessary for the economical handling of the traffic under modern conditions. It may be pointed out that the up consumes more water than the down traffic. An ascending boat on entering a lock displaces a volume of water equal to its submerged capacity. The water so displaced flows into the lower reach of the canal, and as the boat passes through the lock is replaced by water flowing from the upper reach. A descending boat in the same way displaces a volume of water equal to its submerged capacity, but in this case the water flows back into the higher reach where it is retained when the gates are closed.

Waste-weirs and stop-gates.

An essential adjunct to a canal is a sufficient number of waste-weirs to discharge surplus water accumulating during floods, which, if not provided with an exit, may overflow the tow-path, and cause a breach in the banks, stoppage of the traffic, and damage to adjoining lands. The number and positions of these waste-weirs must depend on the nature of the country through which the canal passes. Wherever the canal crosses a stream a waste-weir should be formed in the aqueduct; but independently of this the engineer must consider at what points large influxes of water may be apprehended, and must at such places form not only waste-weirs of sufficient size to carry off the surplus, but also artificial courses for its discharge into the nearest streams. These waste-weirs are placed at the top water-level of the canal, so that when a flood occurs the water flows over them and thus relieves the banks.

Stop-gates are necessary at short intervals of a few miles for the purpose of dividing the canal into isolated reaches, so that in the event of a breach the gates may be shut, and the discharge of water confined to the small reach intercepted between two of them, instead of extending throughout the whole line of canal. In broad canals these stop-gates may be formed like the gates of locks, two pairs of gates being made to shut in opposite directions. In small works they may be made of thick planks slipped into grooves formed at the narrow points of the canal under road bridges, or at contractions made at intermediate points to receive them. Self-acting stop-gates have been tried, but have not proved trustworthy. When repairs have to be made stop-gates allow of the water being run off by "off-lets" from a short reach, and afterwards restored with but little interruption of the traffic. These off-lets are pipes placed at the level of the bottom of the canal and provided with valves which can be opened when required. They are generally formed at aqueducts or bridges crossing rivers, where the contents of the canal between the stop-gates can be run off into the stream.

Locks.

Locks are chambers, constructed of wood, brickwork, masonry or concrete, and provided with gates at each end, by the aid of which vessels are transferred from one reach of the canal to another. To enable a boat to ascend, the upper gates and the sluices which command the flow of water from the upper reach are closed. The sluices at the lower end of the lock are then opened, and when the level of the water in the lock has fallen to that of the lower reach, the boat passes in to the lock. The lower gates and sluices being then closed, the upper sluices are opened, and when the water rising in the lock has floated the boat up the level of the upper reach the upper gates are opened and it passes out. For a descending boat the procedure is reversed. The sluices by which the lock is filled or emptied are carried through the walls in large locks, or consist of openings in the gates in small ones. The gates are generally of oak, fitting into recesses of the walls when open, and closing against sills in the lock bottom when shut.

In small narrow locks single gates only are necessary; in large locks pairs of gates are required, fitting together at the head or "mitre-post" when closed. The vertical timber at the end of the gate is known as the "heel-post," and at its foot is a casting that admits an iron pivot which is fixed in the lock bottom, and on which the gate turns. Iron straps round the head of the heel-post are let into the lock-coping to support the gate. The gates are opened and closed by balance beams projecting over the lock side, by gearing or in cases where they are very large and heavy by the direct action of a hydraulic ram. In order to economize water canal locks are made only a few inches wider than the vessels they have to accommodate. The English canal boat is about 70 or 75 ft. long and 7 or 8 ft. in beam; canal barges are the same length but 14 or 15 ft. in width, so that locks which will hold one of them will admit two of the narrower canal boats side by side. In general canal locks are just long enough to accommodate the longest vessels using the navigation. In some cases, however, provision is made for admitting a train of barges; such long locks have sometimes intermediate gates by which the effective length is reduced when a single vessel is passing. The lift of canal locks, that is, the difference between the level of adjoining reaches, is in general about 8 or 10 ft., but sometimes is as little as 1½ ft. On the Canal du Centre (Belgium) there are locks with a lift of 17 ft., and on the St Denis canal near La Villette basins in Paris there is one with a lift of 32½ ft. In cases where a considerable difference of level has to be surmounted the locks are placed close together in a series or "flight," so that the lower gates of one serve also as the upper gates of the next below. To save water, expecially where the lift is considerable, side ponds are sometimes employed; they are reservoirs into which a portion of the water in a lock-chamber is run, instead of being discharged into the lower reach, and is afterwards used for partially filling the chamber again. Double locks, that is, two locks placed side by side and communicating by a passage which can be opened or closed at will, also tend to save water, since each serves as a side pond to the other. The same advantage is gained with double flights of locks, and time also is saved since vessels can pass up and down simultaneously.

A still greater economy of water can be effected by the use of inclined planes or vertical lifts in place of locks. In China rude inclines appear to have been used at an early date, vessels being carried down a sloping plane of stonework by the aid of a flush of water or hauled up it by capstans. On the Bude canal (England) this plan was adopted in an improved form, the small flat-bottomed boats employed being fitted with wheels to facilitate their course over the inclines. Another variant, often adopted as an adjunct to locks where many small pleasure boats have to be dealt with, is to fit the incline itself with rollers, upon which the boats travel. In some cases the boats are conveyed on a wheeled trolley or cradle running on rails; this plan was adopted on the Morris canal, built in 1825–1831, in the case of 23 inclines having gradients of about 1 in 10, the rise of each varying from 44 to 100 ft. Between the Ourcq canal and the Marne, near Meaux, the difference of level is about 40 ft., and barges weighing about 70 tons are taken from the one to the other on a wheeled cradle weighing 35 tons by a wire rope over an incline nearly 500 yards long. But heavy barges are apt to be strained by being supported on cradles in this way, and to avoid this objection they are sometimes drawn up the inclines floating in a tank or caisson filled with water and running on wheels. This arrangement was utilized about 1840 on the Chard canal (England), and 10 years later it was adapted at Blackhill on the Monkland canal (Scotland) to replace a double flight of locks, in consequence of the traffic having been interrupted by insufficiency of water. There the height to be overcome was 96 ft. Two pairs of rails, of 7 ft. gauge, were laid down on a gradient of 1 in 10, and on these ran two carriages having wrought iron, water-tight caissons with lifting gates at each end, in which the barges floated partially but not wholly supported by water. The carriages, with the barge and water, weighed about 80 tons each, and were arranged to counterbalance each other, one going up as the other was going down. The power required was provided by two high pressure steam engines of 25 h.p., driving two large drums round which was coiled, in opposite directions, the 2-inch wire rope that hauled the caissons. An incline constructed on the Union canal at Foxton (England) to replace 10 locks giving a total rise of 75 ft., accommodates barges of 70 tons, or two canal boats of 33 tons. It is in some respects like the Monkland canal incline, but the movable caissons work on four pairs of rails on an incline of 1 in 14, broadside on, and the boats are entirely waterborne. Steam power is employed, with an hydraulic accumulator which enables hydraulic power to be used in keeping the caisson in position at the top of the incline while the boats are being moved in or out, a water-tight joint being maintained with the final portion of the canal during the operation. The gates in the caisson and canal are also worked by hydraulic power. The incline is capable of passing 200 canal boats in 12 hours, and the whole plant is worked by three men.

Vertical lifts can only be used instead of locks with advantage at places where the difference in level occurs in a short length of canal, since otherwise long embankments or aqueducts would be necessary to obtain sites for their construction. An early example was built in 1809 at Tardebigge on the Worcester and Birmingham canal. It consisted of a timber caisson, weighing 64 tons when full of water, counterpoised by heavy weights carried on timber platforms. The lift of 12 ft. was effected in about three minutes by two men working winches. Seven lifts, erected on the Grand Western canal between Wellington and Tiverton about 1835, consisted of two chambers with a masonry pier between them. In each chamber there worked a timber caisson, suspended at either end of a chain hung over large pulleys above. As one caisson descended the other rose, and the apparatus was worked by putting about a ton more water in the descending caisson than in the ascending one. At Anderton a lift was erected in 1875 to connect the Weaver navigation with the Trent and Mersey canal, which at that point is 50 ft. higher than the river. The lift is a double one, and can deal with barges up to 100 tons. The change is made while the vessels are floating in 5 ft. of water contained in a wrought iron caisson, 75 ft. long and 15½ ft. wide. An hydraulic ram 3 ft. in diameter supports each caisson, the bottom of which is strengthened so as to transfer the weight to the side girders. The descending caisson falls owing to being filled with 6 in. greater depth of water than the ascending one, the weight on the rams (240 tons) being otherwise constant, since the barge displaces its own weight of water; an hydraulic accumulator is used to overcome the loss of weight in the descending caisson when it begins to be immersed in the lower level of the river. The two presses in which the rams work are connected by a 5-in. pipe, so that the descent of one caisson effects the raising of the other. A similar lift, completed in 1888 at Fontinettes on the Neuffossé canal in France, can accommodate vessels of 250 tons, a total weight of 785 tons being lifted 43 ft.; and a still larger example on the Canal du Centre at La Louvière in Belgium has a rise of 50 ft., with caissons that will admit vessels up to 400 tons, the total weight lifted amounting to over 1000 tons. This lift, with three others of the same character, overcomes the rise of 217 ft., which occurs in this canal in the course of 4⅓ m.

Haulage.—The horse or mule walking along a tow-path and drawing or "tracking" a boat or barge by means of a towing rope, still remains the typical method of conducting traffic on the smaller canals; on ship-canals vessels proceed under their own steam or are aided by tugs. Horse traction is very slow. The maximum speed on a narrow canal is about 3½ m. an hour, and the average speed, which, of course, depends largely on the number of locks to be passed through, very much less. It has been calculated that in England on the average one horse hauls one narrow canal boat about 2 m. an hour loaded or 3 m. empty, or two narrow canal boats 1½ m. loaded and 2½ m.

empty. Efforts have accordingly been made not only to quicken the rate of transit, but also to move heavier loads, thus increasing the carrying capacity of the waterways. But at speeds exceeding about 3½ m. an hour the "wash" of the boat begins to cause erosion of the banks, and thus necessitates the employment of special protective measures, such as building side walls of masonry or concrete. For a canal of given depth there is a particular speed at which a boat can be hauled with a smaller expenditure of energy than at a higher or a lower speed, this maximum being the speed of free propagation of the primary wave raised by the motion of the boat (see WAVE). About 1830 when, in the absence of railways, canals could still aspire to act as carriers of passengers, advantage was taken of this fact on the Glasgow and Ardrossan canal, and subsequently on some others, to run fast passenger boats, made lightly of wrought iron and measuring 60 ft. in length by about 6 ft. in breadth. Provided with two horses they started at a low speed behind the wave, and then on a given signal were jerked on the top of the wave, when their speed was maintained at 7 or 8 m. an hour, the depth of the canal being 3 or 4 ft. This method, however, is obviously inapplicable to heavy barges, and in their case improved conditions of transport had to be sought in other directions.

Mechanical power.

Steam towage was first employed on the Forth and Clyde canal in 1802, when a tug-boat fitted with steam engines by W. Symington drew two barges for a distance of 19½ m. in 6 hours in the teeth of a strong headwind. As a result of this successful experiment it was proposed to employ steam tugs on the Bridgewater canal; but the project fell through owing to the death of the duke of Bridgewater, and the directors of the Forth and Clyde canal also decided against this method because they feared damage to the banks. Steam tugs are only practicable on navigations on which there are either no locks or they are large enough to admit the tug and its train of barges simultaneously; otherwise the advantages are more than counterbalanced by the delays at locks. On the Bridgewater canal, which has an average width of 50 ft. with a depth of 5½ ft., is provided with vertical stone walls in place of sloping banks, and has no locks for its entire length of 40 m. except at Runcorn, where it joins the Mersey, tugs of 50 i.h.p., with a draught of 4 ft., tow four barges, each weighing 60 tons, at a rate of nearly 3 m. an hour. On the Aire and Calder navigation, where the locks have a minimum length of 215 ft., a large coal traffic is carried in trains of boat-compartments on a system designed by W. H. Bartholomew. The boats are nearly square in shape, except the leading one which has an ordinary bow; they are coupled together by knuckle-joints fitted into hollow stern-posts, so that they can move both laterally and vertically, and a wire rope in tension on each side enables the train to be steered. No boat crews are required, the crew of the steamer regulating the train. If the number of boats does not exceed 11 they can be pushed, but beyond that number they are towed. Each compartment carries 35 tons, and the total weight in a train varies from 700 to 900 tons. On the arrival of a train at Goole the boats are detached and are taken over submerged cradles under hydraulic hoists which lift the boat with the cradle sufficiently high to enable it to be turned over and discharge the whole cargo at once into a shoot and thence into sea-going steamers. Another method of utilizing steam-power, which was also first tried on the Forth and Clyde canal by Symington in 1789, is to provide each vessel with a separate steam engine, and many barges are now running fitted in this way. Experiments have also been made with internal combustion engines in place of steam engines. In some cases, chiefly on rivers having a strong current, recourse has been had to a submerged chain passed round a drum on a tug: this drum is rotated by steam power and thus the tug is hauled up against the current. To obviate the inconvenience of passing several turns of the chain round the drum in order to get sufficient grip, the plan was introduced on the Seine and Oise in 1893 of passing the chain round a pulley which could be magnetized at will, the necessary adhesion being thus obtained by the magnetic attraction exercised on the iron chain; and it was also adopted about the same time in combination with electrical haulage on a small portion of the Bourgogne canal, electricity being employed to drive the motor that worked the pulley. Small locomotives running on rails along the towpath were tried on the Shropshire Union canal, where they were abandoned on account of practical difficulties in working, and also on certain canals in France and Germany, where, however, the financial results were not satisfactory. On portions of the Teltow canal, joining the Havel and the Spree, electrical tractors run on rails along both banks, taking their power from an overhead wire; they attain a speed of 2½ m. an hour when hauling two 600-ton barges. The electrical supply is also utilized for working the lock gates and for various other purposes along the route of the canal. In the Mont-de-Rilly tunnel, at the summit level of the Aisne-Marne canal, a system of cable-traction was established in 1894, the boats being taken through by being attached to an endless travelling wire rope supported by pulleys on the towpath.

When railways were being carried out in England some canal companies were alarmed for their future, and sold their canals to the railway companies, who in 1906 owned 1138 m. of canals out of a total length in the United Kingdom of 3901 m. As some of these canals are links in the chain of internal water communication complaints have frequently arisen on the question of through traffic and tolls. The great improvements carried out in America and on the continent of Europe by state aid enable manufacturers to get the raw material they use and goods they export to and from their ports at much cheaper rates than those charged on British canals. The association of chambers of commerce and other bodies having taken up the matter, a royal commission was appointed in 1906 to report on the canals and water-ways of the kingdom, with a view to considering how they could be more profitably used for national purposes. Its Report was published in December 1909.

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CANAL DOVER, a city of Tuscarawas county, Ohio, U.S.A., on the Tuscarawas river, about 70 m. S. by E. of Cleveland. Pop. (1890) 3470; (1900) 5422, of whom 939 were foreign-born. It is served by the Baltimore & Ohio and the Pennsylvania railways, and by the Ohio canal, and is connected with Cleveland by an inter-urban electric line. It lies on a plateau about 880 ft. above sea-level and commands pleasant views of diversified scenery. Coal and iron ore abound in the vicinity, and the city manufactures iron, steel, tin plate, electrical and telephone supplies, shovels, boilers, leather, flour, brick and tile, salt, furniture and several kinds of vehicles. The municipality owns and operates its water-works. Canal Dover was laid out as a town in 1807, and was incorporated as a village in 1842, but its charter was soon allowed to lapse and was not revived until 1867. Canal Dover became a city under the Ohio municipal code of 1903.

CANALE (or CANALETTO), **ANTONIO** (1697–1768), Venetian painter, born on the 18th of October 1697, was educated under his father Bernard, a scene-painter of Venice, and for some time followed his father's line of art. In 1719 he went to Rome, where he employed himself chiefly in delineating ancient ruins, and particularly studied effects of light and shade, in which he became an adept. He was the first painter who made practical use of the camera lucida. On returning home he devoted his powers to views in his native city, which he painted with a clear and firm touch and the most facile mastery of colour in a deep tone, introducing groups of figures with much effect. In his latter days he resided some time in England. His pictures, in their particular range, still remain unrivalled for their magnificent perspective. The National Gallery, London, has five pictures by him, notably the "View on the Grand Canal, Venice," and

the "Regatta on the Grand Canal." He died on the 20th of August 1768. Bellotto (commonly named Bernardo) who is also sometimes called CANALETTO (1724–1780), was his nephew and pupil, and painted with deceptive resemblance to the style of the more celebrated master.

CANALIS (also "canal" and "channel"; from the Latin), in architecture, the sinking between the fillets of the volute of the Ionic capital: in the earliest examples, though sunk below the fillets, it is slightly convex in section.

CANANDAIGUA, a village and the county-seat of Ontario county, New York, U.S.A., 30 m. S.E. of Rochester. Pop. (1890) 5868; (1900) 6151; (1910) 7217. It is served by the New York Central and Hudson River, and the Northern Central (Pennsylvania system) railways, and is connected with Rochester by an inter-urban electric line. Among the manufactures are pressed bricks, tile, beer, ploughs, flour, agate and tin-ware. The village, picturesquely situated at the north end of Canandaigua Lake, a beautiful sheet of water about 15 m. long with a breadth varying from a mile to a mile and a half, is a summer resort. It has a county court house; the Canandaigua hospital of physicians and surgeons; the Frederick Ferris Thompson memorial hospital, with a bacteriological laboratory supported by the county; the Clark Manor House (a county home for the aged), given by Mrs Frederick Ferris Thompson in memory of her mother and of her father, Myron Holley Clark (1806–1892), president of the village of Canandaigua in 1850–1851 and governor of New York in 1855–1857; the Ontario Orphan Asylum; Canandaigua Academy; Granger Place school for girls; Brigham Hall (a private sanatorium for nervous and mental diseases); Young Men's Christian Association building (1905); and two libraries, the Wood (public) library and the Union School library, founded in 1795. There is a public playground in the village with free instruction by a physical director; and a swimming school, endowed by Mrs F. F. Thompson, gives free lessons in swimming. The village owns its water-supply system. A village of the Seneca Indians, near the present Canandaigua, bearing the same name, which means "a settlement was formerly there" (not, as Lewis Morgan thought, "chosen spot"), was destroyed by Gen. John Sullivan in 1779. There are boulder memorials of Sullivan's expedition and of the treaty signed here on the 11th of November 1794 by Timothy Pickering, on behalf of the United States with the Six Nations—a treaty never ratified by the Senate. Canandaigua was settled in 1789 and was first incorporated in 1812.

CANARD (the Fr. for "duck"), a sensational or extravagant story, a hoax or false report, especially one circulated by newspapers. This use of the word in France dates from the 17th century, and is supposed by Littré to have originated in the old expression, "*vendre un canard à moitié*" (to half-sell a duck); as it is impossible to "half-sell a duck," the phrase came to signify to take in, or to cheat.

CANARY (*Serinus canarius*), a well-known species of passerine bird, belonging to the family *Fringillidae* or finches (see FINCH). It is a native of the Canary Islands and Madeira, where it occurs abundantly in the wild state, and is of a greyish-brown colour, slightly varied with brighter hues, although never attaining the beautiful plumage of the domestic bird. It was first domesticated in Italy during the 16th century, and soon spread over Europe, where it is now the most common of cage-birds. During the years of its domestication, the canary has been the subject of careful artificial selection, the result being the production of a bird differing widely in the colour of its plumage, and in a few of its varieties even in size and form, from the original wild species. The prevailing colour of the most admired varieties of the canary is yellow, approaching in some cases to orange, and in others to white; while the most robust birds are those which, in the dusky green of the upper surface of their plumage, show a distinct approach to the wild forms. The least prized are those in which the plumage is irregularly spotted and speckled. In one of the most esteemed varieties, the wing and tail feathers are at first black—a peculiarity, however, which disappears after the first moulting. Size and form have also been modified by domestication, the wild canary being not more than $5\frac{1}{2}$ in. in length, while a well-known Belgian variety usually measures 8 in. There are also hooped or bowed canaries, feather-footed forms and top-knots, the latter having a distinct crest on the head; but the offspring of two such top-knotted canaries, instead of showing an increased development of crest, as might be expected, are apt to be bald on the crown. Most of the varieties, however, of which no fewer than twenty-seven were recognized by French breeders so early as the beginning of the 18th century, differ merely in the colour and the markings of the plumage. Hybrids are also common, the canary breeding freely with the siskin, goldfinch, citril, greenfinch and linnet. The hybrids thus produced are almost invariably sterile. It is the female canary which is almost invariably employed in crossing, as it is difficult to get the females of the allied species to sit on the artificial nest used by breeders. In a state of nature canaries pair, but under domestication the male bird has been rendered polygamous, being often put with four or five females; still he is said to show a distinct preference for the female with which he was first mated. It is from the others, however, that the best birds are usually obtained. The canary is very prolific, producing eggs, not exceeding six in number, three or four times a year; and in a state of nature it is said to breed still oftener. The work of building the nest, and of incubation, falls chiefly on the female, while the duty of feeding the young rests mainly with the cock bird. The natural song of the canary is loud and clear; and in their native groves the males, especially during the pairing season, pour forth their song with such ardour as sometimes to burst the delicate vessels of the throat. The males appear to compete with each other in the brilliancy of their melody, in order to attract the females, which, according to the German naturalist Johann Matthaüs Bechstein (1757–1822) always select the best singers for their mates. The canary readily imitates the notes of other birds, and in Germany and especially Tirol, where the breeding of canaries gives employment to a large number of people, they are usually placed for this purpose beside the nightingale. (A. N.)

CANARY ISLANDS (*Canarias*), a Spanish archipelago in the Atlantic Ocean; about 60 m. W. of the African coast, between 27° 40′ and 29° 30′ N., and between 13° 20′ and 18° 10′ W. Pop. (1900) 358,564; area 2807 sq. m. The Canary Islands resemble a roughly-drawn semicircle, with its convex side facing southwards, and with the island of Hierro detached on the south-west. More precisely, they may be considered as two groups, one of which, including Teneriffe, Grand Canary, Palma, Hierro and

Gomera, consists of mountain peaks, isolated and rising directly from an ocean of great depth; while the other, comprising Lanzarote, Fuerteventura and six uninhabited islets, is based on a single submarine plateau, of far less depth. Teneriffe and Gomera, the only members of the principal group which have a common base, may be regarded as the twin peaks of one great volcanic mass. Ever since the researches of Leopold von Buch the Canary Islands have been classical ground to the student of volcanic action. Buch considered them to be representative of his "craters of elevation." In common with the other West

African islands they are of volcanic origin. The lavas consist chiefly of trachytes and basalts.

Climate.—From April to October a north or north-east wind blows upon the islands, beginning about 10 A.M. and continuing until 5 or 6 P.M. In summer this wind produces a dense stratum of sea-cloud (*cumuloni*), 500 ft. thick, whose lower surface is about 2500 ft. above the sea at Teneriffe. This does not reach up to the mountains, which have on every side a stratum of their own, about 1000 ft. thick, the lower surface being about 3500 ft. above the level of the sea. Between these two distinct strata there is a gap, through which persons on a vessel near the island may obtain a glimpse of the peak. The sea-cloud conceals from view the other islands, except those whose mountains pierce through it. On the south-west coasts there is no regular sea or land breeze. In winter they are occasionally visited by a hot south-east wind from Africa, which is called the *Levante*, and produces various disagreeable consequences on the exposed parts of the person, besides injuring the vegetation, especially on the higher grounds. Locusts have sometimes been brought by this wind. In 1812 it is said that locusts covered some fields in Fuerteventura to the depth of 4 ft. Hurricanes, accompanied by waterspouts, sometimes cause much devastation; but, on the whole, the islands are singularly free from such visitations. The climate generally is mild, dry and healthy. On the lower grounds the temperature is equable, the daily range seldom exceeding 6° Fahr. At Santa Cruz the mean for the year is about 71°. The rainy season occurs at the same period as in southern Europe. The dry season is at the time of the trade-winds, which extend a few degrees farther north than this latitude.

Fauna.—The indigenous mammals of the Canary Islands are very few in number. The dog, swine, goat and sheep were alone found upon the island by the Spanish conquerors. The race of large dogs which is supposed to have given a name to the islands has been long extinct. A single skeleton has been found, which is deposited in one of the museums at Paris. The ferret, rabbit, cat, rat, mouse and two kinds of bat have become naturalized. The ornithology is more interesting, on account at once of the birds native to the islands, and the stragglers from the African coast, which are chiefly brought over in winter, when the wind has blown for some time from the east. Among the indigenous birds are some birds of prey, as the African vulture, the falcon, the buzzard, the sparrow-hawk and the kite. There are also two species of owl, three species of sea-mew, the stockdove, quail, raven, magpie, chaffinch, goldfinch, blackcap, canary, titmouse, blackbird, house-swallow, &c. As to the insects, mention may be made of a species of gnat or mosquito which is sometimes troublesome, especially to strangers. The list of reptiles is limited to three varieties of lizard and one species of frog. The only fresh-water fish is the eel. Marine fishes are not numerous, the reason perhaps being that the steepness of the coast does not allow seaweed to grow in sufficient quantity to support the lower forms of marine animal life. Whales and seals are occasionally seen. The cuttle-fish is abundant, and is sought for as an article of food.

Flora.—The position of mountainous islands like the Canaries, in the subtropical division of the temperate zone, is highly favourable to the development, within a small space, of plants characteristic of both warm and cold climates. Von Buch refers to five regions of vegetation in Teneriffe:—(1) From the sea to the height of 1300 ft. This he styles the African region. The climate in the hottest parts is similar to that of Egypt. Here grow, among the introduced plants, the coffee tree, the date-palm, the sugar-cane, the banana, the orange tree, the American agave and two species of cactus; and among indigenous plants, the dragon tree on the north-west of Teneriffe. A leafless and fantastic euphorbia, *E. canariensis*, and a shrubby composite plant, *Cacalia kleinia*, give a character to the landscape about Santa Cruz. (2) Between 1300 ft. and 2800 ft. This is the region of south European vegetation, the climate answering to that of southern France and central Italy. Here flourish vines and cereals. (3) The region of indigenous trees, including various species of laurel, an *Ardisia*, *Ilex*, *Rhamnus*, *Olea*, *Myrica*, and other trees found wild also at Madeira. The clouds rest on this region during the day, and by their humidity support a vegetation amongst the trees, partly of shrubs, and partly of ferns. It extends to the height of 4000 ft. (4) The region of the beautiful *Pinus canariensis*, extending to the height of 6400 ft.; here the broad-leaved trees have ceased to grow, but arborescent heaths are found throughout its whole extent, and specimens of *Juniperus oxycedrus* may be met with. (5) The region of Retama (*Cytisus nubigenus*), a species of white-flowering and sweet-scented broom, which is found as high as 11,000 ft. At the upper edge of this region a lilac-coloured violet clings to the soil, and above there is nothing but a little lichen. The number of wild flowering plants may be estimated at 900, upwards of 270 of which are peculiar to the Canaries. The forms of vegetation must in the main be considered North African. The character of the vegetation in Lanzarote and Fuerteventura, islands composed of extensive plains and low hills, with few springs, is different from that of the other islands, which are more elevated and have many springs. The wood is less abundant, and the vegetation less luxuriant.

Inhabitants.—The Guanches (*q.v.*), who occupied the Canaries at the time of the Spanish invasion, no longer exist as a separate race, for the majority were exterminated, and the remainder intermarried with their conquerors. The present inhabitants are slightly darker than the people of Spain, but in other respects are scarcely distinguishable from them. The men are of middle height, well-made and strong; the women are not striking in respect of beauty, but they have good eyes and hair. Spanish is the only language in use. The birth-rate is uniformly high and the death-rate low; and, despite the emigration of many families to South America and the United States, the census of 1900 showed that the population had increased by over 75,000 since 1877. The excess of females over males, which in 1900 amounted to upwards of 22,000, is partly explained by the fact that few women emigrate. Fully 80% of the inhabitants could neither read nor write in 1900; but education progresses more rapidly than in many other Spanish provinces. Good schools are numerous, and the return of emigrants and their children who have been educated in the United States, tends to raise the standard of civilization. The sustenance of the poorer classes is chiefly composed of fish, potatoes and *gofio*, which is merely Indian corn or wheat roasted, ground and kneaded with water or milk. The land is, in great part, strictly entailed.

Government.—The archipelago forms one Spanish province, of which the capital is Santa Cruz de Tenerife, the residence of the civil governor, who has under his command one of the two districts into which the archipelago is divided, this first district comprising Teneriffe, Palma, Gomera and Hierro. The other district includes Grand Canary, Lanzarote, Fuerteventura, and has at its head a sub-governor, residing in Las Palmas, on Grand Canary, who is independent of the governor except in regard to elections and municipal administration. The chief finance office is at Santa Cruz de Tenerife. The court of appeal, created in 1526, is in Las Palmas. The captain-general and second commandant of the archipelago reside in Santa Cruz de Tenerife, and there is a brigadier-governor of Grand Canary, residing in Las Palmas, besides eight inferior military commandants. The province furnishes no men for the Spanish peninsular army, but its annual conscription provides men for the local territorial militia, composed of regiments of infantry, squadrons of mounted rifles and companies of garrison artillery—about 5000 men all told. The archipelago is divided into two naval districts, commanded by royal navy captains. Roman Catholicism is the official religion, and ecclesiastical law is the same as in other Spanish provinces. The convents have been suppressed, and in many cases converted to secular uses. Laguna and Las Palmas are episcopal sees, in the archbishopric of Seville.

Industry and Commerce.—Owing to the richness of the volcanic soil, agriculture in the Canaries is usually very profitable.

Land varies in value according to the amount of water available, but as a rule commands an extraordinarily high price. In the *Terrenos de secano*, or non-irrigable districts, the average price of an acre ranges from £7 to £17; in the *Terrenos de riego*, or irrigable land, it ranges from £100 to £250. Until 1853 wine was the staple product, and although even the finest brand (known as *Vidonia*) never equalled the best Madeira vintages, it was largely consumed abroad, especially in England. The annual value of the wine exported often exceeded £500,000. In 1853, however, the grape disease attacked the vineyards; and thenceforward the production of cochineal, which had been introduced in 1825, took the place of viticulture so completely that, twenty years later, the exports of cochineal were worth £556,000. France and England were the chief purchasers. This industry declined in the later years of the 19th century, and was supplanted by the cultivation of sugar-cane, and afterwards of bananas, tomatoes, potatoes and onions. Bananas are the most important crop. Other fruits grown in smaller quantities include oranges, figs, dates, pineapples, guavas, custard-apples and prickly pears. Tobacco-planting is encouraged by the Spanish government, and the sugar trade is maintained, despite severe competition. The grain harvest does not supply the needs of the islanders. Pigs and sheep of a small, coarse-woolled breed, are numerous; and large herds of goats wander in an almost wild state over the higher hills. Fishing is a very important industry, employing over 10,000 hands. The fleet of about 2200 boats operates along some 600 m. of the African coast, between Cape Cantin and the Arguin Bank. Shipbuilding is carried on at Las Palmas; and the minor industries include the manufacture of cloth, drawn-linen (*calado*) work, silk, baskets, hats, &c. A group of Indian merchants, who employ coolie labour, produce silken, jute and cotton goods, Oriental embroideries, wrought silver, brass-ware, porcelain, carved sandal-wood, &c. The United Kingdom heads the import trade in coal, textiles, hardware, iron, soap, candles and colonial products. Timber comes chiefly from North America and Scandinavia, alcohol from Cuba and the United States, wheat and flour from various British possessions, maize from Morocco and Argentina. Large quantities of miscellaneous imports are sent by Germany, Spain, France and Italy. Bananas, tomatoes, potatoes, sugar and wine are exported. The total value of the foreign trade fluctuates very greatly, and the difficulty of forming an estimate is enhanced in many years by the absence of official statistics; but imports and exports together probably amount in a normal year to about £1,000,000. The chief ports are Las Palmas and Santa Cruz, which annually accommodate about 7000 vessels of over 8,000,000 tons. In 1854 all the ports of the Canaries were practically declared free; but on the 1st of November 1904 a royal order prohibited foreign vessels from trading between one island and another. This decree deprived the outlying islands of their usual means of communication, and, in answer to a protest by the inhabitants, its operation was postponed.

History.—There is ground for supposing that the Phoenicians were not ignorant of the Canaries. The Romans learned of their existence through Juba, king of Mauretania, whose account of an expedition to the islands, made about 40 B.C., was preserved by the elder Pliny. He mentions "Canaria, so called from the multitude of dogs of great size," and "Nivaria, taking its name from perpetual snow, and covered with clouds," doubtless Teneriffe. Canaria was said to abound in palms and pine trees. Both Plutarch and Ptolemy speak of the Fortunate Islands, but from their description it is not clear whether the Canaries or one of the other island groups in the western Atlantic are meant; see ISLES OF THE BLEST. In the 12th century the Canaries were visited by Arab navigators, and in 1334 they were rediscovered by a French vessel driven among them by a gale. A Portuguese expedition, undertaken about the same time, failed to find the archipelago, and want of means frustrated the project of conquest entertained by a grandson of Alphonso X. of Castile, named Juan de la Cerda, who had obtained a grant of the islands and had been crowned king of them at Avignon, by Pope Clement VI. Two or possibly more Spanish expeditions followed, and a monastic mission was established, but at the close of the 14th century the Guanches remained unconquered and unconverted. In 1402, however, Gadifer de la Salle and Jean de Béthencourt (*q.v.*) sailed with two vessels from Rochelle, and landed early in July on Lanzarote. The relations between these two leaders, and their respective shares in the work of conquest and exploration, have been the subject of much controversy. Between 1402 and 1404 La Salle conquered Lanzarote and part of Fuerteventura, besides exploring other islands; Béthencourt meanwhile sailed to Cadiz for reinforcements. He returned in 1404 with the title of king, which he had secured from Henry III. of Castile. La Salle, thus placed in a position of inferiority, left the islands and appealed unsuccessfully for redress at the court of Castile. In 1405 Béthencourt visited Normandy, and returned with fresh colonists who conquered Hierro. In December 1406 he left the Canaries, entrusting their government to his nephew Maciot de Béthencourt, and reserving for himself a share in any profits obtained, and the royal title. Eight years of misrule followed before Queen Catherine of Castile intervened. Maciot thereupon sold his office to her envoy, Pedro Barba de Campos; sailed to Lisbon and resold it to Prince Henry the Navigator; and a few years afterwards resold it once more to Enrique de Guzman, count of Niebla. Jean de Béthencourt, who died in 1422, bequeathed the islands to his brother Reynaud; Guzman sold them to another Spaniard named Paraza, who was forced to re-sell to Ferdinand and Isabella of Castile in 1476; and Prince Henry twice endeavoured to enforce his own claims. Meanwhile the Guanches remained unconquered throughout the greater part of the archipelago. In 1479 the sovereignty of Ferdinand and Isabella over the Canaries was established by the treaty of Alcaçova, between Portugal and Castile. After much bloodshed, and with reinforcements from the mother country, the Spaniards, under Pedro de Vera, became masters of Grand Canary in 1483. Palma was conquered in 1491, and Teneriffe in 1495, by Alonzo de Lugo. The archipelago was included for administrative purposes in the captaincy-general of Andalusia until 1833, when it was made a separate province. In 1902 a movement in favour of local autonomy was repressed by Spanish troops.

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CANCALE, a fishing port of north-western France in the department of Ille-et-Vilaine on the Bay of Cancale, 9 m. E.N.E. of St Malo by road. Pop. (1906) town 3827, commune 7061. It exports oysters, which are found in its bay in large numbers and of excellent quality, and equips a fleet for the Newfoundland cod-fisheries. The harbour is protected by the rocks known as the Rochers de Cancale. In 1758 an English army under the duke of Marlborough landed here for the purpose of attacking St Malo and pillaged the town. It was again bombarded by the English in 1779.

CANCEL (from the Lat. *cancelli*, a plural diminutive of *cancer*, a grating or lattice, from which are also derived "chancel" and "chancellor"), a word meaning to cross out, from the

crossed latticed lines drawn across a legal document to annul it, hence to delete or destroy.

CANCELLI (plural of Lat. *cancellus*, dim. of *cancer*, a crossing bar), in architecture, the term given to barriers which correspond to the modern balustrade or railing, especially the screen dividing the body of a church from the part occupied by the ministers; hence "chancel" (*q.v.*). By the Romans *cancelli* were similarly employed to divide off portions of the courts of law (cf. the English "bar").

CANCER, LUIS (d. 1549), Spanish missionary to Central America, was born at Barbastro near Saragossa. After working for some time in Dominica and Haiti, he crossed to the mainland, where he had great success in pacifying the Indians whom more violent methods had failed to subdue. He upheld the cause of the natives at an ecclesiastical assembly held in Mexico in 1546, and three years later, on the 26th of June, met his death at their hands on the west coast of Florida.

CANCER ("THE CRAB"), in astronomy, the fourth sign of the zodiac, denoted by the symbol ♋. Its name may be possibly derived from the fact that when the sun arrives at this part of the ecliptic it apparently retraces its path, resembling in some manner the sidelong motion of a crab. It is also a constellation, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.); Ptolemy catalogued 13 stars in it, Tycho Brahe 15 and Hevelius 29. Its most interesting objects are: a large loose cluster of stars, known as *Praesepe* or the Beehive, visible as a nebulous patch to the naked eye, and ζ *Cancri*, a remarkable multiple star, composed of two stars, of magnitudes 5 and 5·7, revolving about each other in 60 years, and a third star of magnitude 5·5 which revolves about these two in an opposite direction in a period of 17½ years; from irregularities in the motion of this star, it is supposed to be a satellite of an invisible body which itself revolves about the two stars previously mentioned, in a period of 600 to 700 years.

CANCER, or CARCINOMA (from Lat. *cancer*, Gr. *καρκίνωμα*, an eating ulcer), the name given to a class of morbid growths or tumours which occur in man, and also in most or all vertebrate animals. The term "malignant disease" is commonly used as synonymous with "cancer." For the general pathology, &c., of tumours see TUMOUR.

Cancer exists in various forms, which, although differing from each other in many points, have yet certain common characters to which they owe their special significance.

1. In structure such growths are composed of nucleated cells and free nuclei together with a milky fluid called cancer juice, all contained within a more or less dense fibrous stroma or framework.

2. They have no well-defined limits, and they involve all textures in their vicinity, while they also tend to spread by the lymphatics and veins, and to cause similar growths in distant parts or organs called "secondary cancerous growths."

3. They are undergoing constant increase, and their progress is usually rapid.

4. Pain is a frequent symptom. When present it is generally of a severe and agonizing character, and together with the local effects of the disease and the resulting condition of ill health or "cachexia," hastens the fatal termination to which all cancerous growths tend.

5. When such growths are removed by the surgeon they are apt to return either at the same or at some other part.

The chief varieties of cancer are *Scirrhus* or hard cancer, *Encephaloid* or soft cancer and *Epithelial cancer*.

Scirrhus is remarkable for its hardness, which is due to the large amount of its fibrous, and relatively small proportion of its cell elements. It is of comparatively slow growth, but it tends to spread and to ulcerate. Its most common seat by far is the female breast, though it sometimes affects internal organs.

Encephaloid is in structure the reverse of the last, its softness depending on the preponderance of its cell over its fibrous elements. Its appearance and consistence resemble brain substance (hence its name), and it is of such rapid growth as to have given rise to its being occasionally termed *acute cancer*. Its most frequent seats are internal organs or the limbs. Ulceration and haemorrhage are common accompaniments of this form of cancer.

Epithelial cancer is largely composed of cells resembling the natural epithelium of the body. It occurs most frequently in those parts provided with epithelium, such as the skin and mucous membranes, or where those adjoin, as in the lips. This form of cancer does not spread so rapidly nor produce secondary growths in other organs to the same extent as the two other varieties, but it tends equally with them to involve the neighbouring lymphatic glands, and to recur after removal.

Cancer affects all parts of the body, but is much more frequent in some tissues than in others. According to recent statistics prepared by the registrar-general for England and Wales (sixty-seventh annual report) the most frequent seats are, in numerical order, as follows:—*males*—stomach, liver, rectum, intestines, aesophagus, tongue; *females*—uterus, breast, stomach, liver, intestines, rectum. Other statistics give similar, though not identical results. It may be said, broadly, that the most frequent seats are the female sexual organs and after them the digestive tract in both sexes. In children, in whom cancer is rare, the most frequent seats appear to be—under five, the kidneys and supra-renal bodies; five to ten, the brain; ten to twenty, the arm and leg bones.

Cancer tends to advance steadily to a fatal termination, but its duration varies in different cases according to the part affected and according to the variety of the disease. Soft cancer affecting important organs of the body often proves fatal in a few months, while, on the other hand, cases of hard or epithelial cancer may sometimes last for several years; but no precise limit can be assigned for any form of the disease. In some rare instances growths exhibiting all the signs of cancer may exist for a great length of time without making any progress, and may even dwindle and disappear altogether. This is called "spontaneous cure."

Cancer research.

Cancer has been the subject of observation from time immemorial, and of the most elaborate investigation by innumerable workers in recent years; but the problems of its origin and character have hitherto baffled inquiry. Modern scientific study of them may be said to have begun with J. Müller's microscopic work in the structure of cancerous tissue early in the 19th century. A great impetus to this line of investigation was given by the cellular theory of R. Virchow and the pathological researches of Sir J. Paget, and general attention was directed to the microscopic examination of the cells of which cancer is composed. This led to a classification, on which much reliance was once placed, of different kinds of cancer, based on the character of the cells, and particularly to a distinction between *carcinoma*, in which the cells are of the epithelial type, and *sarcoma*, in which they are of the connective tissue type. The distinction, though still maintained, has proved barren; it never had any real significance, either clinical or pathological, and the tendency in recent research is to ignore it. The increased knowledge gained in numerous other branches of biological science has also been brought to bear on the problem of cancer and has led to a number of theories; and at the same time the apparently increasing prevalence of the disease recorded by the vital statistics of many countries has drawn more and more public attention to it. Two results have followed. One is the establishment of special endowed institutions devoted to cancer research; the other is the publication and discussion of innumerable theories and proposed methods of treatment. Popular interest has been constantly fanned by the announcement of some pretended discovery or cure, in which the public is invited to place its trust. Such announcements have no scientific value whatever. In the rare cases in which they are not pure quackery, they are always premature and based on inadequate data.

Organized cancer research stands on a different footing. It may be regarded as the revival at the end of the 19th century of what was unsuccessfully attempted at the beginning. As early as 1792, at the suggestion of Mr. John Howard, surgeon, a ward was opened at the Middlesex hospital in London for

the special benefit of persons suffering from cancer. It was fitted up and endowed anonymously by Mr. Samuel Whitbread, M.P. for Bedford, and according to the terms of the benefaction at least six patients were to be continually maintained in it until relieved by art or released by death. The purpose was both philanthropic and scientific, as Mr. Howard explained in bringing forward the suggestion. Two principal objects, he said, presented themselves to his mind, "namely, the relief of persons suffering under this disease and the investigation of a complaint which, although extremely common, is both with regard to its natural history and cure but imperfectly known." This benefaction was the origin of one of the most complete institutions for the scientific study of cancer that exists to-day.

In 1804 a Society for Investigating the Nature of Cancer was formed by a number of medical men in London, Edinburgh and other towns at the instigation of John Hunter. The aim was collective investigation, and an attempt was made to carry it out by issuing forms of inquiry; but the imperfect means of communication then existing caused the scheme to be abandoned in a short time. Subsequent attempts at collective investigation also failed until recently. About 1900 a movement, which had been for some time gathering force, began to take visible shape simultaneously in different countries. The cancer ward at the Middlesex hospital had then developed into a cancer wing, and to it were added special laboratories for the investigation of cancer, which were opened on the 1st of March 1900. In this establishment the fully equipped means of clinical and laboratory research were united under one roof and manned by a staff of investigators under the direction of Dr W. S. Lazarus Barlow. In the same year the *Deutsche Comité für Krebsforschung* was organized in Berlin, receiving an annual subsidy of 5000 marks (£250) from the imperial exchequer. This body devoted its energies to making a census of cancer patients in Germany on a definite date. A special ward for cancer was also set apart at the Charité hospital in Berlin, with a state endowment of 53,000 marks (£2560) per annum, and a laboratory for cancer research was attached to the first medical clinique under Professor Ernst von Leyden at the same hospital. A third institution in Germany is a special cancer department at the Royal Prussian Institute for Experimental Therapeutics at Frankfort-on-Main, which has been supported, like the Imperial Cancer Research Fund in England, by private contributions on a generous scale. The fund just mentioned was initiated in October 1901, and its operations took definite shape a year later, when Dr. E. F. Bashford was appointed general superintendent of research. The patron of the foundation was King Edward VII., and the president was the prince of Wales. It had in 1908 a capital endowment of about £120,000, subscribed by private munificence and producing an income of about £7000 a year. The central laboratory is situated in the examination building of the Royal Colleges of Physicians and Surgeons in London, and the work is conducted under the superintendence of an executive committee formed by representatives of those bodies. In the United States a cancer laboratory, which had been established in Buffalo in 1899 under Dr Roswell Park, was formally placed under the control of New York state in June 1901, and is supported by an annual grant of $15,000 (£3000). There are other provisions in the United States connected with Harvard and Cornell universities. At the former the "Caroline Brewer Croft Fund for Cancer Research" started special investigations in the surgical department of the Harvard Medical School in 1900 or the previous year, and in connexion with the Cornell University Medical School there is a small endowment called the "Huntingdon Cancer Research Fund." There appear to be institutions of a similar character in other countries, in addition to innumerable investigators at universities and other ordinary seats of scientific research.

Some attempt has been made to co-ordinate the work thus carried on in different countries. An international cancer congress was held at Heidelberg and Frankfort in 1906, and a proposal was put forward by German representatives that a permanent international conference on cancer should be established, with headquarters in Berlin. The committee of the Imperial Cancer Research Fund did not fall in with the proposal, being of opinion that more was to be gained in the existing stage of knowledge by individual intercourse and exchange of material between actual laboratory workers.

Theories of cancer.

In spite of the immense concentration of effort indicated by the simultaneous establishment of so many centres of endowed research, and in spite of the light thrown upon the problem from many sides by modern biological science, our knowledge of the origin of cancer is still in such a tentative state that a detailed account of the theories put forward is not called for; it will suffice to indicate their general drift. The actual pathological process of cancer is extremely simple. Certain cells, which are apparently of a normal character and have previously performed normal functions, begin to grow and multiply in an abnormal way in some part of the body. They continue this process so persistently that they first invade and then destroy the surrounding tissues; nothing can withstand their march. They are moreover carried to other parts of the body, where they establish themselves and grow in the same way. Their activity is carried on with relentless determination, though at a varying pace, until the patient dies, unless they are bodily removed. Hence the word "malignant." The problem is—what are these cells, or why do they behave in this way? The principal answers put forward may be summarized:—(1) they are epithelial cells which grow without ceasing because the connective tissue has lost the capacity to hold their proliferative powers in check (H. Freund, following K. Thiersch and W. Waldeyer); (2) they are embryonic cells accidentally shut off (J. F. Cohnheim); (3) they are epithelial cells with a latent power of unlimited proliferation which becomes active on their being dislocated from the normal association (M. W. H. Ribbert and Borrmann); (4) they are stimulated to unlimited growth by the presence of a parasite (Plimmer, Sanfelice, Roncali and others); (5) they are fragments of reproductive tissue (G. T. Beatson); (6) they are cells which have lost their differentiated character and assumed elementary properties (von Hausemann, O. Hertwig). The very number and variety of hypotheses show that none is established. Most of them attempt to explain the growth but not the origin of the disease. The hypothesis of a parasitic origin, suggested by recent discoveries in relation to other diseases, has attracted much attention; but the observed phenomena of cancerous growths are not in keeping with those of all known parasitic diseases, and the theory is now somewhat discredited. A more recent theory that cancer is due to failure of the normal secretions of the pancreas has not met with much acceptance.

Some generalizations bearing on the problem have been drawn from the work done in the laboratories of the Imperial Cancer Research Fund They may be summarily stated thus. Cancer has been shown to be an identical process in all vertebrates (including fishes), and to develop at a time which conforms in a striking manner to the limits imposed by the long or short compass of life in different animals. Cancerous tissue can be artificially propagated in the short-lived mouse by actual transference to another individual, but only to one of the same species. Cancerous tissue thus propagated presents all the characteristic features of the malignant growth of sporadic tumours; it infiltrates and produces extensive secondary growths. Under suitable experimental conditions the aggregate growth of a cancer is undefined, of enormous and, so far as we can judge, of limitless amount. This extraordinary growth is due to the continued proliferation of cancerous cells when transplanted. The processes by which growing cancer cells are transferred to a new individual are easily distinguishable and fundamentally different from all known processes of infection. The artificial propagation of cancer causes no specific symptoms of illness in the animal in which it proceeds. Under artificial propagation cancer maintains all the characters of the original tumours of the primary hosts. *Carcinoma* and *sarcoma* agree

in possessing all the pathological and cellular features of malignant new growths.

Statistics of cancer.

Simultaneously with the active pursuit of laboratory research much statistical work has been devoted to establishing the broad facts of the prevalence and incidence of cancer on a firm basis. The point of most general interest is the apparently steady increase of the disease in all countries possessing fairly trustworthy records. It will be sufficient to give the figures for England and Wales as an example.

Annual Death-rates from Cancer to a Million Living.
England and Wales.

1871-1875	1876-1880.	1881-1885.	1886-1890.	1891-1895.	1896-1900.	1901-1904.
445	493	547	631	711	800	861

In forty years the recorded rate had risen from 403 to 861. The question how far these and similar statistics represent a real increase cannot be satisfactorily resolved, because it is impossible to ascertain how much of the apparent increase is due to more accurate diagnosis and improved registration. Some of it is certainly due to those causes, so that the recorded figures cannot be taken to represent the facts as they stand. At the same time it is certain that some increase has taken place in consequence of the increased average length of life; a larger proportion of persons now reach the ages at which cancer is most frequent. Increase due to this fact, though it is a real increase, does not indicate that the cause of cancer is more rife or more potent; it only means that the condition of the population in regard to age is more favourable to its activity. On the whole it seems probable that, when allowance has been made for this factor and for errors due to improved registration, a real increase due to other causes has taken place, though it is not so great as the recorded statistics would indicate.

The long-established conclusions concerning the incidence of the disease in regard to age and sex have been confirmed and rendered more precise by modern statistics. Cancer is a disease of old age; the incidence at the ages of sixty-five to seventy-five is ten times greater than at the ages thirty-five to forty-five. This fact is the source of frequent fallacies when different countries or districts and different periods are compared with each other, unless account is taken of the differences in age and constitution. With regard to sex females are far more liable than males; the respective death-rates per million living for England and Wales in 1904 were—males 740; females 1006. But the two rates show a tendency to approximate; the increase shown over a series of years has been considerably more rapid among males than among females. One result of more careful examination of statistics has been to discredit, though perhaps somewhat hastily, certain observations regarding the prevalence of cancer in special districts and special houses. On the other hand the fuller statistics now available concerning the relative frequency of cancer in the several organs and parts of the body, of which some account is given above, go to confirm the old observation that cancer commonly begins at the seat of some local irritation. By far the most frequent seats of disease are the uterus and breast in women and the digestive tract in both sexes, and these are all particularly subject to such irritation. With regard to the influence of heredity the trend of modern research is to minimize or deny its importance in cancer, as in phthisis, and to explain family histories by other considerations. At most heredity is only thought to confer a predisposition.

Treatment.

The only "cure" for cancer remains removal by operation; but improved methods of diagnosis enable this to be done in many cases at an earlier stage of the disease than formerly; and modern methods of surgery permit not only of operation in parts of the body formerly inaccessible, but also more complete removal of the affected tissues. Numerous forms of treatment by modern therapeutic means, both internal and external, have been advocated and tried; but they are all of an experimental nature and have failed to meet with general acceptance. One of the most recent is treatment by trypsin, a pancreatic ferment. This has been suggested by Dr John Beard of Edinburgh in conformity with the theory, mentioned above, that failure of the pancreatic secretions is the cause of cancer. It has been claimed that the drug exercises a favourable influence in conjunction with operation and even without it. The experience of different observers with regard to results is contradictory; but clinical investigations conducted at Middlesex hospital in a number of cases of undoubted cancer in strict accordance with Dr Beard's directions, and summarized by Dr Walter Ball and Dr Fairfield Thomas in the *Sixth Report from the Cancer Research Laboratories* (*Archives of Middlesex Hospital*, vol. ix.) in May 1907, resulted in the conclusion "that the course of cancer, considered both as a disease and as a morbid process, is unaltered by the administration of trypsin and amylopsin." The same conclusion has been reached after similar trials at the cancer hospital. Another experimental method of treatment which has attracted much attention is application of the X-rays. The results vary in a capricious and inexplicable manner; in some cases marked benefit has followed, in others the disease has been as markedly aggravated. Until more is known both of cancer and of X-rays, their use must be considered not only experimental but risky. (A. Sl.)

CANCRIN, FRANZ LUDWIG VON (1738–1812), German mineralogist and metallurgist, was born on the 21st of February 1738, at Breitenbach, Hesse-Darmstadt. In 1764 he entered the service of the landgrave of Hesse-Darmstadt at Hanau, becoming professor of mathematics at the military academy, head of the civil engineering department of the state, director of the theatre and (1774) of the mint. A work on the copper mines of Hesse (1767) earned him a European reputation, and in 1783 he accepted from Catherine II. of Russia the directorship of the famous Staraya salt-works, living thenceforth in Russia. In 1798 he became a councillor of state at St Petersburg. He published many works on mineralogy and metallurgy, of which the most important, the *Grundzüge der Berg- und Salzwerkskunde* (13 vols., Frankfort, 1773–1791), has been translated into several languages. His son, Count Georg von Cancrin, or Kankrin (1774–1845), was the eminent Russian minister of finance.

CANDELABRUM (from Lat. *candela*, a taper or candle), the stand on which ancient lamps were placed. The most ancient example is the bronze candelabrum made by Callimachus for the Erechtheum at Athens, to carry the lamp sacred to Minerva. In this case it is probable the lamp was suspended, as in the example from Pompeii, now in the Naples museum; this consisted of a stalk or reed, the upper part moulded with projecting feature to carry the lamps, and a base resting on three lions' or griffins' feet; sometimes there was a disk at the top to carry a lamp, and sometimes there was a hollow cup, in which resinous woods were burnt. The origin of the term suggests that on the top of the disk was a spike to carry a wax or tallow candle (*candela* or *funalia*). Besides these bronze candelabra, of which there are many varieties in museums, the Romans used more ponderous supports in stone or marble, of which many examples were found in the Thermae. These consisted of a base, often triangular, and of similar design to the small sacrificial altars, and a shaft either richly moulded or carved with the acanthus plant and crowned with a large cup or basin. There is a fine example of the latter in the Vatican. The Roman examples seem to have served as models for many of the candelabra in the churches in Italy. The word "candelabrum" is also now used to describe many different forms of lighting with multiple points, and is often applied to hanging lights as well as to those which rise from a stand.

CANDIA, formerly the capital and still the most populous city of Crete (*q.v.*), to which it has given its name. It is situated on the northern shore somewhat nearer the eastern than the western end of the island, in 35° 20′ N. lat. and 25° 9′ E. long. It is still surrounded by its extensive Venetian fortifications; but they have fallen into disrepair, and a good part of the town is in a dilapidated condition, mainly from the effects of earthquakes. The principal buildings are the Venetian loggia (barbarously mutilated by the new régime), the Konak (now Prefecture), the mosques, which are fourteen in number, the new cathedral,

the two Greek churches, the Armenian church, the Capuchin monastery, the bazaars and the baths. There are also some beautiful Venetian fountains. The town is the seat of a Greek archbishop. A highly interesting museum has been formed here containing the antiquities found during the recent excavations. The chief trade is in oil and soap, both of which are of excellent quality. The coasting trade, which is of considerable importance, is mainly carried on in Turkish vessels. The manufacture of leather for home consumption is an extensive industry, and wine of good quality is produced in the neighbourhood. The harbour, which had grown almost inaccessible, was deepened by Mustapha Pasha between 1820 and 1840. It is formed for the most part by the ancient moles, and was never deep enough to admit the larger vessels even of the Venetians, which were accustomed to anchor in the port of the neighbouring island of Standia. A short distance from St George's Gate there was a small village exclusively inhabited by lepers, who numbered about seventy families, but they have now been transported to Spinalonga. The population of the town is estimated at from 15,000 to 18,000, about half being Mahommedan Greeks. The site of Candia, or, as it was till lately locally known, Megalo castro (the Great Fortress), has been supposed to correspond with that of the ancient *Heracleion*, the seaport of Cnossus, and this appellation has now been officially revived by its Greek inhabitants. The ruins of Cnossus are situated at the distance of about 3 m. to the south-east at the village of Makryteichos or Long Wall. Founded by the Saracens in the 9th century, Candia was fortified by the Genoese in the 12th, and was greatly extended and strengthened by the Venetians in the 13th, 14th and 15th centuries. It was besieged by the Turks under the vizier Achmet in 1667; and, in spite of a most heroic defence, in which the Venetians lost 30,000 in killed and wounded, it was forced to surrender in 1669. (See also CRETE.)

CANDIDATE, one who offers himself or is selected by others for an office or place, particularly one who puts up for election to parliament or to any public body. The word is derived from the Latin *candidatus*, clad in white (*candidus*). In Rome, candidates for election to the higher magistracies appeared in the Campus Martius, the Forum and other public places, during their canvass, in togas with the white of the natural wool brightened by chalk.

CANDLE (Lat. *candela*, from *candere*, to glow), a cylindrical rod of solid fatty or waxy matter, enclosing a central fibrous wick, and designed to be burnt for giving light. The oldest materials employed for making candles are beeswax and tallow, while among those of more recent introduction are spermaceti, stearine and paraffin wax. Waxlights (*cereus*, sc. *funis*) were known to the Romans. In the midlde ages wax candles were little used, owing to their expense, except for the ceremonies of the church and other religious purposes (see LIGHTS, CEREMONIAL USE OF), but in the 15th century, with the cheapening of wax, they began to find wider employment. The tallow candle, mentioned by Apuleius as *sebaceus*, was long an article of domestic manufacture. The tallow was melted and strained, and then lengths of cotton or flax fibre, or rushes from which most of the external skin had been stripped, only sufficient being left to support the pith ("rushlights"), were dipped into it, the operation being repeated until the desired thickness had been attained. In Paris, in the 13th century, there was a gild of candlemakers who went from house to house to make tallow candles, the manufacture of wax candles being in the hands of another gild. This separation of the two branches of the trade is also exemplified by the existence of two distinct livery companies in the city of London—the Waxchandlers and the Tallowchandlers; the French *chandelle* properly means tallow candle, candles made of materials less fusible than tallow being called *bougies*, a term said to be derived from the town of Bougie in Algeria, either because wax was produced there or because the Venetians imported wax candles thence into Europe. The old tallow "dips" gave a poor light, and tallow itself is now used only to a limited extent, except as a source of "stearine." This is the trade name for a mixture of solid fatty acids—mainly stearic and palmitic—manufactured not only from tallow and other animal fats, but also from such vegetable fats as palm-oil. Paraffin wax, a mixture of solid hydrocarbons obtained from crude North American and Rangoon petroleum, and also yielded in large quantities by the Scotch shale oil industry, is, at least in Great Britain, a still more important material of candle-manufacture, which came into use about 1854. Spermaceti, a crystalline fatty substance obtained from the sperm whale (*Physeter macrocephalus*), was introduced as a material for candles about a century earlier. In practice the candlemaker mostly uses mixtures of these materials. For instance, 5-10% of stearine, which is used alone for candles that have to be burnt in hot climates, is mixed with paraffin wax, to counteract the tendency to bend with heat exhibited by the latter substance. Again, the brittleness of spermaceti is corrected by the addition of beeswax, stearine, paraffin wax or ceresin (obtained from the mineral wax ozocerite). In some "composite" candles stearine is mixed with the hard fat ("cocoa-nut stearine") expressed from cocoa-nut oil by hydraulic pressure; and this cocoa-nut stearine is also used for night-lights, which are short thick candles with a thin wick, calculated to burn from six to ten hours.

The stearine or stearic acid industry originated in the discovery made by M. E. Chevreul about 1815, that fats are glycerides or compounds of glycerin with fatty acids, mostly palmitic, stearic and oleic. The object of the candlemaker is to remove this glycerin, not only because it is a valuable product in itself, but also because it is an objectionable constituent of a candle; the vapours of acrolein formed by its decomposition in the flame are the cause of the unpleasant odours produced by tallow "dips." He also removes the oleic acid, which is liquid at ordinary temperatures, from the palmitic and stearic acids, mixtures of which solidify at temperatures varying from about 130° to 155° F., according to the percentage of each present. Several methods are in use for the decomposition of the fats. In the autoclave process the fat, whether tallow, palm-oil or a mixture of the two, mixed with 25 or 30% of water and about 3% of lime, is subjected in an autoclave to steam at a pressure of about 120 lb per square inch for eight or ten hours, when nearly all of it is saponified. On standing the product separates into two layers—"sweet water" containing glycerin below, and the fatty acids with a certain amount of lime soap above. The upper layer is then boiled and treated with enough sulphuric acid to decompose the lime soap, the calcium sulphate formed is allowed to subside, and the fatty acids are run off into shallow boxes to be crystallized or "seeded" prior to the separation of the oleic acid, which is effected by pressing the solid blocks from the boxes, first cold and then hot, by hydraulic machinery. In another process saponification is effected by means of concentrated sulphuric acid. The fat is mixed with 4-6% of the acid and treated with steam in boiling water till the hydrolysis is complete,when on standing the glycerin and sulphuric acid sink to the bottom and the fatty acids rise to the top. Owing to the darkness of their colour, when this process is employed, the latter usually have to be distilled before being crystallized. The autoclave process yields about 45% of stearine, one-third of which is recovered from the expressed oleic acid, but with sulphuric acid saponification the amount of stearine is higher—over 60%—and that of oleic acid less, part of it being converted into solid material by the action of the acid. The yield of glycerin is also less. In a combination of the two processes the fat may first be treated by the autoclave process, so as to obtain a full yield (about 10%) of glycerin, and the resulting fatty acids then subjected to acid saponification, so as to get the higher amount of stearine. At the best, however, some 30% of oleic acid remains, and though often sought, no satisfactory method of converting this residue into solid has been discovered. It constitutes "red oil," and is used in soap-making and in woollen manufacture. In the process patented by Ernst Twitchell in 1898, decomposition is effected by boiling the fat with half its bulk of water in presence of a reagent obtained by the action of sulphuric acid on oleic acid and an aromatic hydrocarbon such as benzene.

The wick is a most important part of a candle, and unless it is of proper size and texture either too much or too little fuel will be supplied to the flame, and the candle will gutter or be otherwise unsatisfactory. The material generally employed is cotton yarn, plaited or "braided" by machinery, and treated or "pickled" with a solution of boracic acid, ammonium or potassium nitrate, or other salt. The tightness of the plaiting varies with the material used for the candle, wicks for stearine being looser than for paraffin, but tighter than for wax or spermaceti. The plaited wick is flat and curls over as the candle burns, and thus the end is kept projecting into the outer part of the flame where it is consumed, complete combustion being aided by the pickling process it has undergone. In the old tallow dips the strands of cotton were merely twisted together, instead of being plaited; wicks made in this way had no determinate bias towards the outside of the flame, and thus were not wholly consumed, the result being that there was apt to be an accumulation of charred matter, which choked the flame unless removed by periodical "snuffing."

Four ways of making candles may be distinguished—dipping, pouring, drawing and moulding, the last being that most commonly employed. *Dipping* is essentially the same as the domestic process already described, but the rate of production is increased by mounting a number of wicks in a series of frames, each of which in turn is brought over the tallow bath so that its wicks can be dipped. *Pouring*, used in the case of wax, which cannot well be moulded because it contracts in cooling and also has a tendency to stick to the moulds, consists in ladling molten wax upon the wicks suspended from an iron ring. When of the desired thickness the candles are rolled under a plate on a marble slab. In *drawing*, used for small tapers, the wick, rolled on a drum, is passed through the molten wax or paraffin, drawn through a circular hole and slowly wound on a second drum; it is then passed again through the molten material and through a somewhat larger hole, and reeled back on the first drum, this process being repeated with larger and larger holes until the coating is of the required thickness. In *moulding*, a number of slightly conical moulds are fixed by the larger extremity to a kind of trough, with their tapered ends projecting downwards and with wicks arranged down their centres. The molten material is poured into the trough and fills the moulds, from which the candles are withdrawn when solidified. Modern candle-moulding machines are continuous in their operation; long lengths of wick are coiled on bobbins, one for each mould, and the act of removing one set of candles from their moulds draws in a fresh set of wicks. "Self-fitting ends," which were invented by J. L. Field in 1864, and being shaped like a truncated cone enable the candles to be fixed in candlesticks of any diameter, are formed by means of an attachment to the tops of the moulds; spirally twisted candles are, as it were, unscrewed from their moulds. It is necessary to be able to regulate the temperature of the moulds accurately, else the candles will not come out freely and will not be of good appearance. For stearine candles the moulds are immersed in tepid water and the cooling must be slow, else the material will crystallize, though if it be too slow cracking will occur. For paraffin, on the other hand, the moulds must be rather hotter than the molten material (about 200° F.), and must be quickly cooled to prevent the candles from sticking.

A candle-power, as a unit of light in photometry, was defined by the (London) Metropolis Gas Act of 1860 as the light given by a sperm candle, of which six weighed 1 lb and each burned 120 grains an hour.

See W. Lant Carpenter, *Soaps and Candles* (London, 1895); C. E. Groves and W. Thorp, *Chemical Technology*, vol. ii. "Lighting" (London, 1895); L. L. Lamborn, *Soaps, Candles and Glycerine* (New York, 1906); J. Lewkowitsch, *Oils, Fats, and Waxes* (London, 1909).

CANDLEMAS (Lat. *festum candelarum sive luminum*), the name for the ancient church festival, celebrated annually on the 2nd of February, in commemoration of the presentation of Christ in the Temple. In the Greek Church it is known as Ὑπαπάντη τοῦ Κυρίου ("the meeting of the Lord," *i.e.* with Simeon and Anna), in the West as the Purification of the Blessed Virgin. It is the most ancient of all the festivals in honour of the Virgin Mary. A description is given of its celebration at Jerusalem in the *Peregrinatio* of Etheria (Silvia), in the second half of the 4th century. It was then kept on the 14th of February, forty days after Epiphany, the celebration of the Nativity (Christmas) not having been as yet introduced; the Armenians still keep it on this day, as "the Coming of the Son of God into the Temple." The celebration gradually spread to other parts of the church, being moved to the 2nd of February, forty days after the newly established feast of Christmas. In 542 it was established throughout the entire East Roman empire by Justinian. Its introduction in the West is somewhat obscure. The 8th-century *Gelasian Sacramentary*, which embodies a much older tradition, mentions it under the title of Purification of the Blessed Virgin Mary, which has led some to suppose that it was ordained by Pope Gelasius I. in 492[1] as a counter-attraction to the heathen Lupercalia; but for this there is no warrant. The procession on this day was introduced by Pope Sergius I. (687–701). The custom of blessing the candles for the whole year on this day, whence the name Candlemas is derived, did not come into common use until the 11th century.

In the *Quadragesimae de Epiphania* as described by Etheria there is, as Monsignor Duchesne points out (*Christian Worship*, p. 272), no indication of a special association with the Blessed Virgin; and the distinction between the festival as celebrated in the East and West is that in the former it is a festival of Christ, in the latter a festival pre-eminently of the Virgin Mother.

See L. Duchesne, *Christian Worship* (Eng. trans., London, 1904); art. *s.v.* by F. G. Holweck in the *Catholic Encyclopaedia*.

CANDLESTICK, the receptacle for holding a candle, nowadays made in various art-forms. The word was formerly used for any form of support on which lights, whether candles or lamps, were fixed; thus a candelabrum (*q.v.*) is sometimes spoken of from tradition as a candlestick, *e.g.* as when Moses was commanded to make a candlestick for the tabernacle, of hammered gold, a talent in weight, and consisting of a base with a shaft rising out of it and six arms, and with seven lamps supported on the summits of the six arms and central shaft. When Solomon built the temple, he placed in it ten golden candlesticks, five on the north and five on the south side of the Holy Place; but after the Babylonish captivity the golden candlestick was again placed in the temple, as it had been before in the tabernacle by Moses. On the destruction of Jerusalem by Titus, it was carried with other spoils to Rome. Representations of the seven-branched candlestick, as it is called, occur on the arch of Titus at Rome, and on antiquities found in the Catacombs at Rome. The primitive form of candlestick was a torch made of slips of bark, vine tendrils or wood dipped in wax or tallow, tied together and held in the hand by the lower end, such as are frequently figured on ancient painted vases. The next step was to attach to them a cup (*discus*) to catch the dripping wax or tallow.

A candlestick may be either "flat" or "tall." The former has a short stem, rising from a dish, and is usually furnished with an extinguisher fitting into a socket; the latter has a pillar which may be only a few inches in height or may rise to several feet, and rarely has an extinguisher. The flat variety is sometimes called a "bedroom candlestick." The beginnings of this interesting and often beautiful appliance are not exactly known, but it dates certainly as far back as the 14th century and is probably older. It is most usually of metal, earthenware or china, but originally it was made of some hard wood and had no socketed pillar, the candle fitting upon a metal spike, in the fashion still familiar in the case of many church candlesticks. It has been constantly influenced by mobiliary and architectural fashions, and has varied, as it still varies, from the severest simplicity of form and material to the most elaborate artistic treatment and the costliest materials—gold and silver, crystal, marble and enamel. Previous to the 17th century, iron, latten, bronze and copper were chiefly used, but thenceforward the

[1] So Baronius, *Ann. ad ann.* 544.

most elegant examples were chiefly of silver, though in more modern periods Sheffield plate, silver plate and china became exceedingly popular. Sometimes the base and sconce are of one material and the pillar of another, as when the former are of silver and the pillar of marble or china. The choice and combination of materials are, indeed, infinite. The golden age of the candlestick lasted, roughly speaking, from the third quarter of the 17th century to the end of the 18th. The later Jacobean, Queen Anne and early Georgian forms were often extremely elegant, with broad bases, round, oval or square and swelling stems. Fine examples of these periods, especially when of silver, are much sought after and command constantly augmenting prices. As with most domestic appliances the history of the candlestick is an unceasing tendency towards simplicity, the most elaborate and fantastic forms, animals and reptiles, the monstrous creatures of mythology, lions and men-at-arms, angels and cupids, having gradually given place to architectural motives such as the baluster stem and to the classic grace of the Adam style. The candlestick in its modern form is, indeed, artistically among the least unsatisfactory of household plenishings.

CANDLISH, ROBERT SMITH (1806–1873), Scottish divine, was born at Edinburgh on the 23rd of March 1806, and spent his early years in Glasgow, where he graduated in 1823. During the years 1823–1826 he went through the prescribed course at the divinity hall, then presided over by Dr Stevenson MacGill, and on leaving, accompanied a pupil as private tutor to Eton, where he stayed two years. In 1829 he entered upon his life's work, having been licensed to preach during the summer vacation of the previous year. After short assistant pastorates at St Andrew's, Glasgow, and Bonhill, Dumbartonshire, he obtained a settled charge as minister of the important parish of St George's, Edinburgh. Here he at once took the place he so long held as one of the ablest preachers in Scotland. Destitute of natural oratorical gifts and somewhat ungainly in his manner, he attracted and even riveted the attention of his audience by a rare combination of intellectual keenness, emotional fervour, spiritual insight and power of dramatic representation of character and life. His theology was that of the Scottish Calvinistic school, but his sympathetic character combined with strong conviction gathered round him one of the largest and most intelligent congregations in the city.

From the very commencement of his ministry in Edinburgh, Candlish took the deepest interest in ecclesiastical questions, and he soon became involved as one of the chief actors in the struggle which was then agitating the Scottish church. His first Assembly speech, delivered in 1839, placed him at once among the leaders of the party that afterwards formed the Free Church, and his influence in bringing about the Disruption of 1843 was inferior only to that of Thomas Chalmers. Great as was his popularity as a preacher, it was in the arena of ecclesiastical debate that his ability chiefly showed itself, and probably no other single man had from first to last so large a share in shaping the constitution and guiding the policy of the Free Church. He took his stand on two principles: the right of the people to choose their ministers, and the independence of the church in things spiritual. On his advice Hugh Miller was appointed editor of the *Witness*, the powerful Free Church organ. He was actively engaged at one time or other in nearly all the various schemes of the church, but special mention should be made of his services on the education committee, of which he was convener from 1846 to 1863, and in the unsuccessful negotiations for union among the non-established Presbyterian denominations of Scotland, which were carried on during the years 1863–1873. In the Assembly of 1861 he filled the moderator's chair.

As a theologian the position of Candlish was perhaps inferior to that which he held as a preacher and ecclesiastic, but it was not inconsiderable. So early as 1841 his reputation in this department was sufficient to secure for him the government nomination to the newly founded chair of Biblical criticism in the university of Edinburgh. Owing to the opposition of Lord Aberdeen, however, the presentation was cancelled. In 1847 Candlish, who had received the degree of D.D. from Princeton, New Jersey, in 1841, was chosen by the Assembly of the Free Church to succeed Chalmers in the chair of divinity in the New College, Edinburgh. After partially fulfilling the duties of the office for one session, he was led to resume the charge of St George's, the clergyman who had been chosen by the congregation as his successor having died before entering on his work. In 1862 he succeeded William Cunningham as principal of New College with the understanding that he should still retain his position as minister of St George's. He died on the 19th of October 1873.

Though his greatest power was not displayed through the press, Candlish made a number of contributions to theological literature. In 1842 he published the first volume of his *Contributions towards the Exposition of the Book of Genesis*, a work which was completed in three volumes several years later. In 1854 he delivered, in Exeter Hall, London, a lecture on the *Theological Essays* of the Rev. F. D. Maurice, which he afterwards published, along with a fuller examination of the doctrine of the essays. In this he defended the forensic aspect of the gospel. A treatise entitled *The Atonement; its Reality, Completeness and Extent* (1861) was based upon a smaller work which first appeared in 1845. In 1864 he delivered the first series of Cunningham lectures, taking for his subject *The Fatherhood of God*. Published immediately afterwards, the lectures excited considerable discussion on account of the peculiar views they represented. Further illustrations of these views were given in two works published about the same time as the lectures, one a treatise *On the Sonship and Brotherhood of Believers*, and the other an exposition of the first epistle of St John.

See William Wilson, *Memorials of R. S. Candlish, D.D.*, with a chapter on his position as a theologian by Robert Rainy.

CANDOLLE, AUGUSTIN PYRAME DE (1778–1841), Swiss botanist, was born at Geneva on the 4th of February 1778. He was descended from one of the ancient families of Provence, whence his ancestors had been expatriated for their religion in the middle of the 16th century. Though a weakly boy he showed great aptitude for study, and distinguished himself at school by his rapid attainments in classical and general literature, and specially by a faculty for writing elegant verse. He began his scientific studies at the college of Geneva, where the teaching of J. P. E. Vaucher first inspired him with the determination to make botanical science the chief pursuit of his life. In 1796 he removed to Paris. His first productions, *Historia Plantarum Succulentarum* (4 vols., 1799) and *Astragalogia* (1802), introduced him to the notice of Cuvier, for whom he acted as deputy at the Collège de France in 1802, and to J. B. Lamarck, who afterwards confided to him the publication of the third edition of the *Flore française* (1803–1815). The *Principes élémentaires de botanique*, printed as the introduction to this work, contained the first exposition of his principle of classification according to the natural as opposed to the Linnean or artificial method. In 1804 he was granted the degree of doctor of medicine by the medical faculty of Paris, and published his *Essai sur les propriétés médicales des plantes comparées avec leurs formes extérieures et leur classification naturelle*, and soon after, in 1806, his *Synopsis plantarum in flora Gallica descriptarum*. At the desire of the French government he spent the summers of the following six years in making a botanical and agricultural survey of the whole kingdom, the results of which were published in 1813. In 1807 he was appointed professor of botany in the medical faculty of the university of Montpellier, and in 1810 he was transferred to the newly founded chair of botany of the faculty of sciences in the same university. From Montpellier, where he published his *Théorie élémentaire de la botanique* (1813), he removed to Geneva in 1816, and in the following year was invited by the now independent republic to fill the newly created chair of natural history. The rest of his life was spent in an attempt to elaborate and complete his "natural" system of botanical classification. The results of his labours in this department are to be found in his *Regni vegetabilis systema*

naturale, of which two volumes only were completed (1821) when he found that it would be impossible for him to execute the whole work on so extensive a scale. Accordingly in 1824 he began a less extensive work of the same kind—his *Prodromus systematis regni vegetabilis*—but even of this he was able to finish only seven volumes, or two-thirds of the whole. He had been for several years in delicate health when he died on the 9th of September 1841 at Geneva.

His son, ALPHONSE LOUIS PIERRE PYRAME DE CANDOLLE, born at Paris on the 28th of October 1806, at first devoted himself to the study of law, but gradually drifted to botany and finally succeeded to his father's chair. He published a number of botanical works, including continuations of the *Prodromus* in collaboration with his son, Anne Casimir Pyrame de Candolle. He died at Geneva on the 4th of April 1893.

CANDON, a town of South Ilocos province, Luzon, Philippine Islands, on the W. coast, about 200 m. N. by W. of Manila. Pop. (1903) 18,828. Its climate is hot, though healthy. Candon is surrounded by an extensive and fertile plain, and is defended by a small fort. Its inhabitants are noted for their honesty and industry, as well as for their regard for law and order. They carry on an extensive traffic with the wild tribes of the neighbouring mountains. Indigo is grown in considerable quantity, as are rice and tobacco. The weaving of blankets, handkerchiefs, and cotton and silk cloths constitutes quite an important industry. The language is Ilocano.

CANDYTUFT (*Iberis amara*, so called from Iberia, *i.e.* Spain, where many species of the genus are native, and *amara*, bitter, *i.e.* in taste), a small annual herb (natural order Cruciferae) with white or purplish flowers, the outer petals of which are longer than the rest. It is a native of western Europe and found wild on dry soil in cultivated ground in the centre and east of England. This and several other species of the genus are known as garden plants, and are of easy culture in ordinary garden soil if well exposed to sun and air. The common candytuft of gardens is *I. umbellata*, a hardy annual, native of southern Europe, and known in a number of varieties differing in colour of flowers. *I. coronaria* (rocket candytuft) has long dense heads of white flowers and is also an annual. Some species have a shrubby growth and are evergreen perennials; the best-known is *I. sempervirens*, a native of southern Europe, a much-branched plant about a foot high with long racemes of white flowers. *I. gibraltarica* is a showy, handsome half hardy evergreen.

CANE, a name applied to many plants which have long, slender, reed-like stalks or stems, as, for example, the sugar-cane, the bamboo-cane or the reed-cane. From the use as walking-sticks to which many of these plants have been applied, the name "cane" is improperly given to sticks, irrespective of the source from which they are derived. Properly it should be restricted to a peculiar class of palms, known as rattans, included under the two closely allied genera *Calamus* and *Daemonorops*, of which there are a large number of species. The plants are found widely extended throughout the islands of the Indian Archipelago, the Malay Peninsula, China, India and Ceylon; and also in Australia and Africa. They were described by Georg Eberhard Rumpf or Rumphius (1627–1702), governor of Amboyna, and author of the *Herbarium Amboynense* (6 vols. folio, Amsterdam, 1741–1755), under the name of Palmijunci, as inhabitants of dense forests into which the rays of the sun scarce can penetrate, where they form spiny bushes, obstructing the passage through the jungle. The slender stems rarely exceed an inch in diameter and are generally much smaller. They creep or trail to an enormous length, often reaching 500 or 600 ft., and support themselves on trees or bushes by recurved spines borne on the stalk or back of the midrib of the leaf, or by stiff hooks replacing the upper leaflets. In some cases the midrib is elongated beyond the leaflets to form a long whip-like structure, bearing recurved hooks at intervals. The natives, in preparing the canes for the market, strip off the leaves by pulling the cut plant through a notch made in a tree. The canes always present distinct rings at the junction of the sheathing leaves with the stem. They assume a yellow colour as they dry; and those imported from Calcutta have a glossy surface, while the produce of the Eastern Archipelago presents a dull exterior.

Canes, on account of their lightness, length, strength and flexibility, are used for a great variety of purposes by the inhabitants of the countries in which they grow. Split into thin strips they are twisted to form ropes and ships' cables, an application mentioned by Captain Dampier in his *Voyages*. A more important application, however, is for basket-work, and for making chairs, couches, pillows, &c., as the great strength and durability of thin and easily prepared strips admit of such articles being made at once airy, strong and flexible. Much of the beautiful and elaborate basket-work of the Chinese and Japanese is made from thin strips of cane, which are also used by the Chinese for larger works, such as door-mats, houses and sheds.

A very large trade with Western countries and the United States is carried on in canes and rattans, the principal centres of the trade being Batavia, Sarawak, Singapore, Penang and Calcutta. In addition to the varieties used for walking-sticks, whip and umbrella handles, &c., the common rattans are in extensive demand for basket-making, the seats and backs of chairs, the ribs of cheap umbrellas, saddles and other harness-work; and generally for purposes where their strength and flexibility make them efficient substitutes for whalebone. The walking-stick "canes" of commerce include a great many varieties, some of which, however, are not the produce of trailing palms. The well-known Malacca canes are obtained from *Calamus Scipionum*, the stems of which are much stouter than is the case with the average species of *Calamus*.

CANEA, or KHANIA, the principal seaport and since 1841 the capital of Crete, finely situated on the northern coast of the island, about 25 m. from its western extremity, on the isthmus of the Akrotiri peninsula, which lies between the Bay of Canea and the Bay of Suda (latitude 35° 31′ N., longitude 24° 1′ E.). Surrounded by a massive Venetian wall, it forms a closely built, irregular and overcrowded town, though of late years a few of its streets have been widened. The ordinary houses are of wood; but the more important buildings are of more solid materials. The Turks have a number of mosques; there are Greek churches and a Jewish synagogue; an old Venetian structure serves as a military hospital; and the prison is of substantial construction. The town is now the principal seat of government; the seat of a Greek bishop, who is suffragan to the metropolitan at Candia, and the official residence of the European consuls. The harbour, formed by an ancient transverse mole nearly 1200 ft. long, and protected by a lighthouse and a fort, would admit vessels of considerable tonnage; but it has been allowed to silt up until it shoals off from 24 ft. to 10 or even 8, so that large vessels have to anchor about 4 or 5 m. out. The principal articles of trade are oil and soap, and there is a pretty extensive manufacture of leather. The fosse is laid out in vegetable gardens; public gardens have been constructed outside the walls; and artesian wells have been bored by the government. To the east of the town a large Arab village had grown up, inhabited for the most part by natives of Egypt and Cyrenaica, who acted as boatmen, porters and servants, but since the fall of the Turkish government most of these have quitted the island; while about a mile off on the rising ground is the village of Khalepa, where the consuls and merchants reside. The population of the town is estimated at 20,000. Canea probably occupies the site of the ancient Cydonia, a city of very early foundation and no small importance. During the Venetian rule it was one of the strongest cities in the island, but it fell into the hands of the Turks in 1646, several years before the capture of Candia. In 1856 it suffered from an earthquake. The neighbouring plain is famous for its fruitfulness, and the quince is said to derive its name *Cydonia* from the town. (See also CRETE.)

CANE-FENCING (the Fr. *canne*), the art of defending oneself with a walking-stick. It may be considered to be single-stick fencing without a guard for the hand, with the important difference that in cane-fencing the thrust is as important as

the cut, and thus *canne* approaches nearer to sabre-play. The cuts are practically identical with those of the single-stick (*q.v.*), but they are generally given after one or more rapid preliminary flourishes (*moulinets*, circles) which the lightness of the stick facilitates, and which serve to perplex and disconcert an assailant. The thrusts are similar to those in foil-play, but are often carried out with both hands grasping the stick, giving greater force and enabling it to be used at very close quarters. The canes used in French fencing schools are made of several kinds of tough wood and are about 3 ft. long, tapering towards the point. As very severe blows are exchanged, masks, gloves, padded vests and shin-guards, similar to those used in football, are worn.

See Georges d'Amoric, *French Method of the Noble Art of Self-Defence* (London, 1898); J. Charlemont, *L'Art de la Boxe française et de la Canne* (Paris, 1899).

CANEPHORAE (Gr. *κάνεον*, a basket, and *φέρειν*, to carry), "basket-bearers," the title given of old to Athenian maidens of noble family, annually chosen to carry on their heads baskets with sacrificial implements and apparatus at the Panathenaic and other festivals. The term (also in the form *Canephori*) is applied in architecture to figures of either sex carrying on their heads baskets, containing edibles or material for sacrifices. The term might well be applied to the Caryatide figures of the Erechtheum. Those represented in the Panathenaic frieze of the Parthenon carry vases on their shoulders.

CANES VENATICI ("The HOUNDS," or "the GREYHOUNDS"), in astronomy, a constellation of the northern hemisphere named by Hevelius in 1690, who compiled it from the stars between the older asterisms Ursa Major, Boötes and Coma Berenices. Interesting objects in this portion of the heavens are: the famous spiral nebula first described by Lord Rosse; *α-Canum Venaticorum*, a double star, of magnitudes 3 and 6; this star was named *Cor Caroli*, or The Heart of Charles II., by Edmund Halley, on the suggestion of Sir Charles Scarborough (1616–1694), the court physician; a cluster of stars of the 11th magnitude and fainter, extremely rich in variables, of the 900 stars examined no less than 132 being regularly variable.

CANGA-ARGUELLES, JOSÉ (1770–1843), Spanish statesman, was born in 1770. He took an active part in the Spanish resistance to Napoleon in a civil capacity and was an energetic member of the cortes of 1812. On the return of the Bourbon line in 1814, Canga-Arguelles was sent into exile in the province of Valencia. On the restoration in 1820 of the constitution of 1812, he was appointed minister of finance. He continued at this post till the spring of 1821, distinguishing himself by the zeal and ability with which he sought to reform the finances of Spain. It was high time; for the annual deficit was greater than the entire revenue itself, and landed and other property was, to an unheard-of extent, monopolized by the priests. The measures he proposed had been only partially enforced, when the action of the king with regard to the ministry, of which he was a member, obliged him to resign. Thereafter, as a member of the Moderate Liberal party, Canga-Arguelles advocated constitutional government and financial reform, till the overthrow of the constitution in 1823, when he fled to England. He did not return to Spain till 1829, and did not again appear in public life, being appointed keeper of the archives at Simancas. He died in 1843. Canga-Arguelles is the author of three works: *Elementos de la Ciencia de Hacienda* (Elements of the Science of Finance), London, 1825; *Diccionario de Hacienda* (Dictionary of Finance), London, 1827; and *Observaciones sobre la guerra de la Peninsula* (Observations on the Peninsular War), in which he endeavoured to show that his countrymen had taken a far more effective part in the national struggle against the French than English historians were willing to admit.

CANGAS DE ONÍS, or CANGAS, a town of northern Spain, in the province of Oviedo; situated on the right bank of the river Sella, in a fertile, well-watered, partly wooded, undulating region. Pop. (1900) 8537. The trade of Cangas de Onís is chiefly in live-stock and coal from the neighbouring mines. A Latin inscription on the town-hall records the fact that this place was the residence of the first Spanish kings after the spread of the Moors over the Peninsula. Here early in the 8th century lived King Pelayo, who started the Christian reconquest of Spain. His historic cave of Covadonga is only 8 m. distant (see ASTURIAS). The church of the Assumption, rebuilt in the 19th century, is on the model and site of an older church of the middle ages. Near Cangas are ruins and bridges of the Roman period.

CANGAS DE TINÉO, a town of northern Spain, in the province of Oviedo, and on the river Narcea. Pop. (1900) 22,742. There is no railway and the river is not navigable, but a good road runs through Tinéo, Grado and the adjacent coal-fields, to the ports of Cudillero and Avilés. The inhabitants have thus an easily accessible market for the farm produce of the fertile hills round Cangas de Tinéo, and for the cloth, leather, pottery, &c., manufactured in the town.

CANGUE, or CANG, the European name for the Chinese *Kia* or *Kea*, a portable pillory, carried by offenders convicted of petty offences. It consists of a square wooden collar weighing from 20 to 60 lb, through a hole in which the victim's head is thrust. It fits tight to the neck and must be worn day and night for the period ordered. The offender is left exposed in the street. Over the parts by which it fastens slips of paper bearing the mandarin's seal are pasted so that no one can liberate the condemned. The length of the punishment is usually from a fortnight to a month. As the cangue is 3 to 4 ft. across the convict is unable to feed himself or to lie down, and thus, unless fed by friends or passers-by, often starves to death. As in the English pillory, the name of the man and the nature of his offence are inscribed on the cangue.

CANINA, LUIGI (1795–1856), Italian archaeologist and architect, was born at Casale in Piedmont. He became professor of architecture at Turin, and his most important works were the excavation of Tusculum in 1829 and of the Appian Way in 1848, the results of which he embodied in a number of works published in a costly form by his patroness, the queen of Sardinia.

CANINI, GIOVANNI AGNOLO (1617–1666), Italian designer and engraver, was born at Rome. He was a pupil of Domenichino and afterwards of Antonio Barbalonga. He painted some altar-pieces at Rome, including two admired pictures for the church of San Martino a' Monti, representing the martyrdom of St Stephen and of St Bartholomew. Having accompanied Cardinal Chigi to France, he was encouraged by the minister Colbert to carry into execution his project of designing from medals, antique gems and similar sources a series of portraits of the most illustrious characters of antiquity, accompanied with memoirs; but shortly after the commencement of the undertaking Canini died at Rome. The work, however, was prosecuted by his brother Marcantonio, who, with the assistance of Picard and Valet, completed and published it in 1699, under the title of *Iconografia di Gio. Ag. Canini.* It contains 150 engravings. A reprint in Italian and French appeared at Amsterdam in 1731.

CANIS MAJOR ("Great Dog"), in astronomy, a constellation placed south of the Zodiac, just below and behind the heels of Orion. *Canis minor*, the "little dog," is another constellation, also following Orion and separated from Canis major by the Milky Way. Both these constellations, or at least their principal stars, Sirius in the Great Dog and Procyon in the Little Dog, were named in very remote times, being referred to as the "dogs of Orion" or in equivalent terms. Sirius is the brightest star in the heavens; and the name is connected with the adjectives *σειρός* and *σείριος*, scorching. It may possibly be related to the Arabic *Sirāj*, thus meaning the "glittering one." Hommel has shown that Sirius and Procyon were "the two *Si'ray*" or glitterers. It is doubtful whether Sirius is referred to in the Old Testament. By some it has been identified with the Hebrew *mazzaroth*, the *Lucifer* of the Vulgate; by others with *mazzaloth*, the *duodecim signa* of the Vulgate; while Professor M. A. Stern identifies it with the Hebrew *kimah*, which is rendered variously

in the Vulgate as Arcturus, Hyades and Pleiades.[1] The inhabitants of the Euphrates valley included both constellations in their stellar system; but considerable difficulty is encountered in the allocation of the Babylonian names to the dominant stars. The name *kak-ban*, which occurs on many tablets, has been determined by Epping and Strassmaier, and also by Jensen and Hommel, as equivalent to Sirius; etymologically this word means "dog-star" (or, according to R. Brown, *Primitive Constellations*, "bow-star"). On the other hand, *Kaksidi* or *Kak-si-sa*, meaning the "leader," has been identified by Sayce and others with Sirius, while Hommel regards it as Procyon. The question is mainly philological, and the arguments seem inconclusive. We may notice, however, that connexions were made between Kaksidi and the weather, which have strong affinities with the ideas expressed at a later date by the Greeks. For example, its appearance in the morning with the sun heralded the "north winds," the *βορέαι ἐτησίαι* or *aquilones etesiae*, the strong and dangerous north-westerly winds of Greece which blow for forty days from the rising of the star; again, when Sirius appeared misty the "locusts devour." Sirius also appears in the cosmogony of Zoroaster, for Plutarch records that Ormuzd appointed this star to be a guard and overseer in the heavens, and in the *Avesta* we find that Tistrya (Sirius) is "the bright and happy star, that gives happy dwelling." With the Egyptians Sirius assumed great importance. Appearing with the sun when the Nile was rising, Sirius was regarded as a herald of the waters which would overspread the land, renewing its fertility and promising good harvests for the coming season. Hephaestion records that from its aspect the rise of the water was foretold, and the Roman historian Florus adds that the weather was predicted also. Its rising marked the commencement of their new year, the *annus canarius* and *annus cynicus* of the Romans. It was the star of Sept or Sothis, and, according to one myth, was identified with the goddess Hathor—the Aphrodite of the Greeks. It was the "second sun" of the heavens, and according to Maspero (*Dawn of Civilization*, 1894) "Sahū and Sopdīt, Orion and Sirius, were the rulers of this mysterious world of night and stars."

The Greeks, borrowing most of their astronomical knowledge from the Babylonians, held similar myths and ideas as to the constellations and stars. Sirius was named *Σείριος*, *Κύων* (the dog) and *τὸ ἄστρον*, the star; and its heliacal rising was associated with the coming of the dry, hot and sultry season. Hesiod tells us that "Sirius parches head and knees"; Homer speaks similarly, calling it *κακὸν σῆμα*, the evil star, and the star of late summer (*ὀπώρα*), the rainy and stormy season. Procyon (*Προκύων*) was so named because it rose before *Κύων*. The Euphratean myth of the dogs has its parallel in Greece, Sirius being the hound of the hunter Orion, and as recorded by Aratus always chasing the Hare; Pindar refers to the chase of Pleione, the mother of the Pleiads, by Orion and his dogs. Similarly Procyon became Maera, the dog of Icarius, when Boötes became Icarius, and Virgo his daughter Erigone.

The Romans adopted the Greek ideas. They named the constellation *Canis*, and Sirius was known as *Canis* also, and as *Canicula*. Procyon became *Antecanem* and *Antecanis*, but these names did not come into general use. They named the hottest part of the year associated with the heliacal rising of Sirius the *Dies caniculares*, a phrase which has survived in the modern expression "dog-days"; and the pestilences which then prevailed occasioned the offering of sacrifices to placate this inimical star. Festus narrates, in this connexion, the sacrificing of red dogs at the feast of Floralia, and Ovid of a dog on the Robigalia. The experience of the ancient Greeks that Sirius rose with the sun as the latter entered Leo, *i.e.* the hottest part of the year, was accepted by the Romans with an entire disregard of the intervening time and a different latitude. To quote Sir Edward Sherburne (*Sphere of Manilius*, 1675), "The greater part of the Antients assign the Dog Star rising to the time of the Sun's first entering into Leo, or, as Pliny writes, 23 days after the summer solstice, as Varro 29, as Columella 30.[2] . . . At this day with us, according to Vulgar computation, the rising and setting of the said Star is in a manner coincident with the Feasts of St Margaret (which is about the 13th of our July) and St Lawrence (which falls on the 10th of our August)."

Sirius is the most conspicuous star in the sky; it sends to the earth eleven times as much light as Aldebaran, the unit standard adopted in the revised Harvard Photometry; numerically its magnitude is −1·6. At the present time its colour is white with a tinge of blue, but historical records show that this colour has not always prevailed. Aratus designated it *ποικίλος*, many coloured; the Alexandrian Ptolemy classified it with Aldebaran, Antares and Betelgeuse as *ὑπόκιρρος*, fiery red; Seneca describes it as "redder than Mars"; while, in the 10th century, the Arabian Biruni termed it "shining red." On the other hand Sufi, who also flourished in the 10th century, pointedly omits it from his list of coloured stars. The question has been thoroughly discussed by T. J. J. See, who shows that Sirius has shone white for the last 1000 to 1200 years.[3] The parallax has been determined by Sir David Gill and W. L. Elkin to be 0·37″; it is therefore distant from the earth over 5×10^{13} miles, and its light takes 8·6 years to traverse the intervening space. If the sun were at the same distance Sirius would outshine it 30 times, the sun appearing as a star of the second magnitude. It has a large proper motion, which shows recurrent undulations having a 50-year period. From this Bessel surmised the existence of a satellite or companion, for which C. A. F. Peters and A. Auwers computed the elements. T. H. Safford determined its position for September 1861; and on the 31st of January 1862, Alvan G. Clark, of Cambridgeport, Mass., telescopically observed it as a barely visible, dull yellow star of the 9th to 10th magnitude. The mean distance apart is about 20 astronomical units; the total mass of the pair is 3·7 times the mass of the sun, Sirius itself being twice as massive as its companion, and, marvellously enough, forty thousand times as bright. The spectrum of Sirius is characterized by prominent absorption lines due to hydrogen, the metallic lines being weak; other stars having the same spectra are said to be of the "Sirian type." Such stars are the most highly heated (see STAR).

Procyon, or α Canis minoris, is a star of the 2nd magnitude, one-fifth as bright as Sirius, or numerically 0·47 when compared with Aldebaran. It is more distant than Sirius, its parallax being 0·33″; and its light is about six times that of the sun. Its proper motion is large, 1·25″, and its velocity at right angles to the line of sight is about 11 m. per second. Its proper motion shows large irregularities, pointing to a relatively massive companion; this satellite was discovered on the 13th of November 1896 by J. M. Schaeberle, with the great Lick telescope, as a star of the 13th magnitude. Its mass is equal to about that of the sun, but its light is only one twenty-thousandth.

CANITZ, FRIEDRICH RUDOLF LUDWIG, FREIHERR VON (1654–1699), German poet and diplomatist, was born at Berlin on the 27th of November 1654. He attended the universities of Leiden and Leipzig, travelled in England, France, Italy and Holland, and on his return was appointed groom of the bedchamber (Kammerjunker) to the elector Frederick William of Brandenburg, whom he accompanied on his campaigns in Pomerania and Sweden. In 1680 he became councillor of legation, and he was employed on various embassies. In 1697 the elector Frederick III. made him a privy councillor, and the emperor Leopold I. created him a baron of the Empire. Having fallen ill on an embassy to the Hague, he obtained his discharge and died at Berlin in 1699. Canitz's poems (*Nebenstunden unterschiedener Gedichte*), which did not appear until after his death (1700), are for the most part dry and stilted imitations of French and Latin models, but they formed a healthy

[1] See G. Schiaparelli, *Astronomy in the Old Testament* (1905).

[2] For other values of the interval between the summer solstice and the rising of Sirius, see Smith's *Dict. of Greek and Roman Antiquities*.

[3] See Thomas Barker, *Phil. Trans.*, 1760, 51, p. 498, for quotations from classical authors; also T. J. J. See, *Astronomy and Astrophysics*, vol. xi. p. 269.

contrast to the coarseness and bombast of the later Silesian poets.

A complete edition of Canitz's poems was published by U. König in 1727; see also L. Fulda, *Die Gegner der zweiten schlesischen Schule*, ii. (1883).

CAÑIZARES, JOSÉ DE (1676–1750), Spanish dramatist, was born at Madrid on the 4th of July 1676, entered the army, and retired with the rank of captain in 1702 to act as censor of the Madrid theatres and steward to the duke of Osuna. In his fourteenth year Cañizares recast a play by Lope de Vega under the title of *Las Cuentas del Gran Capitán*, and he speedily became a fashionable playwright. His originality, however, is slight, and *El Dómine Lucas*, the only one of his pieces that is still read, is an adaptation from Lope de Vega. Cañizares produced a version of Racine's *Iphigénie* shortly before 1716, and is to some extent responsible for the destruction of the old Spanish drama. He died on the 4th of September 1750, at Madrid.

CANNAE (mod. *Canne*), an ancient village of Apulia, near the river Aufidus, situated on a hill on the right bank, 6 m. S.W. from its mouth. It is celebrated for the disastrous defeat which the Romans received there from Hannibal in 216 B.C. (see PUNIC WARS). There is a considerable controversy as to whether the battle took place on the right or the left bank of the river. In later times the place became a *municipium*, and unimportant Roman remains still exist upon the hill known as Monte di Canne. In the middle ages it became a bishopric, but was destroyed in 1276.

See O. Schwab, *Das Schlachtfeld von Canna* (Munich, 1898), and authorities under PUNIC WARS.

CANNANORE, or KANANORE, a town of British India, in the Malabar district of Madras, on the coast, 58 m. N. from Calicut and 470 m. by rail from Madras. Pop. (1901) 27,811. Cannanore belonged to the Kalahasti or Cherakal rajas till the invasion of Malabar by Hyder Ali. In 1498 it was visited by Vasco da Gama; in 1501 a Portuguese factory was planted here by Cabral; in 1502 da Gama made a treaty with the raja, and in 1505 a fort was built. In 1656 the Dutch effected a settlement and built the present fort, which they sold to Ali Raja in 1771. In 1783 Cannanore was captured by the British, and the reigning princess became tributary to the East India Company. Here is the residence of the Moplah chief, known as the Ali Raja, who owns most of the Laccadive Islands. Cannanore is the headquarters of a military division.

CANNES, a seaport of France, in the department of the Alpes Maritimes, on the Mediterranean, 19 m. S.W. of Nice and 120 m. E. of Marseilles by rail. Pop. (1906) 24,531. It enjoys a southern exposure on a seaward slope, and is defended from the northern winds by ranges of hills. Previous to 1831, when it first attracted the attention of Lord Brougham, it mainly consisted of the old quarter (named Sucquet), and had little to show except an ancient castle, and a church on the top of Mont Chevalier, dedicated in 1603 to Notre Dame du Mont Espérance; but since that period it has become a large and important town, and is now one of the most fashionable winter resorts in the south of France, much frequented by English visitors, the Americans preferring Nice. The neighbourhood is thickly studded with magnificent villas, which are solidly built of a stone so soft that it is sawn and not hewn. There is an excellent quay, and a beautiful promenade runs along the beach; and numerous sheltered roads stretch up the valleys amidst groves of olive trees. On the north the modern town climbs up to Le Cannet (2 m.), while on the east it practically extends along the coast to Golfe Jouan (3½ m.), where Napoleon landed on the 1st of March 1815, on his return from Elba. From Cannes a railway runs north in 12½ m. to Grasse. On the top of the hill behind the town are a Roman Catholic and a Protestant cemetery. In the most prominent part of the latter is the grave of Lord Brougham, distinguished by a massive stone cross standing on a double basement, with the simple inscription—"Henricus Brougham, Natus MDCCLXXVIII., Decessit MDCCCLXVIII."; and in the immediate vicinity lies James, fourth duke of Montrose, who died December 1874. The country around is very beautiful and highly fertile; orange and lemon trees are cultivated like peach trees in England, while olives, almonds, figs, peaches, grapes and other fruits are grown in abundance, and, along with the produce of the fisheries, form the chief exports of the town. Essences of various kinds are manufactured, and flowers are extensively cultivated for the perfumers. The climate of Cannes has been the subject of a considerable variety of opinion, —the preponderance being, however, in its favour. According to Dr de Valcourt, it is remarkable by reason of the elevation and regularity of the temperature during the height of the day, the clearness of the atmosphere and abundance of light, the rarity of rain and the absence of fogs.

Cannes is a place of great antiquity, but its earlier history is very obscure. It was twice destroyed by the Saracens in the 8th and the 10th centuries; but it was afterwards repeopled by a colony from Genoa. Opposite the town is the island of Ste Marguerite (one of the Lérins), in the citadel of which the Man with the Iron Mask was confined from 1686 to 1698, and which acquired notoriety as the prison whence Marshal Bazaine escaped in August 1874. On the other chief island (St Honorat) of the Lérins is the famous monastery (5th century to 1788), in connexion with which grew up the school of Lérins, which had a wide influence upon piety and literature in the 5th and 6th centuries.

See L. Alliez, *Histoire du monastère de Lérins* (2 vols., Paris, 1862); and *Les Îles de Lérins, Cannes, et les rivages environnants* (Paris, 1860); *Cartulaire du monastère de Lérins* (2 vols., Paris, 1883 and 1905); de Valcourt, *Cannes and its Climate* (London, 1873); Joanne, special *Guide to Cannes*; J. R. Green, essay on Cannes and St Honorat, in the first series of his *Stray Studies* (1st ed., 1876); A. Cooper-Marsdin, *The School of Lérins* (Rochester, 1905). (W. A. B. C.)

CANNIBALISM, the eating of human flesh by men (from a Latinized form of Carib, the name of a tribe of South America, formerly found also in the West Indies), also called "anthropophagy" (Gr. ἄνθρωπος, man, and φαγεῖν, to eat). Evidence has been adduced from some of the palaeolithic cave-dwellings in France to show that the inhabitants practised cannibalism, at least occasionally. From Herodotus, Strabo and others we hear of peoples like the Scythian Massagetae, a nomad race north-east of the Caspian Sea, who killed old people and ate them. In the middle ages reports, some of them probably untrustworthy, by Marco Polo and others, attributed cannibalism to the wild tribes of China, the Tibetans, &c. In our own days cannibalism prevails, or prevailed until recently, over a great part of West and Central Africa, New Guinea, Melanesia (especially Fiji) and Australia. New Zealand and the Polynesian Islands were great centres of the practice. It is extensively practised by the Battas of Sumatra and in other East Indian islands and in South America; in earlier days it was a common feature of Indian wars in North America. Sporadic cannibalism occurs among more civilized peoples as a result of necessity or as a manifestation of disease (see LYCANTHROPY).

Classification.—Cannibalistic practices may be classified from two points of view: (1) the motives of the act; (2) the ceremonial regulations. A third division of subordinate importance is also possible, if we consider whether the victims are actually killed for food or whether only such are eaten as have met their death in battle or other ways.

1. From a psychological point of view the term cannibalism groups together a number of customs, whose only bond of union is that they all involve eating of human flesh. (*a*) Food cannibalism, where the object is the satisfaction of hunger, may occur sporadically as a result of real necessity or may be kept up for the simple gratification of a taste for human flesh in the absence of any lack of food in general or even of animal food. (i.) Cannibalism from necessity is found not only among the lower races, such as the Fuegians or Red Indian tribes, but also among civilized races, as the records of sieges and shipwrecks show. (ii.) Simple food cannibalism is common in Africa; the Niam-Niam and Monbuttu carry on wars for the sake of obtaining human flesh; in West Africa human flesh could formerly be seen exposed for sale in the market like any other article of commerce; and among some tribes it is the practice to sell the corpses of dead relatives for consumption as food. (*b*) In

curious contrast to this latter custom is the practice of devouring dead kinsfolk as the most respectful method of disposing of their remains. In a small number of cases this practice is combined with the custom of killing the old and sick, but in the great majority of peoples it is simply a form of burial; it seems to prevail in most parts of Australia, many parts of Melanesia, Africa and South America, and less frequently in other parts of the world. To this group belong the customs described by Herodotus; we may perhaps regard as a variant form the custom of using the skull of a dead man as a drinking-cup. This practice is widely found, and the statement of Herodotus that the skull was set in gold and preserved by the Issedones may point in this direction; from the account given of the Tibetans some seven hundred years ago by William of Ruysbruck (Rubruquis) it appears that they had given up cannibalism but still preserved the use of the skull as a drinking vessel. Another modification of an original ritual cannibalism is the custom of drinking the ashes of the dead, which is practised by some African and South American tribes. The custom of holding burial feasts has also been traced to the same origin. More incomprehensible to the European than any other form of cannibalism is the custom of partaking of the products of putrefaction as they run down from the body. The Australians smoke-dry the bodies of tribesmen; here, too, it is the custom to consume the portions of the body which are rendered liquid by the heat. (*c*) The ritual cannibalism just mentioned shades over into and may have been originally derived from magical cannibalism, of which three sub-species may be distinguished. (i.) Savages are accustomed, on the one hand, to abstain from certain foods in order that they may not acquire certain qualities; on the other hand other foods are eagerly desired in order that they may by partaking of the flesh also come to partake of the mental or bodily peculiarities of the man or animal from which the meat is derived; thus, after the birth of a child, especially the first-born, the parents are frequently forbidden the flesh of slow-moving animals, because that would prevent the child from learning to walk; conversely, eating the heart of a lion is recommended for a warrior to make him brave; from this point of view therefore we readily understand the motives which lead to the eating of those slain in battle, both friends and foes. (ii.) We may term protective an entirely different kind of magical cannibalism, which consists in the consumption of a small portion of the body of a murdered man, in order that his ghost may not trouble the murderer; according to Hans Egède, the Eskimo, when they kill a witch, eat a portion of her heart, that she may not haunt them. (iii.) The practice is also said to have the effect of causing the relatives of the murdered man to lose heart or to prevent them from exercising the right of revenge; in this case it may be brought into relation with the ceremony of the blood covenant in one of the forms of which the parties drink each other's blood; or, it may point to a reminiscence of a ritual eating of the dead kinsman. The late survival of this idea in Europe is attested by its mention by Dante in the *Purgatorio*. (*d*) The custom of eating food offered to the gods is widespread, and we may trace to this origin Mexican cannibalism, perhaps, too, that of Fiji. The Aztec worship of the god of war, Huitzilopochtli, led to the sacrifice of prisoners, and the custom of sacrifice to their frequent wars. The priest took out the heart, offered it to the sun, and then went through the ceremonies of feeding the idol with the heart and blood; finally the bodies of the victims were consumed by the worshippers. (*e*) We reach an entirely different set of motives in penal and revenge cannibalism. For the origin of these ideas we may perhaps look to that of protective magic, dealt with above; but it seems possible that there is also some idea of influencing the lot of the criminal in a future life; it may be noted that the whole of the body is seldom eaten in protective cannibalism; among the Battas, however, the criminal, and in parts of Africa the debtor, are entirely consumed. Other cases, especially where the victim is an enemy, may be due to mere fury and bravado. (*f*) In the west of North America a peculiar kind of cannibalism is found, which is confined to a certain body of magicians termed "Hametzen" and a necessary condition of admission to their order. Another kind of initiatory cannibalism prevailed in the south of Australia, where a magician had to eat a portion of a child's body before he was admitted. The meaning of these ceremonials is not clear.

2. Most kinds of cannibalism are hedged round with ceremonial regulations. Certain tribes, as we have seen above, go to war to provide human flesh; in other cases it is only the nearest relatives who may not partake of a body; in other cases again it is precisely the nearest relatives on whom the duty falls. A curious regulation in south-east New Guinea prescribes that the killer of the victim shall not partake in the feast; in some cases the whole of the clan to which belonged the man for whom revenge is taken abstains also; in other cases this clan, together with any others of the same intermarrying group, takes part in the feast to the exclusion of (*a*) the clan or group with which they intermarry and (*b*) all outside clans. Some peoples forbid women to eat human flesh; in others certain classes, as the Muri of the Bambala, a tribe in the Kassai, may be forbidden to eat it. In Mindanao the only person who might eat of a slain enemy was the priest who led the warriors, and he was not permitted to escape this duty. In Grand Bassam all who had taken part in a festival at the foundation of a new village were compelled to eat of the human victim. But the variations are too numerous for any general account to be given of ceremonial limitations. S. R. Steinmetz has proposed a division into endo- and exo-cannibalism; but these divisions are frequently of minor importance, and he has failed to define satisfactorily the limits of the groups on which his classification is based.

Origin.—It will probably never be possible to say how cannibalism originated; in fact the multiplicity of forms and the diversity of ceremonial rules—some prescribing that tribesmen shall on no account be eaten, others that the bodies of none but tribesmen shall provide the meal of human flesh—point to a multiple origin. It has been maintained that the various forms of endo-cannibalism (eating of tribesmen) spring from an original practice of food cannibalism which the human race has in common with many animals; but this leaves unexplained *inter alia* the limitation of the right of participation in the funeral meal to the relatives of the dead man; at the same time it is possible to argue that the magical ideas now associated with cannibalism are of later growth. Against the view put forward by Steinmetz it may be urged that we have other instances of magical foods, such as the eating of a lion's heart, which do not point to an original custom of eating the animal as food. We shall probably be justified in referring all forms of endo-cannibalism to a ritual origin; otherwise the limitation is inexplicable; on the other hand exo-cannibalism, in some of its forms, and much of the extension of endo-cannibalism must be referred to a desire for human flesh, grown into a passion.

Bibliography.—Steinmetz, in *Mitt. Anthrop. Ges. Wien*, N.F. xvi.; Andree, *Die Anthropophagie*; Bergmann, *Die Verbreitung der Anthropophagie*; Schneider, *Die Naturvölker*, i. 121-200; Schaffhausen, *Anthropologische Studien*, *Internat. Archiv* iii. 69-73; xii. 78; E. S. Hartland, *Legend of Perseus*, vol. ii.; *Dictionnaire des sci. méd., s.v.* "Anthropophagie"; Dr Seligmann in *Reports of the Cook-Daniels Expedition to New Guinea*. (N. W. T.)

CANNING, CHARLES JOHN, Earl (1812–1862), English statesman, governor-general of India during the Mutiny of 1857, was the youngest child of George Canning, and was born at Brompton, near London, on the 14th of December 1812. He was educated at Christ Church, Oxford, where he graduated B.A. in 1833, as first class in classics and second class in mathematics. In 1836 he entered parliament, being returned as member for the town of Warwick in the Conservative interest. He did not, however, sit long in the House of Commons; for, on the death of his mother in 1837, he succeeded to the peerage which had been conferred on her with remainder to her only surviving son, and as Viscount Canning took his seat in the House of Lords. His first official appointment was that of under-secretary of state for foreign affairs, in the administration formed by Sir Robert Peel in 1841—his chief being the earl of Aberdeen. This post he held till January 1846; and from January to July of that year, when the Peel administration was broken up,

Lord Canning filled the post of commissioner of woods and forests. He declined to accept office under the earl of Derby; but on the formation of the coalition ministry under the earl of Aberdeen in January 1853, he received the appointment of postmaster-general. In this office he showed not only a large capacity for hard work, but also general administrative ability and much zeal for the improvement of the service. He retained his post under Lord Palmerston's ministry until July 1855, when, in consequence of the death of Lord Dalhousie and a vacancy in the governor-generalship of India, he was selected by Lord Palmerston to succeed to that great position. This appointment appears to have been made rather on the ground of his father's great services than from any proof as yet given of special personal fitness on the part of Lord Canning. The new governor sailed from England in December 1855, and entered upon the duties of his office in India at the close of February 1856. His strong common sense and sound practical judgment led him to adopt a policy of conciliation towards the native princes, and to promote measures tending to the betterment of the condition of the people.

In the year following his accession to office the deep-seated discontent of the people broke out in the Indian Mutiny (*q.v.*). Fears were entertained, and even the friends of the viceroy to some extent shared them, that he was not equal to the crisis. But the fears proved groundless. He had a clear eye for the gravity of the situation, a calm judgment, and a prompt, swift hand to do what was really necessary. By the union of great moral qualities with high, though not the highest, intellectual faculties, he carried the Indian empire safely through the stress of the storm, and, what was perhaps a harder task still, he dealt wisely with the enormous difficulties arising at the close of such a war, established a more liberal policy and a sounder financial system, and left the people more contented than they were before. The name of "Clemency Canning," which was applied to him during the heated animosities of the moment, has since become a title of honour.

While rebellion was raging in Oudh he issued a proclamation declaring the lands of the province forfeited; and this step gave rise to much angry controversy. A "secret despatch," couched in arrogant and offensive terms, was addressed to the viceroy by Lord Ellenborough, then a member of the Derby administration, which would have justified the viceroy in immediately resigning. But from a strong sense of duty he continued at his post; and ere long the general condemnation of the despatch was so strong that the writer felt it necessary to retire from office. Lord Canning replied to the despatch, calmly and in a statesman-like manner explaining and vindicating his censured policy. In April 1859 he received the thanks of both Houses of Parliament for his great services during the mutiny. He was also made an extra civil grand cross of the order of the Bath, and in May of the same year he was raised to the dignity of an earl. By the strain of anxiety and hard work his health and strength were seriously impaired, while the death of his wife was also a great shock to him; in the hope that rest in his native land might restore him, he left India, reaching England in April 1862. But it was too late. He died in London on the 17th of June following. About a month before his death he was created K.G. As he died without issue the title became extinct.

See Sir H. S. Cunningham, *Earl Canning* ("Rulers of India" series), 1891; and A. J. C. Hare, *The Story of Two Noble Lives* (1893).

CANNING, GEORGE (1770–1827), British statesman, was born in London on the 11th of April 1770. The family was of English origin and had been settled at Bishop's Canynge in Wiltshire. In 1618 a George Canning, son of Richard Canning of Foxcote in Warwickshire, received a grant of the manor of Garvagh in Londonderry, Ireland, from King James I. The father of the statesman, also named George, was the eldest son of Mr Stratford Canning, of Garvagh. He quarrelled with and was disowned by his family. He came to London and led a struggling life, partly in trade and partly in literature. In May 1768 he married Mary Annie Costello, and he died on the 11th of April 1771, exactly one year after the birth of his son. Mrs Canning, who was left destitute, received no help from her husband's family, and went on the stage, where she was not successful. She married a dissolute and brutal actor of the name of Reddish. Her son owed his escape from the miseries of her household to another member of the company, Moody, who wrote to Mr Stratford Canning, a merchant in London and younger brother of the elder George Canning. Moody represented to Mr Stratford Canning that the boy, although full of promise, was on the high road to the gallows under the evil influence of Reddish. Mr Stratford Canning exerted himself on behalf of his nephew. An estate of the value of £200 a year was settled on the boy, and he was sent in succession to a private school at Hyde Abbey near Winchester, to Eton in 1781, and to Christchurch, Oxford, in 1787. After leaving Eton and before going to Oxford, he was entered as a student at Lincoln's Inn. At Eton he edited the school magazine, *The Microcosm*, and at Oxford he took the leading part in the formation of a debating society. He made many friends, and his reputation was already so high that Sheridan referred to him in the House of Commons as a rising hope of the Whigs. According to Lord Holland, he had been noted at Oxford as a furious Jacobin and hater of the aristocracy. In 1792 he came to London to read for the bar. He had taken his B.A. in 1791 and proceeded M.A. on the 6th of July 1794.

Soon after coming to London he became acquainted with Pitt in some uncertain way. The hatred of the aristocracy, for which Lord Holland says he was noted at Oxford, would naturally deter an ambitious young man with his way to make in the world, and with no fixed principles, from attaching his fortune to the Whigs. Canning had the glaring examples of Burke and Sheridan himself to show him that the great "revolution families"—Cavendishes, Russells, Bentincks—who controlled the Whig party, would never allow any man, however able, who did not belong to their connexion, to rise to the first rank. He therefore took his place among the followers of Pitt. It is, however, only fair to note that he always regarded Pitt with strong personal affection, and that he may very naturally have been influenced, as multitudes of other Englishmen were, by the rapid development of the French Revolution from a reforming to an aggressive and conquering force. In a letter to his friend Lord Boringdon (John Parker, afterwards earl of Morley), dated the 13th of December 1792, he explicitly states that this was the case. Enlightened self-interest was doubtless combined with honest conviction in ranking him among the followers of Pitt. By the help of the prime minister he entered parliament for the borough of Newtown in the Isle of Wight in July 1793. His maiden speech, on the subvention to the king of Sardinia, was made on the 31st of January 1794. It is by some said to have been a failure, but he satisfied himself, and he soon established his place as the most brilliant speaker on the ministerial side. It may be most conveniently noted here, that his political patrons exerted themselves to provide for his private as well as his official prosperity. Their favour helped him to make a lucrative marriage with Miss Joan Scott, who had a fortune of £100,000, on the 8th of July 1800. The marriage was a very happy one, though the bulk of the fortune was worn away in the expenses of public and social life. Mrs Canning, who survived her husband for ten years, was created a viscountess in 1828. Four children were born of the marriage—a son who died in his father's lifetime, and was lamented by him in very touching verse; another a captain in the navy, drowned at Madeira in 1827; a third son, Charles (*q.v.*), afterwards created Earl Canning; and a daughter Harriet, who married the marquess of Clanricarde in 1825.

The public life of Canning may be divided into four stages. From 1793 to 1801 he was the devoted follower of Pitt, was in minor though important office, and was the wittiest of the defenders of the ministry in parliament and in the press. From 1801 to 1809 he was partly in opposition, partly in office, fighting for the foremost place. Between 1809 and 1822 there was a period of comparative eclipse, during which he was indeed at times in office, but in lesser places than he would have been

prepared to accept between 1804 and 1809, and was regarded with general distrust. From 1822 till his death in 1827 he was the most powerful influence in English, and one of the most powerful in European, politics.

In the spring of 1796 he was appointed under-secretary for the foreign office, and in the election of that year he was returned for Wendover. He was also appointed receiver-general of the alienation office, a sinecure post which brought him £700 a year. His position as under-secretary brought him into close relations with Pitt and the foreign secretary, Lord Grenville (*q.v.*). During the negotiations for peace at Lille (1797), Canning was actively concerned in the devices which were employed by Pitt and Grenville to keep the real character of the discussion secret from other members of the cabinet. Canning had a taste for mystery and disguises, which he had shown at Oxford, and which did much to gain him his unfortunate reputation for trickery. From the 20th of November 1797, till the 9th of July 1798, he was one of the most active, and was certainly the most witty of the contributors to the *Anti-Jacobin*, a weekly paper started to ridicule the frothy philanthropic and eleutheromaniac rant of the French republicans, and to denounce their brutal rapacity and cruelty. But Canning's position as under-secretary was not wholly pleasant to him. He disliked his immediate chief Grenville, one of the Whigs who joined Pitt, and a man of thoroughly Whiggish aristocratic insolence. In 1799 he left the foreign office and was named one of the twelve commissioners for India, and in 1800 joint paymaster of the forces, a post which he held till the retirement of Pitt in 1801.

During these years of subordinate activity Canning had established his position as an orator and a wit. His oratory cannot be estimated with absolute confidence. Speeches were then badly reported. The text of his own, published by Therry (6 volumes, London, 1828), were revised by himself, and not for the better. Though his favourite author was Dryden, whose prose is uniformly manly and simple, and though he had a keen eye for faults of taste in the style of others, Canning had himself a leaning to preciosity and tinsel. His wit was, and remains, above all question. In public life it did him some harm in the opinion of serious people, who could not believe that so jocose a politician had solid capacity. It exasperated opponents, some of whom, notably Peter Pindar (see WOLCOT, JOHN), retaliated by brutal personalities. Canning was constantly reminded that his mother was a strolling actress, and was accused of foisting his pauper family on the public funds. The accusation was perfectly untrue, but this style of political controversy was common, and was adopted by Canning. He put himself on a level with Peter Pindar when he assailed Pitt's successor Addington (see SIDMOUTH, VISCOUNT) on the ground that he was the son of a doctor.

While out of office with Pitt, Canning proved a somewhat insubordinate follower. The snobbery and malignity of his attacks on Addington roused considerable feeling against him, and his attempts to act as a political go-between in ministerial arrangements were unfortunate. On the formation of Pitt's second ministry he took the post of treasurer of the navy on the 12th of May 1804. In office he continued to be insubordinate, and committed mistakes which got him into bad odour as untrustworthy. He endeavoured to persuade Lord Hawkesbury (see LIVERPOOL, EARLS OF) to join in a scheme for turning an old friend out of the India Office. Though his relations with Pitt began to be somewhat strained towards the end, he left office on the minister's death on the 21st of January 1806.

Canning, who delivered the eulogy of Pitt in the House of Commons on the 3rd of February, refused to take office in Fox's ministry of "all the talents." Attempts were made to secure him, and he was offered the leadership of the House of Commons, under the supervision of Fox, an absurd proposal which he had the good sense to decline. After the death of Fox, and the dismissal by the king of Lord Grenville's ministry, he joined the administration of the duke of Portland as secretary of state for foreign affairs. He held the office from the 25th of March 1807 till the 9th of September 1809. During these two years he had a large share in the vigorous policy which defeated the secret articles of the treaty of Tilsit by the seizure of the Danish fleet. As foreign secretary it fell to him to defend the ministry when it was attacked in parliament. He refused to tell how he became aware of the secret articles, and the mystery has never been fully solved. He threw himself eagerly into the prosecution of the war in Spain, yet his tenure of office ended in resignation in circumstances which left him under deep discredit. He became entangled in what can only be called two intrigues. In view of the failing health of the duke of Portland he told his colleague, Spencer Perceval, chancellor of the exchequer, that a new prime minister must be found, that he must be in the House of Commons, that the choice lay between them, adding that he might not be prepared to serve as subordinate. In April of 1809 he had told the duke of Portland that Lord Castlereagh, secretary for the colonies and war, was in his opinion unfit for his post, and must be removed to another office. The duke, a sickly and vacillating man, said nothing to Castlereagh, and took no steps, and Canning did not enlighten his colleague. When he found that no measures were being taken to make a change of office, Canning resigned on the 7th of September. Castlereagh then learnt the truth, and after resigning sent Canning a challenge on the 19th of September. In the duel on Putney Heath which followed Canning was wounded in the thigh. His apologists have endeavoured to defend him against the charge of double dealing, but there can be no question that Castlereagh had just ground to be angry. Public opinion was strong against Canning, and in the House of Commons he was looked upon with distrust. For twelve years he remained out of office or in inferior places. His ability made it impossible that he should be obscure. In 1810 he was a member of the Bullion Committee, and his speeches on the report showed his mastery of the subject. It was no doubt his reputation for economic knowledge which chiefly recommended him to the electors of Liverpool in 1812. He had been elected for Tralee in 1803, for Newtown (Hants) in 1806 and for Harwich in 1807. But in parliament he had lost all influence, and is described as wandering about neglected and avoided. In 1812 he committed the serious mistake of accepting a well-paid ornamental mission to Lisbon, which he was about to visit for the health of his eldest son. He remained abroad for eighteen months. In 1816 he submitted to enter office as president of the Board of Control in Lord Liverpool's cabinet, in which Castlereagh, to whom he had now become reconciled, was secretary of state for foreign affairs. In 1820 he resigned his post in order to avoid taking any part in the proceedings against Queen Caroline, the wife of George IV.

Canning's return to great office and influence dates from the suicide of Castlereagh in 1822. He had accepted the governor-generalship of India, which would have implied his retirement from public life at home, and refused to remain unless he was promised "the whole inheritance" of Castlereagh,—the foreign office and the leadership of the House of Commons. His terms were accepted, and he took office in September 1822. He held the office from that date till April 1827, when he became prime minister in succession to Lord Liverpool, whose health had broken down. Even before this he was the real director of the policy of the cabinet—as Castlereagh had been from 1812 to 1822. It may be noted that he resigned his seat for Liverpool in 1823, and was elected for Harwich, which he left for Newport in 1826. Few English public men have represented so many constituencies.

His fame as a statesman is based mainly on the foreign policy which he pursued in those years—the policy of non-intervention, and of the patronage, if not the actual support, of national and liberal movements in Europe (see the historical articles under EUROPE, SPAIN, PORTUGAL, TURKEY, GREECE). To this policy he may be said to have given his name, and he has enjoyed the reputation of having introduced a generous spirit into British politics, and of having undone the work of his predecessor at the foreign office, who was constantly abused as the friend of despotism and of despots. It may well be believed that Canning followed his natural inclinations, and it can be asserted without

the possibility of contradiction, if also without possibility of proof, that he had influenced the mind of Castlereagh. Yet the fact remains that when Canning came into office in September 1822, he found the instructions to be given to the representative of the British government at the congress of Verona already drawn up by his predecessor, who had meant to attend the congress himself (see LONDONDERRY, ROBERT STEWART, 2ND MARQUESS OF). These instructions were handed on without change by Canning to the duke of Wellington, who went as representative, and they contain all the principles which have been said to have been peculiarly Canning's. Indeed this policy was dictated by the character and position of the British government, and had been followed in the main since the conference of Aix-la-Chapelle in 1818. Canning was its orator and minister rather than its originator. Yet his eloquence has associated with his name the responsibility for British policy at the time. No speech of his is perhaps more famous than that in which he claimed the initiative in recognizing the independence of the revolted Spanish colonies in South America in 1823—"I resolved that, if France had Spain, it should not be Spain with the Indies. I called the New World into existence to redress the balance of the Old" (December 12, 1826).

When Lord Liverpool was struck down in a fit on the 17th of February 1827, Canning was marked out by position as his only possible successor. He was not indeed accepted by all the party which had followed Liverpool. The duke of Wellington, Sir Robert Peel and several other members of the ministry, moved perhaps by personal animosity, and certainly by dislike of his known and consistent advocacy of the claims of the Roman Catholics, refused to serve with him. Canning succeeded in constructing a ministry in April—but the hopes and the fears of friends and enemies proved to be equally unfounded. His health had already begun to give way, and broke down altogether under the strain of the effort required to form his ministry. He had caught cold in January at the funeral of the duke of York, and never recovered. He died on the 8th of August 1827, at Chiswick, in the house of the duke of Devonshire, where Fox had died, and in the same room.

See *Speeches*, with a memoir by R. Therry (London, 1826); A. G. Stapleton, *Political Life of Canning*, 1822–1827 (2nd ed., London, 1831); *Canning and His Times* (London, 1859); Lord Dalling and Bulwer, *Historical Characters* (London, 1868); F. H. Hill, *George Canning* (London, 1887); *Some Political Correspondence of George Canning*, ed. E. J. Stapleton (2 vols., 1897); J. A. R. Marriott, *George Canning and His Times, a Political Study* (London, 1903); W. Alison Phillips, *George Canning* (London, 1903), with reproductions of contemporary portraits and caricatures; H. W. V. Temperley, *George Canning* (London, 1905).

CANNIZZARO, STANISLAO (1826–1910), Italian chemist, was born at Palermo on the 13th of July 1826. In 1841 he entered the university of his native place with the intention of making medicine his profession, but he soon turned to the study of chemistry, and in 1845 and 1846 acted as assistant to Rafaelle Piria (1815–1865), known for his work on salicin, who was then professor of chemistry at Pisa and subsequently occupied the same position at Turin. During the Sicilian revolution he served as an artillery officer at Messina and was also chosen deputy for Francavilla in the Sicilian parliament; and after the fall of Messina in September 1848 he was stationed at Taormina. On the collapse of the insurgents he escaped to Marseilles, in May 1849, and after visiting various French towns reached Paris in October. There he gained an introduction to M. E. Chevreul's laboratory, and in conjunction with F. S. Cloëz (1817–1883) made his first contribution to chemical research in 1851, when they prepared cyanamide by the action of ammonia on cyanogen chloride in ethereal solution. In the same year he was appointed professor of physical chemistry at the National College of Alexandria, where he discovered that aromatic aldehydes are decomposed by alcoholic potash into a mixture of the corresponding acid and alcohol, *e.g.* benzaldehyde into benzoic acid and benzyl alcohol ("Cannizzaro's reaction"). In the autumn of 1855 he became professor of chemistry at Geneva university, and six years later, after declining professorships at Pisa and Naples, accepted the chair of inorganic and organic chemistry at Palermo. There he spent ten years, studying the aromatic compounds and continuing to work on the amines, until in 1871 he was appointed to the chair of chemistry at Rome university. Apart from his work on organic chemistry, which includes also an investigation of santonin, he rendered great service to the philosophy of chemistry when in his memoir *Sunto di un corso di Filosofia chemica* (1858) he insisted on the distinction, till then imperfectly realized, between molecular and atomic weights, and showed how the atomic weights of elements contained in volatile compounds can be deduced from the molecular weights of those compounds, and how the atomic weights of elements of whose compounds the vapour densities are unknown can be ascertained from a knowledge of their specific heats. For this achievement, of fundamental importance for the atomic theory in chemistry, he was awarded the Copley medal by the Royal Society in 1891. Cannizzaro's scientific eminence in 1871 secured him admission to the Italian senate, of which he was vice-president, and as a member of the Council of Public Instruction and in other ways he rendered important services to the cause of scientific education in Italy.

CANNOCK, a market town in the western parliamentary division of Staffordshire, England, in the district known as Cannock Chase, 130 m. N.W. from London by the London and North Western railway. Pop. of urban district (1891) 20,613; (1901) 23,974. The church of St Luke is Perpendicular, enlarged in modern times. The famous political preacher, Henry Sacheverell, held the living early in the 18th century. Cannock has tool, boiler, brick and tile works. Cannock Chase, a tract generally exceeding 500 ft. in elevation, extends on an axis from north-west to south-east over some 36,000 acres. It was a royal preserve, and remains for the most part an uncultivated waste, but it is also a rich coalfield, and there are mines in every direction. Brownhills, Burntwood and Chase Town, Great Wyrley, Hednesford, Hammerwich, and Pelsall are townships or villages of the mining population.

CANNON (a word common to Romance languages, from the Lat. *canna*, a reed, tube, with the addition of the augmentative termination *-on*, *-one*), a gun or piece of ordnance. The word, first found about 1400 (there is an indenture of Henry IV. 1407 referring to "*canones, seu instrumenta Anglicè gunnes vocata*"), is commonly applied to any form of firearm which is fired from a carriage or fixed mounting, in contradistinction to "small-arms," which are fired without a rest or support of any kind.[1] An exception must be made, however, in the case of *machine guns* (*q.v.*), and the word as used in modern times may be defined as follows: "a piece of ordnance mounted upon a fixed or movable carriage and firing a projectile of greater calibre than 1½ in." In French, however, *canon* is the term applied to the barrel of small arms, and also, as an alternative to *mitrailleuse* or *mitrailleur*, to machine guns, as well as to ordnance properly so-called. The Hotchkiss machine gun used in several navies is officially called "revolving cannon." For details see ARTILLERY, ORDNANCE, MACHINE GUNS, &c. Amongst the many derived senses of the word may be mentioned "cannon curls," in which the hair is arranged in horizontal tubular curls one above the other. For "cannon" in billiards see BILLIARDS.

In the 16th and 17th centuries the "cannon" in England was distinctively a large piece, smaller natures of ordnance being called by various special names such as culverin, saker, falcon, demi-cannon, &c. We hear of Cromwell taking with him to Ireland (1649) "two cannon of eight inches, two cannon of seven, two demi-cannon, two twenty-four pounders," &c.

Sir James Turner, a distinguished professional soldier contemporary with Cromwell, says: "The cannon or battering ordnance is divided by the English into Cannon Royal, Whole Cannon and Demi-Cannon. The first is likewise called the Double Cannon, she weighs 8000 pound of metal and shoots a bullet of 60, 62 or 63 pound weight. The Whole Cannon weighs 7000 pound of metal and shoots a bullet of 38, 39 or 40 pound.

[1] The original small arms, however, are often referred to as hand cannon.

The Demi-Cannon weighs about 6000 pound and shoots a bullet of 28 or 30 pound. . . . These three several guns are called cannons of eight, cannons of seven and cannons of six." The generic sense of "cannon," in which the word is now exclusively used, is found along with the special sense above mentioned as early as 1474. A warrant of that year issued by Edward IV. of England to Richard Copcote orders him to provide "*bumbardos, canones, culverynes . . . et alios canones quoscumque, ac pulveres, sulfer . . . pro eisdem canonibus necessarias.*" "Artillery" and "ordnance," however, were the more usual terms up to the time of Louis XIV. (*c.* 1670), about which time heavy ordnance began to be classified according to the weight of its shot, and the special sense of "cannon" disappears.

CANNON-BALL TREE (*Couroupita guianensis*), a native of tropical South America (French Guiana), which bears large spherical woody fruits, containing numerous seeds, as in the allied genus *Bertholletia* (Brazil nut).

CANNSTATT, or KANNSTATT, a town of Germany in the kingdom of Württemberg, pleasantly situated in a fertile valley on both banks of the Neckar, 2½ m. from Stuttgart, with which it has been incorporated since 1904. Pop. (1905) 26,497. It is a railway centre, has two Evangelical and a Roman Catholic church, two bridges across the Neckar, handsome streets in the modern quarter of the town and fine promenades and gardens. There is a good deal of business in the town. Railway plant, automobiles and machinery are manufactured; spinning and weaving are carried on; and there are chemical works and a brewery here. Fruit and vines are largely cultivated in the neighbourhood. A large population is temporarily attracted to Cannstatt by the fame of its mineral springs, which are valuable for diseases of the throat and weaknesses of the nervous system. These springs were known to the Romans. Besides the usual bathing establishments there are several medical institutions for the treatment of disease. Near the town are the palaces of Rosenstein and Wilhelma; the latter, built (1842–1851) for King William of Württemberg in the Moorish style, is surrounded by beautiful gardens. In the neighbourhood also are immense caves in the limestone where numerous bones of mammoths and other extinct animals have been found. On the Rotenberg, where formerly stood the ancestral castle of the house of Württemberg, is the mausoleum of King William and his wife.

Cannstatt (Condistat) is mentioned early in the 8th century as the place where a great court was held by Charlemagne for the trial of the rebellious dukes of the Alamanni and the Bavarians. From the emperor Louis the Bavarian it received the same rights and privileges as were enjoyed by the town of Esslingen, and until the middle of the 14th century it was the capital of the county of Württemberg. Cannstatt was the scene of a victory gained by the French over the Austrians on the 21st of July 1796.

See Veiel, *Der Kurort Kannstatt und seine Mineralquellen* (Cannstatt, 1875).

CANO, ALONZO (1601–1667), Spanish painter, architect and sculptor, was born at Granada. He has left in Spain a very great number of specimens of his genius, which display the boldness of his design, the facility of his pencil, the purity of his flesh-tints and his knowledge of chiaroscuro. He learned architecture from his father, Miguel Cano, painting from Pacheco and sculpture from Juan Martinez Montañes. As a statuary, his most famous works are the Madonna and Child in the church of Nebrissa, and the colossal figures of San Pedro and San Pablo. As an architect he indulged in too profuse ornamentation, and gave way too much to the fancies of his day. Philip IV. made him royal architect and king's painter, and gave him the church preferment of a canon. His more important pictures are at Madrid. He was notorious for his ungovernable temper; and it is said that once he risked his life by committing the then capital offence of dashing to pieces the statue of a saint, when in a rage with the purchaser who grudged the price he demanded. His known passionateness also (according to another story) caused him to be suspected, and even tortured, for the murder of his wife, though all other circumstances pointed to his servant as the culprit.

CANO, MELCHIOR (1525–1560), Spanish theologian, born at Tarançon, in New Castile, joined the Dominican order at an early age at Salamanca, where in 1546 he succeeded to the theological chair in that university. A man of deep learning and originality, proud and a victim to the *odium theologicum*, he could brook no rivalry. The only one who at that time could compare with him was the gentle Bartolomeo de Caranza, also a Dominican and afterwards archbishop of Toledo. At the university the schools were divided between the partisans of the two professors; but Cano pursued his rival with relentless virulence, and took part in the condemnation for heresy of his brother-friar. The new society of the Jesuits, as being the forerunners of Antichrist, also met with his violent opposition; and he was not grateful to them when, after attending the council of Trent in 1545, he was sent, by their influence, in 1552, as bishop of the far-off see of the Canaries. His personal influence with Philip II. soon procured his recall, and he was made provincial of his order in Castile. In 1556 he wrote his famous *Consultatio theologica*, in which he advised the king to resist the temporal encroachments of the papacy and, as absolute monarch, to defend his rights by bringing about a radical change in the administration of ecclesiastical revenues, thus making Spain less dependent on Rome. With this in his mind Paul IV. styled him "a son of perdition." The reputation of Cano, however, rests on a posthumous work, *De Locis theologicis* (Salamanca, 1562), which stands to-day unrivalled in its own line. In this, a genuine work of the Renaissance, Cano endeavours to free dogmatic theology from the vain subtleties of the schools and, by clearing away the puerilities of the later scholastic theologians, to bring religion back to first principles; and, by giving rules, method, co-ordination and system, to build up a scientific treatment of theology. He died at Toledo on the 30th of September 1560. (E. TN.)

CANOE (from Carib. *canôoa*, the West Indian name found in use by Columbus; the Fr. *canot*, boat, and Ger. *Kahn*, are derived from the Lat. *canna*, reed, vessel), a sort of general term for a boat sharp at both ends, originally designed for propulsion by one or more paddles (not oars) held without a fixed fulcrum, the paddler facing the bow. As the historical native name for certain types of boat used by savages, it is applied in such cases to those which, like other boats, are open within from end to end, and the modern "Canadian canoe" preserves this sense; but a more specific usage of the name is for such craft as differ essentially from open boats by being covered in with a deck, except for a "well" where the paddler sits. Modern developments are the cruising canoe, combining the use of paddle and sails, and the racing canoe, equipped with sails only.

The primitive canoes were light frames of wood over which skins (as in the Eskimo canoe) or the bark of trees (as in the North American Indians' birch-bark canoe) were tightly stretched. The modern painted canvas canoe, built on Indian lines, was a natural development of this idea. The Indian also used, and the African still uses, the "dug-out," made from a tree hollowed by fire after the manner of Robinson Crusoe. Many of these are of considerable size and carrying capacity; one in the New York Natural History Museum from Queen Charlotte's Island is 63 ft. long, 8 ft. 3 in. wide, and 5 ft. deep, cut from a single log. The "war canoe" of paddling races is its modern successor. In the islands of the Pacific primitive canoes are wonderfully handled by the natives, who make long sea voyages in them, often stiffening them by attaching another hull (see CATAMARAN).

In the earlier part of the 19th century, what was known as a "canoe" in England was the short covered-in craft, with a "well" for the paddler to sit in, which was popularly used for short river practice; and this type still survives. But the sport of canoeing in any real sense dates from 1865, when John MacGregor (*q.v.*) designed the canoe "Rob Roy" for long journeys by water, using both double-bladed paddle and sails, yet light enough (about 70 lb) to be carried over land. The general type of this canoe is built of oak with a cedar deck; the length is from

12 ft. to 15 ft., the beam from 26 in. to 30 in., the depth 10 in. to 16 in. The paddle is 7 ft. long and 6 in. wide in the blade, the canoeist sits low in a cockpit, and in paddling dips the blades first on one side and then the other. The rig is generally yawl.

In 1866 the Royal Canoe Club was formed in England, and the prince of Wales (afterwards Edward VII.) became commodore. Its headquarters are at Kingston-on-Thames and it is still the leading organization. There is also the British Canoe Association, devoted to cruising. After the English canoes were seen in Paris at the Exhibition of 1867, others like them were built in France. Branches and clubs were formed also at the English universities, and in Liverpool, Hull, Edinburgh and Glasgow. The New York Canoe Club was founded in 1871. One member of the Royal Canoe Club crossed the English Channel in his canoe, another the Irish Channel from Scotland to Ireland, and many rivers were explored in inaccessible parts, like the Jordan, the Kishon, and the Abana and the Pharpar at Damascus, as well as the Lake Menzaleh in the Delta of the Nile, and the Lake of Galilee and Waters of Merom in Syria.

W. Baden Powell modified the type of the "Rob Roy" in the "Nautilus," intended only for sailing. From this time the two kinds of pleasure canoe—paddling and sailing—parted company, and developed each on its own lines; the sailing canoe soon (1882) had a deck seat and tiller, a smaller and smaller cockpit, and a larger and larger sail area, with the consequent necessary air and water-tight bulkheads in the hull. Paul Butler of Lowell, Mass., added (1886) the sliding outrigger seat, allowing the canoeist to slide out to windward. The final stage is the racing machine pure and simple, seen in the exciting contests at the annual August meets of the American Canoe Association on the St Lawrence river, or at the more frequent race days of its constituent divisions, associated as Canadian (47 clubs), Atlantic (32 clubs), Central (26 clubs) and Western.

The paddling canoe, propelled by single-bladed paddles, is also represented in single, tandem and crew ("war canoe") races, and this form of the sport remains more of the amateur type. The "Canadian," a clinker or carvel built mahogany or cedar or bass-wood canoe, or the painted canvas, bark or compressed paper canoe, all on the general lines of the Indian birch bark, are as common on American rivers as the punt is on the Thames, and are similarly used.

See MacGregor, *A Thousand Miles in the Rob Roy Canoe* (1866), *The Rob Roy on the Baltic*, &c.; W. Baden Powell, *Canoe Travelling* (1871); W. L. Alden, *Canoe and the Flying Proa* (New York, 1878); J. D. Hayward, *Camping out with the British Canoe Association*; C. B. Vaux, *Canoe Handling* (New York, 1888); Stephens, *Canoe and Boat Building* (New York, 1881).

CANON. The Greek word *κανών* means originally a straight rod or pole, and metaphorically what serves to keep a thing upright or straight, a rule. In the New Testament it occurs in Gal. vi. 16, and 2 Cor. x. 13, 15, 16, signifying in the former passage a measure, in the latter what is measured, a district. The general applications of the word fall mainly into two groups, in one of which the underlying meaning is that of rule, in the other that of a list or catalogue, *i.e.* of books containing the rule. Of the first, such uses as that of a standard or rule of conduct or taste, or of a particular form of musical composition (see below) may be mentioned, but the principal example is of the sum of the laws regulating the ecclesiastical body (see CANON LAW). In the second group of uses that of the ecclesiastical dignitary (see below), that of the list of the names of those persons recognized as saints by the Church (see CANONIZATION), and that of the authoritative body of Scriptures (see below) are examples.

Music.—A canon in part-music is the form taken by the earliest compositions in harmony, successive or consequent parts having the same melody, but each beginning at a stated period after its precursor or antecedent. In many early polyphonic compositions, one or more voices were imitated note for note by the others, so that the other parts did not need to be written out at all, but were deduced from the leaders by a rule or canon. Sir Frederick Bridge has pointed out that in this way the term "canon" came to supersede the old name of the art-form, *Fuga ligata*. (See also under FUGUE, CONTRAPUNTAL FORMS and MUSIC.) When the first part completes its rhythmical sentence before the second enters, and then continues the melody as an accompaniment to the second, and so on for the third or fourth, this form of canon in England was styled a "round" or "catch"; the stricter canon being one in which the succession of parts did not depend on the ending of the phrase. But outside England catches and canons were undifferentiated. The "round" derived its name from the fact that the first part returned to the beginning while the others continued the melody; the "catch" meant that each later part caught up the tune. The problem of the canon, as an artistic composition, is to find one or more points in a melody at which one or more successive parts may start the same tune harmoniously. Catches were familiar in English folk music until after the Restoration; different trades having characteristic melodies of their own. In the time of Charles II. they took a bacchanalian cast, and later became sentimental. Gradually the form went out as a type of folk music, and now survives mainly in its historical interest. (H. CH.)

The Church Dignitary.—A canon is a person who possesses a prebend, or revenue allotted for the performance of divine service in a cathedral or collegiate church. Though the institute of canons as it at present exists does not go back beyond the 11th century it has a long history behind it. The name is derived from the list (*matricula*) of the clergy belonging to a church, *κανών* being thus used in the council of Nicaea (c. 16). In the synod of Laodicea the adjective *κανονικός* is found in this sense (c. 15); and during the 6th century the word *canonicus* occurs commonly in western Europe in relation to the clergy belonging to a cathedral or other church. Eusebius of Vercelli (d. 370) was the first to introduce the system whereby the cathedral clergy dwelt together, leading a semi-monastic life in common and according to rule; and St Augustine established a similar manner of life for the clergy of his cathedral at Hippo. The system spread widely over Africa, Spain and Gaul; a familiar instance is St Gregory's injunction to St Augustine that at Canterbury the bishop and his clergy should live a common life together, similar to the monastic life in which he had been trained; that these "clerics" at Canterbury were not monks is shown by the fact that those of them in the lower clerical grades were free to marry and live at home, without forfeiting their position or emoluments as members of the body of cathedral clergy (Bede, *Hist. Eccl.* i. 27). This mode of life for the secular clergy, which became common in the west, seems never to have taken root in the east. It came to be called *vita canonica*, canonical life, and it was the object of various enactments of councils during the 6th, 7th and 8th centuries. The first serious attempt to legislate for it and reduce it to rule was made by Chrodegang, bishop of Metz (*c.* 750), who composed a rule for the clergy of his cathedral, which was in large measure an adaptation of the Benedictine Rule to the case of secular clergy living in common. Chrodegang's Rule was adopted in many churches, both cathedral and collegiate (*i.e.* those served by a body of clergy). In 816 the synod of Aix-la-Chapelle (see *Mon. Germ. Concil.* ii. 307) made further regulations for the canonical life, which became the law in the Frankish empire for cathedral and collegiate churches. The Rule of Chrodegang was taken as the basis, but was supplemented and in some points mitigated and made less monastic in character. There was a common dormitory and common refectory for all, but each canon was allowed a dwelling room within the cloister; the use of flesh meat was permitted, and the clothing was of better quality than that of monks. Each canon retained the use of his private property and money, but the revenues of the cathedral or church were treated as a common fund for the maintenance of the whole establishment. The chief duty of the canons was the performance of the church services. Thus the canons were not monks, but secular clergy living in community, without taking the monastic vows or resigning their private means—a form of life somewhat resembling that of the fathers of the London or Birmingham Oratory in our day. The bishop was expected to lead the common life along with his clergy.

The canonical life as regulated by the synod of Aix, subsisted in the 9th and 10th centuries; but the maintenance of this

intermediate form of life was of extreme difficulty. There was a constant tendency to relax the bonds of the common life, and attempts in various directions to restore it. In England, by the middle of the 10th century, the prescriptions of the canonical life seem to have fallen into desuetude, and in nine cathedrals the canons were replaced by communities of Benedictines. In the 11th century the Rule of Chrodegang was introduced into certain of the English cathedrals, and an Anglo-Saxon translation of it was made under Leofric for his church of Exeter. The turning point came in 1059, when a reforming synod, held at the Lateran, exhorted the clergy of all cathedral and collegiate churches to live in community, to hold all property and money in common, and to "lead the life of the Apostles" (cf. Acts ii.44, 45). The clergy of numerous churches throughout Western Europe (that of the Lateran Basilica among them) set themselves to carry out these exhortations, and out of this movement grew the religious order of Canons Regular or Augustinian Canons (*q.v.*). The opposite tendency also ran its course and produced the institute of secular canons. The revenues of the cathedral were divided into two parts, that of the bishop and that of the clergy; this latter was again divided among the clergy themselves, so that each member received his own separate income, and the persons so sharing, whatever their clerical grade, were the canons of the cathedral church. Naturally all attempt at leading any kind of common life was frankly abandoned. In England the final establishment of this order of things was due to St Osmund (1090). The nature and functions of the institute of secular canons are described in the article CATHEDRAL.

See Du Cange, *Glossarium*, under "Canonicus"; Amort, *Vetus Disciplina Canonicorum* (1747), to be used with caution for the earlier period; C. du Molinet, *Réflexions historiques et curieuses sur les antiquités des chanoines tant séculiers que réguliers* (1674); Herzog, *Realencyklopädie* (3rd ed.), art. "Kapitel"; Wetzer und Welte, *Kirchenlexicon* (2nd ed.), art. "Canonica vita" and "Canonikat." The history of the canonical institute is succinctly told, and the best literature named, by Max Heimbucher, *Orden und Kongregationen*, 1896, i. § 55; also by Otto Zöckler, *Askese und Mönchtum*, 1897, pp. 422-425. On medieval secular canons a standard work is Chr. Wordsworth's *Statutes of Lincoln Cathedral* (1892–1897); see also an article thereon by Edm. Bishop in *Dublin Review*, July 1898.

(E. C. B.)

In the Church of England, the canons of cathedral or collegiate churches retain their traditional character and functions, though they are now, of course, permitted to marry. Their duties were defined by the Canons of 1603, and included that of residence at the cathedrals according to "their local customs and statutes," and preaching in the cathedral and in the churches of the diocese, "especially those whence they or their church receive any yearly rent or profit." A canonry not being legally a "cure of souls," a canon may hold a benefice in addition to his prebend, in spite of the acts against pluralities. By the Canons of 1603 he was subject to discipline if he made his canonry an excuse for neglecting his cure. By the act of 1840 reforming cathedral chapters the number of canonries was greatly reduced, while some were made applicable to the endowment of archdeaconries and professorships. At the same time it was enacted that a canon must have been six years in priest's orders, except in the case of canonries annexed to any professorship, headship or other office in any university. The obligatory period of residence, hitherto varying in different churches, was also fixed at a uniform period of three months. The right of presentation to canonries is now vested in some cases in the crown, in others in the lord chancellor, the archbishop or in the bishop of the diocese.

Honorary canons are properly canons who have no prebend or other emoluments from the common fund of the chapter. In the case of old cathedrals the title is bestowed upon deserving clergymen by the bishop as a mark of distinction. In new cathedrals, *e.g.* Manchester or Birmingham, where no endowment exists for a chapter, the bishop is empowered to appoint honorary canons, who carry out the ordinary functions of a cathedral body (see CATHEDRAL).

Minor canons, more properly styled priest-vicars, are appointed by the dean and chapter. Their function is mainly to sing the service, and they are selected therefore mainly for their voices and musical qualifications. They may hold a benefice, if it lies within 6 m. of the cathedral.

In the Protestant churches of the continent canons as ecclesiastical officers have ceased to exist. In Prussia and Saxony, however, certain chapters, secularized at the Reformation, still exist. The canons (*Domherren*) are, however, laymen with no ecclesiastical character whatever, and their rich prebends are merely sources of endowment for the cadets of noble families.

See Phillimore, *Eccles. Law*, 2 vols. (London, 1895). (W. A. P.)

The Scriptures.—There are three opinions as to the origin of the application of the term "canon" to the writings used by the Christian Church. According to Semler, Baur and others, the word had originally the sense of list or catalogue—the books publicly read in Christian assemblies. Others, as Steiner, suppose that since the Alexandrian grammarians applied it to collections of old Greek authors as models of excellence or classics, it meant classical (canonical) writings. According to a third opinion, the term included from the first the idea of a regulating principle. This is the more probable, because the same idea lies in the New Testament use of the noun, and pervades its applications in the language of the early Fathers down to the time of Constantine, as Credner has shown.[1] The "*κανών* of the church" in the Clementine homilies,[2] the "ecclesiastical *κανών*"[3] and the "*κανών* of the truth" in Clement and Irenaeus,[4] the *κανών* of the faith in Polycrates,[5] the *regula fidei* of Tertullian,[6] and the *libri regulares* of Origen[7] imply a *normative principle*. Credner's view of *κανών* as an abbreviation of *γραφαὶ κανόνος*, equivalent to *Scripturae legis* in Diocletian's Act,[8] is too artificial, and is unsanctioned by usage.

The earliest example of its application to a catalogue of the Old or New Testament books occurs in the Latin translation of Origen's homily on Joshua, where the original seems to have been *κανών*. The word itself is certainly in Amphilochius,[9] as well as in Jerome[10] and Rufinus.[11] As the Latin translation of Origen has *canonicus* and *canonizatus*, we infer that he used *κανονικός*, opposed as it is to *apocryphus* or *secretus*. The first occurrence of *κανονικός* is in the 59th canon of the council of Laodicea, where it is contrasted with *ἰδιωτικός* and *ἀκανόνιστος*. *Κανονιζόμενα*, "*canonized* books," is first used in Athanasius's festal epistle.[12] The kind of rule which the earliest Fathers thought the Scriptures to be can only be conjectured; it is certain that they believed the Old Testament books to be a divine and infallible guide. But the New Testament was not so considered till towards the close of the 2nd century, when the conception of a Catholic Church was realized. The collection of writings was not called *Scripture*, or put on a par with the Old Testament as sacred and inspired, till the time of Theophilus of Antioch (about 180 A.D.). Hence Irenaeus applies the epithets divine and perfect to the Scriptures; and Clement of Alexandria calls them inspired.

When distinctions were made among the Biblical writings other words were employed, synonymous with *κανονιζόμενα* or *κεκανονισμένα*, such as *ἐνδιάθηκα*, *ὡρισμένα*. The canon was thus a catalogue of writings, forming a rule of truth, sacred, divine, revealed by God for the instruction of men. The rule was perfect for its purpose. (See BIBLE: section *Canon*.)

The term "canonical," *i.e.* that which is approved or ordered by the "canon" or rule, is applied to ecclesiastical vestments, "canonicals," and to those hours set apart by the Church for prayer and devotion, the "Canonical Hours" (see BREVIARY). (S. D.)

[1] *Zur Geschichte des Kanons*, pp. 3-68.
[2] *Clement Hom.*, ap. Coteler. vol. i. p. 608.
[3] *Stromata*, vi. 15, p. 803, ed. Potter.
[4] *Adv. Haeres.* i. 95.
[5] Euseb. *H.E.* v. 24.
[6] *De praescript. Haereticorum*, chs. 12, 13.
[7] *Comment. in Mat.* iii. p. 916, ed. Delarue.
[8] *Monumenta vetera ad Donatistarum historiam pertinentia*, ed. Dupin, p. 168.
[9] At the end of the *Iambi ad Seleucum*, on the books of the New Testament, he adds, *οὗτος ἀψευδέστατος κανὼν ἂν εἴη τῶν θεοπνεύστων γραφῶν*.
[10] *Prologus galeatus in ii. Reg.*
[11] *Expos. in Symb. Apost.* 37, p. 374, ed. Migne.
[12] After the word is added *καὶ παραδοθέντα, πιστευθέντα τε θεῖα εἶναι. Opp.* vol. i. p. 961, ed. Benedict.

CANONESS (Fr. *chanoinesse*, Ger. *Kanonissin*, Lat. *canonica* or *canonica virgo*), a female beneficiary of a religious college. In the 8th century chapters of canons were instituted in the Frankish empire, and in imitation of these certain women took common vows of obedience and chastity, though not of poverty. Like nuns they had common table and dormitory, and recited the breviary, but generally the rule was not so strict as in the case of nuns. The canonesses often taught girls, and were also employed in embroidering ecclesiastical vestments and transcribing liturgical books. A distinction was drawn between regular and secular canonesses, the latter being of noble family and not practising any austerity. Some of their abbesses were notable feudal princesses. In Germany several foundations of this kind (*e.g.* Gandersheim, Herford and Quedlinburg), which were practically secular institutions before the Reformation, adopted the Protestant faith, and still exist, requiring of their members the simple conditions of celibacy and obedience to their superior during membership. These institutions (*Stifter*) are now practically almshouses for the unmarried daughters of noble families. In some cases the right of presentation belongs to the head of the family, sometimes admission is gained by purchase; but in modern times a certain number of prebends have been created for the daughters of deserving officials. The organization of the *Stift* is collegiate, the head bearing the ancient titles of abbess, prioress or provostess (*Pröbstin*), and the canonesses (*Stiftsdamen*) meet periodically in *Konvent* for the discussion of the affairs of the community. The ladies are not bound to residence. In many of these *Stifter* quaint pre-Reformation customs and ceremonies still survive; thus, at the convent of St John the Baptist at Schleswig, on the day of the patron saint, the room in which the *Konvent* is held is draped in black and a realistic life-size wax head of St John on a charger is placed in the centre of the table round which the canonesses sit.

CANONIZATION, in its widest sense, an act by which in the Christian Church the ecclesiastical authority grants to a deceased believer the honour of public *cultus*. In the early Church there was no formal canonization. The *cultus* applied at first to local martyrs, and it was only in exceptional circumstances that a kind of judiciary inquiry and express decision became necessary to legitimate this *cultus*. The peculiar situation of the Church of Africa explains the *Vindicatio martyrum*, which was early practised there (*Optatus Milevit.*, i. 16). In the *cultus* rendered to confessors, the authorization of the Church had long been merely implicit. But when an express decision was given, it was the bishop who gave it. Gradually the canonization of saints came to be included in the centralizing movement which reserved to the pope the most important acts of ecclesiastical power. The earliest acknowledged instance of canonization by the pope is that of Ulric of Augsburg, who was declared a saint by John XV. in A.D. 993. From that time the pontifical intervention became more and more frequent, and, in practice, the right of the bishops in the matter of canonization continued to grow more restricted. In 1170 the new right was sufficiently established for Pope Alexander III. to affirm that the bishops could not institute the *cultus* of a new saint without the authority of the Roman Church (Cap. *Audivimus*, Decret. *De Rell. et venerat. Sanctorum*, iii. 115). The 12th and, especially, the 13th centuries furnish many examples of canonizations pronounced by the popes, and the procedure of this period is well ascertained. It was much more summary than that practised in modern times. The evidence of those who had known the holy personages was collected on the spot. The inquiry was as rapid as the judgment, and both often took place a short time after the death of the saint, as in the cases of St Thomas of Canterbury (died 1170, canonized 1173), St Peter of Castelnau (died on the 15th of January 1208, canonized on the 12th of March of the same year), St Francis of Assisi (died on the 4th of October 1226, canonized on the 19th of July 1228), and St Anthony of Padua (died on the 13th of June 1231, canonized on the 3rd of June 1232).

At this period there was no marked difference between canonization and beatification. In modern practice, as definitively settled by the decrees of Pope Urban VIII. (1625 and 1634), the two acts are totally distinct. Canonization is the solemn and definitive act by which the pope decrees the plenitude of public honours. Beatification consists in permitting a *cultus*, the manifestations of which are restricted, and is merely a step towards canonization.

The procedure at present followed at the Roman curia is either *exceptional* or *common*. The approval of immemorial *cultus* comes within the category of exceptional procedure. Urban VIII., while forbidding the rendering of a public *cultus* without authorization from the Holy See, made an exception in favour of the blessed who were at that time (1625) in possession of an immemorial *cultus*, *i.e.* dating back at least a century (1525). The procedure *per viam casus excepti* consists in the legitimation of a *cultus* which has been rendered to a saint for a very long time. The causes of the martyrs (*declarationis martyrii*) also are exceptional. Juridical proof is required of the *fact* of the martyrdom and of its *cause*, *i.e.* it must be established that the servant of God was put to death through hatred of the faith. These are the two cases which constitute exceptional procedure.

The *common* procedure is that in which the cause is prosecuted *per viam non cultus*. It is, in reality, a suit at law, pleaded before the tribunal of the Congregation of Rites, which is a permanent commission of cardinals, assisted by a certain number of subordinate officers and presided over by a cardinal. The supreme judge in the matter is the pope himself. The *postulator*, who is the mandatory of a diocese or ecclesiastical commonalty, is the solicitor. He must furnish the proofs, which are collected according to very stringent rules. The *promoter of the faith*, popularly called the "devil's advocate" (*advocatus diaboli*), is the defendant, whose official duty is to point out to the tribunal the weak points of the case.

The procedure is loaded with many formalities, of which the historical explanation lies in the tribunals of the ancient system, and which considerably delay the progress of the causes. The first decisive step is the *introduction of the cause*. If, by the advice of the cardinals who have examined the documents, the pope pronounce his approval, the servant of God receives the title of "Venerable," but is not entitled to any manifestation of *cultus*. Only in the event of the claimant passing this test successfully can the essential part of the procedure be begun, which will result in conferring on the Venerable the title of "Blessed." This part consists in three distinct proceedings: (1) to establish a reputation for sanctity, (2) to establish the heroic quality of the virtues, (3) to prove the working of miracles. A favourable judgment on all three of these tests is called the decree *de tuto*, by which the pope decides that they may safely proceed to the solemn beatification of the servant of God (*Tuto procedi potest ad solemnem V.S.D.N. beatificationem*). In the ceremony of beatification the essential part consists in the reading of the pontifical brief, placing the Venerable in the rank of the Blessed, which is done during a solemn mass, celebrated with special rites in the great hall above the vestibule of the basilica of St Peter.

The process of canonization, which follows that of beatification, is usually less lengthy. It consists principally in the discussion of the miracles (usually two in number) obtained by the intercession of the Blessed since the decree of beatification. After a great number of formalities and prayers, the pope pronounces the sentence, and indicates eventually the day on which he will proceed to the ceremony of canonization, which takes place with great solemnity in the basilica of St Peter.

The extremely complicated procedure which is prescribed for the conduct of the cases in order to ensure every opportunity for exercising rigour and discretion, considerably retards the progress of the causes, and necessitates a numerous staff. This circumstance, together with the custom of ornamenting the basilica of St Peter very richly on the day of the ceremony, accounts for the considerable cost which a canonization entails. To prevent abuses, a minute tariff of expenses was drawn up during the pontificate of Leo XIII.

The Greek Church, represented by the patriarch of Constantinople, and the Russian Church, represented by the Holy Synod, also canonize their saints after a preliminary examination of their

titles to public *cultus*. Their procedure is less rigorous than that of the Roman Church, and as yet has been but imperfectly studied.

See J. Fontanini, *Codex Constitutionum quas summi pontifices ediderunt in solemni canonizatione sanctorum* (Rome, 1729, a collection of original documents); Pr. Lambertini (Pope Benedict XIV.), *De servorum Dei beatificatione et beatorum canonizatione* (Bologna, 1734–1738), several times reprinted, and more remarkable for erudition and knowledge of canon law than for historical criticism; Al. Lauri, *Codex pro postulatoribus causarum beatificationis et canonizationis, recognovit Joseph Fornari* (Romae, 1899); F. W. Faber, *Essay on Beatification, Canonization, &c.* (London, 1848); A. Boudinhon, *Les Procès de béatification et de canonisation* (Paris, 1905); E. Golubinskij, *Istorija Kanonizaçii sviatich v russkoj çerkvi* (Moscow, 1903). (H. De.)

CANON LAW. Canon law, *jus canonicum*, is the sum of the laws which regulate the ecclesiastical body; for this reason it is also called ecclesiastical law, *jus ecclesiasticum*. It is also referred to under the name of *canones*, *sacri canones*, a title of great antiquity, for the κανόνες, *regulae*, were very early distinguished from the secular laws, the νόμοι, *leges*.

Word "canon." Different meanings.

The word κανών, canon, has been employed in ecclesiastical literature in several different senses (see Canon above). The disciplinary decisions of the council of Nicaea, for example (can. 1, 2, &c.), employ it in the sense of an established rule, ecclesiastical in its origin and in its object. But the expression is most frequently used to designate disciplinary laws, in which case canons are distinguished from dogmatic definitions. With regard to form, the decisions of councils, even when dogmatic, are called canons; thus the definitions of the council of Trent or of the Vatican, which generally begin with the words "*Si quis dixerit*," and end with the anathema, are canons; while the long chapters, even when dealing with matters of discipline, retain the name of chapters or decrees. Similarly, it has become customary to give the name of canons to the texts inserted in certain canonical complications such as the *Decretum* of Gratian, while the name of chapters is given to the analogous quotations from the Books of the Decretals. It is merely a question of words and of usage. As to the expression *jus canonicum*, it implies the systematic codification of ecclesiastical legislation, and had no existence previous to the labours which resulted in the *Corpus juris canonici*.

Divisions.

Canon law is divided into public law and private law; the former is concerned with the constitution of the Church, and, consequently, with the relations between her and other bodies, religious and civil; the latter has as its object the internal discipline of the ecclesiastical body and its members. This division, which has been found convenient for the study of canon law, has no precedent in the collections of texts. With regard to the texts now in force, the name of *jus antiquum*, ancient law, has been given to the laws previous to the *Corpus juris canonici*; the legislation of this *Corpus* has been called *jus novum*, new law; and finally, the name of recent law, *jus novissimum*, has been given to the law established by the council of Trent and subsequent papal constitutions. There is a further distinction between the written law, *jus scriptum*, laws made by the councils or popes, which are to be found in the collections, and the unwritten law, *jus non scriptum*, a body of practical rules arising rather from natural equity and from custom than from formal laws; with this is connected the customary law. In the Church, as in other societies, it has happened that the unwritten customary law has undergone a gradual diminution in importance, as a consequence of centralization and the accumulation of written laws; nowadays it need not be reckoned with, save in cases where local customs are involved. The common law is that which is intended to regulate the whole body; special or local law is that which is concerned with certain districts or certain categories of persons, by derogation from or addition to the common law.

Sources.

By the *sources* or authors of the canon law are meant the authorities from which it is derived; they must obviously be of such a nature as to be binding upon the whole religious body, or at least upon a specified portion of it. In the highest rank must be placed Christ and the Apostles, whose dispositions for the constitution and government of the Church are contained in the New Testament, completed by tradition; for the Church did not accept the disciplinary and ritual provisions of the Old Testament as binding upon her (see Acts xi., xv.). To the apostles succeeded the episcopal body, with its chief the bishop of Rome, the successor of St. Peter, whose legislative and disciplinary power, by a process of centralization, underwent a slow but uninterrupted development. It is then to the episcopate, assembled in ecumenical council, and to its chief, that the function of legislating for the whole Church belongs; the inferior authorities, local councils or isolated bishops and prelates, can only make special laws or statutes, valid only for that part of the Church under their jurisdiction. Most of the canons, however, which constitute the ancient law, and notably those which appear in the *Decretum* of Gratian, emanate from local councils, or even from individual bishops; they have found a place in the common law because the collections of canons, of which they formed the most notable part, have been everywhere adopted.

Having made these general observations, we must now consider the history of those texts and collections of canons which to-day form the ecclesiastical law of the Western Church: (1) up to the *Decretum* of Gratian, (2) up to the council of Trent, (3 and 4) up to the present day, including the codification ordered by Pius X.

1. *From the Beginning to the Decretum of Gratian.*—At no time, and least of all during the earliest centuries, was there any attempt to draw up a uniform system of legislation for the whole of the Christian Church. The various communities ruled themselves principally according to their customs and traditions, which, however, possessed a certain uniformity resulting from their close connexion with natural and divine law. Strangely enough, those documents which bear the greatest resemblance to a small collection of canonical regulations, such as the Didache, the Didascalia and the Canons of Hippolytus, have not been retained, and find no place in the collections of canons, doubtless for the reason that they were not official documents. Even the Apostolical Constitutions (*q.v.*), an expansion of the Didache and the Didascalia, after exercising a certain amount of influence, were rejected by the council in Trullo (692). Thus the only pseudo-epigraphic document preserved in the law of the Greek Church is the small collection of the eighty-five so-called "Apostolic Canons" (*q.v.*). The compilers, in their several collections, gathered only occasional decisions, the outcome of no predetermined plan, given by councils or by certain great bishops.

Greek collection.

These compilations began in the East. It appears that in several different districts canons made by the local assemblies[1] were added to those of the council of Nicaea which were everywhere accepted and observed. The first example seems to be that of the province of Pontus, where after the twenty canons of Nicaea were placed the twenty-five canons of the council of Ancyra (314), and the fifteen of that of Neocaesarea (315–320). These texts were adopted at Antioch, where there were further added the twenty-five canons of the so-called council *in encaeniis* of that city (341). Soon afterwards, Paphlagonia contributed twenty canons passed at the council of Gangra (held, according to the *Synodicon orientale*, in 343),[2] and Phrygia fifty-nine canons of the assembly of Laodicea (345–381?), or rather of the compilation known as the work of this council.[3] The collection was so well and so widely known that all these canons were numbered in sequence, and thus at the council of Chalcedon (451) several of the canons of Antioch were read out under the number assigned to them in the collection of the whole. It was further increased by the

[1] The councils which we are about to mention, up to the 9th century, have been published several times, notably in the great collections of Hardouin, Mansi, &c.; they will be found brought together in one small volume in Bruns, *Canones apostolorum et conciliorum* (Berlin, 1839).

[2] The date of this council was formerly unknown; it is ascribed to 343 by the Syriac Nestorian collection recently published by M. Chabot, *Synodicon Orientale*, p. 278, note 4.

[3] See Boudinhon, "Note sur le concile de Laodicée," in the *Comple rendu du premier congrès des savants catholiques à Paris*, 1888 (Paris, 1889), vol. ii. p. 420.

twenty-eight (thirty) canons of Chalcedon; about the same time were added the four canons of the council of Constantinople of 381, under the name of which also appeared three (or seven) other canons of a later date. Towards the same date, also, the so-called "Apostolic Canons" were placed at the head of the group. Such was the condition of the Greek collection when it was translated and introduced into the West.

In the course of the 6th century the collection was completed by the addition of documents already in existence, but which had hitherto remained isolated, notably the canonical letters of several great bishops, Dionysius of Alexandria, St Basil and others. It was at this time that the Latin collection of Dionysius Exiguus became known; and just as he had given the Greek councils a place in his collection, so from him were borrowed the canons of councils which did not appear in the Greek collection—the twenty canons of Sardica (343), in the Greek text, which differs considerably from the Latin; and the council of Carthage of 419, which itself included, more or less completely, in 105 canons, the decisions of the African councils. Soon after came the council *in Trullo* (692), also called the *Quinisextum*, because it was considered as complementary to the two councils (5th and 6th ecumenical) of Constantinople (553 and 680), which had not made any disciplinary canons. This assembly elaborated 102 canons, which did not become part of the Western law till much later, on the initiative of Pope John VIII. (872–881). Now, in the second of its canons, the council in Trullo recognized and sanctioned the Greek collection above mentioned; it enumerates all its articles, insists on the recognition of these canons, and at the same time prohibits the addition of others. As thus defined, the collection contains the following documents: firstly, the eighty-five Apostolic Canons, the Constitutions having been put aside as having suffered heretical alterations; secondly, the canons of the councils of Nicaea, Ancyra, Neocaesarea, Gangra, Antioch, Laodicea, Constantinople (381), Ephesus (the disciplinary canons of this council deal with the reception of the Nestorians, and were not communicated to the West), Chalcedon, Sardica, Carthage (that of 419, according to Dionysius), Constantinople (394); thirdly, the series of canonical letters of the following great bishops—Dionysius of Alexandria, Peter of Alexandria (the Martyr), Gregory Thaumaturgus, Athanasius, Basil, Gregory of Nyssa, Gregory of Nazianzus, Amphilochus of Iconium, Timotheus of Alexandria, Theophilus of Alexandria, Cyril of Alexandria, Gennadius of Constantinople; the canon of Cyprian of Carthage (the Martyr) is also mentioned, but with the note that it is only valid for Africa. With the addition of the twenty-two canons of the ecumenical council of Nicaea (787), this will give us the whole contents of the official collection of the Greek Church; since then it has remained unchanged. The law of the Greek Church was in reality rather the work of the Byzantine emperors.[1]

Its final form.

The collection has had several commentators; we need only mention the commentaries of Photius (883), Zonaras (1120) and Balsamon (1170). A collection in which the texts are simply reproduced in their chronological order is obviously inconvenient; towards 550, Johannes Scholasticus, patriarch of Constantinople, drew up a methodical classification of them under fifty heads. Finally should be mentioned yet another kind of compilation still in use in the Greek Church, bearing the name of *nomocanon*, because in them are inserted, side by side with the ecclesiastical canons, the imperial laws on each subject: the chief of them are the one bearing the name of Johannes Scholasticus, which belongs, however, to a later date, and that of Photius (883).

Nomocanon.

The canon law of the other Eastern Churches had no marked influence on the collections of the Western Church, so we need not speak of it here. While, from the 5th century onwards a certain unification in the ecclesiastical law began to take place within the sphere of the see of Constantinople, it was not till later that a similar result was arrived at in the West. For several centuries there is no mention of any but local collections of canons, and even these are not found till the 5th century; we have to come down to the 8th or even the 9th century before we find any trace of unification. This process was uniformly the result of the passing on of the various collections from one region to another.

In the West.

The most remarkable, and the most homogeneous, as well as without doubt the most ancient of these local collections is that of the Church of Africa. It was formed, so to speak, automatically, owing to the plenary assemblies of the African episcopate held practically every year, at which it was customary first of all to read out the canons of the previous councils. This gave to the collection an official character. At the time of the Vandal invasion this collection comprised the canons of the council of Carthage under Gratus (about 348) and under Genethlius (390), the whole series of the twenty or twenty-two plenary councils held during the episcopate of Aurelius, and finally, those of the councils held at Byzacene. Of the last-named we have only fragments, and the series of the councils under Aurelius is very incomplete. The African collection has not come to us directly: we have two incomplete and confused arrangements of it, in two collections, that of the *Hispana* and that of Dionysius Exiguus. Dionysius knows only the council of 419, in connexion with the affair of Apiarius; but in this single text are reproduced, more or less fully, almost all the synods of the collection; this was the celebrated *Concilium Africanum*, so often quoted in the middle ages, which was also recognized by the Greeks. The Spanish collection divides the African canons among seven councils of Carthage and one of Mileve; but in many cases it ascribes them to the wrong source; for example, it gives under the title of the fourth council of Carthage, the *Statuta Ecclesiae antiqua*, an Arlesian compilation of Saint Caesarius, which has led to a number of incorrect references. Towards the middle of the 6th century a Carthaginian deacon, Fulgentius Ferrandus, drew up a *Breviatio canonum*,[2] a methodical arrangement of the African collection, in the order of the subjects. From it we learn that the canons of Nicaea and the other Greek councils, up to that of Chalcedon, were also known in Africa.

Africa.

The Roman Church, even more than the rest, governed itself according to its own customs and traditions. Up to the end of the 5th century the only canonical document of non-Roman origin which it officially recognized was the group of canons of Nicaea, under which name were also included those of Sardica. A Latin version of the other Greek councils (the one referred to by Dionysius as *prisca*) was known, but no canonical use was made of it. The local law was founded on usage and on the papal letters called decretals. The latter were of two kinds: some were addressed to the bishops of the ecclesiastical province immediately subject to the pope; the others were issued in answer to questions submitted from various quarters; but in both cases the doctrine is the same. At the beginning of the 6th century the Roman Church adopted the double collection, though of private origin, which was drawn up at that time by the monk Dionysius, known by the name of Dionysius Exiguus, which he himself had assumed as a sign of humility. He was a Scythian by birth, and did not come to Rome till after 496; his learning was considerable for his times, and to him we owe the employment of the Christian era and a new way of reckoning Easter. At the desire of Stephen, bishop of Salona, he undertook the task of making a new translation, from the original Greek text, of the canons of the Greek collection. The manuscript which he used contained only the first fifty of the Apostolic Canons; these he translated, and they thus became part of the law of the West. This part of the work of Dionysius was not added to later; it was otherwise with the second part. This

Rome.

Dionysius Exiguus and his collection.

[1] For the further history of the law of the Greek Church and that of the Eastern Churches, see Vering, *Kirchenrecht*, §§ 14-183 (ed. 1893). The Russian Church, as we know, adopted the Greek ecclesiastical law.

[2] Edited by Pierre Pithou (Paris, 1588), and later by Chifflet, *Fulg. Ferrandi opera* (Dijon, 1694); reproduced in Migne, *Patr. Lat.* vol. 67, col. 949.

embodied the documents containing the local law, namely 39 decretals of the popes from Siricius (384–398) to Anastasius II. (496–498). As was natural this collection received successive additions as further decretals appeared. The collection formed by combining these two parts remained the only official code of the Roman Church until the labours undertaken in consequence of the reforming movement in the 11th century. In 774 Pope Adrian I. gave the twofold collection of the Scythian monk to the future emperor Charlemagne as the canonical book of the Roman Church; this is what is called the *Dionysio-Hadriana*. This was an important stage in the history of the centralization of canon law; the collection was officially received by the Frankish Church, imposed by the council of Aix-la-Chapelle of 802, and from that time on was recognized and quoted as the *liber canonum*. If we consider that the Church of Africa, which had already suffered considerably from the Vandal invasion, was at this period almost entirely destroyed by the Arabs, while the fate of Spain was but little better, it is easy to see why the collection of Dionysius became the code of almost the whole of the Western Church, with the exception of the Anglo-Saxon countries; though here too it was known.

Dionysio-Hadriana.

The other collections of canons, of Italian origin, compiled before the 10th century, are of importance on account of the documents which they have preserved for us, but as they have not exercised any great influence on the development of canon law, we may pass them over.

The Dionysio-Hadriana did not, when introduced into Gaul, take the place of any other generally received collection of canons. In this country the Church had not been centralized round a principal see which would have produced unity in canon law as in other things; even the political territorial divisions had been very unstable. The only canonical centre of much activity was the Church of Arles, which exercised considerable influence over the surrounding region in the 5th and 6th centuries. The chief collection known throughout Gaul before the Dionysio-Hadriana was the so-called collection of Quesnel, named after its first editor.[1] It is a rich collection, though badly arranged, and contains 98 documents—Eastern and African canons and papal letters, but no Gallic councils; so that it is not a collection of local law. We might expect to find such a collection, in view of the numerous and important councils held in Gaul; but their decisions remained scattered among a great number of collections none of which had ever a wide circulation or an official character.

In Gaul.

Quesnel collection.

It would be impossible to enumerate here all the Gallic councils which contributed towards the canon law of that country; we will mention only the following:—Arles (314), of great importance; a number of councils in the district of Arles, completed by the *Statuta Ecclesiae antiqua* of St Caesarius;[2] the councils of the province of Tours; the assemblies of the episcopate of the three kingdoms of the Visigoths at Agde (506), of the Franks at Orleans (511), and of the Burgundians at Epaone (517); several councils of the kingdoms of the Franks, chiefly at Orleans; and finally, the synods of the middle of the 8th century, under the influence of St Boniface. Evidently the impulse towards unity had to come from without; it began with the alliance between the Carolingians and the Papacy, and was accentuated by the recognition of the *liber canonum*.

Councils.

In Spain the case, on the contrary, is that of a strong centralization round the see of Toledo. Thus we find Spanish canon law embodied in a collection which, though perhaps not official, was circulated and received everywhere; this was the Spanish collection, the *Hispana*.[3] The collection is well put together and includes almost all the important canonical documents. In the first part are contained the councils, arranged according to the regions in which they were held: Greek councils, following a translation of Italian origin, but known by the name of *Hispana*; African councils, Gallican councils and Spanish councils. The latter, which form the local section, are further divided into several classes: firstly, the synods held under the Roman empire, the chief being that of Elvira[4] (*c.* 300); next the texts belonging to the kingdom of the Suevi, after the conversion of these barbarians by St Martin of Braga: these are, the two councils of Braga (563 and 572), and a sort of free translation or adaptation of the canons of the Greek councils, made by Martin of Braga; this is the document frequently quoted in later days under the name of *Capitula Martini papae*; thirdly, the decisions of the councils of the Visigothic Church, after its conversion to Catholicism. Nearly all these councils were held at Toledo, beginning with the great council of 589. The series continued up to 694 and was only interrupted by the Mussulman invasion. Finally, the second part of the *Hispana* contains the papal decretals, as in the collection of Dionysius.

In Spain.

The Hispana

From the middle of the 9th century this collection was to become even more celebrated; for, as we know, it served as the basis for the famous collection of the False Decretals.

The Churches of Great Britain and Ireland remained still longer outside the centralizing movement. Their contribution towards the later system of canon law consisted in two things: the Penitentials and the influence of the Irish collection, the other sources of local law not having been known to the predecessors of Gratian nor to Gratian himself.

Great Britain and Ireland.

The Penitentials[5] are collections intended for the guidance of confessors in estimating the penances to be imposed for various sins, according to the discipline in force in the Anglo-Saxon countries. They are all of Anglo-Saxon or Irish origin, and although certain of them were compiled on the continent, under the influence of the island missionaries, it seems quite certain that a Roman Penitential has never existed.[6] They are, however, of difficult and uncertain ascription, since the collections have been largely amended and remodelled as practice required. Among the most important we may mention those bearing the names of Vinnianus (d. 589), Gildas (d. 583), Theodore of Canterbury (d. 690), the Venerable Bede (d. 735) and Egbert of York (732–767); the Penitentials which are ascribed to St Columbanus, the founder of Luxeuil and Bobbio (d. 615), and Cumean (Cumine Ailbha, abbot of Iona); in the Frankish kingdom the most interesting work is the Penitential of Halitgar, bishop of Cambrai[7] from 817 to 831. As penances had for a long time been lightened, and the books used by confessors began to consist more and more of instructions in the style of the later moral theology (and this is already the case of the books of Halitgar and Rhabanus Maurus), the canonical collections began to include a greater or smaller number of the penitential canons.

Penitentials.

The Irish collection,[8] though it introduced no important documents into the law of the Western Church, at least set canonists the example of quoting passages from the Scriptures and the writings of the Fathers. This collection seems to date from the 8th century; besides the usual sources, the author has included several documents of local origin, beginning with the pretended synod of St Patrick.

Irish collection.

[1] Published by Quesnel in his edition of the works of St Leo, vol. ii. (Paris, 1675); reproduced by the brothers Ballerini, with learned dissertations, *Opera S. Leonis*, vol. iii.; Migne, *P.L.* 56.

[2] Malnory, *Saint Césaire d'Arles* (Paris, 1894).

[3] *Collectio canonum Ecclesiae Hispanae* (Madrid, 1808); reproduced in Migne, *P.L.* 84.

[4] L. Duchesne, "Le Concile d'Elvire" in the *Mélanges Renier*.

[5] For the Penitentials, see Wasserschleben, *Die Bussordnungen der abendländischen Kirche* (Halle, 1851); Mgr. H. J. Schmitz, *Die Bussbücher und die Bussdisciplin der Kirche* (2 vols., Mainz, 1883, 1898).

[6] This is proved, in spite of the contrary opinions of Wasserschleben and Schmitz, by M. Paul Fournier, "Étude sur les Pénitentiels," in the *Revue d'histoire et de littérature religieuses*, vol. vi. (1901), pp. 289-317, and vol. vii., 1902, pp. 59-70 and 121-127.

[7] In Migne, *P.L.* 105, col. 651.

[8] Edited by Wasserschleben (Giessen, 1874). See also P. Fournier, "De l'influence de la collection irlandaise sur la formation des collections canoniques," in *Nouvelle Revue historique de droit français et étranger*, vol. xxiii. note 1.

In the very middle of the 9th century a much enlarged edition of the *Hispana* began to be circulated in France. To this rich collection the author, who assumes the name of Isidore, the saintly bishop of Seville, added a good number of apocryphal documents already existing, as well as a series of letters ascribed to the popes of the earliest centuries, from Clement to Silvester and Damasus inclusive, thus filling up the gap before the decretal of Siricius, which is the first genuine one in the collection. The other papal letters only rarely show signs of alteration or falsification, and the text of the councils is entirely respected.[1] From the same source and at the same date came two other forged documents—firstly, a collection of Capitularies, in three books, ascribed to a certain Benedict (Benedictus Levita),[2] a deacon of the church of Mainz; this collection, in which authentic documents find very little place, stands with regard to civil legislation exactly in the position of the False Decretals with regard to canon law. The other document, of more limited scope, is a group of *Capitula* given under the name of Angilram, bishop of Metz. It is nowadays admitted by all that these three collections come from the same source. For a study of the historical questions connected with the famous False Decretals, see the article DECRETALS (FALSE); here we have only to consider them with reference to the place they occupy in the formation of ecclesiastical law. In spite of some hesitation, with regard rather to the official character than to the historical authenticity of the letters attributed to the popes of the earlier centuries, the False Decretals were accepted with confidence, together with the authentic texts which served as a passport for them. All later collections availed themselves indiscriminately of the contents of this vast collection, whether authentic or forged, without the least suspicion. The False Decretals did not greatly modify nor corrupt the Canon Law, but they contributed much to accelerate its progress towards unity. For they were the last of the chronological collections, *i.e.* those which give the texts in the order in which they appeared. From this time on, canonists began to exercise their individual judgment in arranging their collections according to some systematic order, grouping their materials under divisions more or less happy, according to the object they had in view. This was the beginning of a codification of a common canon law, in which the sources drawn upon lose, as it were, their local character. This is made even more noticeable by the fact that, in a good number of the works extant, the author is not content merely to set forth and classify the texts; but he proceeds to discuss the point, drawing conclusions and sometimes outlining some controversy on the subject, just as Gratian was to do more fully later on.

The false decretals.

Systematic collections.

During this period, which extended from the end of the 9th century to the middle of the 12th, we can enumerate about forty systematic collections, of varying value and circulation, which all played a greater or lesser part in preparing the juridical renaissance of the 12th century, and most of which were utilized by Gratian. We need mention only the chief of them —the *Collectio Anselmo dedicata*, by an unknown author of the end of the 9th century; the *Libri duo de synodalibus causis et disciplinis ecclesiasticis*,[3] compiled about 906 by Regino, abbot of Prüm, and dedicated to Hatto of Mainz, relatively a very original treatise; the enormous compilation in twenty books of Burchard, bishop of Worms (1112–1122), the *Decretum* or *Collectarium*,[4] very widely spread and known under the name of *Brocardum*, of which the 19th book, dealing with the process of confession, is specially noteworthy. Towards the end of the 11th century, under the influence of Hildebrand, the reforming movement makes itself felt in several collections of canons, intended to support the rights of the Holy See and the Church against the pretensions of the emperor. To this group belong an anonymous collection, described by M. P. Fournier as the first manual of the Reform;[5] the collection of Anselm, bishop of Lucca,[6] in 13 books (1080–1086); that of Cardinal Deusdedit,[7] in 4 books, dedicated to Pope Victor III. (1086–1087); and lastly that of Bonizo,[8] bishop of Sutri, in 10 books (1089). In the 12th century, the canonical works of Ivo of Chartres[9] are of great importance. His *Panormia*, compiled about 1095 or 1096, is a handy and well-arranged collection in 8 books; as to the *Decretum*, a weighty compilation in 17 books, there seems sufficient proof that it is a collection of material made by Ivo in view of his *Panormia*. To the 12th century belong the collection in the MS. of Saragossa (*Caesaraugustana*) to which attention was drawn by Antonio Agustin; that of Cardinal Gregory, called by him the *Polycarpus*, in 8 books (about 1115); and finally the *Liber de misericordia et justitia* of Algerus,[10] scholasticus of Liége, in 3 books, compiled at latest in 1123.

Regino.

Burchard.

Anselm Deusdedit.

Ivo of Chartres.

But all these works were to be superseded by the *Decretum* of Gratian.

2. *The Decretum of Gratian and the Corpus Juris Canonici.*— The work of Gratian, though prepared and made possible by those of his predecessors, greatly surpasses them in scientific value and in magnitude. It is certainly the work which had the greatest influence on the formation of canon law; it soon became the sole manual, both for teaching and for practice, and even after the publication of the Decretals was the chief authority in the universities. The work is not without its faults; Gratian is lacking in historical and critical faculty; his theories are often hesitating; but on the whole, his treatise is as complete and as perfect as it could be; so much so that no other work of the same kind has been compiled; just as there has never been made another Book of the Sentences. These two works, which were almost contemporary (Gratian is only about two years earlier),[11] were destined to have the same fate; they were the manuals, one for theology, the other for canon law, in use in all the universities, taught, glossed and commented on by the most illustrious masters. From this period dates the more marked and definitive separation between theology and ecclesiastical law.

The Decretum of Gratian.

Of Gratian we know practically nothing. He was a Camaldulensian monk of the convent of St Felix at Bologna, where he taught canon law, and published, probably in 1148, his treatise called at first *Concordantia discordantium canonum*, but soon known under the name of the *Decretum*. Nowadays, and for some time past, the only part of the *Decretum* considered is the collection of texts; but it is actually a treatise, in which the author endeavours to piece together a coherent juridical system from the vast body of texts, of widely differing periods and origin, which are furnished by the collections. These texts he inserts bodily in the course of his dissertation; where they do not agree, he divides them into opposite groups and endeavours to reconcile them; but the really original part of his work are the *Dicta Gratiani*, inserted between the texts, which are still read. Gratian drew his materials from the existing collections, and especially from the

Dicta Gratiani.

[1] The collection of the False Decretals has been published with a long critical introduction by P. Hinschius, *Decretales Pseudo-Isidorianae et capitula Angilramni* (Leipzig, 1863). For the rest of the bibliography, see DECRETALS (FALSE).

[2] The latest edition is in Pertz, *Monumenta Germaniae*, vol. ii. part ii.

[3] Edited by Wasserschleben (Leipzig, 1840); reproduced by Migne, *P.L.* 132.

[4] Edited several times; in Migne, *P.L.* 140.

[5] P. Fournier, "Le Premier Manuel canonique de la réforme du XIe siècle," in *Mélanges de l'École française de Rome*, xiv. (1894).

[6] Unpublished.

[7] Edited by Mgr. Pio Martinucci (Venice, 1869). On this collection see Wolf von Glanvell, *Die Kanonessammlung des Kardinals Deusdedit* (Paderborn, 1905).

[8] Unpublished.

[9] Several times edited; in Migne, *P.L.* 161. See P. Fournier, "Les Collections canoniques attribuées à Yves de Chartres," *Bibliothèque de l'École des Chartes* (1896 and 1897).

[10] Printed in Martene, *Nov. Thesaur. anecdot.* vol. v. col. 1019.

[11] See P. Fournier, "Deux Controverses sur les origines du Décret de Gratien," in the *Revue d'histoire et de littérature religieuses* vol. iii. (1898), pp. n. 2 and 3.

richer of them; when necessary, he has recourse to the Roman laws, and he made an extensive use of the works of the Fathers and the ecclesiastical writers; he further made use of the canons of the recent councils, and the recently published decretals, up to and including the Lateran council of 1139. His immense work consists of three parts (*partes*). The first, treating of the sources of canon law and of ecclesiastical persons and offices, is divided according to the method of Paucapalea, Gratian's pupil, into 101 *distinctiones*, which are subdivided into *canones*. The second part consists of 36 *causae* (cases proposed for solution), subdivided into *quaestiones* (the several questions raised by the case), under each of which are arranged the various *canones* (canons, decretals, &c.) bearing on the question. But *causa* xxxiii. *quaestio* 3, headed *Tractatus de Poenitentia*, is divided like the main part into seven *distinctiones*, containing each several *canones*. The third part, which is entitled *De Consecratione*, gives, in five *distinctiones*, the law bearing on church ritual and the sacraments. The following is the method of citation. A reference to the first part indicates the initial words or number of the *canon* and the number of the *distinctio*, *e.g.* can. Propter ecclesiasticas, dist. xviii. or c. 15, d. xviii. The second part is cited by the *canon*, *causa* and *quaestio*, *e.g.* can. Si quis suadente, C. 17, qu. 4, or c. 29, C. xvii., qu. 4. The treatise *De Poenitentia*, forming the 3rd *quaestio* of the 33rd *causa* of the second part, is referred to as if it were a separate work, *e.g.* c. Principium, D. ii. de poenit. or c. 45, D. ii. de poenit. In quoting a passage from the third part the *canon* and *distinctio* are given, *e.g.* c. Missar. solenn. D. I. de consecrat., or c. 12, D. I. de consecr.

Contents.

Mode of citation.

Considered from the point of view of official authority, the *Decretum* occupies an intermediate position very difficult to define. It is not and cannot be a really official code, in which every text has the force of a law. It has never been recognized as such, and the pretended endorsement of it by Pope Eugenius III. is entirely apocryphal. Moreover, it could not have become an official code; it would be impossible to transform into so many laws either the discordant texts which Gratian endeavoured to reconcile or his own *Dicta*; a treatise on canon law is not a code. Further, there was as yet no idea of demanding an official compilation. The *Decretum* has thus remained a work of private authority, and the texts embodied in it have only that legal value which they possess in themselves. On the other hand, the *Decretum* actually enjoys a certain public authority which is unique; for centuries it has been the text on which has been founded the instruction in canon law in all the universities; it has been glossed and commented on by the most illustrious canonists; it has become, without being a body of laws, the first part of the *Corpus juris canonici*, and as such it has been cited, corrected and edited by the popes. It has thus, by usage, obtained an authority perfectly recognized and accepted by the Church.[1]

Authority.

Gratian's collection, for the very reason that it had for its aim the creation of a systematic canon law, was a work of a transitional character. Henceforth a significant differentiation began to appear; the collections of texts, the number of which continued to increase, were clearly separated from the commentaries in which the canonists continued the formation and interpretation of the law. Thus the way was prepared for official collections. The disciples of Gratian, in glossing or commenting on the *Decretum*, turned to the papal decretals, as they appeared, for information and the determination of doubtful points. Their idea, then, was to make collections of these points, to support their teaching; this is the origin of those *Compilationes* which were soon to be embodied in the collection of Gregory IX. But we must not forget that these compilations were intended by their authors to complete the *Decretum* of Gratian; in them were included the decretals called *extravagantes*, i.e. *quae vagabantur extra Decretum*. This is why we find in them hardly any documents earlier than the time of Gratian, and also why canonists have continued to refer to the decretals of Gregory IX. by the abbreviation X (*Extra*, i.e. *extra Decretum*).

After Gratian.

There were numerous collections of this kind towards the end of the 12th and at the beginning of the 13th century. Passing over the first *Additiones* to the *Decretum* and the *Appendix concilii Lateranensis* (council of 1179), we will speak only of the *Quinque compilationes*,[2] which served as a basis for the works of Raymond of Pennaforte. The first and most important is the work of Bernard, provost and afterwards bishop of Pavia, namely, the *Breviarium extravagantium*, compiled about 1190; it included the decretals from Alexander III. to Clement III., together with certain "useful chapters" omitted by Gratian. The important feature of the book is the arrangement of the decretals or sections of decretals in five books, divided into titles (*tituli*) logically arranged. The five books treat of (1) ecclesiastical persons and dignitaries or judges; (2) procedure; (3) rights, duties and property of the clergy, *i.e.* benefices, dues, sacraments, &c., with the exception of marriage, which is the subject of book (4); (5) of penalties. There is a well-known hexameter summing up this division:

"Quinque compilationes."

Bernard of Pavia, "Breviarium."

Judex, judicium, clerus, connubia, crimen.

This is the division adopted in all the official collections of the *Corpus juris*. By a bull of the 28th of December 1210 Innocent III. sent to the university of Bologna an authentic collection of the decretals issued during the first twelve years of his pontificate; this collection he had caused to be drawn up by his notary, Petrus Collivacinus of Benevento, his object being to supersede the collections in circulation, which were incomplete and to a certain extent spurious. This was the *Compilatio tertia*; for soon after, Joannes Galensis (John of Wales) collected the decretals published between the collection of Bernard of Pavia and the pontificate of Innocent III.; and this, though of later date, became known as the *Compilatio secunda*. The *quarta*, the author of which is unknown, contained the decretals of the last six years of Innocent III., and the important decrees of the Lateran council of 1215. Finally, in 1226, Honorius III. made an official presentation to Bologna of his own decretals, this forming the *Compilatio quinta*.

"Compilatio tertia."

"Secunda."

"Quarta."

"Quinta."

The result of all these supplements to Gratian's work, apart from the inconvenience caused by their being so scattered, was the accumulation of a mass of material almost as considerable as the *Decretum* itself, from which they tended to split off and form an independent whole, embodying as they did the latest state of the law. From 1230 Gregory IX. wished to remedy this condition of affairs, and gave to his penitentionary, the Dominican Raymond of Pennaforte, the task of condensing the five compilations in use into a single collection, freed from useless and redundant documents. The work was finished in 1234, and was at once sent by the pope to Bologna with the bull *Rex pacificus*, declaring it to be official. Raymond adopts Bernard of Pavia's division into five books and into titles; in each title he arranges the decretals in chronological order, cutting out those which merely repeat one another and the less germane parts of those which he preserves; but these *partes decisae*, indicated by the words "*et infra*" or "*et j*," are none the less very useful and have been printed in recent editions. Raymond does not attempt any original work; to the texts already included in the *Quinque compilationes*, he adds only nine decretals of Innocent III. and 196 chapters of Gregory IX. This first official code was the basis of the second part of the *Corpus juris canonici*. The collection of Gregory IX. is cited as follows: the opening words of the chapter are given, or else its order or number, then the title to which it belongs; earlier scholars added X (*extra*); nowadays, this indication is omitted, and the order or number of the title in the book is given

Decretals of Gregory IX.

[1] See Laurin, *Introductio in corpus juris canonici*, c. vii. p. 73.

[2] By referring to the decretals of Gregory IX. for the texts inserted there, E. Friedberg has succeeded in giving a much abridged edition of the *Quinque compilationes* (Leipzig, 1882).

instead, e.g. *Quum olim, de Consuetudine*, X.; or cap. 6, *de consuet.* (I. iv.); that is to say, book I., title iv., *de consuetudine*, chapter 6, beginning with the words *Quum olim*.

Their relation to the general law.

Though Gregory IX. wished to supersede the *compilationes*, he had no idea of superseding the *Decretum* of Gratian, still less of codifying the whole of the canon law. Though his collection is still in theory the chief monument of ecclesiastical law, it only marked a certain stage and was before long to receive further additions. The reason for this is that in most cases the decretals did not formulate any law, but were merely solutions of particular cases, given as models; to arrive at the abstract law it was necessary to examine the solution in each case with regard to the circumstances and thus formulate a rule; this was the work of the canonists. The "decretalists" commented on the new collection, as the "decretists" had done for that of Gratian; but the canonists were not legislators: even the summaries which they placed at the head of the chapters could not be adduced as legislative texts. The abstract law was to be found rather in the *Summae* of the canonists than in the decretals. Two important results, however, were achieved: on the one hand, supplementary collections on private authority ceased to be made, for this Gregory IX. had forbidden; on the other hand, the collections were no longer indefinitely swelled by the addition of new decisions in particular cases, those already existing being enough to form a basis for the codification of the abstract law; and for this reason subsequent collections contain as a rule only the "constitutions" of popes or councils, *i.e.* rules laid down as of general application. Hence arose a separation, which became more and more marked, between legislation and jurisprudence. This change was not produced suddenly, the old method being at first adhered to. In 1245 Innocent IV. sent to the universities a collection of 45 decretals, with the order that they should be inserted under their proper titles in the collection of Gregory IX. In 1253 he sent a further list of the first words (*principia*) of the complementary constitutions and decretals; but the result was practically *nil* and the popes gave up this system of successive additions. It was, however, found expedient to publish a new official collection. At the instance of the university of Bologna, Boniface VIII., himself an eminent canonist, had this prepared by a committee of canonists and published it in 1298. As it came as an addition to the five books of Gregory IX., it was called the sixth book, the *Liber Sextus*. It includes the constitutions subsequent to 1234, and notably the decrees of the two ecumenical councils of Lyons, and is arranged in books and titles, as above described; the last title, *de regulis juris*, contains no less than eighty-eight legal axioms, mostly borrowed from Roman law. The *Liber Sextus* is cited like the decretals of Gregory IX., only with the addition of: *in sexto* (in VI°.).

The "Liber Sextus."

The same observations apply to the next collection, the *Clementinae*. It was prepared under the care of Clement V., and even promulgated by him in consistory in March 1314; but, in consequence of the death of the pope, which took place almost immediately after, the publication and despatch of the collection to the universities was postponed till 1317, under John XXII. It includes the constitutions of Clement V., and above all, the decrees of the council of Vienne of 1311, and is divided, like preceding collections, into books and titles; it is cited in the same way, with the additional indication *Clem-(entina)*.

The "Clementinae."

At this point the official collections stop. The two last, which have found a place in the editions of the *Corpus*, are collections of private authority, but in which all the documents are authentic. Evidently the strict prohibition of the publishing of collections not approved by the Holy See had been forgotten. The *Extravagantes* (i.e. *extra collectiones publicas*) of John XXII. number 20, and are classified under fourteen titles. The *Extravagantes communes* (*i.e.* coming from several popes) number 73, from Boniface VIII. to Sixtus IV. (1484), and are classified in books and titles. These two collections were included in the edition of Jean Chappuis in 1500; they passed into the later editions, and are considered as forming part of the *Corpus juris canonici*. As such, and without receiving any complementary authority, they have been corrected and re-edited, like the others, by the *Correctores romani*. They are cited, like the decretals, with a further indication of the collection to which they belong: *Extrav. Jo. XXII.*, or *inter-comm-(unes)*.

"Extravagantes" of John XXII.

And "communes."

Thus was closed, as the canonists say, the *Corpus juris canonici*; but this expression, which is familiar to us nowadays, is only a bibliographical term. Though we find in the 15th century, for example, at the council of Basel the expression *corpus juris*, obviously suggested by the *Corpus juris civilis*, not even the official edition of Gregory XIII. has as its title the words *Corpus juris canonici*, and we do not meet with this title till the Lyons edition of 1671.

The "Corpus juris canonici."

The history of the canonical collections forming the *Corpus juris* would not be complete without an account of the labours of which they were the object. We know that the universities of the middle ages contained a Faculty of Decrees, with or without a Faculty of Laws, *i.e.* civil law. The former made *doctores decretorum*, the latter *doctores legum*. The teaching of the *magistri* consisted in oral lessons (*lecturae*) directly based on the text. The short remarks explanatory of words in the text, originally written in the margin, became the gloss which, formed thus by successive additions, took a permanent form and was reproduced in the manuscripts of the *Corpus*, and later in the various editions, especially in the official Roman edition of 1582; it thus acquired by usage a kind of semi-official authority. The chief of the *glossatores* of the *Decretum* of Gratian were Paucapalea, the first disciple of the master, Rufinus (1160–1170), John of Faenza (about 1170), Joannes Teutonicus (about 1210), whose glossary, revised and completed by Bartholomeus Brixensis (of Brescia) became the *glossa ordinaria decreti*. For the decretals we may mention Vincent the Spaniard and Bernard of Botone (Bernardus Parmensis, d. 1263), author of the *Glossa ordinaria*. That on the *Liber Sextus* is due to the famous Joannes Andreae (*c.* 1340); and the one which he began for the Clementines was finished later by Cardinal Zabarella (d. 1417). The commentaries not so entirely concerned with the text were called *Apparatus*; and *Summae* was the name given to general treatises. The first of these works are of capital importance in the formation of a systematic canon law. Such were the *Summae* of the first disciples of Gratian: Paucapalea (1150),[1] Rolando Bandinelli[2] (afterwards Alexander III., *c.* 1150), Rufinus[3] (*c.* 1165), Étienne of Tournai[4] (Stephanus Tornacensis, *c.* 1168), John of Faenza (*c.* 1170), Sicard, bishop of Cremona (*c.* 1180), and above all Huguccio (*c.* 1180). For the Decretals we should mention: Bernard of Pavia[5] (*c.* 1195), Sinibaldo Fieschi (Innocent IV., *c.* 1240), Henry of Susa (d. 1271), commonly called (cardinalis) Hostiensis, whose *Summa Hostiensis* or *Summa aurea* is a work of the very highest order; Wilhelmus Durantis or Durandus, Joannes Andreae, Nicolas de Tudeschis (*abbas siculus*), &c. The 15th century produced few original treatises; but after the council of Trent the *Corpus juris* was again commented on by distinguished canonists, *e.g.* the Jesuit Paul Laymann (1575–1635), the Portuguese Agostinho Barbosa (1590–1649), Manuel Gonzalez Tellez (d. 1649) and Prospero Fagnani (1598–1687), who, although blind, was secretary to the Congregation of the Council. But as time goes on, the works gradually lose the character of commentaries on the text, and develop into expositions of the law as a whole.

The study of canon law.

The glosses.

The "Summae."

[1] Edited by Schulte, *Die Summa des Paucapalea* (Giessen, 1890).

[2] Edited by Thaner, *Die Summa Magistri Rolandi* (Innsbruck, 1874); later by Gietl, *Die Sentenzen Rolands* (Freiburg im B., 1891).

[3] Edited by H. Singer, *Die Summa Decretorum des Magister Rufinus* (Paderborn, 1902).

[4] Edited by Schulte, *Die Summe des Stephanus Tornacensis* (Giessen, 1891).

[5] He made a Summa of his own collection, ed. E. Laspeyres, *Bernardi Papiensis Summa Decretalium* (Mainz, 1860). The commentaries of Innocent IV. and Henry of Susa have been frequently published.

We can mention here only the chief editions of the *Corpus*. The council of Trent, as we know, ordered that the official books of the Roman Church—sacred books, liturgical books, &c.—should be issued in official and more correct editions; the compilations of ecclesiastical law were also revised. The commission of the *Correctores romani*,[1] established about 1563 by Pius IV., ended its work under Gregory XIII., and the official edition, containing the text and the glosses, appeared at Rome in 1582. Richter's edition (2 vols., Leipzig, 1839) remains valuable, but has been greatly surpassed by that of E. Friedberg (Leipzig, 1879–1881). Many editions contain also the *Institutiones* composed at the command of Paul IV. (1555–1559) by Giovanni Paolo Lancelotti, a professor of Bologna, on the model of the Institutes of Justinian. The work has merits, but has never been officially approved.

Editions.

The "Correctores romani."

"Institutiones Lancelotti."

Though the collections of canon law were to receive no more additions, the source of the laws was not dried up; decisions of councils and popes continued to appear; but there was no attempt made to collect them. Canonists obtained the recent texts as they could. Moreover, it was an epoch of trouble: the great Schism of the West, the profound divisions which were its result, the abuses which were to issue in the Reformation, were conditions little favourable for a reorganization of the ecclesiastical laws. Thus we are brought to the third period.

3. *After the Council of Trent.*—The numerous important decrees made by the council of Trent, in the second part of its sessions, called *de reformatione*, are the starting-point of the canon law in its latest stage, *jus novissimum*; it is this which is still in force in the Roman Church. It has in no way undermined the official status of the *Corpus juris*; but it has completed the legislation of the latter in many important respects, and in some cases reformed it.

The law during this period, as abstracted from the texts and compilations, suggests the following remarks. The laws are formulated in general terms, and the decisions in particular cases relegated to the sphere of jurisprudence; and the canonists have definitely lost the function which fell to them in the 12th and 13th centuries: they receive the law on authority and no longer have to deduce it from the texts. The legislative power is powerfully centralized in the hands of the pope: since the reforming decrees of the council of Trent it is the pontifical constitutions alone which have made the common law; the ecumenical council, doubtless, has not lost its power, but none were held until that of the Vatican (1870), and this latter was unable to occupy itself with matters of discipline. Hence the separation, increasingly marked, between the common law and the local laws, which cannot derogate from the common law except by concession of the Holy See, or by right of a lawfully authorized custom. This centralization, in its turn, has greatly increased the tendency towards unity and uniformity, which have reached in the present practice of the Roman Church a degree never known before, and considered by some to be excessive.

Final state of the law.

If we now consider the laws in themselves, we shall find that the dispersed condition of the legislative documents has not been modified since the closure of the *Corpus juris*; on the contrary, the enormous number of pontifical constitutions, and of decrees emanating from the Roman Congregations, has greatly aggravated the situation; moreover, the attempts which have been made to resume the interrupted process of codification have entirely failed. As regards the texts, the canon law of to-day is in a very similar position to that of English law, which gave rise to J. S. Mill's saying: "All ages of English history have given one another rendezvous in English law; their several products may be seen all together, not interfused, but heaped one upon another, as many different ages of the earth may be read in some perpendicular section of its surface."[2] Nothing has been abrogated, except in so far as this has been implicitly demanded by subsequent laws. From this result insoluble controversies and serious uncertainties, both in the study and practice of the law; and, finally, it has become impossible for most people to have a first-hand knowledge of the actual laws.

Dispersion of the texts.

For this third period, the most important and most considerable of the canonical texts is the body of disciplinary decrees of the council of Trent (1545–1563). In consequence of the prohibition issued by Pius IV., they have not been published separately from the dogmatic texts and other acts, and have not been glossed;[3] but their official interpretation has been reserved by the popes to the "Congregation of the cardinal interpreters of the Council of Trent," whose decisions form a vast collection of jurisprudence. Next in importance come the pontifical constitutions, which are collected together in the *Bullarium*; but this is a collection of private authority, if we except the *Bullarium* of Benedict XIV., officially published by him in 1747; further, the *Bullarium* is a compilation arranged in chronological order, and its dimensions make it rather unwieldy. In the third place come the decrees of the Roman Congregations, which have the force of law. Several of these organs of the papal authority have published official collections, in which more place is devoted to jurisprudence than to laws; several others have only private compilations, or even none at all, among others the most important, viz. the Holy Office (see CURIA ROMANA). The resulting confusion and uncertainty may be imagined.

Decrees of the Council of Trent.

Pontifical constitutions.

Decrees of the Curia.

These drawbacks were felt a long time back, and to this feeling we owe two attempts at a supplementary codification which were made in the 16th century, both of which are known under the name of *Liber septimus*. The first was of private origin, and had as its author Pierre Mathieu, the Lyons jurist (1563–1621); it appeared in 1590 at Lyons. It is a continuation of the *Extravagantes communes*, and includes a selection of papal constitutions, from Sixtus IV. (1471–1484) to Sixtus V. (1585–1590) inclusive, with the addition of a few earlier documents. It follows the order of the decretals. This collection has been of some service, and appears as an appendix in many editions of the *Corpus juris*; the chief reason for its failure is that it has no official sanction. The second attempt was official, but it came to nothing. It was connected with the movement of reform and revision which followed the council of Trent. Immediately after the publication of the official edition of the *Corpus juris*, Gregory XIII. appointed a committee of cardinals charged with the task of drawing up a *Liber septimus*. Sixtus V. hurried on its execution, which was rapidly proceeded with, mainly owing to Cardinal Pinelli, who submitted the draft of it to Clement VIII. The pope had this Liber VII. printed as a basis for further researches; but after long deliberations the volume was suppressed, and the idea of a fresh codification was abandoned. The collection included the decrees of the council of Trent, and a number of pontifical constitutions, arranged in the order of the titles of the decretals.[4] But even had it been promulgated, it is doubtful whether it would have improved the situation. It would merely have added another collection to the previous ones, which were already too voluminous, without resulting in any useful abrogations.

"Liber septimus" of P. Mathieu.

of Clement VIII.

[1] The history of this commission and the rules which it followed for editing the *Decretum*, will be found in Laurin, *Introductio in corpus juris canonici*, p. 63, or in the Prolegomena to Friedberg's edition of the *Decretum*.

[2] Quoted by Hogan, *Clerical Studies*, p. 235.

[3] There are innumerable editions of the council of Trent. That which is favoured by canonists is Richter's edition (Leipzig, 1863), in which each chapter *de reformatione* is followed by a selection of decisions of the S.C. of the council.

[4] Republished by F. Sentis, from one of the few copies which have escaped destruction: *Clementis Papae VIII. Decretales, quae vulgo nuncupantur Liber septimus Decretalium Clementis VIII.* (Freiburg im B., 1870).

4. *The Future Codification.*—Neither Clement VIII. nor, at a later date, Benedict XIV., could have dreamt of the radical reform at present in course of execution. Instead of accumulating the texts of the laws in successive collections, it is proposed entirely to recast the system of editing them. This codification in a series of short articles was suggested by the example of the French codes, the history of which during the 19th century is well known. From all quarters the Catholic episcopate had submitted to the Vatican council petitions in this sense. "It is absolutely clear," said some French bishops, "and has for a long time past been universally acknowledged and asserted, that a revision and reform of the canon law is necessary and most urgent. As matters now stand, in consequence of the many and grave changes in human affairs and in society, many laws have become useless, others difficult or impossible to obey. With regard to a great number of canons, it is a matter of dispute whether they are still in force or are abrogated. Finally, in the course of so many centuries, the number of ecclesiastical laws has increased to such an extent, and these laws have accumulated in such immense collections, that in a certain sense we can well say: We are crushed beneath the laws, *obruimur legibus*. Hence arise infinite and inextricable difficulties which obstruct the study of canon law; an immense field for controversy and litigation; a thousand perplexities of conscience; and finally contempt for the laws."[1] We know how the Vatican council had to separate without approaching the question of canonical reform; but this general desire for a recasting of the ecclesiastical code was taken up again on the initiative of Rome. On the 19th of March 1904, Pius X. published a *Motu proprio*, "*de ecclesiae legibus in unum redigendis*." After briefly reviewing the present condition of the canonical texts and collections, he pointed out its inconvenience, referred to the many requests from the episcopate, and decreed the preparation of a general code of canon law. This immense undertaking involved the codification of the entire canon law, drawing it up in a clear, short and precise form, and introducing any expedient modifications and reforms. For this purpose the pope appointed a commission of cardinals, of which he himself became president; also a commission of "consultors" resident at Rome, which asked for a certain amount of assistance from canonists at various universities and seminaries. Further, the assembled bishops of each province were invited to give their opinion as to the points in which they considered the canon law might profitably be modified or abrogated. Two consultors had the duty of separately drawing up a preliminary plan for each title, these projects being twice submitted for the deliberation of the commission (or sub-commission) of consultors, the version adopted by them being next submitted to the commission of cardinals, and the whole finally sent up for the papal sanction. These commissions started work at the end of 1904.

Demand for codification.

Decision of Pius X.

Method.

Local Law.—The common law of the Roman Church cannot by itself uniformly regulate all the churches of the different nations; each of them has its own local law, which we must briefly mention here. In theory, this law has as its author the local ecclesiastical authorities, councils or bishops; but this is true only for laws and regulations which are in harmony with the common law, merely completing or defining it. But if it is a question of derogating from the common law, the authority of the Holy See must intervene to legalize these derogations. This intervention takes the form either of "indults," *i.e.* graceful concessions granted at the request of the episcopate, or of special approbation of conciliary resolutions. It would, however, be impossible to mention any compilations containing only local law. Whether in the case of national or provincial councils, or of diocesan synods, the chief object of the decrees is to reinforce, define or apply the law; the measures which constitute a derogation have only a small place in them. It is, then, only in a limited sense that we can see a local canon law in the councils of the various regional churches. Having made this remark, we must distinguish between the countries which are still subject to the system of concordats and other countries.

Local law.

In the case of the former, the local law is chiefly founded on the concordat (*q.v.*), including the derogations and privileges resulting from it. The chief thing to note is the existence, for these countries, of a civil-ecclesiastical law, that is to say, a body of regulations made by the civil authority, with the consent, more or less explicit, of the Church, about ecclesiastical matters, other than spiritual; these dispositions are chiefly concerned with the nomination or confirmation by the state of ecclesiastics to the most important benefices, and with the administration of the property of the Church; sometimes also with questions of jurisdiction, both civil and criminal, concerning the persons or property of the Church. It is plain that the agreements under the concordats have a certain action upon a number of points in the canonical laws; and all these points go to constitute the local concordatory law. This is the case for Austria, Spain, Portugal, Bavaria, the Prussian Rhine provinces, Alsace, Belgium, and, in America, Peru. Up to 1905 it was also the case in France, where the ancient local customs now continue, pending the reorganization of the Church without the concordat.

Countries subject to concordats.

We do not imply that in other countries the Church can always find exemption from legislative measures imposed upon her by the civil authorities, for example, in Italy, Prussia and Russia; but here it is a situation *de facto* rather than *de jure*, which the Church tolerates for the sake of convenience; and these regulations only form part of the local canon law in a very irregular sense.

In other countries the episcopal assemblies lay down the local law. England has its council of Westminster (1852), the United States their plenary councils of Baltimore (1852, 1866, 1884), without mentioning the diocesan synods; and the whole of Latin America is ruled by the special law of its plenary council, held at Rome in 1899. The same is the case with the Eastern Churches united to the Holy See; following the example of the famous council of Lebanon for the Maronites, held in 1730, and that of Zamosc for the Ruthenians, in 1720, these churches, at the suggestion of Leo XIII., have drawn up in plenary assembly their own local law: the Syrians at Sciarfa in 1888; the Ruthenians at Leopol in 1891; and a little later, the Copts. The framing of local law will certainly be more clear and more easy when the general code of canon law has been published.

Other countries.

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[1] *Omnium concilii Vaticani ... documentorum collectio*, per Conradum Martin (Paderborn, 1873), p. 152.

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Canon Law in England and in the Anglican Communion.—There were matters in which the local English and Irish canon law, even before the 16th century, differed from that obtaining on the western part of the European continent. Thus (1), it has been said that—whereas the continental canon law recognized a quadripartite division of Church revenue of common right between (*a*) the bishop, (*b*) the clergy, (*c*) the poor, (*d*) the fabric—the English law maintained a tripartite division—(*a*) clergy, (*b*) the poor, (*c*) the fabric. Lord Selborne (*Ancient Facts and Fictions concerning Churches and Tithes*, 2nd ed., 1892) denies that there was any division of tithe in England. (2) By the general canon law the burden of repairing the nave, as well as the chancel of the church, was upon the parson or rector who collected the whole tithe. But the custom of England transferred this burden to the parishioners, and some particular local customs (as in the city of London) placed even the burden of repair of the chancel on them. To meet this burden church rates were levied. (3) A church polluted by the shedding of blood, as by suicide or murder, was reconsecrated on the continent. In England the custom was (and is) simply to "reconcile." (4) A much more important difference, if the decision of the Irish court of exchequer chamber upheld in the House of Lords, where the peers were equally divided, correctly stated the English canon law (*Reg.* v. *Millis*, 10 Cl. & Fin., 534) was in regard to the essentials of marriage. By the general Western canon law before the council of Trent, the parties themselves were said to be the "ministers of the Sacrament" in the case of holy matrimony. The declared consent of the parties to take each other there and then constituted at once (although irregularly) holy matrimony. The presence of priest or witnesses was not necessary. In *Reg.* v. *Millis*, however, it was held that in England it was always otherwise and that here the presence of a priest was necessary. High authorities, however, have doubted the historical accuracy of this decision. (5) The addition of houses of priests to the provincial synods seems peculiar to England and Ireland.

The historical position of the general canon law of the Catholic Church in the English provinces has, since the separation from Rome, been the subject of much consideration by English lawyers and ecclesiastics. The view taken by the king's courts, and acquiesced in by the ecclesiastical courts, since Henry VIII., is that the Church of England was always an independent national church, subject indeed to the general principles of the *jus commune ecclesiasticum* (Whitlock J. in *Ever* v. *Owen*, Godbolt's Reports, 432), but unbound by any particular constitutions of council or pope; unless those constitutions had been "received" here by English councils, or so recognized by English courts (secular or spiritual) as to become part of the ecclesiastical custom of the realm. Foreign canon law never bound (so it has been taught) *proprio vigore*.

The sources of English ecclesiastical law (purely ecclesiastical) were therefore (1) the principles of the *jus commune ecclesiasticum*; (2) foreign particular constitutions received here, as just explained; (3) the constitutions and canons of English synods (cf. *Phill. Ecc. Law*, part i. ch. iv., and authorities there cited).

1. On the existence of this *jus commune ecclesiasticum* and that the Church of England, in whatever sense independent, takes it over until she repeals it, see *Escott* v. *Mastin*, 4 Moo. *P.C.C.* 119. Lord Brougham, in delivering the judgment, speaks of the "common law prevailing for 1400 years over Christian Europe," and (p. 137) says that "nothing but express enactment can abrogate the common law of all Christendom before the Reformation of the Anglican Church."

2. As to foreign particular constitutions in England, there are a great number of them, of which it has been and is admitted, that they have currency in England. However papal in their origin, post-Reformation lawyers have regarded them as valid, unless they can be shown to be contrary to the king's prerogative, or to the common or statute law of the realm. To this doctrine express statutory authority (as the events have happened) has been given by 25 Hen. VIII. c. 19. sect. 7. A striking example of the doctrine is furnished by the decree of Innocent III. in the Fourth Lateran Council against pluralities. This decree was enforced in the court of Arches against a pluralist clerk in 1848 (*Burder* v. *Mavor*, 1 Roberts, 614). The courts of common law from Lord Coke's time downwards have recognized this "constitution of the pope" (as the queen's bench called it in 1598). The exchequer chamber, in 1837, declared it to have "become part of the common law of the land" (*Alstan* v. *Atlay*, 7 *A.* and *E.* 289).

3. The particular constitutions of English synods are numerous and cover a large field. At least in legal theory, the only distinction between pre-Reformation and post-Reformation constitutions is in favour of the former—so long as they do not contravene the royal prerogative or the law of the land (see 25 Hen. VIII. c. 19). The most important are collected together and digested (so far as regards England) in Lyndwood's *Provinciale*, a work which remains of great authority in English courts. These constitutions are again divided into two classes: (*a*) provincial constitutions promulgated by provincial synods, usually in the name of the presiding archbishop or bishop; and (*b*) decrees of papal legates, Otho in 1236 and Othobon (Ottobuono de' Fieschi, afterwards Pope Adrian V.) in 1269. Canons passed since 25 Hen. VIII. c. 19 have not the parliamentary confirmation which that act has been held to give to previous canons, and do not necessarily bind the laity, although made under the king's licence and ratified by him. This doctrine laid down by Lord Hardwicke in *Middleton* v. *Croft* (2 *Stra.* 1056) was approved in 1860 in *Marshall* v. *Bp. of Exeter* (L.R. 3 H.L. 17). Nevertheless, there are many provisions in these post-Reformation canons which are declaratory of the ancient usage and law of the Church, and the law which they thus record is binding on the laity. The chief body of English post-Reformation canon law is to be found in the canons of 1603, amended in 1865 and 1888. The canons of 1640 are apparently upon the same footing as those of 1603; notwithstanding objections made at the time that they were void because convocation continued to sit after the dissolution of parliament. The opinion of all the judges taken at the time was in favour of the legality of this procedure. 13 Car. ii. c. 12 simply provided that these canons should not be given statutory force by the operation of that act.

In addition to the enactment of canons (strictly so-called) the English provincial synods since the Henrician changes have

legislated—in 1570 by the enactment of the Thirty-Nine Articles, in 1661 by approving the present Book of Common Prayer, and in 1873 by approving shorter forms of matins and evensong.

The distinction between pre-Henrician and post-Henrician procedure lies in the requirement, since 25 Hen. VIII., of the royal licence and confirmation. Apparently diocesan synods may still enact valid canons without the king's authority; but these bodies are not now called.

The prevailing legal view of the position of the Church of England in regard to canon law has been just stated, and that is the view taken by judicial authority for the past three centuries. On the other hand, it is suggested by, *e.g.*, the late Professor Maitland, that it was not, in fact, the view taken here in the later middle ages—that in those ages there was no theory that " reception " here was necessary to validate papal decrees. It is said by this school of legal historians that, from the Conquest down to Henry VIII., the Church of England was regarded by churchmen not as in any sense as separate entity, but as two provinces of the extra-territorial, super-national Catholic Church, and that the pope at this period was contemplated as the *princeps* of this Catholic Church, whose edicts bound everywhere, as those of Augustus had bound in the Roman empire.

It is right that this view should be stated, but it is not that of the writer of this article.

As to *Ireland*, in a national synod of the four Irish provinces held at Dublin before the four archbishops, in 1634, a hundred canons were promulgated with the royal licence, containing much matter not dealt with by similar constitutions in England. In 1711, some further canons were promulgated (with royal licence) by another national synod. Some forms of special prayer were appended to these canons.

In 1869 the Irish Church Act (32 and 33 Vict. c. 42) " disestablished " the Irish Church, sect. 19 repealed any act of parliament, law or custom whereby the bishops, clergy or laity of the said church were prohibited from holding synods or electing representatives thereto for the purpose of making rules for the well-being and ordering of the said church, and enacted that no such law, &c., should hinder the said bishops, clergy and laity, by such representatives, lay and clerical, and so elected as they shall appoint, from meeting in general synod or convention and in such general synod or convention forming constitutions and providing for future representation of the members of the church in diocesan synods, general convention or otherwise. The Church of Ireland, so set free, created for herself new legislative authorities, unknown to the old canon law, viz. mixed synods of clergy and laity, and a system of representation by election, unknown to primitive or medieval times. Similar changes had, however, been introduced during the preceding century in some parts of the Anglican communion outside the British Isles (see *infra*). Sect. 20 of the same statute kept alive the old ecclesiastical law of Ireland by way of assumed contract (cf. ECCLESIASTICAL JURISDICTION).

Under the provisions of this statute, the " archbishops and bishops of the ancient Apostolic and Catholic Church of Ireland " (so they describe themselves), together with representatives of the clergy and laity, assembled in 1870, in " General Convention," to " provide for the regulation " of that church. This Convention declared that a General Synod of the archbishops and bishops, with representatives of the clergy and laity, should have chief legislative power in the Irish Church, with such administrative power as might be necessary and consistent with the church's episcopal constitution. This General Synod was to consist of two Houses—the House of Bishops and the House of Lay and Clerical Representatives. No question was to be carried unless there were in its favour a majority of the clerical and lay representatives, voting either conjointly or by orders, and also a majority of the bishops, should they desire to vote. This General Synod was given full power to alter or amend canons, or to repeal them, or to enact new ones. For any alteration or amendment of " articles, doctrines, rites or rubrics," a two-thirds majority of each order of the representative house was required and a year's delay for consultation of the diocesan synods. Provisions were made as to lay representation in the diocesan synods. The Convention also enacted some canons and a statute in regard to ecclesiastical tribunals (see ECCLESIASTICAL JURISDICTION). It expressly provided that its own legislation might be repealed or amended by future general synods.

In 1871 the General Synod attempted to codify its canon law in forty-eight canons which, " and none other," were to have force and effect as the canons of the Church of Ireland. Since 1871 the General Synod has, from time to time, put forth other canons.

The post-Reformation history of canon law in the Anglican communion in *Scotland* has differed from the story of that law in the last four centuries in Ireland. After the legislation under William and Mary disestablishing episcopacy in Scotland and subjecting its professors to civil penalties, little attention was given to canon law for many years. Synods of bishops at Edinburgh in 1724 and 1731 dealt with some disputed questions of ritual and ceremonial. In 1743 an assembly of five bishops enacted sixteen canons. A " primus " was to be chosen indifferently from the bishops, but to have no other powers than those of convoking and presiding over synods. He was to hold office only during pleasure of the other bishops. Bishops were to be elected by the presbyters of the district. Such election was subject to the confirmation of the majority of the bishops. In 1811, a " Code of Canons " was enacted by a " General Ecclesiastical Synod," consisting of the bishops, the deans (viz. presbyters appointed by the bishops in each diocese to defend the interests of the presbyters and now for the first time given " decisive " voice in synods) and certain clerical representatives from the " districts " or dioceses. Future synods, called for the purpose of altering the code, were to consist of two chambers. The first was to be composed of the bishops; the second to consist of the " deans " and clerical representatives. No law or canon was to be enacted or abrogated, save by the consent of both chambers. These canons were revised in 1828, 1829 and 1838. The code of this last year created diocesan synods, to be held annually and to consist of the bishop, dean and all instituted clergy of the diocese. It also provided for the annual meeting of a purely episcopal synod, which was to receive appeals from either clergy or laity. In 1862–1863, another General Synod further revised and amended the Code of Canons. This revised code enabled the bishop to appoint a learned and discreet layman to act as his chancellor, to advise him in legal matters and be his assessor at diocesan synods. Assistant curates and mission priests were, under certain restrictions, given seats in diocesan synods. Male communicants were also permitted to be present at such synods, with a deliberative but not " decisive " voice; unless in special circumstances the bishop excluded them. Canon 46 provides that " if any question shall arise as to the interpretation of this Code of Canons or of any part thereof, the general principles of canon law shall be alone deemed applicable thereto." This provision was re-enacted in Canon 47 of 1876. Canon 51 of 1890, however, weakens this provision. It enacts that: " The preceding canons shall in all cases be construed in accordance with the principles of the civil law of Scotland. Nevertheless, it shall be lawful, in cases of dispute or difficulty concerning the interpretation of these canons, to appeal to any generally recognized principles of canon law." The canons of 1862–1863 also provided for a lay share in the election of bishops. In 1890 the 32nd canon enacted that the " General Synod " should thereafter be called the Provincial Synod.

The canon law in Scotland before the 16th century was generally that of the continent of Europe. The usages of the church were similar to those in France, and had not the insular character of those in England and Ireland. The canon law regulating marriage, legitimacy and succession was taken over by the Scottish secular courts (see ECCLESIASTICAL JURISDICTION) and survived as part of the common law of the land almost unimpaired. Thus, the courts recognize marriages by *verba de*

praesenti or by *verba de futuro cum copula*—in this last matter following a decree of Gregory IX.—and also legitimation *per subsequens matrimonium*. But though one of the *fontes juris Scotiae*, canon law never was of itself authoritative in Scotland. In the canons of her national provincial councils (at whose yearly meetings representatives attended on behalf of the king) that country possessed a canon law of her own, which was recognized by the parliament and the popes, and enforced in the courts of law. Much of it, no doubt, was borrowed from the *Corpus juris canonici* and the English provincial canons. But the portions so adopted derived their authority from the Scottish Church. The general canon law, unless where it has been acknowledged by act of parliament, or a decision of the courts, or sanctioned by the canons of a provincial council, is only received in Scotland according to equity and expediency.

The "Protestant Episcopal Church *in the United States*" is the organization of the Anglican Communion in the American colonies before the separation. This communion was subject to "all the laws of the Church of England applicable to its situation" (Murray Hoffman, *A Treatise on the Law of the Protestant Episcopal Church*, New York, 1850, p. 17). This body of law the Protestant Episcopal Church of the United States took over (*op. cit.* p. 41 et seq.; F. Vinton, *A Manual Commentary of the General Canon Law and the Constitution of the Protestant Episcopal Church*, New York, 1870, p. 16 et seq.). Much, however, of the English post-Reformation canonical legislation was not applicable to the United States, because of different circumstances, as *e.g.* a very large portion of the canons of 1603 (Vinton, p. 32). In 1789, a General Convention, consisting of clerical and lay deputies as well as of bishops, assumed for itself and provided for its successors supreme legislative power. The concurrence of both "orders," clerical and lay, was required for the validity of any vote. Since 1853 a lay deputy to the Convention has been required to be a communicant (*ib.* p. 102). Upon the American bishops numbering more than three, they became a separate "House" from the "Convention." The House of Bishops was given a right to propose measures to the "House of Deputies," and to negative acts of the House of Deputies, provided they complied with certain forms. Similar "constitutions" providing for representation of the laity have been adopted by the different dioceses (Hoffman, *op. cit.* p. 184 et seq.). Deacons are also admitted to a deciding voice in every diocese but New Jersey, where they may speak but not vote. A great body of legislation has been put forth by these bodies during the past century.

Since 1870, at least, the "Church of the Province of *South Africa*" has secured autonomy while yet remaining a part of the Anglican Communion. By its constitution of that year the English Church in South Africa adopts the laws and usages of the Church of England, as far as they are applicable to an unestablished church, accepts the three creeds, the Thirty-Nine Articles, the Book of Common Prayer, the decisions of the undisputed general councils, the Authorized English Version of the Scriptures, disclaims the right of altering any of these standards of faith and doctrine, except in agreement with such alterations as may be adopted by a general synod of the Anglican Communion. But in interpreting these standards of faith and doctrine, the Church of the Province of South Africa is not bound by decisions other than those of its own Church courts, or such court as the Provincial Synod may recognize as a tribunal of appeal. The Provincial Synod is the legislative authority subject to a general synod of the Anglican Communion, provided such latter synod include representatives from the Church of South Africa. The Provincial Synod consists of (1) the House of Bishops, (2) the House of the Clergy, (3) the House of the Laity. No resolution can be passed which is not accepted by all three orders. Bishops are elected by the clergy with the assent of lay representatives, subject to the confirmation of the metropolitan and comprovincial bishops. The metropolitan is to be consecrated in England by the archbishop of Canterbury. He now bears the title of archbishop. All bishops are to enter into a contract to obey and maintain the constitution and canons of the province. Canon 18 of the Code of 1870 recognizes the offices of catechist, reader and sub-deacon (Wirzmann, *The English Church and People in South Africa*, p. 223 et seq.).

In the West Indies, Canada, Australia and New Zealand, provincial and diocesan synods or conventions have been formed on one or other of the types above mentioned and have enacted canons. (W. G. F. P.)

CANOPUS, or CANOBUS, an ancient coast town of Lower Egypt, a hundred and twenty stadia, or 15 m. east of Alexandria, the principal port in Egypt for Greek trade before the foundation of Alexandria, situated at the mouth of the westernmost (Canopic or Heracleotic) branch of the Nile, on the western bank. The channel, which entered the Mediterranean at the western end of the Bay of Aboukir, is entirely silted up, but on the shore at Aboukir there are extensive traces of the city with its quays, &c. Excavation has disclosed granite monuments with the name of Rameses II., but they may have been brought at a late period for the adornment of the place. It is not certain that Canopus was an old Egyptian town, but it appears in Herodotus as an ancient port. In the 9th year of Ptolemy Euergetes (239 B.C.) a great assembly of priests at Canopus passed an honorific degree, *inter alia*, conferring the title Εὐεργέτης "Benefactor" on the king. Two examples of this decree are known, inscribed in hieroglyphic, demotic and Greek. From it we learn that the native form of the name of Canopus was Karob. A temple of Osiris was built by Euergetes, but very near to Canopus was an older shrine, a temple of Heracles mentioned by Herodotus as an asylum for fugitive slaves. The decree shows that Heracles here stands for Ammon. Osiris was worshipped at Canopus under a peculiar form, a vase with a human head, and was identified with Canopus, the pilot of Menelaus, who was said to have been buried here: the name canopic has been applied, through an old misunderstanding, to the vases with human and animal heads in which the internal organs were placed by the Egyptians after embalming. In the Roman epoch the town was notorious for its dissoluteness. Aboukir means "father Cyrus," referring to a Coptic saint of that name. (F. Ll. G.)

CANOPY (through Fr. *canapé*, from Med. Lat. *canapeum*, classical *conopeum*, a mosquito curtain, Gr. *κώνωψ*, a gnat), the upper part or cover of a niche, or the projecting ornament over an altar or seat or tomb. Early English canopies are generally simple, with trefoiled or cinquefoiled heads; but in the later styles they are very rich, and divided into compartments with pendants, knots, pinnacles, &c. The triangular arrangement over an Early English and Decorated doorway is often called a canopy. The triangular canopies in the north of Italy are peculiar. Those in England are generally part of the arrangement of the arch mouldings of the door, and form, as it were, the hood-moulds to them, as at York. The former are above and independent of the door mouldings, and frequently support an arch with a tympanum, above which is a triangular canopy, as in the Duomo at Florence. Sometimes the canopy and arch project from the wall, and are carried on small jamb shafts, as at San Pietro Martire, at Verona. There is an extremely curious canopy, being a sort of horseshoe arch, surmounting and breaking into a circular arch, at Tournai. Similar canopies are often over windows, as at York, over the great west window, and lower tiers in the towers. These are triangular, while the upper windows in the towers have ogee canopies.

CANOSA (anc. *Canusium*), a town of Apulia, Italy, in the province of Bari, situated on the right bank of the Ofanto (anc. *Aufidus*), 505 ft. above sea-level, 15 m. S.W. of Barletta by rail. Pop. (1901) 24,230. It was rebuilt in 963 below the Roman city, which had been abandoned after its devastation by the Saracens in the 9th century. The former cathedral of S. Sabino (the bishopric passed in 1818 to Andria), in the southern Romanesque style, was consecrated in 1101: it has five domes (resembling St Mark's at Venice, except that it is a Latin cross, instead of a Greek cross, in plan) and many ancient columns. The archiepiscopal throne and pulpit of the end of the 11th century are also fine. On the south side of the building

is the detached mausoleum of Bohemund, son of Robert Guiscard, who died in 1111, constructed partly in Byzantine, partly in the local style. It has fine bronze doors with long inscriptions; the exterior is entirely faced with *cipollino* (Carystian) marble. The conception of this mortuary chapel, which is unique at this period, was undoubtedly derived from the *turbeh* before a mosque; these turbehs are square, domed-roofed tombs in which the sultans and distinguished Mahommedans are buried (E. Bertaux, *L'Art dans l'Italie méridionale*, Paris, 1904, i. 312). A medieval castle crowns the hill on the side of which the city stands. (See CANUSIUM.) (T. As.)

CANOSSA, a ruined castle, 1890 ft. above sea-level, in Emilia, Italy, 12 m. S.W. of Reggio Emilia, commanding a fine view of the Apennines. It belonged to the countess Matilda of Tuscany (d. 1115), and is famous as the scene of the penance performed by the emperor Henry IV. before Pope Gregory VII. in 1077. The castle was destroyed by the inhabitants of Reggio in 1255.

CANOVA, ANTONIO (1757–1822), Italian sculptor, was born on the 1st of November 1757, at Passagno, an obscure village situated amid the recesses of the hills of Asolo, where these form the last undulations of the Venetian Alps, as they subside into the plains of Treviso. At three years of age Canova was deprived of both parents, his father dying and his mother re-marrying. Their loss, however, was compensated by the tender solicitude and care of his paternal grandfather and grandmother, the latter of whom lived to experience in her turn the kindest personal attention from her grandson, who, when he had the means, gave her an asylum in his house at Rome. His father and grandfather followed the occupation of stone-cutters or minor statuaries; and it is said that their family had for several ages supplied Passagno with members of that calling. As soon as Canova's hand could hold a pencil, he was initiated into the principles of drawing by his grandfather Pasino. The latter possessed some knowledge both of drawing and of architecture, designed well, and showed considerable taste in the execution of ornamental works. He was greatly attached to his art; and upon his young charge he looked as one who was to perpetuate, not only the family name, but also the family profession.

The early years of Canova were passed in study. The bias of his mind was to sculpture, and the facilities afforded for the gratification of this predilection in the workshop of his grandfather were eagerly improved. In his ninth year he executed two small shrines of Carrara marble, which are still extant. Soon after this period he appears to have been constantly employed under his grandfather. Amongst those who patronized the old man was the patrician family Falier of Venice, and by this means young Canova was first introduced to the senator of that name, who afterwards became his most zealous patron. Between the younger son, Giuseppe Falier, and the artist a friendship commenced which terminated only with life. The senator Falier was induced to receive him under his immediate protection. It has been related by an Italian writer and since repeated by several biographers, that Canova was indebted to a trivial circumstance—the moulding of a lion in butter—for the warm interest which Falier took in his welfare. The anecdote may or may not be true. By his patron Canova was placed under Bernardi, or, as he is generally called by filiation, Torretto, a sculptor of considerable eminence, who had taken up a temporary residence at Pagnano, a village in the vicinity of the senator's mansion. This took place whilst Canova was in his thirteenth year; and with Torretto he continued about two years, making in many respects considerable progress. This master returned to Venice, where he soon afterwards died; but by the high terms in which he spoke of his pupil to Falier, the latter was induced to bring the young artist to Venice, whither he accordingly went, and was placed under a nephew of Torretto. With this instructor he continued about a year, studying with the utmost assiduity. After the termination of this engagement he began to work on his own account, and received from his patron an order for a group, "Orpheus and Eurydice." The first figure, which represents Eurydice in flames and smoke, in the act of leaving Hades, was completed towards the close of his sixteenth year. It was highly esteemed by his patron and friends, and the artist was now considered qualified to appear before a public tribunal. The kindness of some monks supplied him with his first workshop, which was the vacant cell of a monastery. Here for nearly four years he laboured with the greatest perseverance and industry. He was also regular in his attendance at the academy, where he carried off several prizes. But he relied far more on the study and imitation of nature. From his contemporaries he could learn nothing, for their style was vicious. From their works, therefore, he reverted to living models, as exhibited in every variety of situation. A large portion of his time was also devoted to anatomy, which science was regarded by him as "the secret of the art." He likewise frequented places of public amusement, where he carefully studied the expressions and attitudes of the performers. He formed a resolution, which was faithfully adhered to for several years, never to close his eyes at night without having produced some design. Whatever was likely to forward his advancement in sculpture he studied with ardour. On archaeological pursuits he bestowed considerable attention. With ancient and modern history he rendered himself well acquainted and he also began to acquire some of the continental languages.

Three years had now elapsed without any production coming from his chisel. He began, however, to complete the group for his patron, and the Orpheus which followed evinced the great advance he had made. The work was universally applauded, and laid the foundation of his fame. Several groups succeeded this performance, amongst which was that of "Daedalus and Icarus," the most celebrated work of his noviciate. The simplicity of style and the faithful imitation of nature which characterized them called forth the warmest admiration. His merits and reputation being now generally recognized, his thoughts began to turn from the shores of the Adriatic to the banks of the Tiber, for which he set out at the commencement of his twenty-fourth year.

Before his departure for Rome, his friends had applied to the Venetian senate for a pension, to enable him to pursue his studies without embarrassment. The application was ultimately successful. The stipend amounted to three hundred ducats (about £60 per annum), and was limited to three years. Canova had obtained letters of introduction to the Venetian ambassador, the Cavaliere Zulian, and enlightened and generous protector of the arts, and was received in the most hospitable manner. His arrival in Rome, on the 28th of December 1780, marks a new era in his life. It was here he was to perfect himself by a study of the most splendid relics of antiquity, and to put his talents to the severest test by a competition with the living masters of the art. The result was equal to the highest hopes cherished either by himself or by his friends. The work which first established his fame at Rome was "Theseus vanquishing the Minotaur." The figures are of the heroic size. The victorious Theseus is represented as seated on the lifeless body of the monster. The exhaustion which visibly pervades his whole frame proves the terrible nature of the conflict in which he has been engaged. Simplicity and natural expression had hitherto characterized Canova's style; with these were now united more exalted conceptions of grandeur and of truth. The Theseus was regarded with fervent admiration.

Canova's next undertaking was a monument in honour of Clement XIV.; but before he proceeded with it he deemed it necessary to request permission from the Venetian senate, whose servant he considered himself to be, in consideration of the pension. This he solicited in person, and it was granted. He returned immediately to Rome, and opened his celebrated studio close to the Via del Babuino. He spent about two years of unremitting toil in arranging the design and composing the models for the tomb of the pontiff. After these were completed, other two years were employed in finishing the monument, and it was finally opened to public inspection in 1787. The work, in the opinion of enthusiastic *dilettanti*, stamped the author as the first artist of modern times. After five years of incessant labour, he completed another cenotaph to the memory of Clement

XIII., which raised his fame still higher. Works now came rapidly from his chisel. Amongst these is Psyche, with a butterfly, which is placed on the left hand, and held by the wings with the right. This figure, which is intended as a personification of man's immaterial part, is considered as in almost every respect the most faultless and classical of Canova's works. In two different groups, and with opposite expression, the sculptor has represented Cupid with his bride; in the one they are standing, in the other recumbent. These and other works raised his reputation so high that the most flattering offers were sent him from the Russian court to induce him to remove to St Petersburg, but these were declined. "Italy," says he, in writing of the occurrence to a friend, "Italy is my country—is the country and native soil of the arts. I cannot leave her; my infancy was nurtured here. If my poor talents can be useful in any other land, they must be of some utility to Italy; and ought not her claim to be preferred to all others?"

Numerous works were produced in the years 1795–1797, of which several were repetitions of previous productions. One was the celebrated group representing the "Parting of Venus and Adonis." This famous production was sent to Naples. The French Revolution was now extending its shocks over Italy; and Canova sought obscurity and repose in his native Passagno. Thither he retired in 1798, and there he continued for about a year, principally employed in painting, of which art also he had some knowledge. He executed upwards of twenty paintings about this time. One of his productions is a picture representing the dead body of the Saviour just removed from the cross, surrounded by the three Marys, S. John, Joseph of Arimathea, and, somewhat in the background, Nicodemus. Above appears the Father, with the mystic dove in the centre of a glory, and surrounded by a circle of cherubs. This composition, which was greatly applauded, he presented to the parochial church of his native place. Events in the political world having come to a temporary lull, he returned to Rome; but his health being impaired from arduous application, he took a journey through a part of Germany, in company with his friend Prince Rezzonico. He returned from his travels much improved, and again commenced his labours with vigour and enthusiasm.

Canova's sculptures have been distributed under three heads:—(1) Heroic compositions; (2) Compositions of grace and elegance; and (3) Sepulchral monuments and relievos. In noticing the works which fall under each of these divisions, it will be impossible to maintain a strict chronological order, but perhaps a better idea of his productions may thus be obtained. Their vast number, however, prevents their being all enumerated.

(1) His "Perseus with the Head of Medusa" appeared soon after his return. The moment of representation is when the hero, flushed with conquest, displays the head of the "snaky Gorgon," whilst the right hand grasps a sword of singular device. By a public decree, this fine work was placed in one of the *stanze* of the Vatican hitherto reserved for the most precious works of antiquity; but it would be a mistake to say that it wholly sustains this comparison, or that it rivals the earlier realization of the same subject in Italian art, that by Cellini. In 1802, at the personal request of Napoleon, Canova repaired to Paris to model a bust of the first consul. The artist was entertained with munificence, and various honours were conferred upon him. The statue, which is colossal, was not finished till six years after. On the fall of the great Napoleon, Louis XVIII. presented this statue to the British government, by whom it was afterwards given to the duke of Wellington. "Palamedes," "Creugas and Damoxenus," the "Combat of Theseus and the Centaur," and "Hercules and Lichas" may close the class of heroic compositions, although the catalogue might be swelled by the enumeration of various others, such as "Hector and Ajax," and the statues of Washington, King Ferdinand of Naples, and others. The group of "Hercules and Lichas" is considered as the most terrible conception of Canova's mind, and in its peculiar style as scarcely to be excelled.

(2) Under the head of compositions of grace and elegance, the statue of Hebe takes the first place in point of date. Four times has the artist embodied in stone the goddess of youth, and each time with some variation. The only material improvement, however, is the substitution of a support more suitable to the simplicity of the art. Each of the statues is, in all its details, in expression, attitude and delicacy of finish, strikingly elegant. The "Dancing Nymphs" maintain a character similar to that of the Hebe. The "Graces" and the "Venus" are more elevated. The "Awakened Nymph" is another work of uncommon beauty. The mother of Napoleon, his consort Maria Louisa (as Concord), to model whom the author made a further journey to Paris in 1810, the princess Esterhazy and the muse Polymnia (Elisa Bonaparte) take their place in this class, as do the ideal heads, comprising Corinna, Sappho, Laura, Beatrice and Helen of Troy.

(3) Of the cenotaphs and funeral monuments the most splendid is the monument to the archduchess Maria Christina of Austria, consisting of nine figures. Besides the two for the Roman pontiffs already mentioned, there is one for Alfieri, another for Emo, a Venetian admiral, and a small model of a cenotaph for Nelson, besides a great variety of monumental relievos.

The events which marked the life of the artist during the first fifteen years of the period in which he was engaged on the above-mentioned works scarcely merit notice. His mind was entirely absorbed in the labours of his studio, and, with the exception of his journeys to Paris, one to Vienna, and a few short intervals of absence in Florence and other parts of Italy, he never quitted Rome. In his own words, "his statues were the sole proofs of his civil existence." There was, however, another proof, which modesty forbade him to mention, an ever-active benevolence, especially towards artists. In 1815 he was commissioned by the Pope to superintend the transmission from Paris of those works of art which had formerly been conveyed thither under the direction of Napoleon. By his zeal and exertions, for there were many conflicting interests to reconcile, he adjusted the affair in a manner at once creditable to his judgment and fortunate for his country. In the autumn of this year he gratified a wish he had long entertained of visiting London, where he received the highest tokens of esteem. The artist for whom he showed particular sympathy and regard in London was Haydon, who might at the time be counted the sole representative of historical painting there, and whom he especially honoured for his championship of the Elgin marbles, then recently transported to England, and ignorantly depreciated by polite connoisseurs. Canova returned to Rome in the beginning of 1816, with the ransomed spoils of his country's genius. Immediately after, he received several marks of distinction,—by the hand of the Pope himself his name was inscribed in "the Golden Volume of the Capitol;" and he received the title of marquis of Ischia, with an annual pension of 3000 crowns, about £625.

He now contemplated a great work, a colossal statue of Religion. The model filled Italy with admiration; the marble was procured, and the chisel of the sculptor ready to be applied to it, when the jealousy of churchmen as to the site, or some other cause, deprived the country of the projected work. The mind of Canova was inspired with the warmest sense of devotion, and though foiled in this instance he resolved to consecrate a shrine to the cause. In his native village he began to make preparations for erecting a temple which was to contain, not only the above statue, but other works of his own; within its precincts were to repose also the ashes of the founder. Accordingly he repaired to Passagno in 1819. At a sumptuous entertainment which he gave to his workmen, there occurred an incident which marks the kindliness of his character. When the festivities of the day had terminated, he requested the shepherdesses and peasant-girls of the adjacent hamlets to pass in review before him, and to each he made a present, expending on the occasion about £400. We need not, therefore, be surprised that a few years afterwards, when the remains of the donor came to be deposited in their last asylum, the grief which the surrounding peasantry evinced was in natural expression so intense as to eclipse the studied solemnity of more pompous mourning.

After the foundation-stone of this edifice had been laid,

Canova returned to Rome; but every succeeding autumn he continued to visit Passagno, in order to direct the workmen, and encourage them with pecuniary rewards and medals. In the meantime the vast expenditure exhausted his resources, and compelled him to labour with unceasing assiduity notwithstanding age and disease. During the period which intervened between commencing operations at Passagno and his decease, he executed or finished some of his most striking works. Amongst these were the group "Mars and Venus," the colossal figure of Pius VI., the "Pietà," the "St John," the "recumbent Magdalen." The last performance which issued from his hand was a colossal bust of his friend, the Count Cicognara. In May 1822 he paid a visit to Naples, to superintend the construction of wax moulds for an equestrian statue of the perjured Bourbon king Ferdinand. This journey materially injured his health, but he rallied again on his return to Rome. Towards the latter end of the year he paid his annual visit to the place of his birth, when he experienced a relapse. He proceeded to Venice, and expired there on the 13th of October 1822, at the age of nearly sixty-five. His disease was one which had affected him from an early age, caused by the continual use of carving-tools, producing a depression of the ribs. The most distinguished funeral honours were paid to his remains, which were deposited in the temple at Passagno on the 25th of the same month.

Canova, in a certain sense, renovated the art of sculpture in Italy, and brought it back to that standard from which it had declined when the sense both of classical beauty and moderation, and of Titanic invention and human or superhuman energy as embodied by the unexampled genius of Michelangelo, had succumbed to the overloaded and flabby mannerisms of the 17th and 18th centuries. His finishing was refined, and he had a special method of giving a mellow and soft appearance to the marble. He formed his models of the same size as the work was intended to be. The prominent defect of Canova's attractive and highly trained art is that which may be summed up in the word artificiality,—that quality, so characteristic of the modern mind, which seizes upon certain properties of conception and execution in the art of the past, and upon certain types of beauty or emotion in life, and makes a compound of the two—regulating both by the standard of taste prevalent in contemporary "high society," a standard which, referring to cultivation and refinement as its higher term, declines towards fashion as the lower. Of his moral character a generous and unwearied benevolence formed the most prominent feature. The greater part of the vast fortune realized by his works was distributed in acts of this description. He established prizes for artists and endowed all the academies of Rome. The aged and unfortunate were also the objects of his peculiar solicitude. His titles were numerous. He was enrolled amongst the nobility of several states, decorated with various orders of knighthood, and associated in the highest professional honours.

See the *Life of Canova* by Memes; that by Missirini; the *Biografia* by the Count Cicognara; *Canova et ses ouvrages*, by Quatremère de Quincy (1834); *Opere scelte di Antonio Canova*, by Anzelmi (Naples, 1842); *Canova*, by A. G. Meyer (1898); and *La Relazione del Canova con Napoli . . . memorie con documenti inediti*, by Angelo Borzelli (1901). (W. M. R.)

CANOVAS DEL CASTILLO, ANTONIO (1828–1897), Spanish statesman, was born in Malaga on the 8th of February 1828. Educated in his native town, he went to Madrid in 1845, bent upon finding means to complete his literary and philosophical studies. His uncle, Don Serafin Estebañez Calderon, found him a situation as clerk in the Madrid-Aranjuez railway, but Canovas soon took to journalism and literature, earning enough to support himself and pay for his law studies at the Madrid University. During this period he published his two best works—an historical novel, *Las Campanas de Huesca*, and the history of the decay of Spain from Philip III. to Charles II. under the house of Austria. He became a politician through his Junius-like letters to the "Murcielago"—*The Bat*, a satirical political journal—and by drawing up the manifesto of Manzanares in 1854 for Marshal O'Donnell, of whom he always remained a loyal adherent. Canovas entered the Cortes in 1854; he was made governor of Cadiz in 1857, sub-director of the state department in 1858, under-secretary at the home office in 1860, minister of the interior in 1864, minister of the colonies in 1865, minister of finance in 1866, and was exiled by Marshal Narvaez in the same year, afterwards becoming a bitter opponent of all the reactionary cabinets until the revolution of 1868. He took no part in preparing that event. He sat in the Cortes Constituyentes of 1869 as a doctrinaire Conservative, combating all Radical and democratic reforms, and defending the exiled Bourbons; but he abstained from voting when the Cortes elected Amadeus king on the 16th of November 1870. He did not object to some of his political friends, like Silvela and Elduayen, entering the cabinets of King Amadeus, and in 1872 declared that his attitude would depend on the concessions which government would make to Conservative principles. After the abdication of Amadeus and the proclamation of the federal republic, Canovas took the lead of the propaganda in favour of the restoration of the Bourbons, and was their principal agent and adviser. He drew up the manifesto issued in 1874 by the young king Alphonso XII., at that time a cadet at Sandhurst; but he dissented from the military men who were actively conspiring to organize an Alphonsist *pronunciamiento*. Like Marshal Concha, marquis del Duero, he would have preferred to let events develop enough to allow of the dynasty being restored without force of arms, and he severely blamed the conduct of the generals when he first heard of the *pronunciamiento* of Marshal Campos at Sagunto. Sagasta thereupon caused Canovas to be arrested (30th of December 1874); but the next day the Madrid garrison also proclaimed Alphonso XII. king, and Canovas showed the full powers he had received from the king to assume the direction of affairs. He formed a regency ministry pending the arrival of his majesty, who confirmed his appointment, and for six years Canovas was premier except during the short-lived cabinets of Marshal Jovellar in 1875 and Marshal Campos for a few months in 1879. Canovas was, in fact, the soul of the Restoration. He had to reconstruct a Conservative party out of the least reactionary parties of the days of Queen Isabella and out of the more moderate elements of the revolution. With such followers he made the constitution of 1876 and all the laws of the monarchy, putting a limited franchise in the place of universal suffrage, curtailing liberty of conscience, rights of association and of meeting, liberty of the press, checking democracy, obliging the military to abstain from politics, conciliating the Carlists and Catholics by his advances to the Vatican, the Church and the religious orders, pandering to the protectionists by his tariff policy, and courting abroad the friendship of Germany and Austria after contributing to the marriage of his king to an Austrian princess. Canovas crowned his policy by countenancing the formation of a Liberal party under Sagasta, flanked by Marshal Serrano and other Liberal generals, which took office in 1881. He again became premier in 1883, and remained in office until November 1885; but he grew very unpopular, and nearly endangered the monarchy in 1885 by his violent repression of popular and press demonstrations, and of student riots in Madrid and the provinces. At the death of Alphonso XII. he at once advised the queen regent to send for Sagasta and the Liberals, and during five years he looked on quietly whilst Sagasta re-established universal suffrage and most of the liberties curtailed in 1876, and carried out a policy of free trade on moderate lines. In 1890 Canovas took office under the queen regent, and one of his first acts was to reverse the tariff policy of the Liberals, denouncing all the treaties of commerce, and passing in 1892 a highly protectionist tariff. This was the starting-point of the decline in foreign trade, the advance of foreign exchanges, the decay of railway traffic, and the monetary and financial crisis which continued from 1892 to 1898. Splits in the Conservative ranks forced Canovas to resign at the end of 1893, and Sagasta came in for eighteen months. Canovas resumed office in March 1895 immediately after the outbreak of the Cuban insurrection, and devoted most of his time and efforts, with characteristic determination, to the preparation of ways and means for sending 200,000 men to the West Indies to carry out his stern and unflinching policy of no surrender, no concessions and no reforms. He was making up his mind for another effort

to enable General Weyler to enforce the reforms that had been wrung from the Madrid government, more by American diplomacy than from a sense of the inevitable, when the bullet of an anarchist, in August 1897, at the baths of Santa Agueda, cut short his career. On the whole, Canovas must be regarded as the greatest Spanish statesman of the close of the 19th century. He was not only a politician but also a man of the world, a writer of considerable merit, a scholar well versed in social, economic and philosophical questions, a great debater, a clever lecturer, a member of all the Madrid academies and a patron of art and letters. (A. E. H.)

CANROBERT, FRANÇOIS CERTAIN (1809–1895), marshal of France, was born at St Céré (Lot) on the 27th of June 1809 and educated at St Cyr; he received a commission as sub-lieutenant in 1828, becoming lieutenant in 1833. He went to Algeria in 1835, served in the expedition to Mascara, at the capture of Tlemcen, and in 1837 became captain. In the same year he was wounded in the storm of Constantine, receiving the Legion of Honour for his conduct. In 1839 he was employed in organizing a battalion of the Foreign Legion for the Carlist Wars. In 1841 he was again serving in Africa. Promoted lieutenant-colonel in 1846 and colonel of the 3rd regiment in 1847, he commanded the expedition against Ahmed Sghir in 1848, and defeated the Arabs at the Djerma Pass. Transferred to the Zouaves, he defeated the Kabyles, and in 1849 displayed both courage and energy in reinforcing the blockaded garrison of Bou Sada, and in command of one of the attacking columns at Zaatcha (December 1849). For his valour on the latter occasion he received the rank of general of brigade and the commandership of the Legion of Honour. He led the expedition against Narah in 1850 and destroyed the Arab stronghold. Summoned to Paris, he was made aide-de-camp to the president, Louis Napoleon, and took part in the *coup d'état* of the 2nd of December 1851. In the Crimean War he commanded a division at the Alma, where he was twice wounded. He held a dormant commission entitling him to command in case of St Arnaud's death, and he thus succeeded to the chief command of the French army a few days after the battle. He was slightly wounded and had a horse killed under him at Inkerman, when leading a charge of Zouaves. Disagreements with the English commander-in-chief and, in general, the disappointments due to the prolongation of the siege of Sevastopol led to his resignation of the command, but he did not return to France, preferring to serve as chief of his old division almost up to the fall of Sevastopol. After his return to France he was sent on diplomatic missions to Denmark and Sweden, and made a marshal and senator of France (grand cross Legion of Honour, and honorary G.C.B.). He commanded the III. army corps in Lombardy in 1859, distinguishing himself at Magenta and Solferino. He successively commanded the camp at Châlons, the IV. army corps at Lyons and the army of Paris. In the Franco-German War he commanded the VI. army corps, which won the greatest distinction in the battle of Gravelotte, where Canrobert commanded on the St Privat position. The VI. corps was amongst those shut up in Metz and included in the surrender of that fortress. After the war Canrobert was appointed a member of the superior council of war, and was also active in political life, being elected senator for Lot in 1876 and for Charente in 1879 and again in 1885. He died at Paris on the 28th of January 1895 and his remains received a public funeral. His *Souvenirs* were published in 1898 at Paris.

CANT, ANDREW (1590?–1663), a leader of the Scottish Covenanters. About 1623 the people of Edinburgh called him to be their minister, but he was rejected by James I. Ten years later he was minister of Pitsligo in Aberdeenshire, a charge which he left in 1638 for that of Newbattle in Mid-Lothian. In July of that year he went with other commissioners to Aberdeen in the vain attempt to induce the university and the presbytery of that city to subscribe the National Covenant, and in the following November sat in the general assembly at Glasgow which abolished episcopacy in Scotland. In 1640 he was chaplain to the Scottish army and then settled as minister at Aberdeen. Though a stanch Covenanter, he was a zealous Royalist, preaching before Charles I. in Edinburgh, and stoutly advocating the restoration of the monarchy in the time of the Commonwealth. Cant's frequent and bitter attacks on various members of his congregation led in 1660 to complaints laid before the magistrates, in consequence of which he resigned his charge. His son Andrew was principal of Edinburgh University (1675–1685).

CANT. (1) (Possibly through the Fr. from Lat. *cantos*, corner), in architecture, a term used where the corner of a square is cut off, octagonally or otherwise. Thus a bay window, the sides of which are not parallel, or at right angles to the spectator, is said to be canted. (2) (From the Lat. *cantare*, to sing, very early in use, in a depreciatory sense, of religious services), a word appearing in English in the 16th century for the whining speech of beggars; hence it is applied to thieves' or gipsies' jargon, to the peculiar language of any class or sect, to any current phrase or turn of language, and particularly to the hypocritical use of pious phraseology.

CANTABRI, an ancient tribe which inhabited the north coast of Spain near Santander and Bilbao and the mountains behind—a district hence known as Cantabria. Savage and untameable mountaineers, they long defied the Roman arms and made themselves a name for wild freedom. They were first attacked by the Romans about 150 B.C.; they were not subdued till Agrippa and Augustus had carried out a series of campaigns (29–19 B.C.) which ended in their partial annihilation. Thenceforward their land was part of the province Hispania Tarraconensis with some measure of local self-government. They became slowly Romanized, but developed little town life and are rarely mentioned in history. They provided recruits for the Roman *auxilia*, like their neighbours the Astŭres, and their land contained lead mines, of which, however, little is known.

CANTABRIAN MOUNTAINS (Span. *Cordillera Cantabrica*), a mountain chain which extends for more than 300 m. across northern Spain, from the western limit of the Pyrenees to the borders of Galicia, and on or near the coast of the Bay of Biscay. The Cantabrians stretch from east to west, nearly parallel to the sea, as far as the pass of Leitariegos, afterwards trending southward between Leon and Galicia. Their western boundary is marked by the valley of the river Miño (Portuguese Minho), by the lower Sil, which flows into the Miño, and by the Cabrera, a small tributary of the Sil. Some geographers regard the mountains of Galicia beyond the Miño as an integral part of the same system; others confine the name to the eastern half of the highlands between Galicia and the Pyrenees, and call their western half the Asturian Mountains. There are also many local names for the subsidiary ranges within the chain. As a whole, the Cantabrian Mountains are remarkable for their intricate ramifications, but almost everywhere, and especially in the east, it is possible to distinguish two principal ranges, from which the lesser ridges and mountain masses radiate. One range, or series of ranges, closely follows the outline of the coast; the other, which is loftier, forms the northern limit of the great tableland of Castile and Leon, and is sometimes regarded as a continuation of the Pyrenees. The coastal range rises in some parts sheer above the sea, and everywhere has so abrupt a declivity that the streams which flow seaward are all short and swift. The descent from the southern range to the high plateaus of Castile is more gradual, and several large rivers, notably the Ebro, rise here and flow to the south or west. The breadth of the Cantabrian chain, with all its ramifications, increases from about 60 m. in the east to about 115 m. in the west. Many peaks are upwards of 6000 ft. high, but the greatest altitudes are attained in the central ridges on the borders of Leon, Oviedo, Palencia and Santander. Here are the Peña Vieja (8743 ft.), Prieta (8304 ft.) and Espinguete (7898 ft.); an unnamed summit in the Peñas de Europa, to which range the Peña Vieja also belongs, rises on the right bank of the Sella to a height of 8045 ft.; farther west the peaks of Manipodre, Ubiña, Rubia and Cuiña all exceed 7000 ft. A conspicuous feature of the chain, as of the adjacent tableland, is the number of its *parameras*, isolated plateaus shut in by lofty mountains or even by precipitous walls of rock. At the south-western extremity of the chain is el Vierzo, once a

lake-bed, now a valley drained by the upper Sil and enclosed by mountains which bifurcate from the main range south of the pass of Leitariegos—the Sierra de Justredo and Montañas de Leon curving towards the east and south-west, the Sierra de Picos, Sierra del Caurel and other ranges curving towards the west and south-east. The Cantabrians are rich in coal and iron; an account of their geological structure is given under SPAIN. They are crossed at many points by good roads and in their eastern half by several railways. In the west, near the pass of Pájares, the railway from Leon to Gijón passes through the Perruca tunnel, which is 2 m. long and 4200 ft. above sea-level; the railway descends northward through fifty-eight smaller tunnels. The line from Leon to Orense also traverses a remarkable series of tunnels, bridges and deep cuttings.

CANTACUZINO, CANTACUZEN or CANTACUZENE, the name of a family which traces its origin to the Byzantine emperors and writers of the same name (see under JOHN V., Cantacuzene). The founder of the family, Andronik, migrated to Rumania in 1633, and from his two sons Constantine and Gheorge sprang the two principal lines which afterwards branched into numerous families of nobles and high dignitaries, including hospodars (rulers) of Walachia and Moldavia. The Cantacuzinos were represented in every branch of administration and in the world of letters. Under their influence the Rumanian language and literature in the 17th century reached their highest development. Among the more prominent members of the family the following may be mentioned. (1) SHERBAN CANTACUZINO (1640–1688), appointed hospodar of Walachia in 1679. He served under the Turks in the siege of Vienna, and when they were defeated it is alleged that he conceived the plan of marching on Constantinople to drive the Turks out of Europe, the western powers having promised him their moral support. In the midst of his preparations he died suddenly, poisoned, it is said, by the boyars who were afraid of his vast plans. Far more important was his activity in economic and literary directions. He introduced the maize into Rumania; it is now the staple food of the country. He founded the first Rumanian school in Bucharest; he assisted liberally in the establishment of various printing offices; and under his auspices the famous Rumanian Bible appeared in Bucharest in 1688. Through his influence also the Slavonic language was officially and finally abolished from the liturgy and the Rumanian language substituted for it. (2) STEFAN CANTACUZINO, son of Constantine, prince of Walachia, 1714–1716. (3) DEMETRIUS CANTACUZINO, prince of Moldavia, 1674–1676. He left an unsatisfactory record. Descendants of Demetrius and Sherban have emigrated to Russia, and held high positions there as governors of Bessarabia and in other responsible posts. (4) Of the Moldavian Cantacuzinos, THEODORE is well known as a chronicler of his times (*c.* 1749). (5) GHEORGE CANTACUZINO (b. 1837), son of GREGORI (1800–1849). He was appointed in 1870 minister of public instruction in Rumania; in 1889, president of the chamber; in 1892, president of the senate; from 1899 he was head of the Conservative party, and from 1905 to 1907 prime minister (see also RUMANIA: *History*). (M. G.)

CANTAGALLO, an inland town of the state of Rio de Janeiro, Brazil, about 100 m. by rail N.E. of the port of Rio de Janeiro, with which it is connected by the Cantagallo railway. Pop. (1890) of the municipality, 26,067, of whom less than one-fourth live in the town. Cantagallo is situated in the fertile Parahyba valley and is the commercial centre of a rich coffee-producing district. There are exhausted gold placer mines in its vicinity, but they were not rich enough to cause any considerable development in mining. Coffee production is the principal industry, but sugar-cane is grown to a limited extent, and some attention is given to the raising of cattle and swine. The district is an excellent fruit region.

CANTAL, a department of central France, formed from Haute-Auvergne, the southern portion of the old province of Auvergne. It is bounded N. by the department of Puy-de-Dôme, E. by Haute-Loire, S.E. by Lozère, S. by Aveyron and Lozère, and W. by Corrèze and Lot. Area 2231 sq. m. Pop. (1906) 228,690. Cantal is situated in the middle of the central plateau of France. It takes its name from the Monts du Cantal, a volcanic group occupying its central region, and continued towards the north and east by ranges of lower altitude. The Plomb du Cantal, the culminating summit of the department, attains a height of 6096 ft.; and its neighbours, the Puy Mary and the Puy Chavaroche, attain a height of 5863 and 5722 ft. respectively. Immediately to the east of this central mass lies the lofty but fertile plateau of Planèze, which merges into the Monts de la Margeride on the eastern border. The valley of the Truyère skirts the Planèze on the south and divides it from the Monts d'Aubrac, at the foot of which lies Chaudesaigues, noted for its thermal springs, the most important in the department. Northwards the Monts du Cantal are connected with the Monts Dore by the volcanic range of Cézallier and the arid plateaus of Artense. In the west of the department grassy plateaus and beautiful river valleys slope gently down from the central heights. Most of the streams of the department have their sources in this central ridge and fall by a short and rapid course into the rivers which traverse the extensive valleys on either side. The principal rivers are the Alagnon, a tributary of the Allier; the Celle and Truyère, tributaries of the Lot; and the Cère and Rue, tributaries of the Dordogne. The climate of the department varies considerably in the different localities. In the alluvial plain between Murat and St Flour, and in the south-west in the arrondissement of Aurillac, it is generally mild and dry; but in the northern and central portions the winters are long and severe and the hurricanes peculiarly violent. The cold and damp of the climate in these districts are great obstacles to the cultivation of wheat, but rye and buckwheat are grown in considerable quantities, and in natural pasture Cantal is extremely rich. Cattle are accordingly reared with profit, especially around Salers and in the Monts d'Aubrac, while butter and Roquefort cheese are made in large quantities. Large flocks of sheep pasture in the Monts d'Aubrac and elsewhere in the department; goats are also reared. The inhabitants are simple and primitive and accustomed to live on the scantiest fare. Many of them migrate for part of the year to Paris and the provinces, where they engage in the humblest occupations. The principal articles of food are rye, buckwheat and chestnuts. The internal resources of the department are considerable; but the difficulty of land-carriage prevents them being sufficiently developed. The hills and valleys abound with game and the streams with fish. Cantal produces a vast variety of aromatic and medicinal plants; and its mineral products include coal, antimony and lime. The department has no prominent manufactures. Live-stock, cheese, butter and coal are the principal exports; coal, wine, cereals, flour and earthenware are imported. The department is served by the railways of the Orléans and Southern companies, the construction of which at some points demanded considerable engineering skill, notably in the case of the viaduct of Garabit spanning the gorge of the Truyère. Cantal is divided into four arrondissements—Aurillac, Mauriac, Murat and St Flour—23 cantons and 267 communes. It belongs to the region of the XIII. army corps and to the académie (educational division) of Clermont-Ferrand. Its bishopric is at St Flour and depends on the archbishopric of Bourges. Its court of appeal is at Riom. The capital is Aurillac (*q.v.*), and St Flour (*q.v.*) is the other principal town.

CANTARINI, SIMONE (1612–1648), called SIMONE DA PESARO, painter and etcher, was born at Oropezza near Pesaro in 1612. He was a disciple of Guido Reni and a fellow-student of Domenichino and Albano. The irritability of his temper and his vanity were extreme; and it is said that his death, which took place at Verona in 1648, was occasioned by chagrin at his failure in a portrait of the duke of Mantua. Others relate that he was poisoned by a Mantuan painter whom he had injured. His pictures, though masterly and spirited, are deficient in originality. Some of his works have been mistaken for examples of Guido Reni, to whom, indeed, he is by some considered superior in the extremities of the figures. Among his principal paintings are "St Anthony," at Cagli; the "Magdalene," at Pesaro; the "Transfiguration," in the Brera Gallery, Milan; the "Portrait

of Guido," in the Bologna gallery; and "St Romuald," in the Casa Paolucci. His most celebrated etching is "Jupiter, Neptune and Pluto, honouring the arms of Cardinal Borghese."

CANTATA (Italian for a song or story set to music), a vocal composition accompanied by instruments and generally containing more than one movement. In the 16th century, when all serious music was vocal, the term had no reason to exist, but with the rise of instrumental music in the 17th century cantatas began to exist under that name as soon as the instrumental art was definite enough to be embodied in sonatas. From the middle of the 17th till late in the 18th century a favourite form of Italian chamber music was the cantata for one or two solo voices, with accompaniment of harpsichord and perhaps a few other solo instruments. It consisted at first of a declamatory narrative or scene in recitative, held together by a primitive aria repeated at intervals. Fine examples may be found in the church music of Carissimi; and the English vocal solos of Purcell (such as *Mad Tom* and *Mad Bess*) show the utmost that can be made of this archaic form. With the rise of the Da Capo aria the cantata became a group of two or three arias joined by recitative. Handel's numerous Italian duets and trios are examples on a rather large scale. His Latin motet *Silete Venti*, for soprano solo, shows the use of this form in church music.

The Italian solo cantata naturally tended, when on a large scale, to become indistinguishable from a scene in an opera. In the same way the church cantata, solo or choral, is indistinguishable from a small oratorio or portion of an oratorio. This is equally evident whether we examine the unparalleled church cantatas of Bach, of which nearly 200 are extant, or the *Chandos Anthems* of Handel. In Bach's case many of the larger cantatas are actually called oratorios; and the *Christmas Oratorio* is a collection of six church cantatas actually intended for performance on six different days, though together forming as complete an artistic whole as any classical oratorio.

The essential point, however, in Bach's church cantatas is that they formed part of a church service, and moreover of a service in which the organization of the music was far more coherent than is possible in the Anglican church. Many of Bach's greatest cantatas begin with an elaborate chorus followed by a couple of arias and recitatives, and end with a plain chorale. This has often been commented upon as an example of Bach's indifference to artistic climax in the work as a whole. But no one will maintain this who realizes the place which the church cantata occupied in the Lutheran church service. The text was carefully based upon the gospel or lessons for the day; unless the cantata was short the sermon probably took place after the first chorus or one of the arias, and the congregation joined in the final chorale. Thus the unity of the service was the unity of the music; and, in the cases where all the movements of the cantata were founded on one and the same chorale-tune, this unity has never been equalled, except by those 16th-century masses and motets which are founded upon the Gregorian tones of the festival for which they are written.

In modern times the term cantata is applied almost exclusively to choral, as distinguished from solo vocal music. There has, perhaps, been only one kind of cantata since Bach which can be recognized as an art form and not as a mere title for works otherwise impossible to classify. It is just possible to recognize as a distinct artistic type that kind of early 19th-century cantata in which the chorus is the vehicle for music more lyric and song-like than the oratorio style, though at the same time not exclude ing the possibility of a brilliant climax in the shape of a light order of fugue. Beethoven's *Glorreiche Augenblick* is a brilliant "pot-boiler" in this style; Weber's *Jubel Cantâta* is a typical specimen, and Mendelssohn's *Walpurgisnacht* is the classic. Mendelssohn's "Symphony Cantata," the *Lobgesang*, is a hybrid work, partly in the oratorio style. It is preceded by three symphonic movements, a device avowedly suggested by Beethoven's ninth symphony; but the analogy is not accurate, as Beethoven's work is a symphony of which the fourth movement is a choral finale of essentially single design, whereas Mendelssohn's "Symphony Cantata" is a cantata with three symphonic preludes. The full lyric possibilities of a string of choral songs were realized at last by Brahms in his *Rinaldo*, set to a text which Goethe wrote at the same time as he wrote that of the *Walpurgisnacht*. The point of Brahms's work (his only experiment in this *genre*) has naturally been lost by critics who expected in so voluminous a composition the qualities of an elaborate choral music with which it has nothing whatever to do. Brahms has probably said the last word on this subject; and the remaining types of cantata (beginning with Beethoven's *Meeres-stille*, and including most of Brahms's and many notable English small choral works) are merely so many different ways of setting to choral music a poem which is just too long to be comprised in one movement. (D. F. T.)

CANTEEN (through the Fr. *cantine*, from Ital. *cantina*, a cellar), a word chiefly used in a military sense for an official sutler's shop, where provisions, &c., are sold to soldiers. The word was formerly applied also to portable equipments for carrying liquors and food, or for cooking in the field. Another sense of the word, which has survived to the present day, is that of a soldier's water-bottle, or of a small wooden or metal can for carying a workman's liquor, &c.

CANTEMIR, the name of a celebrated family of Tatar origin, which came from the Crimea in the 17th century and settled in Moldavia.

CONSTANTINE CANTEMIR became a prince of Moldavia, 1685–1693. He was a good and conscientious ruler, who protected the people from the rapacity of the tax-gatherers and introduced peace into his country. He was succeeded on the throne by his son Antioch, who ruled twice, 1696–1700 and 1705–1707.

His youngest brother, DEMETRIUS or DEMETER CANTEMIR (b. October 26, 1673), was made prince of Moldavia in 1710; he ruled only one year, 1710–1711, when he joined Peter the Great in his campaign against the Turks and placed Moldavia under Russian suzerainty. Beaten by the Turks, Cantemir emigrated to Russia, where he and his family finally settled. He died at Kharkov in 1723. He was known as one of the greatest linguists of his time, speaking and writing eleven languages, and being well versed in Oriental scholarship. He was a voluminous and original writer of great sagacity and deep penetration, and his writings range over many subjects. The best known is his *History of the Growth and Decay of the Ottoman Empire*. He also wrote a history of oriental music, which is no longer extant; the first critical history of Moldo-Walachia; the first geographical, ethnographical and economic description of Moldavia, *Descriptio Moldaviae*, under the name of *Historia Hieroglyphica*, to which he furnished a key, and in which the principal persons are represented by animals; also the history of the two ruling houses of Brancovan and Cantacuzino; and a philosophical treatise on the old theme of the disputation between soul and body, written in Greek and Rumanian under the title *Divanul Lumii*.

The latter's son, ANTIOCH CANTEMIR (born in Moldavia, 1700; died in Paris, 1744), became in 1731 Russian minister in Great Britain, and in 1736 minister plenipotentiary in Paris. He brought to London the Latin MS. from whence the English translation of his father's history of the Turkish empire was made by N. Tindal, London, 1756, to which he added an exhaustive biography and bibliography of the author (pp. 455-460). He was a Russian poet and almost the first author of satires in modern Russian literature.

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CANTERBURY, CHARLES MANNERS-SUTTON, 1ST VISCOUNT (1780–1845), speaker of the House of Commons, was the elder son of Charles Manners-Sutton (*q.v.*), afterwards archbishop of Canterbury, and was born on the 29th of January 1780 Educated at Eton and Trinity College, Cambridge, he graduated B.A. in 1802, and was called to the bar at Lincoln's Inn in 1806. At the general election of this year he was returned to parliament

in the Tory interest as member for Scarborough, and in 1809 became judge-advocate-general in the ministry of Spencer Perceval. He retained this position until June 1817, when he was elected speaker in succession to Charles Abbot, created Baron Colchester, refusing to exchange this office in 1827 for that of home secretary. In 1832 he abandoned Scarborough and was returned to parliament as one of the members for the university of Cambridge. Before the general election of 1832 Manners-Sutton had intimated his desire to retire from the position of speaker and had been voted an annuity of £4000 a year. The ministry of Earl Grey, however, reluctant to meet the reformed House of Commons with a new and inexperienced occupant of the chair, persuaded him to retain his office, and in 1833 he was elected speaker for the seventh time. Some feeling had been shown against him on this occasion owing to his Tory proclivities, and the Whigs frequently complained that outside the House he was a decided partisan. The result was that when a new parliament met in February 1835 a sharp contest ensued for the speakership, and Manners-Sutton was defeated by James Abercromby, afterwards Lord Dunfermline. In March 1835 the retiring speaker was raised to the peerage as Baron Bottesford and Viscount Canterbury. In 1835 he was appointed high commissioner for Canada, but owing to domestic reasons he never undertook the appointment. He died in London on the 21st of July 1845 and was buried at Addington. His first wife was Lucy (d. 1815), daughter of John Denison of Ossington, by whom he had two sons and a daughter. Both his sons, Charles John (1812–1869), and John Henry Thomas (1814–1877), succeeded in turn to the viscounty. By his second wife, Ellen (d. 1845), widow of John Home-Purves, he had a daughter.

CANTERBURY, a city and county of a city, the metropolis of an archdiocese of the Church of England, and a municipal, county and parliamentary borough of Kent, England, 62 m. E.S.E. of London by the South-Eastern & Chatham railway. Pop. (1901) 24,889. It lies on the river Stour, which here debouches from a beautiful narrow valley of the North Downs, the low but abrupt elevations of which command fine views of the city from the west and south, while the river presently enters upon the flat belt of land which separates the elevated Isle of Thanet from the rest of Kent. This belt represents the existence, in early historic times, of a sea-strait, and Fordwich, little more than 2 m. north-east of Canterbury, was once accessible for shipping. The city surrounds the precincts of the great cathedral.

The Cathedral.—It was to Canterbury, as the capital of Æthelberht, the fourth Saxon king of Kent, that in 597 Augustine and his fellow-missionaries came from Rome, and their settlement by Æthelberht in his capital became the origin of its position, held ever since, as the metropolis of the Church of England. Æthelberht, whose queen, Bertha, was already a Christian, gave the missionaries a church whose mythical founder was King Lucius. Augustine was a Benedictine and established the monastery of that order attached to the cathedral; this foundation was set upon a firm basis after the Norman Conquest by Archbishop Lanfranc, who placed its charge (as distinct from that of the diocese) in the hands of a prior.

Preparatory to the description of the cathedral, the principal epochs in the history of its erection may be noted. The Romano-British church occupied by St Augustine, of basilica form, remained long in use, though it was largely rebuilt by Archbishop Odo, *c.* 950; after further vicissitudes it was destroyed by fire in 1067. Archbishop Lanfranc, taking up his office in 1070, undertook the building of an entirely new church, but under Anselm (*c.* 1100) Prior Ernulf rebuilt the eastern part, and his successor Conrad carried on the work. A fire destroyed much of this part of the building in 1174, and from that year the architect, William of Sens, took up the work of rebuilding until 1178, when, on his suffering serious injury by falling from a scaffold, another William, commonly distinguished as the Englishman, carried on the work and completed it in 1184. In 1376 Archbishop Sudbury entered upon the construction of a new nave, and Prior Chillenden continued this under Archbishop Courtenay. The building of the central tower was undertaken *c.* 1495 by Prior Goldstone, with the counsel of Selling, his predecessor, and Archbishop Morton.

History of the building.

This Perpendicular tower is the most notable feature of the exterior. It rises in two storeys to a height of 235 ft. from the ground, and is known variously as Bell Harry tower from the great bell it contains, or as the Angel steeple from the gilded figure of an angel which formerly adorned the summit. The Perpendicular nave is flanked at the west front by towers, whose massive buttresses, rising in tiers, serve to enhance by contrast the beautiful effect of the unbroken straight lines of Bell Harry tower. The south-western of these towers is an original Perpendicular structure by Prior Goldstone, while the north-western was copied from it in 1834–1840, replacing a Norman tower which had carried a spire until 1705 and had become unsafe. The north-west and south-west transepts are included in Chillenden's Perpendicular reconstruction; but east of these earlier work is met with. The south-east transept exhibits Norman work; the projecting chapel east of this is known as Anselm's tower. The cathedral terminates eastward in a graceful apsidal form, with the final addition of the circular eastern chapel built by William the Englishman, and known as the Corona or Becket's Crown. St Andrew's tower or chapel on the north side, corresponding to Anselm's on the south, is the work of Ernulf. From this point westward the various monastic buildings adjoin the cathedral on the north side, so that the south side is that from which the details of the exterior must be examined.

Exterior.

When the nave of the cathedral is entered, the complete separation of the interior into two main parts, not only owing to the distinction between the two main periods of building, but by an actual structural arrangement, is realized as an unusual and, as it happens, a most impressive feature. In most English cathedrals the choir is separated from the nave by a screen; at Canterbury not only is this the case, but the separation is further marked by a broad flight of steps leading up to the screen, the choir floor (but not its roof) being much higher than that of the nave. Chillenden, in rebuilding the nave, retained only the lower parts of some of the early Norman walls of Lanfranc and the piers of the central tower arches. These piers were encased or altered on Perpendicular lines. In the choir, the late 12th-century work of the two Williams, the notable features are its great length, the fine ornamentation and the use of arches both round and pointed, a remarkable illustration of the transition between the Norman and Early English styles; the prolific use of dark marble in the shafts and mouldings strongly contrasting with the light stone which is the material principally used; and, finally, the graceful incurve of the main arcades and walls at the eastern end of the choir where it joins the chapel of the Trinity, an arrangement necessitated by the preservation of the earlier flanking chapels or towers of St Anselm and St Andrew. From the altar eastward the floor of the church is raised again above that of the choir. The choir screen was built by Prior de Estria, *c.* 1300. The organ is not seen, being hidden in the triforium and played from the choir. There are several tombs of archbishops in the choir. The south-east transept serves as the chapel of the King's school and exhibits the work of William of Sens in alteration of that of Ernulf. Anselm's chapel or tower, already mentioned, may be noticed again as containing a Decorated window (1336). This style is not common in the cathedral.

Interior.

Behind the altar is Trinity Chapel, in the centre of which stood the celebrated shrine of St Thomas of Canterbury. The priory owed its chief fame to the murder of Archbishop Becket (1170) in the church, his canonization as St Thomas of Canterbury, and the resort of the Christian world on pilgrimage to his shrine. Miracles were almost immediately said to be worked at his grave in the crypt and at the well in which his garments had been washed; and from the time when Henry II. did his penance for the murder in the church, and the battle of Alnwick was gained over the Scots a few days afterwards—it was supposed as a result—the

Becket's shrine. Pilgrimages.

fame of the martyr's power and the popularity of his worship became established in England. On the rebuilding of the cathedral after the fire of 1174, a magnificent shrine was erected for him in Trinity Chapel, which was built for the purpose, and became thronged for three centuries by pilgrims and worshippers of all classes, from kings and emperors downward. Henceforward the interests of the city became bound up in those of the cathedral, and were shown in the large number of hostels for the accommodation of pilgrims, and of shops containing wares especially suited to their tastes. A pilgrimage to Canterbury became not only a pious exercise, but a favourite summer excursion; and the poet Chaucer, writing in the 14th century, gives an admirable picture of such pilgrimages, with the manners and behaviour of a party of pilgrims, leisurely enjoying the journey and telling stories on the road. The English language even preserved two words originating in these customs—a "canterbury," or a "canterbury tale," a phrase used for a fiction, and a "canter," which is a short form for a "canterbury gallop," an allusion to the easy pace at which these pilgrimages were performed. The shrine with its vast collected wealth was destroyed, and every reminiscence connected with it as far as possible effaced, by King Henry VIII.'s commissioners in 1538. But some of the beautiful old windows of stained glass, illustrating the miracles wrought in connexion with the saint, are preserved. The north-west transept was the actual scene of Becket's murder; the spot where he fell is shown on the floor, but this part of the building is of later date than the tragedy.

Close to the site of the shrine is the fine tomb of Edward the Black Prince, with a remarkable portrait effigy, and above it his helmet, shield and other equipment. There is also in this chapel the tomb of King Henry IV. The Corona, at the extreme east of the church, contains the so-called St Augustine's chair in which the archbishops are enthroned. It is of marble, but its name is not deserved, as it dates probably from *c.* 1200. The western part of the crypt, beneath the choir, is the work of Ernulf, and perhaps incorporates some of Lanfranc's work. The chapel of St John or St Gabriel, beneath Anselm's tower, is still used for service, in which the French language is used; it was devoted to this purpose in 1561, on behalf of French Protestant refugees, who were also permitted to carry on their trade as weavers in the crypt. The eastern and loftier part of the crypt, with its apsidal termination, is the work of William the Englishman. Here for some time lay the body of Becket, and here the celebrated penance of Henry II. was performed.

The chief entrance to the precincts is through an ornate gateway at the south-west, called Christchurch gateway, and built by Prior Goldstone in 1517. Among the remains of the monastic buildings there may be mentioned the Norman ruins of the infirmary, the fine two-storeyed treasury and the lavatory tower, Norman in the lower part and Perpendicular in the upper. The cloisters are of various dates, containing a little rich Norman work, but were very largely rebuilt by Prior Chillenden. The upper part of the chapter-house is also his work, but the lower is by Prior de Estria. The library is modern. The site of the New Hall of the monastery is covered by modern buildings of King's school, but the Norman entry-stair is preserved—a magnificent example of the style, with highly ornate arcading.

Monastic buildings.

The principal dimensions of the cathedral are: length (outside) 522 ft., nave 178 ft., choir 180 ft. The nave is 71 ft. in breadth and 80 ft. in height.

The archbishop of Canterbury is primate of all England; the ecclesiastical province of Canterbury covers England and Wales south of Cheshire and Yorkshire; and the diocese covers a great part of Kent with a small part of Sussex. The following is a list of archbishops of Canterbury:—

Province and diocese.

1. Augustine, 597 to 605.
2. Lawrence (Laurentius), 605 to 619.
3. Mellitus, 619 to 624.
4. Justin, 624 to 627.
5. Honorius, 627 to 653.
6. Deusdedit (Frithona), 655 to 664.
7. Theodore, 668 to 690.
8. Brethwald (Berhtuald), 693 to 731.
9. Taetwine, 731 to 734.
10. Nothelm, 734 to 740.
11. Cuthbert, 740 to 758.
12. Breogwine, 759 to 762.
13. Jaenberht, 763 to 790.
14. Æthelhard, 790 to 803.
15. Wulfred, 803 to 829.
16. Fleogild, 829 to 830.
17. Ceolnoth, 830 to 870.
18. Æthelred, 870 to 889.
19. Plegemund, 889 to 914.
20. Æthelm, 914 to 923.
21. Wulfelm, 923 to 942.
22. Odo, 942 to 959.
23. Ælsine, 959.
24. Dunstan, 960 to 988.
25. Æthelgar, 988 to 989.
26. Sigeric, 990 to 994.
27. Ælfric, 995 to 1005.
28. Alphege (Ælfeah), 1005 to 1012.
29. Lyfing, 1013 to 1020.
30. Æthelnoth, 1020 to 1038.
31. Eadsige, 1038 to 1050.
32. Robert of Jumièges, 1051 to 1052.
33. Stigand, 1052 to 1070.
34. Lanfranc, 1070 to 1089.
35. Anselm, 1093 to 1109.
36. Ralph de Turbine, 1114 to 1122.
37. William de Corbeuil (Curbellio), 1123 to 1136.
38. Theobald, 1139 to 1161.
39. Thomas Becket, 1162 to 1170.
40. Richard, 1174 to 1184.
41. Baldwin, 1185 to 1190.
42. Reginald Fitz-Jocelyn, 1191.
43. Hubert Walter, 1193 to 1205.
44. Stephen Langton, 1207 to 1228.
45. Richard Wethershed, 1229 to 1231.
46. Edmund Rich (de Abbendon) 1234 to 1240.
47. Boniface of Savoy, 1241 to 1270.
48. Robert Kilwardby, 1273 to 1278.
49. John Peckham, 1279 to 1292.
50. Robert Winchelsea, 1293 to 1313.
51. Walter Reynolds, 1313 to 1327.
52. Simon de Meopham, 1328 to 1333.
53. John Stratford, 1333 to 1348.
54. John de Ufford, 1348 to 1349.
55. Thomas Bradwardin, 1349.
56. Simon Islip, 1349 to 1366.
57. Simon Langham, 1366 to 1368.
58. William Whittlesea, 1368 to 1374.
59. Simon Sudbury, 1375 to 1381.
60. William Courtenay, 1381 to 1396.
61. Thomas Arundel, 1396 to 1414.
62. Henry Chicheley, 1414 to 1443.
63. John Stafford, 1443 to 1452.
64. John Kemp, 1452 to 1454.
65. Thomas Bourchier, 1454 to 1486.
66. John Morton, 1486 to 1500.
67. Henry Dean (Dene), 1501 to 1503.
68. William Warham, 1503 to 1532.
69. Thomas Cranmer, 1533 to 1556.
70. Reginald Pole, 1556 to 1558.
71. Matthew Parker, 1559 to 1575.
72. Edmund Grindal, 1575 to 1583.
73. John Whitgift, 1583 to 1604.
74. Richard Bancroft, 1604 to 1610.
75. George Abbot, 1610 to 1633.
76. William Laud, 1633 to 1645.
77. William Juxon, 1660 to 1663.
78. Gilbert Sheldon, 1663 to 1677.
79. William Sancroft, 1678 to 1691.
80. John Tillotson, 1691 to 1694.
81. Thomas Tenison, 1694 to 1715.
82. William Wake, 1716 to 1737.
83. John Potter, 1737 to 1747.
84. Thomas Herring, 1747 to 1757.
85. Matthew Hutton, 1757 to 1758.
86. Thomas Secker, 1758 to 1768.
87. Frederick Cornwallis, 1768 to 1783.
88. John Moore, 1783 to 1805.
89. Charles Manners-Sutton, 1805 to 1828.
90. William Howley, 1828 to 1848.
91. John Bird Sumner, 1848 to 1862.
92. Charles Thomas Longley, 1862 to 1868.
93. Archibald Campbell Tait, 1868 to 1882.
94. Edward White Benson, 1882 to 1896.
95. Frederick Temple, 1896 to 1903.
96. Randall Thomas Davidson.

The archbishop has a seat at Lambeth Palace, London. There are fragments in Palace Street of the old archbishop's palace which have been incorporated with a modern palace.

Other Ecclesiastical Foundations. — Canterbury naturally abounded in religious foundations. The most important, apart from the cathedral, was the Benedictine abbey of St Augustine. This was erected on a site granted by King Æthelberht outside his capital, in a tract called Longport. Augustine dedicated it to St Peter and St Paul, but Archbishop Dunstan added the sainted name of the founder to the dedication, and in common use it came to exclude those of the apostles. The site is now occupied by St Augustine's Missionary College, founded in 1844 when the property was acquired by A. J. B. Beresford Hope. Some ancient remnants are preserved, the principal being the entrance gateway (1300), with the cemetery gate, dated a century later, and the guest hall, now the refectory; but the scanty ruins of St Pancras' chapel are of high interest, and embody Roman material. The chapel is said to have received its dedication from St Augustine on account of the special association of St Pancras with children, and in connexion with the famous story of St Gregory, whose attention was first attracted to Britain

when he saw the fair-faced children of the Angles who had been brought to Rome, and termed them " not Angles but angels."

There were lesser houses of many religious orders in Canterbury, but only two, those of the Dominicans near St Peter's church in St Peter's Street, and the Franciscans, also in St Peter's Street, have left notable remains. The Dominican refectory is used as a chapel. Among the many churches, St Martin's, Longport, is of the first interest. This was the scene of the earliest work of Augustine in Canterbury, and had seen Christian service before his arrival. Its walls contain Roman masonry, but whether it is in part a genuine remnant of a Romano-British Christian church is open to doubt. There are Norman, Early English and later portions; and the font may be in part pre-Norman, and is indeed associated by tradition with the baptism of Æthelberht himself. St Mildred's church exhibits Early English and Perpendicular work, and the use of Roman material is again visible here. St Paul's is of Early English origin; St Dunstan's, St Peter's and Holy Cross are mainly Decorated and Perpendicular. The village of Harbledown, on the hill west of Canterbury on the London road, from the neighbourhood of which a beautiful view over the city is obtained, has many associations with the ecclesiastical life of Canterbury. It is mentioned by Chaucer in his pilgrimage under the name, appropriate to its site, of " Bob up and down." The almshouses, which occupy the site of Lanfranc's hospital for lepers, include an ancient hall and a chapel in which the west door and northern nave arcade are Norman, and are doubtless part of Lanfranc's buildings. The neighbouring parish church is in great part rebuilt. Among the numerous charitable institutions in Canterbury there are several which may be called the descendants of medieval ecclesiastical foundations.

City Buildings, &c.—The old city walls may be traced, and the public walk called the Dane John (derived probably from *donjon*) follows the summit of a high artificial mound within the lines. The cathedral is finely seen from this point. Only the massive turreted west gate, of the later part of the 14th century, remains out of the former six city gates. The site of the castle is not far from the Dane John, and enough remains of the Norman keep to show its strength and great size. Among other buildings and institutions there may be mentioned the guildhall in High Street, of the early part of the 18th century; the museum, which includes a fine collection of local, including many Roman, relics; and the school of art, under municipal management, but founded by the painter T. Sidney Cooper (d. 1902), who was a resident at Harbledown. A modern statue of a muse commemorates the poet Christopher Marlowe (1564–1593), a native of the city; and a pillar indicates the place where a number of persons were burnt at the stake in the reign of Mary.

The King's school, occupying buildings adjacent to the cathedral, developed out of the early teaching furnished by the monastery. It was refounded by Henry VIII. in 1541 (whence its name), and is managed on the lines of ordinary public schools. It has about 250 boys; and there is besides a junior or preparatory school. The school is still connected with the ecclesiastical foundation, the dean and chapter being its governors.

A noted occasion of festivity in Canterbury is the Canterbury cricket-week, when the Kent county cricket eleven engages in matches with other first-class teams, and many visitors are attracted to the city.

Canterbury has a considerable agriculture trade, breweries, tanneries, brickworks and other manufactures. The parliamentary borough returns one member. The city is governed by a mayor, 6 aldermen and 18 councillors. Area, 3955 acres.

History of the City.—The existence of a Romano-British town on the site of Canterbury has already been indicated. It was named *Durovernum*, and was a flourishing county town on the road from the Kentish ports to London. Mosaic pavements and other remains have been found in considerable abundance. The city, known by the Saxons as *Cantwaraburh*, the town of the men of Kent, was the metropolis of Æthelberht's kingdom. At the time of the Domesday survey Canterbury formed part of the royal demesne and was governed by a portreeve as it had been before the Conquest. In the 13th and 14th centuries, two bailiffs presided over the burghmote, assisted by a larger and smaller council. Henry II., by an undated charter, confirmed former privileges and granted to the citizens that no one should implead them outside the city walls and that the pleas of the crown should be decided according to the customs of the city. In 1256 Henry III. granted them the city at an annual fee farm of £60, also the right of electing their bailiffs. Confirmations of former charters with additional liberties were granted by later sovereigns, and Henry VI. incorporated Canterbury, which he called " one of our most ancient cities," under the style of the mayor and commonalty, the mayor to be elected by the burgesses. James I. in 1609 confirmed these privileges, giving the burgesses the right to be called a body corporate and to elect twelve aldermen and a common council of twenty-four. Charles II., after calling in the charters of corporations, granted a confirmation in 1684. Canterbury was first represented in parliament in 1283, and it continued to return two members until 1885, when the number was reduced to one. A fair was granted by Henry VI. to the citizens to be held in the city or suburbs on the 4th of August and the two days following; other fairs were in the hands of the monasteries; the corn and cattle markets and a general market have been held by prescription from time immemorial. Canterbury was a great centre of the silk-weaving trade in the 17th century, large numbers of Walloons, driven by persecution to England, having settled there in the reign of Elizabeth. In 1676 Charles II. granted a charter of incorporation to the Walloon congregation under style of the master, wardens and fellowship of weavers in the city of Canterbury. The market for the sale of corn and hops was regulated by a local act in 1801.

See A. P. Stanley, *Historical Memorials of Canterbury* (London, 1855); J. Brent, *Canterbury in the Olden Time* (Canterbury, 1879); J. W. Legg and W. H. St J. Hope, *Inventories of Christchurch, Canterbury* (London, 1902); *Victoria County History, Kent.*

CANTHARIDES, or SPANISH FLIES, the common blister-beetles (*Cantharis vesicatoria*) of European pharmacy. They are bright, iridescent, golden-green or bluish-coloured beetles (see COLEOPTERA), with the breast finely punctured and pubescent, head and thorax with a longitudinal channel, and elytra with two slightly elevated lines. The insect is from half-an-inch to an inch in length, and from one to two lines broad, the female being broader in the abdomen and altogether larger than the male. It is a native of the south of Europe, being found in Spain, France, Germany, Italy, Hungary and the south of Russia, and it is also obtained in Siberia. The Spanish fly is also occasionally found in the south of England. The insects feed upon ash, lilac, privet and jasmine leaves, and are found more rarely on elder, rose, apple and poplar trees. Their presence is made known by a powerful disagreeable odour, which penetrates to a considerable distance. They are collected for use at late evening or early morning, while in a dull bedewed condition, by shaking them off the trees or shrubs into cloths spread on the ground; and they are killed by dipping them into hot water or vinegar, or by exposing them for some time over the vapour of vinegar. They are then dried and put up for preservation in glass-stoppered bottles; and they require to be very carefully guarded against mites and various other minute insects, to the attacks of which they are peculiarly liable. It has been shown by means of spectroscopic observations that the green colour of the elytra, &c., is due to the presence of chlorophyll; and that the variations of the spectral bands are sufficient, after the lapse of many years, to indicate with some certainty the kind of leaves on which the insects were feeding shortly before they were killed.

Cantharides owe their value to the presence of a peculiar chemical principle, to which the name *cantharidin* has been given. It is most abundant in large full-grown insects, while in very young specimens no cantharidin at all has been found. From about one-fourth to rather more than one-half per cent. of cantharidin has been obtained from different samples; and it has been ascertained that the elytra or wing-sheaths of the insect, which alone are used in pharmacy, contain more of the active principle than the soft parts taken together; but

apparently cantharidin is most abundant in the eggs and generative organs.

Cantharidin constitutes from ½ to 1 % of cantharides. It has the formula $C_{10}H_{12}O_4$, and on hydrolysis is converted into cantharinic acid, $C_{10}H_{14}O_5$. It crystallizes in colourless plates and is readily soluble in alcohol, ether, &c., but not in water. The British Pharmacopeia contains a large number of preparations of cantharides, but the only one needing special mention is the tincture, which is meant for internal administration; the small dose is noteworthy, five minims being probably the maximum for safety.

The external action of cantharides or cantharidin is extremely characteristic. When it is applied to the skin there are no obvious consequences for some hours. Thereafter the part becomes warm and painful, owing to marked local vascular dilatation. This is the typical *rubefacient* action. Soon afterwards there is an accumulation under the epidermis of a serum derived from the dilated blood-vessels. The numerous small blisters or vesicles thus derived coalesce, forming a large sac full of "blister-fluid." The drug is described as a counter-irritant, though the explanation of this action is very doubtful. Apparently there is an influence on the afferent nerves of the part which causes a reflex contraction—some authors say dilatation—of the vessels in the internal organs that are under the control of the same segment of the nervous system as that supplying the area of skin from which the exciting impulse comes. When applied in this fashion a certain quantity of the cantharides is absorbed.

Taken internally in any but minute doses, the drug causes the most severe gastro-intestinal irritation, the vomited and evacuated matters containing blood, and the patient suffering agonizing pain and extreme depression. The further characteristic symptoms are displayed in the genito-urinary tract. The drug circulates in the blood in the form of an albuminate and is slowly excreted by the kidneys. The effect of large doses is to cause great pain in the renal region and urgent wish to micturate. The urine is nevertheless small in amount and contains albumen and blood owing to the local inflammation produced in the kidney by the passage of the poison through that organ. The drug often has a marked aphrodisiac action, producing priapism, or in the female sex the onset of the catamenia or abortion.

Cantharides is used externally for its counter-irritant action. There are certain definite contra-indications to its use. It must not be employed in cases of renal disease, owing to the risks attendant upon absorption. It must always be employed with caution in the case of elderly persons and children; and it must not be applied to a paralysed limb (in which the power of healing is deficient), nor to parts upon which the patient lies, as otherwise a bed-sore is likely to follow its use. The drug is administered internally in certain cases of impotence and occasionally in other conditions. Its criminal employment is usually intended to heighten sexual desire, and has frequently led to death.

The toxic symptoms have already been detailed, the patient usually dying from arrest of the renal functions. The treatment is far from satisfactory, and consists in keeping up the strength and diluting the poison in the blood and in the urine by the administration of bland fluids, such as soda-water, milk and plain water, in quantities as large as possible. External warmth should also be applied to the regions specially affected by the drug.

A very large number of other insects belonging to the same family possess blistering properties, owing to their containing cantharidin. Of these the most remarkable is the Telini "fly" of India (*Mylabris cichorii*), the range of which extends from Italy and Greece through Egypt and central Asia as far as China. It is very rich in cantharidin, yielding fully twice as much as ordinary cantharides. Several green-coloured beetles are, on account of their colour, used as adulterants to cantharides, but they are very easily detected by examination with the eye, or, if powdered, with the microscope.

CANTICLES. The Old Testament book of Canticles, or the Song of Solomon, is called in Hebrew *The Song of Songs* (that is, *the choicest of songs*), or, according to the full title which stands as the first verse of the book, *The choicest of the songs of Solomon*. In the Western versions the book holds the third place among the so-called Solomonic writings, following Proverbs and Ecclesiastes. In Hebrew Bibles it stands among the *Megilloth*, the five books of the Hagiographa which have a prominent place in the Synagogue service. In printed Bibles and in German MSS. it is the first of these because it is read at the Passover, which is the first great feast of the sacred year of the Jews.

No part of the Bible has called forth a greater diversity of opinions than the Song of Solomon, and this for two reasons. In the first place, the book holds so unique a position in the Old Testament, that the general analogy of Hebrew literature is a very inadequate key to the verbal difficulties, the artistic structure, and the general conception and purpose of the poem. In point of language the departures from ordinary Hebrew are almost always in the direction of Aramaic. Many forms unique in Biblical Hebrew are at once explained by the Aramaic dialects, but not a few are still obscure. The philological difficulties of the book are, however, less fundamental than those which lie in the unique character of the Song of Solomon in point of artistic form, and in the whole atmosphere of thought and feeling in which it moves. Even in these respects it is not absolutely isolated. Parallels to the peculiar imagery may be found in the book of Hosea, in Ezekiel xvi. and xxiii. and above all in the 45th Psalm; but such links of union to the general mass of the Old Testament literature are too slight to be of material assistance in the solution of the literary problem of the book. Here, again, as in the lexical difficulties already referred to, we are tempted or compelled to argue from the distant and insecure analogy of other Eastern literatures, or are thrown back upon traditions of uncertain origin and ambiguous authority.

The power of tradition has been the second great source of confusion of opinion about the Song of Solomon. To tradition we owe the title, which apparently indicates Solomon as the author and not merely as the subject of the book. The authority of titles in the Old Testament is often questionable, and in the present case it is certain on linguistic grounds that the title is not from the hand that wrote the poem; while to admit that it gives a correct account of the authorship is to cut away at one stroke all the most certain threads of connexion between the book and our historical knowledge of the Old Testament people and literature.

To tradition, again, we owe the prejudice in favour of an allegorical interpretation, that is, of the view that from verse to verse the Song sets forth the history of a spiritual and not merely of an earthly love. To apply such an exegesis to Canticles is to violate one of the first principles of reasonable interpretation. True allegories are never without internal marks of their allegorical design. The language of symbol is not so perfect that a long chain of spiritual ideas can be developed without the use of a single spiritual word or phrase; and even were this possible it would be false art in the allegorist to hide away his sacred thoughts behind a screen of sensuous and erotic imagery, so complete and beautiful in itself as to give no suggestion that it is only the vehicle of a deeper sense. Apart from tradition, no one, in the present state of exegesis, would dream of allegorizing poetry which in its natural sense is so full of purpose and meaning, so apt in sentiment, and so perfect in imagery as the lyrics of Canticles. We are not at liberty to seek for allegory except where the natural sense is incomplete. This is not the case in the Song of Solomon. On the contrary, every form of the allegorical interpretation which has been devised carries its own condemnation in the fact that it takes away from the artistic unity of the poem and breaks natural sequences of thought.[1] The allegorical interpretation of the Song of Solomon had its rise in the very same conditions which forced a deeper

[1] An argument for the allegorical interpretation has been often drawn from Mahommedan mysticism—from the poems of Hafiz, and the songs still sung by dervishes. See Jones, *Poëseos Asiaticae Com.* pt. iii. cap. 9; Rosenmüller's remarks on Lowth's *Praelectio*, xxxi., and Lane's *Modern Egyptians*, ch. xxiv. But there is no true analogy between the Old Testament and the pantheistic mysticism of Islam, and there is every reason to believe that, where the allegory takes a form really analogous to Canticles, the original sense of these songs was purely erotic.

sense, now universally discarded, upon so many other parts of scripture. Yet strangely enough there is no evidence that the Jews of Alexandria extended to the book their favourite methods of interpretation. The arguments which have been adduced to prove that the Septuagint translation implies an allegorical exegesis are inadequate;[1] and Philo does not mention the book. Nor is there any allusion to Canticles in the New Testament. The first trace of an allegorical view identifying Israel with the "spouse" appears to be in the Fourth Book of Ezra, near the close of the 1st Christian century (v. 24, 26; vii. 26). Up to this time the canonicity of the Canticles was not unquestioned; and the final decision as to the sanctity of the book, so energetically carried through by R. Aqiba, when he declared that "the whole world is not worth the day on which the Song of Songs was given to Israel; for all the scriptures (or Hagiographa) are holy, but the Canticles most holy," must be understood as being at the same time a victory of the allegorical interpretation over the last remains of a view which regarded the poem as simply erotic.[2]

The form in which the allegorical theory became fixed in the synagogue is contained in the Midrash *Chazita* and in the Targum, which is a commentary rather than a translation. The spouse is Israel, her royal lover the divine king, and the poem is explained as tracing the great events of the people's history from the Exodus to the Messianic glory and final restoration.[3]

The authority of Origen, who, according to Jerome, surpassed himself in his commentary of ten volumes on this book, established the allegorical theory in the Christian church in the two main forms in which it has since prevailed. The bridegroom is Christ, the bride either the church or the believing soul. The latter conception is, of course, that which lends itself most readily to purposes of mystical edification, and which has made Canticles the manual in all ages of a wide-spread type of religious contemplation. But the other view, which identifies the bride with the church, must be regarded as the standard of orthodox exegesis. Of course the allegorical principle admitted of very various modifications, and readily adapted itself to new religious developments, such as the rise of Mariolatry. Within the limits of the orthodox traditions the allegory took various colours, according as its mystical or its prophetical aspect was insisted on. Among medieval commentators of the former class S. Bernard holds a pre-eminent place; while the second class is represented by Nicolaus de Lyra, who, himself a converted Jew, modified the Jewish interpretation so as to find in the book an account of the *processus ecclesiae* under the Old and New Testaments. The prophetic exegesis reached its culminating point in the post-Reformation period, when Cocceius found in the Canticles a complete conspectus of church history. But the relaxation of traditional authority opened the door to still stranger vagaries of interpretation. Luther was tempted to understand the book of the political relations of Solomon and his people. Others detected the loves of Solomon and Wisdom—a view which found a supporter in Rosenmüller.

The history of the literal interpretation begins with the great "commentator" of the Syrian Church, Theodorus of Mopsuestia (died 429), who condemned equally the attempt to find in the book a prophecy of the blessings given to the church, and the idea even at that time expressed in some quarters that the book is immoral. Theodorus regarded the Canticles as a poem written by Solomon in answer to the complaints of his people about his Egyptian marriage; and this was one of the heresies charged upon him after his death, which led to his condemnation at the second council of Constantinople (553 A.D.). A literal interpretation was not again attempted till in 1544 Chateillon (Castellio or Castalion) lost his regency at Geneva for proposing to expel the book from the canon as impure. Grotius (*Annot. in V.T.*, 1644) took up a more moderate position. Without denying the possibility of a secondary reference designed by Solomon to give his poem a more permanent value, he regards the Canticles as primarily an ὀαρίστυς (conjugal prattle) between Solomon and Pharaoh's daughter. The distinction of a primary and secondary sense gradually became current not only among the Remonstrants, but in England (Lightfoot, Lowth) and even in Catholic circles (Bossuet, 1693). In the actual understanding of the book in its literal sense no great progress was made. Solomon was still viewed as the author, and for the most part the idea that the poem is a dramatic epithalamium was borrowed from Origen and the allegorists, and applied to the marriage of Pharaoh's daughter.

From Grotius to Lowth the idea of a typical reference designed by Solomon himself appears as a mere excrescence on the natural interpretation, but as an excrescence which could not be removed without perilling the place of Canticles in the canon, which, indeed, was again assailed by Whiston in 1723. But in his notes on Lowth's lectures, J. D. Michaelis, who regarded the poem as a description of the enduring happiness of true wedded love long after marriage, proposed to drop the allegory altogether, and to rest the canonicity of the book, as of those parts of Proverbs which treat of conjugal affection, on the moral picture it presents (1758).

Then came Herder's exquisite little treatise on *Solomon's Songs of Love, the Oldest and Sweetest of the East* (1778). Herder, possessing delicacy of taste and sympathetic poetical genius, delighted in the Canticles as the transparently natural expression of innocent and tender love. He expressed the idea that the poem is simply a sequence of independent songs without inner unity, grouped so as to display various phases and stages of love in a natural order, culminating in the placid joys of wedded life. The theory of Herder, which refuses to acknowledge any continuity in the book, was accepted by Eichhorn on the part of scholars, and with some hesitation by Goethe on the part of the poets. Commentaries based on this view are those of Döpke (1829), Magnus (1842), Noyes (1846).

The prevalent view of the 19th century, however, recognizes in the poem a more or less pronounced dramatic character, and following Jacobi (1771) distinguishes the shepherd, the true love of the Shulamite, from King Solomon, who is made to play an ignominious part. Propounded by Stäudlin (1792) and Ammon (1795), this view was energetically carried out by Umbreit (1820), and above all by Ewald, whose acuteness gave the theory a new development, while his commanding influence among Hebrew scholars acquired for it general recognition. Ewald assumed a very simple dramatic structure, and did not in his first publication (1826) venture to suppose that the poem had ever been acted on a stage. His less cautious followers have been generally tempted to dispose of difficulties by introducing more complicated action and additional interlocutors (so, for example, Hitzig, 1855; Ginsburg, 1857; Renan, 1860); while Böttcher (1850) did his best to reduce the dramatic exposition to absurdity by introducing the complexities and stage effects of a modern operetta. Another view is that of Delitzsch (1851 and 1875) and his followers, who also plead for a dramatic form—though without supposing that the piece was ever acted—but adhere to the traditional notion that Solomon is the author, who celebrates his love to a peasant maiden, whom he made his wife, and in whose company the proud monarch learned to appreciate the sweetness of a true affection and a simple rustic life.

In view of the prevalence of the "dramatic" theory of Canticles during the 19th century, and its retention by some comparatively recent writers (Oettli, Driver, Adeney, Harper), it seems desirable that this theory should be presented in some detail. A convenient summary of the form it assumed in the hands of Ewald (the shepherd-hypothesis) and of Delitzsch (the king-hypothesis) is given by Driver (*Literature of the Old*

[1] Repeated recently by Scholz, *Kommentar*, pp. iii. and iv.

[2] The chief passages of Jewish writings referring to this dispute are Mishna *Jadaim*, iii. 5 and Tosifta *Sanhedrin*, xii. For other passages see Grätz's *Commentary*, p. 115, and in control of his criticism the introduction to the commentary of Delitzsch.

[3] The text of the Targum in the Polyglots and in Buxtorf's Rabbinic Bible is not complete. The complete text is given in the Venice editions, and in Lagarde's *Hagiographa Chaldaice* (Lipsiae, 1873). The Polyglots add a Latin version. A German version is given by Riedel in his very useful book, *Die Auslegung des Hohenliedes* (1898), which also reviews the interpretation of Canticles by Hippolytus, Origen and later Greek writers.

Testament, ch. x. § 1). The following presentation of the theory, on the general lines of Ewald, gives that form of it which Robertson Smith was able to accept in 1876.

The centre of attraction is throughout a female figure, and the unity of this figure is the chief test of the unity of the book. In the long canto, i. 1–ii. 7, the heroine appears in a royal palace (i. 4) among the daughters of Jerusalem, who are thus presumably ladies of the court of Zion. At i. 9, an additional interlocutor is introduced, who is plainly a king, and apparently Solomon (i. 9, 12). He has just risen from table, and praises the charms of the heroine with the air of a judge of beauty, but without warmth. He addresses her simply as "my friend" (not as English version, "my love"). The heroine, on the contrary, is passionately in love, but nothing can be plainer than that the object of her affection is not the king. She is not at home in the palace, for she explains (i. 6) that she has spent her life as a peasant girl in the care of vineyards. Her beloved, whom she knows not where to find (i. 7), but who lies constantly on her heart and is cherished in her bosom like a spray of the sweet henna flowers which Oriental ladies delight to wear (i. 13, 14), is like herself a peasant—a shepherd lad (i. 7)—with whom she was wont to sit in the fresh greenwood under the mighty boughs of the cedars (i. 16, 17). Even before the king's entrance the ladies of the court are impatient at so silly an affection, and advise her, "if she is really so witless," to begone and rejoin her plebeian lover (i. 8). To them she appeals in ii. 5, 6, where her self-control, strung to the highest pitch as she meets the compliments of the king with reminiscences of her absent lover, breaks down in a fit of half-delirious sickness. The only words directed to the king are those of i. 12, which, if past tenses are substituted for the presents of the English version, contain a pointed rebuff. Finally, ii. 7 is, on the plainest translation, a charge not to arouse love till it please. The moral of the scene is the spontaneity of true affection.

Now, at viii. 5, a female figure advances leaning upon her beloved, with whom she claims inseparable union,—"for love is strong as death, its passion inflexible as the grave, its fire a divine flame which no waters can quench or floods drown. Yea, if a man would give all his wealth for love he would only be contemned." This is obviously the sentiment of ii. 7, and the suitor, whose wealth is despised, must almost of necessity be identified with the king of chapter i., if, as seems reasonable, we place viii. 11, 12 in the mouth of the same speaker—"King Solomon has vineyards which bring him a princely revenue, and enrich even the farmers. Let him and them keep their wealth; my vineyard is before me" (*i.e.* I possess it in present fruition). The last expression is plainly to be connected with i. 6. But this happiness has not been reached without a struggle. The speaker has proved herself an impregnable fortress (ver. 10), and, armed only with her own beauty and innocence, has been in his eyes as one that found peace. The sense is that, like a virgin fortress, she has compelled her assailant to leave her in peace. To these marks of identity with the heroine of ch. i. are to be added that she appears here as dwelling in gardens, there as a keeper of vineyards (i. 6, and viii. 13), and that as there it was her brethren that prescribed her duties, so here she apparently quotes words in which her brothers, while she was still a child, speculated as to her future conduct and its reward (viii. 8, 9).

If this analysis of the commencement and close of the book is correct, it is certain that the poem is in a sense dramatic, that is, that it uses dialogue and monologue to develop a story. The heroine appears in the opening scene in a difficult and painful situation, from which in the last chapter she is happily extricated. But the dramatic progress which the poem exhibits scarcely involves a plot in the usual sense of that word. The words of viii. 9, 10 clearly indicate that the deliverance of the heroine is due to no combination of favouring circumstances, but to her own inflexible fidelity and virtue.

The constant direction of the maiden's mind to her true love is partly expressed in dialogue with the ladies of the court (the daughters of Jerusalem), who have no dramatic individuality, and whose only function in the economy of the piece is to give the heroine opportunity for a more varied expression of her feelings. In i. 8 we found them contemptuous. In chapter iii. they appear to be still indifferent; for when the heroine relates a dream in which the dull pain of separation and the uneasy consciousness of confinement and danger in the unsympathetic city disappear for a moment in imagined reunion with her lover, they are either altogether silent or reply only by taking up a festal part song describing the marriage procession of King Solomon (iii. 6-11), which stands in jarring contrast to the feelings of the maiden.[1] A second dream (v. 2-8), more weird and melancholy, and constructed with that singular psychological felicity which characterizes the dreams of the Old Testament, gains more sympathy, and the heroine is encouraged to describe her beloved at large (v. 10–vi. 3). The structure of these dialogues is so simple, and their purpose is so strictly limited to the exhibition of the character and affection of the maiden, that it is only natural to find them supplemented by a free use of pure monologue, in which the heroine recalls the happiness of past days, or expresses her rising hope of reunion with her shepherd, and restoration to the simple joys of her rustic life. The vivid reminiscence of ii. 8-17 takes the form of a dialogue within the main dialogue of the poem, a picture within a picture—the picture of her beloved as he stood at her window in the early spring time, and of her own merry heart as she laughingly answered him in the song with which watchers of the vineyards frighten away the foxes. It is, of course, a fault of perspective that this reminiscence is as sharp in outline and as strong in colour as the main action. But no one can expect perspective in such early art, and recollection of the past is clearly enough separated from present reality by ii. 16, 17. The last monologue (vii. 10–viii. 3), in which the hope of immediate return with her lover is tempered by maidenly shame, and a maiden's desire for her mother's counsel, is of special value for a right appreciation of the psychology of the love which the poem celebrates, and completes a picture of this flower of the northern valleys which is not only firm in outline, but delicate in touch. The subordinate action which supports the portraiture of the maiden of Galilee is by no means easy to understand.

We come next to chapter vi., which again sings the praises of the heroine, and takes occasion in this connexion to introduce, with the same want of perspective as we observed in ch. ii., a dialogue descriptive of Solomon's first meeting with the maiden. We learn that she was an inhabitant of Shulem or Shunem in Issachar, whom the king and his train surprised in a garden on the occasion of a royal progress through the north. Her beauty drew from the ladies of the court a cry of admiration. The maiden shrinks back with the reply—"I was gone down into my garden to see its growth. . . . I know not how my soul hath brought me among the chariots of princes"; but she is commanded to turn and let herself be seen in spite of her bashful protest—"Why do ye gaze on the Shulamite as at a dance of Mahanaim (a spectacle)?" Now the person in whose mouth this relation is placed must be an eye-witness of the scene, and so none other than the king. But in spite of the verbal repetition of several of the figures of ch. iv. . . . the tone in which the king now addresses the Shulamite is quite changed. She is not only beautiful but terrible, her eyes trouble him, and he cannot endure their gaze. She is unique among women, the choice and only one of her mother. The unity of action can only be maintained by ignoring vii. 1-9, and taking the words of Solomon in chapter vi. in their obvious sense as implying that the king at length recognizes in the maiden qualities of soul unknown in the harem, a character which compels respect, as well as a beauty that inflames desire. The change of feeling which was wrought in the daughters of Jerusalem in the previous scene now extends to Solomon himself, and thus the glad utterances of vii. 10, seq.,

[1] Ewald and others make this song a distinct scene in the action of the poem, supposing that the author here exhibits the honourable form of espousal by which Solomon thought to vanquish the scruples of the damsel. This view, however, seems to introduce a complication foreign to the plan of the book.

have a sufficient motive, and the *dénouement* is no longer violent and unprepared.

The *nodus* of the action is fully given in chapter i., the final issue in chapter viii. The solution lies entirely in the character and constancy of the heroine, which prevail, in the simplest possible way, first over the ladies of the court and then over the king.

The attractiveness of the above theory cannot be denied; but it may be asked whether the attraction does not lie in the appeal to modern taste of a story which is largely the product of modern imagination. It supposes a freedom of intercourse between lovers inconceivable for the East. The initial situation of the maiden in the harem of Solomon is left as a problem for the reader to discover, until he comes to its supposed origin in vi. 11; the expedient might be granted in the case of one of Browning's *Men and Women*, but seems very improbable in the present case. The more elaborate dramatic theories can find no parallel in Semitic literature to the "drama" of Canticles, the book of Job being no exception to this statement; whilst even the simpler theories ask us to believe that the essential parts of the story—the rape of the Shulamite, the change in Solomon's disposition, her release from the harem—are to be supplied by the reader from obscure and disputable references. More serious still is the fact that any progress of action from first to last is so difficult to prove. In the first chapter we listen to a woman speaker desiring to be kissed by the man who has brought her into his chambers, and speaking of "our bed"; in the last we leave her "leaning upon her beloved." The difficulties of detail are equally great. To suppose that all the male love-making, by hypothesis unsuccessful, belongs to Solomon, whilst the heroine addresses her passionate words to the continuously absent shepherd, is obviously unconvincing; yet, if this shepherd speaks in iv. 8–v. 1, how are we to explain his appearance in the royal harem? This and other difficulties were acknowledged by Robertson Smith, notably the presence of vii. 1-9, which he proposed to set aside as an interpolation, because of its sensuality and of the difficulty of working it into the dramatic scheme. The fact that this passage has subsequently become the central element in the new interpretation of the book is, perhaps, a warning against violent measures with difficulties.

Attention has already been drawn to Herder's proposal, accepted by some later writers, including Diestel and Reuss, to regard the book as a collection of detached songs. This received new and striking confirmation from the anthropological data supplied by J. G. Wetstein (1873), Prussian consul at Damascus. His observations of the wedding customs of Syrian peasants led him to believe that Canticles is substantially a collection of songs originally sung at such festivities. Wetstein's contribution was republished shortly afterwards by Delitzsch, in an appendix to his *Commentary*; but it received little attention. The first amongst Old Testament scholars to perceive its importance seems to have been Stade, who accepted Wetstein's view in a footnote to his *History of the Jewish People* (ii. p. 197), published in 1888; to Budde, however, belongs the distinction of the systematic and detailed use of Wetstein's suggestions, especially in his *Commentary* (1898). This interpretation of the book is accepted by Kautzsch (1896), Siegfried (1898), Cheyne (1899), and other eminent scholars. The last-named states the theory tersely as follows: "The book is an anthology of songs used at marriage festivals in or near Jerusalem, revised and loosely connected by an editor without regard to temporal sequence" (*Ency. Bibl.* 691). The character of the evidence which has contributed to the acceptance of this view may be indicated in Wetstein's own statements:—

"The finest time in the life of the Syrian peasant consists of the first seven days after his wedding, in which he and his young wife play the part of king (*melik*) and queen (*melika*), both being so treated and served by their village and the invited communities of the neighbourhood. The majority of the greater village weddings fall in the month of March, the finest of the Syrian year. The winter rains being over, and the sun still refreshing, not oppressive as in the following months, the weddings are celebrated in the open air on the village threshing-floor, which at this time of the year is with few exceptions a flowery mead. . . . We pass over the wedding-day itself with its displays, the sword-dance of the bride, and the great feast. On the morrow, bridegroom and bride awake as king and queen. Already before sunrise they receive the leader of the bridesmen, as their vizier, and the bridesmen themselves; the latter thereupon fetch the threshing-board and bring it to the threshing-floor, singing a rousing song of battle or love, generally both. There it is erected as a throne, and after the royal couple have taken their seats and the necessary formalities are gone through, a great dance in honour of the young couple begins; the accompanying song is concerned only with themselves, its principal element being the inevitable *wasf*, *i.e.* a description of the physical perfections of both and their ornaments. The eulogy of the queen is more moderate, and praises her visible, rather than veiled, charms; this is due to the fact that she is to-day a married woman, and that the *wasf* sung on the previous day during her sword-dance has left nothing to desire. This *wasf* is the weak element in Syrian wedding-songs according to our taste; its comparisons are to us frequently too clumsy and reveal the stereotyped pattern. It is the same with the little collection of charming wedding-songs and fragments of them which has been received into the canon of the Old Testament under the name of Canticles; the *wasf* (iv.–vii.) is considerably below the rest in poetical value. With this dance begin the sports, lasting seven days, begun in the morning on the first, shortly before midday on the other days, and continuing far into the night by the light of the fires that are kindled; on the last day alone all is over by sunset. During the whole week both royalties are in marriage attire, must do no work and have no cares; they have only to look down from the *merteba* (throne) on the sports carried on before them, in which they themselves take but a moderate part; the queen, however, occasionally gives a short dance to attract attention to her bridal attire."[1]

For the general application of these and the related customs to the interpretation of the book, reference should be made to Budde's *Commentary*, which recognizes four *wasfs*, viz. iv. 1-7 (describing the bride from head to breasts), v. 10-16 (the bridegroom), vi. 4-7 (similar to and partly repeating iv. 1-7), and vii. 1-9, belonging to the sword-dance of the bride, her physical charms being sung from feet to head (cf. vii. 1: "Why look ye on the Shulamite as (on) a dance of camps?" *i.e.* a war-dance). This dance receives its name from the fact that she dances it with a sword in her hand in the firelight on the evening of her wedding-day, and amid a circle of men and women, whilst such a *wasf* as this is sung by the leader of the choir. The passage relating to the litter of Solomon (iii. 6-11)—an old difficulty with the dramatizers—relates to the erection of the throne on the threshing-floor.[2] The terms "Solomon" and "the Shulamite" are explained as figurative references to the famous king, and to Abishag the Shulamite, "fairest among women," on the lines of the use of "king" and "queen" noted above. Other songs of Canticles are referred by Budde to the seven days of festivities. It need hardly be said that difficulties still remain in the analysis of this book of wedding-songs; whilst Budde detects 23 songs, besides fragments, Siegfried divides the book into 10.[3] Such differences are to be expected in the case of a collection of songs, some admittedly in dialogue form, all concerned with the common theme of the love of man and woman, and without any external indication of the transition from one song to the next.

Further, we must ask whether the task has been complicated by any editorial rearrangement or interpolation; the collector of these songs has certainly not reproduced them in the order of their use at Syrian weddings. Can we trace any principle, or even any dominant thought in this arrangement? In this connexion we touch the reason for the reluctance of some scholars to accept the above interpretation, viz. the alleged marks of

[1] Wetstein, *Zeitschrift f. Ethn.*, 1873, pp. 270-302; quoted and condensed by Budde as above in *Comm.* p. xvii.; for a fuller reproduction of Wetstein in English see Harper, *The Song of Songs*, pp. 74-76.

[2] For the connexion of the threshing-floor with marriage through the idea of sexual fertility, we may compare many primitive ideas and customs, such as those described by Frazer (*The Golden Bough*, ii. p. 181 f., 186).

[3] Castelli (*Il Cantico dei Cantici*, 1892) has written a very attractive little book on Canticles (quite apart from the Wetstein development) regarded as "poem formed by a number of dialogues mutually related by a certain succession"; they require for their understanding nothing but some indication of the speaker at each transition (such as we find in codex A of the Septuagint).

literary unity which the book contains (*e.g.* Driver, *loc. cit.*). These are (1) general similarity of treatment, seen in the use of imagery (the bride as a garden, iv. 12; vi. 2, 3), the frequent references to nature and to particular places, and the recurrence of descriptions of male and female beauty; (2) references to "Solomon" or "the king," to "the Shulamite" and to "the daughters of Jerusalem" (from which, indeed, the dramatic theory has found its chief inspiration); (3) indications that the same person is speaking in different places (cf. the two dreams of a woman, and the vineyard references, i. 6; viii. 12); (4) repetitions of words and phrases especially of the refrains, "disturb not love" (ii. 7; iii. 5; viii. 4), and "until the day break" (ii. 17; iv. 6). But of these (1) is no more than should be expected, since the songs all relate to the same subject, and spring from a common world of life and thought of the same group of people; (2) finds at least a partial parallel and explanation in the use of "king" and "queen" noted above; whilst (3) and (4) alone seem to require something more than the work of a mere collector of the songs. It is, of course, true that, in recurrent ceremonies, the same thought inevitably tends to find expression in the same words. But this hardly meets the case of the refrains, whilst the reference to the vineyard at beginning and end does suggest some literary connexion. It is to be noted that the three refrains "disturb not love" severally follow passages relating to the consummation of the sexual relation, whilst the two refrains "until the day break" appear to form an invitation and an answer in the same connexion, whilst the "Omnia vincit Amor" passage in the last chapter forms a natural climax (cf. Haupt's translation). So far, then, as this somewhat scanty evidence goes, it may point to some one hand which has given its semblance of unity to the book by underlining the joy of consummated love—to which the vineyard and garden figures throughout allude—and by so arranging the collection that the descriptions of this joy find their climax in viii. 6-7.[1]

Whatever conclusion, however, may be reached as to the present *arrangement* of Canticles, the recognition of wedding-songs as forming its nucleus marks an important stage in the interpretation of the book; even Rothstein (1902), whilst attempting to resuscitate a dramatic theory, "recognizes . . . the possibility that older wedding-songs (as, for instance, the *wasfs*) are worked up in the Song of Songs" (Hastings' *D.B.* p. 594b). The drama he endeavours to construct might, indeed, be called "The Tokens of Virginity," since he makes it culminate in the procedure of Deut. xxii. 13 f., which still forms part of the Syrian ceremonies. But his reconstruction is open to the same objection as all similar attempts, in that the vital moments of the dramatic action have to be supplied from without. Thus between v. 1 and v. 2, the baffled king is supposed to have disappeared, and to have been replaced by the happy lover; between viii. 7 and viii. 8, we are required to imagine "the bridal night and its mysteries"; whilst between viii. 9 and viii. 10, we must suppose the evidence that the bride has been found a virgin is exhibited. He also attempts, with considerable ingenuity, to trace the legend involved in the supposed drama to the fact that Abishag remained a virgin in regard to David (1 Kings i. 4) whilst nothing is said of her marriage to Solomon.[2]

On the view accepted above, Canticles describes in a number of separate poems the central passion of human life, and is wholly without didactic tendencies. Of its earliest history as a book we have no information. It is already included in the Hebrew canon (though its right to be there is disputed) when the first explicit mention of the book occurs. We have no evidence, therefore, of the theory of interpretation prevalent at the time of its incorporation with the other books of the canon. It seems, however, fair to infer that it would hardly have found acceptance but for a Solomonic theory of authorship and a "religious" theory of meaning. The problem raised by its present place in the canon occurs in relation to mistaken Jewish theories about other books also; it suggests, at least, that divine inspiration may belong to the life of a people rather than to the letter of their literature. Of that life Canticles portrays a central element—the passion of love—in striking imagery and graceful language, however far its oriental standard of taste differs from that of the modern West.

From the nature of the book, it is impossible to assign a precise date for its origin; the wedding-songs of which it chiefly consists must belong to the folklore of more than one century. The only evidence we possess as to date is drawn from the character of the Hebrew in which the book is written, which shows frequent points of contact with new Hebrew.[3] On this ground, we may suppose the present form of the work to date from the Greek period, *i.e.* after 332 B.C. This is the date accepted by most recent writers, *e.g.* Kautzsch, Cheyne, Budde, Rothstein, Jacob, Haupt. This late date finds some confirmation in the fact that Canticles belongs to the third and latest part of the Old Testament canon, and that its canonicity was still in dispute at the end of the 1st century A.D. The evidence offered for a north Israelite origin, on the ground of linguistic parallels and topographical familiarity (Driver, *loc. cit.*), does not seem very convincing; Haupt, however, places the compilation of the book in the neighbourhood of Damascus.

LITERATURE.—Most of the older books of importance are named above; Ginsburg, *The Song of Songs* (1857), gives much information as to the history of the exegesis of Canticles; Diestel's article, "Hohes Lied," in Schenkel's *Bibel Lexikon* (1871), reviews well the history of interpretation prior to Wetstein; cf. also Riedel, *Die Auslegung des Hohenliedes in der jüdischen Gemeinde und der griechischen Kirche* (1898). The most important commentary is that by Budde, in Marti's *Kurzer Hand-Commentar* (*Die fünf Megilloth*) (1898), where references to the literature of the 19th century are given. To his list add Siegfried, "Prediger und Hohes-lied," in Nowack's *Handkommentar* (1898); Cheyne's article "Canticles," in the *Encyclopaedia Biblica* (1899); Dalman, *Palästinischer Diwan* (1901), parallels to the songs; Rothstein's article, "Song of Songs," in Hastings' *Dictionary of the Bible* (1902); G. Jacob, *Das Hohelied auf Grund arabischer und anderer Parallelen von neuem Untersucht* (1902); A. Harper, *The Song of Songs* (1902); Haupt, "The Book of Canticles," in *The American Journal of Semitic Languages* (July 1902); Scholz, *Kommentar über das Hohelied und Psalm 45* (1904) (written from the Roman Catholic dogmatic standpoint of allegorical interpretation, with a vigorous criticism of other positions). No commentator in English, except Haupt, in the article named above, has yet worked on the lines of the above anthology theory. Haupt gives valuable notes, with a translation and rearrangement of the separate songs.

(W. R. S.; H. W. R.*)

CANTILEVER (a word of doubtful origin, probably derived from "lever," in its ordinary meaning, and "cant," an angle or edge, or else from modern Lat. *quanta libra*, of what weight), a building term for a stone, iron or wooden bracket, considerably greater in length than depth, used to support a gallery, &c.; and for a system of bridge-building (see BRIDGES).

CANTILUPE, THOMAS DE (*c.* 1218–1282), English saint and prelate, was a son of William de Cantilupe, the 2nd baron (d. 1251), one of King John's ministers, and a nephew of Walter de Cantilupe, bishop of Worcester. He was educated at Paris and Orleans, afterwards becoming a teacher of canon law at Oxford and chancellor of the university in 1262. During the Barons' War Thomas favoured Simon de Montfort and the baronial party. He represented the barons before St Louis of France

[1] On the erotic meaning of many of the figures employed see the notes of Haupt in *The American Journal of Semitic Languages* (July 1902); also G. Jacob, *Das Hohelied* (1902), who rightly protests against the limitation in the *Comm.* of Budde and Siegfried (p. 10) of all the songs to the marriage relation. Haupt thinks that the songs were not originally composed for weddings, though used there (p. 207, *op. cit.*). Diestel had pointed out, in another connexion (*B.L.* 125), that nothing is said in the book of the blessing of children, the chief end of *marriage* from a Hebrew standpoint.

[2] Rothstein's criticism of Budde turns chiefly on the latter's admission of redactional elements, introducing "movement and action," and may be summed up in the statement that "Budde himself by the characteristics he assigns to the redactor points the way again past his own hypothesis to the dramatical view of the Song" (*loc. cit.* 594b). A. Harper, "The Song of Songs" (*Cambridge Bible*), also criticizes Budde at length in favour of the conventional dramatical theory (Appendix).

[3] *E.g.* the late form of the relative pronoun used throughout except in title; foreign words, Persian and Greek; Aramaic words and usages (details in the *Comm.* or in *E. B.* 693).

at Amiens in 1264; he was made chancellor of England in February 1265, but was deprived of this office after Montfort's death at Evesham, and lived out of England for some time. Returning to England, he was again chancellor of Oxford University, lectured on theology, and held several ecclesiastical appointments. In 1274 he attended the second council of Lyons, and in 1275 he was appointed bishop of Hereford. Cantilupe was now a trusted adviser of Edward I.; he attended the royal councils, and even when differing from the king did not forfeit his favour. The archbishop of Canterbury, Robert Kilwardby, was also his friend; but after Kilwardby's death in 1279 a series of disputes arose between the bishop and the new archbishop, John Peckham, and this was probably the cause which drove Cantilupe to visit Italy. He died at Orvieto, on the 25th of August 1282, and he was canonized in 1330. Cantilupe appears to have been an exemplary bishop both in spiritual and secular affairs. His charities were large and his private life blameless; he was constantly visiting his diocese, correcting offenders and discharging other episcopal duties; and he compelled neighbouring landholders to restore estates which rightly belonged to the see of Hereford. In 1905 the Cantilupe Society was founded to publish the episcopal registers of Hereford, of which Cantilupe's is the first in existence.

See the *Acta Sanctorum, Boll.*, 1st October; and the *Register of Thomas de Cantilupe*, with introduction by W. W. Capes (1906).

CANTILUPE, WALTER DE (*d.* 1265), bishop of Worcester, came of a family which had risen by devoted service to the crown. His father and his elder brother are named by Roger of Wendover among the "evil counsellors" of John, apparently for no better reason than that they were consistently loyal to an unpopular master. Walter at first followed in his father's footsteps, entering the service of the Exchequer and acting as an itinerant justice in the early years of Henry III. But he also took minor orders, and, in 1236, although not yet a deacon, received the see of Worcester. As bishop, he identified himself with the party of ecclesiastical reform, which was then led by Edmund Rich and Robert Grosseteste. Like his leaders he was sorely divided between his theoretical belief in the papacy as a divine institution and his instinctive condemnation of the policy which Gregory IX. and Innocent IV. pursued in their dealings with the English church. At first a court favourite, the bishop came at length to the belief that the evils of the time arose from the unprincipled alliance of crown and papacy. He raised his voice against papal demands for money, and after the death of Grosseteste (1253) was the chief spokesman of the nationalist clergy. At the parliament of Oxford (1258) he was elected by the popular party as one of their representatives on the committee of twenty-four which undertook to reform the administration; from that time till the outbreak of civil war he was a man of mark in the councils of the baronial party. During the war he sided with Montfort and, through his nephew, Thomas, who was then chancellor of Oxford, brought over the university to the popular side. He was present at Lewes and blessed the Montfortians before they joined battle with the army of the king; he entertained Simon de Montfort on the night before the final rout of Evesham. During Simon's dictatorship, the bishop appeared only as a mediating influence; in the triumvirate of "Electors" who controlled the administration, the clergy were represented by the bishop of Chichester. Walter de Cantilupe died in the year after Evesham (1266). He was respected by all parties, and, though far inferior in versatility and force of will to Grosseteste, fully merits the admiration which his moral character inspired. He is one of the few constitutionalists of his day whom it is impossible to accuse of interested motives.

See the *Chronica Maiora* of Matthew Paris ("Rolls" series, ed. Luard); the *Chronicon de Bellis* (ed. Halliwell, Camden Society); and the *Annales Monastici* ("Rolls" series, ed. Luard); also T. F. Tout in the *Political History of England*, vol. iii. (1905).

CANTO (from the Lat. *canlus*, a song), one of the divisions of a long poem, a convenient division when poetry was more usually sung by the minstrel to his own accompaniment than read. In music, the *canto*, in a concerted piece, is that part to which the air is given. In modern music this is nearly always the soprano. The old masters, however, more frequently allotted it to the tenor. *Canto fermo*, or *cantus firmus*, is that part of the melody which remains true to the original motive, while the other parts vary with the counterpoint; also in Church music the simple straightforward melody of the old chants as opposed to *canto figurato*, which is full of embellishments of a florid character (see PLAIN SONG).

CANTON, JOHN (1718–1772), English natural philosopher, was born at Stroud, Gloucestershire, on the 31st of July 1718. At the age of nineteen, he was articled for five years as clerk to the master of a school in Spital Square, London, with whom at the end of that time he entered into partnership. In 1750 he read a paper before the Royal Society on a method of making artificial magnets, which procured him election as a fellow of the society and the award of the Copley medal. He was the first in England to verify Benjamin Franklin's hypothesis of the identity of lightning and electricity, and he made several important electrical discoveries. In 1762 and 1764 he published experiments in refutation of the decision of the Florentine Academy, at that time generally accepted, that water is incompressible; and in 1768 he described the preparation, by calcining oyster-shell with sulphur, of the phosphorescent material known as Canton's phosphorus. His investigations were carried on without any intermission of his work as a schoolmaster. He died in London on the 22nd of March 1772.

CANTON (more correctly KWANG-CHOW FU), a large and populous commercial city of China, in the province of Kwang-tung, situated on the eastern bank of the Pearl river, which at Canton is somewhat broader than the Thames at London Bridge, and is navigable 300 m. into the interior. The Pearl river has an additional course of 80 m. to the sea, the first part of which lies through a rich alluvial plain. Beyond this rises a range of hills terminating in abrupt escarpments along the course of the river. The bold shore thus formed compresses the stream at this point into a narrow pass, to which the Chinese have given the name of Hu-mun, or Tiger's Gate. This the Portuguese translated into Boca Tigre, whence the designation of "the Bogue," by which it is commonly known among Europeans. When viewed from the hills on the north, Canton appears to be little more than an expanse of reddish roofs relieved by a few large trees,—two pagodas shooting up within the walls, and a five-storeyed tower near the northern gate, being the most conspicuous objects. These hills rise 1200 ft. above the river. Little or no vegetation is seen on them; and their acclivities, covered for miles with graves and tombs, serve as the necropolis of this vast city. Three or four forts are built on the points nearest the northern walls. Facing the city on the opposite side of the river is the suburb and island of Honan. The part of Canton enclosed by walls is about 6 m. in circumference, and has a partition wall, running east and west, and dividing the city into two unequal parts. The northern and larger division is called the old, and the southern the new city. Including the suburbs, the city has a circuit of nearly 10 m. The houses stretch along the river for 4 m., and the banks are almost entirely concealed by boats and rafts. The walls of the city are of brick, on a foundation of sandstone and granite, are 20 ft. thick, and rise to an average height of 25 ft. On the north side the wall rises to include a hill which it there meets with, and on the other three sides the city is surrounded by a ditch, which is filled by the rising tide, when, for a time, the revolting mass of filth that lies in its bed is concealed from view. There are twelve outer gates—four of which are in the partition wall, and two water gates, through which boats pass from east to west across the new city. The gates are all shut at night, and in the daytime a guard is stationed at them to preserve order. The streets, amounting in all to upwards of 600, are long, straight, and very narrow. They are mostly paved and are not as dirty as those of some of the other cities in the empire; in fact, considering the habits of the people and the inattention of the government to these matters, Canton may be said to be a well-governed and comparatively cleanly city. The houses are in general small, seldom consisting of more than two storeys, the

ground floor serving as a shop, and the rest of the house, with the court behind, being used as a warehouse. Here are to be found the productions of every quarter of the globe; and the merchants are in general attentive, civil, expert men of business, and generally assiduous.

The temples and public buildings of Canton are numerous, but none of them presents features worthy of special remark. There are two pagodas near the west gate of the old city, and 124 temples, pavilions, halls and other religious edifices within the city. One of the pagodas called the *Kwangtah*, or Plain Pagoda, is a Mahommedan mosque, which was erected by the Arabian voyagers who were in the habit of visiting Canton about ten centuries ago. It rises in an angular tapering tower to the height of 160 ft. The other is an octagonal pagoda of nine storeys, 170 ft. in height, and was first erected more than thirteen centuries ago. A Buddhist temple at Honan, opposite the foreign factories, and named in Chinese *Hai-ch'wang-sze*, or the Temple of the Ocean Banner, is one of the largest in Canton. Its grounds, which cover about seven acres, are surrounded by a wall, and are divided into courts, gardens and a burial-ground, where are deposited the ashes of priests, whose bodies are burned. There are about 175 priests connected with this establishment. Besides the *Hai-ch'wang-sze* the most noteworthy temples in and about the city are those of the Five Hundred Gods and of Longevity, both in the western suburbs; the Tatar City Temple and the Temple of the Five Genii. The number of priests and nuns in Canton is not exactly known, but they probably exceed 2000, nine-tenths of whom are Buddhists. The temples are gloomy-looking edifices. The areas in front of them are usually occupied by hucksters, beggars and idlers, who are occasionally driven off to make room for the mat-sheds in which the theatrical performances got up by the wealthy inhabitants are acted. The principal hall, where the idol sits enshrined, is lighted only in front, and the inner apartments are inhabited by a class of men almost as senseless as the idols they serve.

The residences of the high officers of government are all within the walls of the old city. The residence of the governor-general used to be in the south-west corner of the new city, but it was utterly destroyed by the bombardment in 1856. The site remained desolate until 1860, when it was taken possession of by the French authorities, who erected a Roman Catholic cathedral upon it. The residence of the commander-in-chief is in the old city, and is said to be one of the best houses in Canton. There are four prisons in the city, all large edifices. For the space of 4 or 5 m. opposite Canton boats and vessels are ranged parallel to each other in such close order as to resemble a floating city; and these marine dwellings are occupied by numerous families, who reside almost constantly on the water. In the middle of the river lie the Chinese junks, some of them of from 600 to 1000 tons burden, which trade to the north and to the Strait Settlements. The various gilds and associations among the people and the merchants from other provinces have public halls each for its own particular use. The number of these buildings is not less than 150. Canton was long the only seat of British trade with China, and was no doubt fixed upon by the Chinese government for the European trade, as being the most distant from the capital Peking.

Formerly only a limited number of merchants, called the *hong* or security merchants, were allowed to trade with foreigners. They were commonly men of large property and were famed for integrity in their transactions. All foreign cargoes passed through the hands of these merchants, and by them also the return cargoes were furnished. They became security for the payment of customs duties, and it was criminal for any other merchant to engage in the trade with foreigners.

Although it is in the same parallel of latitude as Calcutta, the climate of Canton is much cooler, and is considered superior to that of most places situated between the tropics. The extreme range of the thermometer is from 38° to 100° F., though these extremes are rarely reached. In ordinary years the winter minimum is about 42° and the maximum in summer 96°. The hot season is considered to last from May to October; during the rest of the year the weather is cool. In shallow vessels ice sometimes forms at Canton; but so rarely is snow seen that when in February 1835 a fall to the depth of 2 in. occurred, the citizens hardly knew its proper name. Most of the rain falls during May and June, but the amount is nothing in comparison with that which falls during a rainy season in Calcutta. July, August and September are the regular monsoon months, the wind coming from the south-west with frequent showers, which allay the heat. In the succeeding months the northerly winds begin, with some interruptions at first, but from October to January the temperature is agreeable, the sky clear and the air invigorating. Few large cities are more generally healthy than Canton, and epidemics rarely prevail there.

Provisions and refreshments of all sorts are abundant, and in general are excellent in quality and moderate in price. It is a singular fact that the Chinese make no use of milk, either in its natural state or in the form of butter or cheese. Among the delicacies of a Chinese market are to be seen horse-flesh, dogs, cats, hawks, owls and edible birds'-nests. The business between foreigners and natives at Canton is generally transacted in a jargon known as "pidgin English," the Chinese being extremely ready in acquiring a sufficient smattering of English words to render themselves intelligible.

The intercourse between China and Europe by the way of the Cape of Good Hope began in 1517, when Emanuel, king of Portugal, sent an ambassador, accompanied by a fleet of eight ships, to Peking, on which occasion the sanction of the emperor to establish a trade at Canton was obtained. It was in 1596, in the reign of Queen Elizabeth, that the English first attempted to open an intercourse with China, but ineffectually, for the two ships which were despatched on this mission were lost on the outward voyage, and it was not till about 1634 that English ships visited Canton. Unfortunately at this time a misunderstanding having occurred with the Chinese authorities owing to the treachery of the Portuguese, a rupture and a battle took place, and it was with difficulty that peace was again restored. In 1673 China was again visited by an English ship which was subsequently refused admission into Japan, and in 1677 a factory was established at Amoy. But during an irruption of the Tatars three years later this building was destroyed, and it was not till 1685 that the emperor permitted any trade with Europeans at that port. Upon the union of the two East India Companies in London, an imperial edict was issued, restricting the foreign commerce to the port of Canton.

Tea was first imported into England about the year 1667, and in 1689 a customs duty of 5s. per lb was for the first time imposed. From this date to 1834 the East India Company held a monopoly of the trade at Canton, and during this period the prosperity of the port increased and multiplied, notwithstanding the obstructions which were constantly thrown in the way of the "barbarians" by the Chinese government. The termination of the Company's monopoly brought no alteration in the conduct of the native authorities, whose oppressions became before long so unbearable that in 1839 war was declared on the part of Great Britain. In 1841, while the forces under Sir Hugh (afterwards Lord) Gough were preparing to capture Canton, Captain Elliott entered into negotiations with the Chinese, and consented to receive a pecuniary ransom in lieu of occupying the city. Meanwhile the war was carried on in central China, and finally resulted in the conclusion of the Nanking treaty in August 1842, under the terms of which four additional ports, viz. Shanghai, Ningpo, Fu-chow and Amoy, were thrown open to foreign trade, and foreigners were granted permission to enter the city of Canton, from which they had hitherto been excluded. This latter provision of the treaty, however, the Chinese refused to carry out; and after endless disputes about this and other improper acts of the Chinese government, war was again declared in 1856, the immediate cause of which was an insult offered to the British flag by the capture of certain Chinese on board the "Arrow," a small craft trading under English colours. The outbreak of hostilities was followed by the pillage and destruction of the foreign "factories" in December 1856 by a Chinese mob,

and twelve months later Canton was taken by assault by a force under Sir Charles Straubenzee, which had been sent out from England for the purpose. From this time until October 1861 the city was occupied by an English and French garrison, and the administration of affairs was entrusted to an allied commission, consisting of two English officers and one French officer, acting under the English general. Since the withdrawal of this garrison, the city of Canton has been freely open to foreigners of all nationalities, and the English consul has his residence in the Yamun formerly occupied by the allied commissioners, within the city walls.

On the conclusion of peace it became necessary to provide a foreign settlement for the merchants whose "factories" had been destroyed, and after some consultation it was determined to fill in and appropriate as the British settlement an extensive mud flat lying to the westward of the old factory site, and known as Sha-mien or "The Sand Flats." This site having been leased, it was converted into an artificial island by building a massive embankment of granite in an irregular oval form. Between the northern face of the site and the Chinese suburb a canal of 100 ft. in width was constructed, thus forming an island of about 2850 ft. in length and 950 ft. in greatest breadth. The expense of making this settlement was 325,000 Mexican dollars, four-fifths of which were defrayed by the British government and one-fifth by the French government. The British portion of the new settlement was laid out in eighty-two lots; and so bright appeared the prospect of trade at the time of their sale that 9000 dollars and upwards was paid in more than one instance for a lot with a river frontage, measuring 12,645 sq. ft. The depression in trade, however, which soon followed acted as a bar to building, and it was not until the British consulate was erected in 1865 that the merchants began to occupy the settlement in any numbers. The British consulate occupies six lots, with an area of 75,870 sq. ft. in the centre of the site, overlooking the river, and is enclosed with a substantial wall. A ground-rent of 15,000 cash (about £3) per *mow* (a third of an acre) is annually paid by the owners of lots to the Chinese government.

The Sha-mien settlement possesses many advantages. It is close to the western suburb of Canton, where reside all the wholesale dealers as well as the principal merchants and brokers; it faces the broad channel known as the Macao Passage, up which the cool breezes in summer are wafted almost uninterruptedly, and the river opposite to it affords a safe and commodious anchorage for steamers up to 1000 tons burden. Steamers only are allowed to come up to Canton, sailing vessels being restricted to the anchorage at Whampoa. There is daily communication by steamer with Hong-Kong, and with the Portuguese colony of Macao which lies near the mouth of the river. Inland communication by steam is now open by the west river route to the cities of Wuchow and Nanking. The opening of these inland towns to foreign trade, which has been effected, cannot but add considerably to the volume of Canton traffic. The native population is variously estimated at from 1,500,000 to 2,000,000, the former being probably nearer the truth. The foreign residents number about 400. Canton is the headquarters of the provincial government of Kwangtung and Kwangsi, generally termed the two Kwang, at the head of which is a governor-general or viceroy, an office which next to that of Nanking is the most important in the empire. It possesses a mint built in 1889 by the then viceroy Chang Chih-tung, and equipped with a very complete plant supplied from England. It turns out silver subsidiary coinage and copper cash. Contracts have been entered into to connect Canton by railway with Hong-Kong (Kowlun), and by a grand trunk line with Hankow on the Yangtsze. It is connected by telegraph with all parts. The value of the trade of Canton for the year 1904 was £13,749,582, £7,555,090 of which represented imports and £6,194,490 exports. (R. K. D.)

CANTON, a city of Fulton county, Illinois, U.S.A., in the W. part of the state, 12 m. N. of the Illinois river, and 28 m. S.W. of Peoria. Pop. (1890) 5604; (1900) 6564, of whom 424 were foreign-born. Canton is served by the Chicago, Burlington & Quincy, the Toledo, Peoria & Western, and the Illinois Central Electric Interurban railways. About 1 m. from the centre of the city are the Canton Chautauqua grounds. The city has a public library. Canton is situated in a rich agricultural region, for which it is a supply point, and there are large coal-mines in the vicinity. Among the manufactures are agricultural implements (particularly ploughs), machine-shop and foundry products (particularly mining-cars and equipment), flour, cigars, cigar-boxes, brooms, and bricks and tile. The municipal water-works are supplied from a deep artesian well. Canton was laid out in 1825; it was incorporated as a town in 1837 and as a village in 1849, and was chartered as a city in 1854.

CANTON, a village and the county-seat of St Lawrence county, New York, U.S.A., 17 m. S.E. of Ogdensburg, on the Grasse river. Pop. (1890) 2580; (1900) 2757; (1905, state census) 3083. The village is served by the Rome, Watertown & Ogdensburg division of the New York Central & Hudson River railway. Canton is the seat of St Lawrence University (co-educational; chartered in 1856; at first Universalist, afterwards unsectarian), having a college of letters and science, which developed from an academy, opened in 1859; a theological school (Universalist), opened in 1858; a law school, established in 1869, discontinued in 1872 and re-established in Brooklyn, New York, in 1903 as the Brooklyn Law School of St Lawrence University; and a state school of agriculture, established in 1906 by the state legislature and opened in 1907. In 1907–1908 the university had 52 instructors, 168 students in the college of letters and science, 14 students in the theological school, 287 in the law school and 13 in the agricultural school. The Clinton Liberal Institute (Universalist, 1832), which was removed in 1879 from Clinton to Fort Plain, New York, was established in Canton in 1901. The Grasse river furnishes water-power, and the village has saw-, planing- and flour-mills, and plant for the building of small boats and launches. The village corporation owns a fine water-supply system. Canton was first settled in 1800 by Daniel Harrington of Connecticut and was incorporated in 1845. It was for many years the home of Silas Wright, who was buried here.

CANTON, a city and the county-seat of Stark county, Ohio, U.S.A., on Nimishillen Creek, 60 m. S. by E. of Cleveland. Pop. (1890) 26,189; (1900) 30,667, of whom 4018 were foreign-born; and (1910) 50,217. It is served by the Pennsylvania, the Baltimore & Ohio, and the Wheeling & Lake Erie railways, and is connected by an interurban electric system with all the important cities and towns within a radius of 50 m. It lies at an elevation of about 1030 ft. above sea-level, in a wheat-growing region, in which bituminous coal, limestone, and brick and potter's clay abound. Meyer's Lake in the vicinity is a summer attraction. The principal buildings are the post-office, court-house, city hall, an auditorium with a seating capacity of 5000, a Masonic building, an Oddfellows' temple, a Y.M.C.A. building and several handsome churches. On Monument Hill, in West Lawn Cemetery, in a park of 26 acres—a site which President McKinley had suggested for a monument to the soldiers and sailors of Stark county—there is a beautiful monument to the memory of McKinley, who lived in Canton. This memorial is built principally of Milford (Mass.) granite, with a bronze statue of the president, and with sarcophagi containing the bodies of the president and Mrs McKinley, and has a total height, from the first step of the approaches to its top, of 163 ft. 6 in., the mausoleum itself being 98 ft. 6 in. high and 78 ft. 9 in. in diameter; it was dedicated on the 30th of September 1907, when an address was delivered by President Roosevelt. Another monument commemorates the American soldiers of the Spanish-American War. Among the city's manufactures are agricultural implements, iron bridges and other structural iron work, watches and watch-cases, steel, engines, safes, locks, cutlery, hardware, wagons, carriages, paving-bricks, furniture, dental and surgical chairs, paint and varnish, clay-working machinery and saw-mill machinery. The value of the factory product in 1905 was $10,591,143, being 10·6 % more than the product value of 1900. Canton was laid out as a town in 1805, became the county-seat

in 1808, was incorporated as a village in 1822 and in 1854 was chartered as a city.

CANTON (borrowed from the Ital. *cantone*, a corner or angle), a word used for certain divisions of some European countries. In France, the canton, which is a subdivision of the arrondissement, is a territorial, rather than an administrative, unit. The canton, of which there are 2908, generally comprises, on an average, about twelve communes, though very large communes are sometimes divided into several cantons. It is the seat of a justice of the peace, and returns a member to the *conseil d'arrondissement* (see FRANCE). In Switzerland, canton is the name given to each of the twenty-two states comprising the Swiss confederation (see SWITZERLAND).

In heraldry, a "canton" is a corner or square division on a shield, occupying the upper corner (usually the dexter). It is in area two-thirds of the quarter (see HERALDRY).

CANTONMENT (Fr. *cantonnement*, from *cantonner*, to quarter; Ger. *Ortsunterkunft* or *Quartier*). When troops are distributed in small parties amongst the houses of a town or village, they are said to be in cantonments, which are also called quarters or billets. Formerly this method of providing soldiers with shelter was rarely employed on active service, though the normal method in "winter quarters," or at seasons when active military operations were not in progress. In the field, armies lived as a rule in camp (*q.v.*), and when the provision of canvas shelter was impossible in bivouac. At the present time, however, it is unusual, in Europe at any rate, for troops on active service to hamper themselves with the enormous trains of tent wagons that would be required, and cantonments or bivouacs, or a combination of the two have therefore taken the place, in modern warfare, of the old long rectilinear lines of tents that marked the resting-place and generally, too, the order of battle of an 18th-century army. The greater part of an army operating in Europe at the present day is accommodated in widespread cantonments, an army corps occupying the villages and farms found within an area of 4 m. by 5 or 6. This allowance of space has been ascertained by experience to be sufficient, not only for comfort, but also for subsistence for one day, provided that the density of the ordinary civil population is not less than 200 persons to the square mile. Under modern conditions there is little danger from such a dissemination of the forces, as each fraction of each army corps is within less than two hours' march of its concentration post. If the troops halt for several days, of course they require either a more densely populated country from which to requisition supplies, or a wider area of cantonments. The difficulty of controlling the troops, when scattered in private houses in parties of six or seven, is the principal objection to this system of cantonments. But since Napoleon introduced the "war of masses" the only alternative to cantoning the troops is bivouacking, which if prolonged for several nights is more injurious to the well-being of the troops than the slight relaxation of discipline necessitated by the cantonment system, when the latter is well arranged and policed. The troops nearest the enemy, however, which have to be maintained in a state of constant readiness for battle, cannot as a rule afford the time either for dispersing into quarters or for rallying on an alarm, and in western Europe at any rate they are required to bivouac. In India, the term "cantonment" means more generally a military station or standing camp. The troops live, not in private houses, but in barracks, huts, forts or occasionally camps. The large cantonments are situated in the neighbourhood of the North-Western frontier, of the large cities and of the capitals of important native states. Under Lord Kitchener's redistribution of the Indian army in 1903, the chief cantonments are Rawalpindi, Quetta, Peshawar, Kohat, Bannu, Nowshera, Sialkot, Mian Mir, Umballa, Muttra, Ferozepore, Meerut, Lucknow, Mhow, Jubbulpore, Bolarum, Poona, Secunderabad and Bangalore.

CANTÙ, CESARE (1804–1895), Italian historian, was born at Brivio in Lombardy and began his career as a teacher. His first literary essay (1828) was a romantic poem entitled *Algiso, o la Lega Lombarda* (new ed., Milan, 1876), and in the following year he produced a *Storia di Como* in two volumes (Como, 1829). The death of his father then left him in charge of a large family, and he worked very hard both as a teacher and a writer to provide for them. His prodigious literary activity led to his falling under the suspicions of the Austrian police, and he was mixed up in a political trial and arrested in 1833. While in prison writing materials were denied him, but he managed to write on rags with a tooth-pick and candle smoke, and thus composed the novel *Margherita Pusterla* (Milan, 1838). On his release a year later, as he was interdicted from teaching, literature became his only resource. In 1836 the Turinese publisher, Giuseppe Pomba, commissioned him to write a universal history, which his vast reading enabled him to do. In six years the work was completed in seventy-two volumes, and immediately achieved a general popularity; the publisher made a fortune out of it, and Cantù's royalties amounted, it is said, to 300,000 lire (£12,000). Just before the revolution of 1848, being warned that he would be arrested, he fled to Turin, but after the "Five Days" he returned to Milan and edited a paper called *La Guardia Nazionale*. Between 1849 and 1850 he published his *Storia degli Italiani* (Turin, 1855) and many other works. In 1857 the archduke Maximilian tried to conciliate the Milanese by the promise of a constitution, and Cantù was one of the few Liberals who accepted the olive branch, and went about in company with the archduke. This act was regarded as treason and caused Cantù much annoyance in after years. He continued his literary activity after the formation of the Italian kingdom, producing volume after volume until his death. For a short time he was member of the Italian parliament; he founded the Lombard historical society, and was appointed superintendent of the Lombard archives. He died in March 1895. His views are coloured by strong religious and political prejudice, and by a moralizing tendency, and his historical work has little critical value and is for the most part pure book-making, although he collected a vast amount of material which has been of use to other writers. In dealing with modern Italian history he is reactionary and often wilfully inaccurate. Besides the above-mentioned works he wrote *Gli Eretici in Italia* (Milan, 1873); *Cronistoria dell' Indipendenza italiana* (Naples, 1872–1877); *Il Conciliatore e i Carbonari* (Milan, 1878), &c. (L. V.*)

CANUSIUM (Gr. Κανύσιον, mod. *Canosa*), an ancient city of Apulia, on the right bank of the Aufidus (Ofanto), about 12 m. from its mouth, and situated upon the Via Traiana, 85 m. E.N.E. of Beneventum. It was said to have been founded by Diomede, and even at the time of Horace (*Sat.* i. 10. 30) both Greek and Latin were spoken there. The legends on the coins are Greek, and a very large number of Greek vases have been found in the necropolis. The town came voluntarily under Roman sovereignty in 318 B.C., afforded a refuge to the Roman fugitives after Cannae, and remained faithful for the rest of the war. It revolted in the Social War, in which it would appear to have suffered, inasmuch as Strabo (vi. 283) speaks of Canusium and Arpi as having been, to judge from the extent of their walls, the greatest towns in the plain of Apulia, but as having shrunk considerably in his day. Its importance was maintained, however, by its trade in agricultural products and in Apulian wool (which was there dyed and cleaned), by its port (probably Cannae) at the mouth of the Aufidus, and by its position on the high-road. It was a *municipium* under the early empire, but was converted into a *colonia* under Antoninus Pius by Herodes Atticus, who provided it with a water-supply. In the 6th century it was still the most important city of Apulia. Among the ancient buildings which are still preserved, an amphitheatre, an aqueduct and a city gate may be mentioned.

See N. Jacobone, *Ricerche sulla storia e la topografia di Canosa Antica* (Canosa di Puglia, 1905). (T. As.)

CANUTE (CNUT), known as "the Great" (*c.* 995–1035), king of Denmark and England, second son of King Sweyn Forkbeard and his first wife, the daughter of the Polish prince, Mieszko, was born *c.* 995. On the death of his father he was compelled to quit England by a general rising of the Anglo-Saxons, on which occasion in a fit of rage, for he was not naturally cruel, he abandoned his hostages after cutting off their hands, ears

and noses. In the following year, 1015, he returned with a great fleet manned by a picked host, "not a thrall or a freedman among them." He speedily succeeded in subduing all England except London, now the last refuge of King Æthelred and his heroic son, Edmund Ironside. On the death of Æthelred (23rd of April 1016) Canute was elected king by an assembly of notables at Southampton; but London clung loyally to Edmund, who more than once succeeded in raising the western shires against Canute. Edmund indeed approved himself the better general of the two, and would doubtless have prevailed, but for the treachery of his own ealdormen. This was notably the case at the great battle of Assandun, in which by the desertion of Eadric an incipient Anglo-Saxon victory was converted into a crushing defeat. Nevertheless, the antagonists were so evenly matched that the great men on both sides, fearing that the interminable war would utterly ruin the land, arranged a conference between Canute and Edmund on an island in the Severn, when they agreed to divide England between them, Canute retaining Mercia and the north, while Edmund's territory comprised East Anglia and Wessex with London. On the death of Edmund, a few months later (November 1016), Canute was unanimously elected king of all England at the beginning of 1017. The young monarch at once showed himself equal to his responsibilities. He did his utmost to deserve the confidence of his Anglo-Saxon subjects, and the eighteen years of his reign were of unspeakable benefit to his adopted country. He identified himself with the past history of England and its native dynasty by wedding Emma, or Ælgifu, to give her her Saxon name (the Northmen called her Alfifa), who came over from Normandy at his bidding, Canute previously repudiating his first wife, another Ælgifu, the daughter of the ealdorman Ælfhem of Deira, who, with her sons, was banished to Denmark. In 1018 Canute inherited the Danish throne, his elder brother Harold having died without issue. He now withdrew most of his army from England, so as to spare as much as possible the susceptibilities of the Anglo-Saxons. For the same reason he had previously dispersed all his warships but forty. On his return from Denmark he went a step farther. In a remarkable letter, addressed to the prelates, ealdormen and people, he declared his intention of ruling England by the English, and of upholding the laws of King Edgar, at the same time threatening with his vengeance all those who did not judge righteous judgment or who let malefactors go free. The tone of this document, which is not merely Christian but sacerdotal, shows that he had wisely resolved, in the interests of law and order, to form a close alliance with the native clergy. Those of his own fellow-countrymen who refused to co-operate with him were summarily dismissed. Thus, in 1021, the stiffnecked jarl Thorkil was banished the land, and his place taken by an Anglo-Saxon, the subsequently famous Godwin, who became one of Canute's chief counsellors. The humane and conciliatory character of his government is also shown in his earnest efforts to atone for Danish barbarities in the past. Thus he rebuilt the church of St Edmundsbury in memory of the saintly king who had perished there at the hands of the earlier Vikings, and with great ceremony transferred the relics of St Alphege from St Paul's church at London to a worthier resting-place at Canterbury. His work of reform and reconciliation was interrupted in 1026 by the attempt of Olaf Haraldson, king of Norway, in conjunction with Anund Jakob, king of Sweden, to conquer Denmark. Canute defeated the Swedish fleet at Stangebjerg, and so seriously injured the combined squadrons at the mouth of the Helgeaa in East Scania, that in 1028 he was able to subdue the greater part of Norway "without hurling a dart or swinging a sword." But the conquest was not permanent, the Norwegians ultimately rising successfully against the tyranny of Alfifa, who misruled the country in the name of her infant son Sweyn. Canute also succeeded in establishing the dominion of Denmark over the southern shores of the Baltic, in Witland and Samland, now forming part of the coast of Prussia. Of the details of Canute's government in Denmark proper we know but little. His most remarkable institution was the *Tinglid*, a military brotherhood, originally 3000 in number, composed of members of the richest and noblest families, who not only formed the royal bodyguard, but did garrison duty and defended the marches or borders. They were subject to strict discipline, embodied in written rules called the *Viderlog* or *Vederlag*, and were the nucleus not only of a standing army but of a royal council. Canute is also said to have endeavoured to found monasteries in Denmark, with but indifferent success, and he was certainly the first Danish king who coined money, with the assistance of Anglo-Saxon mint-masters. Of his alliance with the clergy we have already spoken. Like the other great contemporary kingdom-builder, Stephen of Hungary, he clearly recognized that the church was the one civilizing element in a world of anarchic barbarism, and his submission to her guidance is a striking proof of his perspicacity. But it was no slavish submission. When, in 1027, he went to Rome, with Rudolf III. of Burgundy, to be present at the coronation of the emperor Conrad II., it was quite as much to benefit his subjects as to receive absolution for the sins of his youth. He persuaded the pope to remit the excessive fees for granting the *pallium*, which the English and Danish bishops had found such a grievous burden, substituting therefor a moderate amount of Peter's pence. He also induced the emperor and other German princes to grant safe-conducts to those of his subjects who desired to make the pilgrimage to Rome.

Canute died at Shaftesbury on the 12th of November 1035 in his 40th year, and was buried at Winchester. He was cut off before he had had the opportunity of developing most of his great plans; yet he lived long enough to obtain the title of "Canute the Wealthy" (*i.e.* "Mighty"), and posterity, still more appreciative, has well surnamed him "the Great." A violent, irritable temper was his most salient defect, and more than one homicide must be laid to his charge. But the fierce Viking nature was gradually and completely subdued; for Canute was a Christian by conviction and sincerely religious. His humility is finely illustrated by the old Norman poem which describes how he commanded the rising tide of the Thames at Westminster to go back. The homily he preached to his courtiers on that occasion was to prepare them for his subsequent journey to Rome and his submission to the Holy See. Like his father Sweyn, Canute loved poetry, and the great Icelandic skalder, Thorar Lovtunge and Thormod Kolbrunarskjöld, were as welcome visitors at his court as the learned bishops. As an administrator Canute was excelled only by Alfred. He possessed in an eminent degree the royal gift of recognizing greatness, and the still more useful faculty of conciliating enemies. No English king before him had levied such heavy taxes, yet never were taxes more cheerfully paid; because the people felt that every penny of the money was used for the benefit of the country. According to the *Knytlinga Saga* King Canute was huge of limb, of great strength, and a very goodly man to look upon, save for his nose, which was narrow, lofty and hooked; he had also long fair hair, and eyes brighter and keener than those of any man living.

See *Danmarks Riges Historie. Old Tiden og den aeldre Middelalder*, pp. 382-406 (Copenhagen, 1897–1905); Freeman, *Norman Conquest* (Oxford, 1870–1875); Steenstrup, *Normannerne* (Copenhagen, 1876–1882). (R. N. B.)

CANUTE VI. (1163–1202), king of Denmark, eldest son of Valdemar I., was crowned in his seventh year (1170), as his father's co-regent, so as to secure the succession. In 1182 he succeeded to the throne. During his twenty years' reign Denmark advanced steadily along the path of greatness and prosperity marked out for her by Valdemar I., consolidating and extending her dominion over the North Baltic coast and adopting a more and more independent attitude towards Germany. The emperor Frederick I.'s claim of overlordship was haughtily rejected at the very outset, and his attempt to stir up Duke Bogislav of Pomerania against Denmark's vassal, Jaromir of Rügen, was defeated by Archbishop Absalon, who destroyed 465 of Bogislav's 500 ships in a naval action off Strela (Stralsund) in 1184. In the following year Bogislav did homage to Canute on the deck of his long-ship, off Jomsborg in Pomerania, Canute

henceforth styling himself king of the Danes and Wends. This victory led two years later to the voluntary submission of the two Abodrite princes Niklot and Borwin to the Danish crown, whereupon the bulk of the Abodrite dominions, which extended from the Trave to the Warnow, including modern Mecklenburg, were divided between them. The concluding years of Canute's reign were peaceful, as became a prince who, though by no means a coward, was not of an overwhelmingly martial temperament. In 1197, however, German jealousy of Denmark's ambitions, especially when Canute led a fleet against the pirates of Esthonia, induced Otto, margrave of Brandenburg, to invade Pomerania, while in the following year Otto, in conjunction with Duke Adolf of Holstein, wasted the dominions of the Danophil Abodrites. The war continued intermittently till 1201, when Duke Valdemar, Canute's younger brother, conquered the whole of Holstein, and Duke Adolf was subsequently captured at Hamburg and sent in chains to Denmark. North Albingia, as the district between the Eider and the Elbe was then called, now became Danish territory. Canute died on the 12th of November 1202. Undoubtedly he owed the triumphs of his reign very largely to the statesmanship of Absalon and the valour of Valdemar. But he was certainly a prudent and circumspect ruler of blameless life, possessing, as Arnold of Lübeck (*c.* 1160–1212) expresses it, "the sober wisdom of old age even in his tender youth."

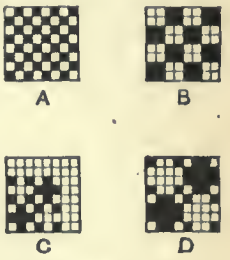
See *Danmarks Riges Historie. Oldtiden og den aeldre Middelalder* (Copenhagen, 1897–1905), pp. 721-735. (R. N. B.)

CANVAS, a stout cloth which probably derives its name from *cannabis*, the Latin word for hemp. This would appear to indicate that canvas was originally made from yarns of the hemp fibre, and there is some ground for the assumption. This fibre and that of flax have certainly been used for ages for the production of cloth for furnishing sails, and for certain classes of cloth used for this purpose the terms "sailcloth" and "canvas" are synonymous. Warden, in his *Linen Trade*, states that the manufacture of sailcloth was established in England in 1590, as appears by the preamble of James I., cap. 23:—"Whereas the cloths called *Mildernix* and *Powel Davies*, whereof sails and other furniture for the navy and shipping are made, were heretofore altogether brought out of France and other parts beyond sea, and the skill and art of making and weaving of the said sailcloths never known or used in England until about the thirty-second year of the late Queen Elizabeth, about what time and not before the perfect art or skill of making or weaving of the said cloths was attained to, and since practised and continued in this realm, to the great benefit and commodity thereof." But this, or a similar cloth of the same name had been used for centuries before this time by the Egyptians and Phoenicians. Since the introduction of the power loom the cloth has undergone several modifications, and it is now made both from flax, hemp, tow, jute and cotton, or a mixture of these, but the quality of sailcloth for the British government is kept up to the original standard. All flax canvas is essentially of double warp, for it is invariably intended to withstand some pressure or rough usage.

In structure it is similar to jute tarpaulin; indeed, if it were not for the difference in the fibre, it would be difficult to say where one type stopped and the other began. "Bagging," "tarpaulin" and "canvas" form an ascending series of cloths so far as fineness is concerned, although the finest tarpaulins are finer than some of the lower canvases. The cloth may be natural colour, bleached or dyed, a very common colour being tan. It has an enormous number of different uses other than naval.

Amongst other articles made from it are:—receptacles for photographic and other apparatus; bags for fishing, shooting, golf and other sporting implements; shoes for cricket and other games, and for yachting; travelling cases and hold-alls, letter-bags, school-bags and nose-bags for horses. Large quantities of the various makes of flax and cotton canvases are tarred, and then used for covering goods on railways, wharves, docks, etc.

Sail canvas is, naturally, of a strong build, and is quite different from the canvas cloth used for embroidery purposes, often called "art canvas." The latter is similar in structure to cheese cloths and strainers, the chief difference being that the yarns for art canvas are, in general, of a superior nature. All kinds of vegetable fibres are used in their production, chief among which are cotton, flax and jute. The yarns are almost invariably two or more ply, an arrangement which tends to obtain a uniform thickness—a very desirable element in these open-built fabrics. The plain weave A in the figure is extensively used for these fabrics, but in many cases special weaves are used which leave the open spaces well defined. Thus weave B is often employed, while the "imitation gauze" weaves, C and D, are also largely utilized in the production of these embroidery cloths. Weave B is known as the hopsack, and probably owes its name to being originally used for the making of bags for hops. The cloth for this purpose is now called "hop pocketing," and is of a structure between bagging and tarpaulin. Another class of canvas, single warp termed "artists' canvas," is used, as its name implies, for paintings in oils. It is also much lighter than sail canvas, but must, of necessity, be made of level yarns. The best qualities are made of cream or bleached flax line, although it is not unusual to find an admixture of tow, and even of cotton in the commoner kinds. When the cloth comes from the loom, it undergoes a special treatment to prepare the surface for the paint.



CANVASS (an older spelling of "canvas"), to sift by shaking in a sheet of canvas, hence to discuss thoroughly; as a political term it means to examine carefully the chances of the votes in a prospective election, and to solicit the support of the electors.

CANYNGES, CANYNGE, **WILLIAM** (*c.* 1399–1474), English merchant, was born at Bristol in 1399 or 1400, a member of a wealthy family of merchants and cloth-manufacturers in that city. He entered, and in due course greatly extended, the family business, becoming one of the richest Englishmen of his day. Canynges was five times mayor of, and twice member of parliament for, Bristol. He owned a fleet of ten ships, the largest hitherto known in England, and employed, it is said, 800 seamen. By special license from the king of Denmark he enjoyed for some time a monopoly of the fish trade between Iceland, Finland and England, and he also competed successfully with the Flemish merchants in the Baltic, obtaining a large share of their business. In 1456 he entertained Margaret of Anjou at Bristol, and in 1461 Edward IV. Canynges undertook at his own expense the great work of rebuilding the famous Bristol church of St Mary, Redcliffe, and for a long time had a hundred workmen in his regular service for this purpose. In 1467 he himself took holy orders, and in 1469 was made dean of Westbury. He died in 1474. The statesman George Canning and the first viscount Stratford de Redcliffe were descendants of his family.

See Pryce, *Memorials of the Canynges Family and their Times* (Bristol, 1854).

CANYON (Anglicized form of Span. *cañon*, a tube, pipe or cannon; the Spanish form being also frequently written), a type of valley with huge precipitous sides, such as the Grand Canyons of the Colorado and the Yellowstone rivers, and the gorge of the Niagara river below the falls, due to rapid stream erosion in a "young" land. A river saws its channel vertically downwards, and a swift stream erodes chiefly at the bottom. In rainy regions the valleys thus formed are widened out by slope-wash and the resultant valley-slopes are gentle, but in arid regions there is very little side-extension of the valleys and the river cuts its way downwards, leaving almost vertical cliffs above the stream. If the stream be swift as in the western plateau of North America, the cutting action will be rapid. The ideal conditions for developing a canyon are: great altitude and slope causing swift streams, arid conditions with absence of side-wash, and hard rock horizontally bedded which will hold the walls up.

CANZONE, a form of verse which has reached us from Italian literature, where from the earliest times it has been assiduously cultivated. The word is derived from the Provençal *cansò*, a song, but it was in Italian first that the form became a literary one, and was dedicated to the highest uses of poetry. The canzone-strophe consists of two parts, the opening one being distinguished by Dante as the *fronte*, the closing one as the *sirma*. These parts are connected by rhyme, it being usual to make the rhyme of the last line of the *fronte* identical with that of the first line of the *sirma*. In other respects the canzone has great liberty, as regards number and length of lines, arrangement of rhymes and conduct of structure. An examination of the best Italian models, however, shows that the tendency of the canzone-strophe is to possess 9, 10, 11, 13, 14 or 16 verses, and that of these the strophe of 14 verses is so far the most frequent that it may almost be taken as the type. In this form it resembles an irregular sonnet. The *Vita Nuova* contains many examples of the canzone, and these are accompanied by so many explanations of their form as to lead us to believe that the canzone was originally invented or adopted by Dante. The following is the *proemio* or *fronte* of one of the most celebrated canzoni in the *Vita Nuova* (which may be studied in English in Dante Gabriel Rossetti's translation):—

" Donna pietosa e di novella etate,
Adorna assai di gentilezza umane,
Era là ov' io chiamava spesso Morte.
Veggendo gli occhi miei pien di pietate,
Ed ascoltando le parole vane,
Si mosse con paura a pianger forte;
Ed altro donne, che si furo accorte
Di me per quella che meco piangía,
Fecer lei partir via
Ed apprissârsi per farmi sentire.
Quel dicea: ' Non dormire ';
E qual dicea: ' Perchè sì te sconforte? '
Allor lasciai la nuova fantasia,
Chiamando il nome della donna mia."

The *Canzoniere* of Petrarch is of great authority as to the form of this species of verse. In England the canzone was introduced at the end of the sixteenth century by William Drummond of Hawthornden, who has left some very beautiful examples. In German poetry it was cultivated by A. W. von Schlegel and other poets of the Romantic period. It is doubtful, however, whether it is in agreement with the genius of any language but Italian, and whether the genuine " Canzone toscana " is a form which can be reproduced elsewhere than in Italy. (E. G.)

CAPE BRETON, the north-east portion of Nova Scotia, Canada, separated from the mainland by a narrow strait, known as the Gut of Canceau or Canso. Its extreme length from north to south is about 110 m., greatest breadth about 87 m., and area 3120 sq. m. It juts out so far into the Atlantic that it has been called " the long wharf of Canada," the distance to the west coast of Ireland being less by a thousand miles than from New York. A headland on the east coast is also known as Cape Breton, and is said by some to be the first land made by Cabot on his voyage in 1497–1498. The large, irregularly-shaped, salt-water lakes of Bras d'Or communicate with the sea by two channels on the north-east; a short ship canal connects them with St Peter's bay on the south, thus dividing the island into two parts. Except on the north-west, the coast-line is very irregular, and indented with numerous bays, several of which form excellent harbours. The most important are Aspy, St Ann's, Sydney, Mira, Louisburg, Gabarus, St Peter's and Mabou; of these, Sydney Harbour, on which are situated the towns of Sydney and North Sydney, is one of the finest in North America. There are numerous rivers, chiefly rapid hill streams not navigable for any distance; the largest are the Denys, the Margaree, the Baddeck and the Mira. Lake Ainslie in the west is the most extensive of several fresh-water lakes. The surface of the island is broken in several places by ranges of hills of moderate elevation, well wooded, and containing numerous picturesque glens and gorges; the northern promontory consists of a plateau, rising at Cape North to a height of 1800 ft. This northern projection is formed of Laurentian gneiss, the only instance in Nova Scotia of this formation, and is fringed by a narrow border of carboniferous rocks. South of this extends a Cambrian belt, a continuation of the same formation on the Atlantic coast of Nova Scotia. On various portions of the west coast, and on the south side of the island at Seacoal Bay and Little River (Richmond county), valuable seams of coal are worked. Still more important is the Sydney coal-field, which occupies the east coast from Mira Bay to St Ann's. The outcrop is plainly visible at various points along the coast, and coal has been mined in the neighbourhood from a very early period. Since 1893 the operations have been greatly extended, and over 3,000,000 tons a year are now shipped, chiefly to Montreal and Boston. The coal is bituminous, of good quality and easily worked, most of the seams dipping at a low angle. Several have been mined for some distance beneath the ocean. Slate, marble, gypsum and limestone are quarried, the latter, which is found in unlimited quantities, being of great value as a flux in the blast-furnaces of Sydney. Copper and iron are also found, though not in large quantities.

Its lumber, agricultural products and fisheries are also important. Nearly covered with forest at the time of its discovery, it still exports pine, oak, beech, maple and ash. Oats, wheat, turnips and potatoes are cultivated, chiefly for home consumption; horses, cattle and sheep are reared in considerable numbers; butter and cheese are exported. The Bras d'Or lakes and the neighbouring seas supply an abundance of cod, mackerel, herring and whitefish, and the fisheries employ over 7000 men. Salmon are caught in several of the rivers, and trout in almost every stream, so that it is visited by large numbers of tourists and sportsmen from the other provinces and from the United States. The Intercolonial railway has been extended to Sydney, and crosses the Gut of Ganso on a powerful ferry. From the same strait a railway runs up the west coast, and several shorter lines are controlled by the mining companies. Of these the most important is that connecting Sydney and Louisburg. Numerous steamers, with Sydney as their headquarters, ply upon the Bras d'Or lakes. The inhabitants are mainly of Highland Scottish descent, and Gaelic is largely spoken in the country districts. On the south and west coasts are found a number of descendants of the original French settlers and of the Acadian exiles (see Nova Scotia), and in the mining towns numbers of Irish are employed. Several hundred Mic Mac Indians, for the most part of mixed blood, are principally employed in making baskets, fish-barrels and butter-firkins. Nearly the whole population is divided between the Roman and Presbyterian creeds, and the utmost cordiality marks the relations between the two faiths. The population is steadily increasing, having risen from 27,580 in 1851 to over 100,000 in 1906.

There is some evidence in favour of early Norse and Icelandic voyages to Cape Breton, but they left no trace. It was probably visited by the Cabots in 1497–1498, and its name may either have been bestowed in remembrance of Cap Breton near Bayonne, by the Basque sailors who early frequented the coast, or may commemorate the hardy mariners of Brittany and Normandy.

In 1629 James Stewart, fourth Lord Ochiltree, settled a small colony at Baleine, on the east side of the island; but he was soon after taken prisoner with all his party by Captain Daniell of the French Company, who caused a fort to be erected at Great Cibou (now St Ann's Harbour). By the peace of St Germain in 1632, Cape Breton was formally assigned to France; and in 1654 it formed part of the territory granted by patent to Nicholas Denys, Sieur de Fronsac, who made several small settlements on the island, which, however, had only a very temporary success. When by the treaty of Utrecht (1713) the French were deprived of Nova Scotia and Newfoundland, they were still left in possession of Cape Breton, and their right to erect fortifications for its defence was formally acknowledged. They accordingly transferred the inhabitants of Plaisance in Newfoundland to the settlement of Havre à l'Anglois, which soon after, under the name of Louisburg, became the capital of Cape Breton (or Ile Royale, as it was then called), and an important military post.

Cod-fishing formed the staple industry, and a large contraband trade in French wines, brandy and sugar, was carried on with the English colonies to the south. In 1745 it was captured by a force of volunteers from New England, under Sir William Pepperell (1696–1759) aided by a British fleet under Commodore Warren (1703–1752). By the treaty of Aix-la-Chapelle, the town was restored to France; but in 1758 was again captured by a British force under General Sir Jeffrey Amherst and Admiral Boscawen. On the conclusion of hostilities the island was ceded to England by the treaty of Paris; and on the 7th of October 1763 it was united by royal proclamation to the government of Nova Scotia. In 1784 it was separated from Nova Scotia, and a new capital founded at the mouth of the Spanish river by Governor Desbarres, which received the name of Sydney in honour of Lord Sydney (Sir Thomas Townshend), then secretary of state for the colonies. There was immediately a considerable influx of settlers to the island, which received another important accession by the immigration of Scottish Highlanders from 1800 to 1828. In 1820, in spite of strong opposition, it was again annexed to Nova Scotia. Since then, its history has been uneventful, chiefly centring in the development of the mining industry.

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CAPE COAST, a port on the Gold Coast, British West Africa, in 5° 5′ N., 1° 13′ W., about 80 m. W. of Accra. Pop. (1901) 28,948, mostly Fantis. There are about 100 Europeans and a colony of Krumen. The town is built on a low bank of gneiss and micaceous slate which runs out into the sea and affords some protection at the landing-place against the violence of the surf. (This bank was the *Cabo Corso* of the Portuguese, whence the English corruption of Cape Coast.) The castle faces the sea and is of considerable size and has a somewhat imposing appearance. Next to the castle, used as quarters for military officers and as a prison, the principal buildings are the residence of the district commissioner, the churches and schools of various denominations, the government schools and the colonial hospital. Many of the wealthy natives live in brick-built residences. The streets are hilly, and the town is surrounded on the east and north by high ground, whilst on the west is a lagoon. Fort Victoria lies west of the town, and Fort William (used as a light-house) on the east.

The first European settlement on the spot was that of the Portuguese in 1610. In 1652 the Swedes established themselves here and built the castle, which they named Carolusburg. In 1659 the Dutch obtained possession, but the castle was seized in 1664 by the English under Captain (afterwards Admiral Sir) Robert Holmes, and it has not since been captured in spite of an attack by De Ruyter in 1665, a French attack in 1757, and various assaults by the native tribes. Next to Elmina it was considered the strongest fort on the Guinea Coast. Up to 1876 the town was the capital of the British settlements on the coast, the administration being then removed to Accra. It is still one of the chief ports of the Gold Coast Colony, and from it starts the direct road to Kumasi. In 1905 it was granted municipal government. In the courtyard of the castle are buried George Maclean (governor of the colony 1830–1843) and his wife (Laetitia Elizabeth Landon). The graves are marked by two stones bearing respectively the initials "L. E. L." and "G. M." The land on the east side of the town is studded with disused gold-diggers' pits. The natives are divided into seven clans called companies, each under the rule of recognized captains and possessing distinct customs and fetish.

See A. Ffoulkes, "The Company System in Cape Coast Castle," in *Jnl. African Soc.* vol. vii., 1908; and GOLD COAST.

CAPE COLONY (officially, "PROVINCE OF THE CAPE OF GOOD HOPE"), the most southern part of Africa, a British possession since 1806. It was named from the promontory on its south-west coast discovered in 1488 by the Portuguese navigator Diaz, and near which the first settlement of Europeans (Dutch) was made in 1652. From 1872 to 1910 a self-governing colony, in the last-named year it entered the Union of South Africa as an original province. Cape Colony as such then ceased to exist. In the present article, however, the word "colony" is retained. The "provinces" referred to are the colonial divisions existing before the passing of the South Africa Act 1909, except in the sections *Constitution and Government* and *Law and Justice*, where the changes made by the establishment of the Union are set forth. (See also SOUTH AFRICA.)

Boundaries and Area.—The coast-line extends from the mouth of the Orange (28° 38′ S. 16° 27′ E.) on the W. to the mouth of the Umtamvuna river (31° 4′ S. 30° 12′ E.) on the E., a distance of over 1300 m. Inland the Cape is bounded E. and N.E. by Natal, Basutoland, Orange Free State and the Transvaal; N. by the Bechuanaland Protectorate and N.W. by Great Namaqualand (German S.W. Africa). From N.W. to S.E. the colony has a breadth of 800 m., from S.W. to N.E. 750 m. Its area is 276,995 sq. m.—more than five times the size of England. Walfish Bay (*q.v.*) on the west coast north of the Orange river is a detached part of Cape Colony.

Physical Features.—The outstanding orographic feature of the country is the terrace-formation of the land, which rises from sea-level by well-marked steps to the immense plateau which forms seven-eighths of South Africa. The coast region varies in width from a few miles to as many as fifty, being narrowest on the south-east side. The western coast line, from the mouth of the Orange to the Cape peninsula, runs in a general south-east direction with no deep indentations save just south of 33° S. where, in Saldanha Bay, is spacious and sheltered anchorage. The shore is barren, consisting largely of stretches of white sand or thin soil sparsely covered with scrub. The Cape peninsula, which forms Table Bay on the north and False Bay on the south, juts pendant beyond the normal coast line and consists of an isolated range of hills. The scenery here becomes bold and picturesque. Dominating Table Bay is the well-known Table Mountain (3549 ft.), flat-topped and often covered with a "table-cloth" of cloud. On its lower slopes and around Table Bay is built Cape Town, capital of the colony. Rounding the storm-vexed Cape of Good Hope the shore trends south-east in a series of curves, forming shallow bays, until at the saw-edged reefs of Cape Agulhas (Portuguese, Needles) in 34° 51′ 15″ S. 20° E. the southernmost point of the African continent is reached. Hence the coast, now very slightly indented, runs north by east until at Algoa Bay (25° 45′ E.) it takes a distinct north-east bend, and so continues beyond the confines of the colony. Along the southern and eastern shore the country is better watered, more fertile and more picturesque than along the western seaboard. Cape Point (Cape of Good Hope) stands 840 ft. above the sea; Cape Agulhas 455 ft. Farther on the green-clad sides of the Uiteniquas Mountains are plainly visible from the sea, and as the traveller by boat proceeds eastward, stretches of forest are seen and numbers of mountain streams carrying their waters to the ocean. In this part of the coast the only good natural harbour is the spacious estuary of the Knysna river in 23° 5′ E. The entrance, which is over a bar with 14 ft. minimum depth of water, is between two bold sandstone cliffs, called the Heads.

Off the coast are a few small islands, mainly mere rocks within the bay. None is far from the mainland. The largest are Dassen Island, 20 m. S. of Saldanha Bay, and Robben Island, at the entrance to Table Bay. St Croix is a rock in Algoa Bay, upon which Diaz is stated to have erected a cross. A number of small islands off the coast of German South-West Africa, chiefly valuable for their guano deposits, also belong to Cape Colony (see ANGRA PEQUENA).

Ocean Currents.—Off the east and south shores of the colony the Mozambique or Agulhas current sweeps south-westward with force sufficient to set up a back drift. This back drift or

counter current flowing north-east is close in shore and is taken advantage of by vessels going from Cape Town to Natal. On the west coast the current runs northwards. It is a deflected stream from the west drift of the "roaring forties" and coming from Antarctic regions is much colder than the Agulhas current. Off the southern point of the continent the Agulhas current meets the west drift, giving rise to alternate streams of warm and cold water. This part of the coast, subject alike to strong westerly and south-easterly winds, is often tempestuous, as is witnessed by the name,

Cabo Tormentoso, given to the Cape of Good Hope, and to the many wrecks off the coast. The most famous was that of the British troopship "Birkenhead," on the 26th of February 1852, off Danger Point, midway between Cape of Good Hope and Cape Agulhas.

Mountains and Tablelands.—It has been stated that the land rises by well-marked steps to a vast central plateau. Beyond the coast plain, which here and there attains a height of 600 ft., are mountain ranges running parallel to the shore. These mountains are the supporting walls of successive terraces. When the steep southern sides of the ranges nearest the sea are ascended the hills are often found to be flat-topped with a gentle slope northward giving on to a plateau rarely more than 40 m. wide. This plateau is called the Southern or Little Karroo, Karroo being a corruption of a Hottentot word meaning dry, arid. Having crossed the Little Karroo, from which rise minor mountain chains, a second high range has to be climbed. This done the traveller finds himself on another tableland—the Great Karroo. It has an average width of 80 m. and is about 350 m. long. Northwards the Karroo (*q.v.*) is bounded by the ramparts of the great inner tableland, of which only a comparatively small portion is in Cape Colony. This sequence of hill and plain—namely (1) the coast plain, (2) first range of hills, (3) first plateau (Little Karroo), (4) second range of hills, (5) second plateau (the Great Karroo), (6) main chain of mountains guarding, (7) the vast interior tableland—is characteristic of the greater part of the colony but is not clearly marked in the south-east and north-west borders. The innermost, and most lofty, chain of mountains follows a curve almost identical with that of the coast at a general distance of 120 m. from the ocean. It is known in different places under different names, and the same name being also often given to one or more of the coast ranges the nomenclature of the mountains is confusing (see the map). The most elevated portion of the innermost range, the Drakensberg (*q.v.*) follows the curve of the coast from south to north-east. Only the southern slopes of the range are in Cape Colony, the highest peaks—over 10,000 ft.—being in Basutoland and Natal. Going westward from the Drakensberg

the rampart is known successively as the Stormberg, Zuurberg, Sneeuwberg and Nieuwveld mountains. These four ranges face directly south. In the Sneeuwberg range is Compass Berg, 8500 ft. above the sea, the highest point in the colony. In the Nieuwveld are heights of over 6000 ft. The Komsberg range, which joins the Nieuwveld on the east, sweeps from the south to the north-west and is followed by the Roggeveld mountains, which face the western seaboard. North of the Roggeveld the interior plateau approaches closer to the sea than in southern Cape Colony. The slope of the plateau being also westward, the mountain rampart is less elevated, and north of 32° S. few points attain 5000 ft. The coast ranges are here, in Namaqualand and the district of Van Rhyns Dorp, but the outer edges of the inner range. They attain their highest point in the Kamies Berg, 5511 ft. above the sea. Northward the Orange river, marking the frontier of the colony, cuts its way through the hills to the Atlantic.

From the Olifants river on the west to the Kei river on the east the series of parallel ranges, which are the walls of the terraces between the inner tableland and the sea, are clearly traceable. Their general direction is always that of the coast, and they are cut across by rugged gorges or *kloofs*, through which the mountain streams make their way towards the sea. The two chief chains, to distinguish them from the inner chain already described, may be called the coast and central chains. Each has many local names. West to east the central chain is known as the Cedarberg, Groote Zwarteberg (highest point 6988 ft.), Groote river, Winterhoek (with Cockscomb mountain 5773 ft. high) and Zuurberg ranges. The Zuurberg, owing to the north-east trend of the shore, becomes, east of Port Elizabeth, a coast range, and the central chain is represented by a more northerly line of hills, with a dozen different names, which are a south-easterly spur of the Sneeuwberg. In this range the Great Winter Berg attains a height of 7800 ft.

The coast chain is represented west to east by the Olifants mountains (with Great Winterhoek, 6618 ft. high), Drakenstein, Zonder Einde, Langeberg (highest point 5614 ft.), Attaquas, Uiteniquas and various other ranges. In consequence of the north-east trend of the coast, already noted, several of these ranges end in the sea in bold bluffs. From the coast plain rise many short ranges of considerable elevation, and on the east side of False Bay parallel to Table Bay range is a mountain chain with heights of 4000 and 5000 ft. East of the Kei river the whole of the country within Cape Colony, save the narrow seaboard, is mountainous. The southern part is largely occupied with spurs of the Stormberg; the northern portion, Griqualand East and Pondoland, with the flanks of the Drakensberg. Several peaks exceed 7000 ft. in height. Zwart Berg, near the Basuto-Natal frontier, rises 7615 ft. above the sea. Mount Currie, farther south, is 7296 ft. high. The Witte Bergen (over 5000 ft. high) are an inner spur of the Drakensberg running through the Herschel district.

That part of the inner tableland of South Africa which is in the colony has an average elevation of 3000 ft., being higher in the eastern than in the western districts. It consists of wide rolling treeless plains scarred by the beds of many rivers, often dry for a great part of the year. The tableland is broken by the Orange river, which traverses its whole length. North of the river the plateau slopes northward to a level sometimes as low as 2000 ft. The country is of an even more desolate character than south of the Orange (see BECHUANALAND). Rising from the plains are chains of isolated flat-topped hills such as the Karree Bergen, the Asbestos mountains and Kuruman hills, comparatively unimportant ranges.

Although the mountains present bold and picturesque outlines on their outward faces, the general aspect of the country north of the coast-lands, except in its south-eastern corner, is bare and monotonous. The flat and round-topped hills (*kopjes*), which are very numerous on the various plateaus, scarcely afford relief to the eye, which searches the sun-scorched landscape, usually in vain, for running water. The absence of water and of large trees is one of the most abiding impressions of the traveller. Yet the vast arid plains are covered with shallow beds of the richest soil, which only require the fertilizing power of water to render them available for pasture or agriculture. After the periodical rains, the Karroo and the great plains of Bushmanland are converted into vast fields of grass and flowering shrubs, but the summer sun reduces them again to a barren and burnt-up aspect. The pastoral lands or *velds* are distinguished according to the nature of their herbage as "sweet" or "sour." Shallow sheets of water termed *vleis*, usually brackish, accumulate after heavy rain at many places in the plateaus; in the dry seasons these spots, where the soil is not excessively saline, are covered with rich grass and afford favourite grazing land for cattle. Only in the southern coast-land of the colony is there a soil and moisture supply suited to forest growth.

Rivers.—The inner chain of mountains forms the watershed of the colony. North of this great rampart the country drains to the Orange (*q.v.*), which flows from east to west nearly across the continent. For a considerable distance, both in its upper and lower courses, the river forms the northern frontier of Cape Colony. In the middle section, where both banks are in the colony, the Orange receives from the north-east its greatest tributary, the Vaal (*q.v.*). The Vaal, within the boundaries of the colony, is increased by the Harts river from the north-east and the Riet river from the south-east, whilst just within the colony the Riet is joined by the Modder. All these tributaries of the Orange flow, in their lower courses, through the eastern part of Griqualand West, the only well-watered portion of the colony north of the mountains. From the north, below the Vaal confluence, the Nosob, Molopo and Kuruman, intermittent streams which traverse Bechuanaland, send their occasional surplus waters to the Orange. In general these rivers lose themselves in some *vlei* in the desert land. The Molopo and Nosob mark the frontier between the Bechuanaland Protectorate and the Cape; the Kuruman lies wholly within the colony. From the south a number of streams, the Brak and Ongers, the Zak and Olifants Vlei (the two last uniting to form the Hartebeest), flow north towards the Orange in its middle course. Dry for a great part of the year, these streams rarely add anything to the volume of the Orange.

South of the inner chain the drainage is direct to the Atlantic or Indian Oceans. Rising at considerable elevations, the coast rivers fall thousands of feet in comparatively short courses, and many are little else than mountain torrents. They make their way down the mountain sides through great gorges, and are noted in the eastern part of the country for their extremely sinuous course. Impetuous and magnificent streams after heavy rain, they become in the summer mere rivulets, or even dry up altogether. In almost every instance the mouths of the rivers are obstructed by sand bars. Thus, as is the case of the Orange river also, they are, with rare exceptions, unnavigable.

Omitting small streams, the coast rivers running to the Atlantic are the Buffalo, Olifants and Berg. It may be pointed out here that the same name is repeatedly applied throughout South Africa to different streams, Buffalo, Olifants (elephants') and Groote (great) being favourite designations. They all occur more than once in Cape Colony. Of the west coast rivers, the Buffalo, about 125 m. long, the most northern and least important, flows through Little Namaqualand. The Olifants (150 m.), which generally contains a fair depth of water, rises in the Winterhoek mountains and flows north between the Cedarberg and Olifants ranges. The Doorn, a stream with a somewhat parallel but more easterly course, joins the Olifants about 50 m. above its mouth, the Atlantic being reached by a semicircular sweep to the south-west. The Berg river (125 m.) rises in the district of French Hoek and flows through fertile country, in a north-westerly direction, to the sea at St Helena Bay. It is navigable for a few miles from its mouth.

On the south coast the most westerly stream of any size is the Breede (about 165 m. long), so named from its low banks and broad channel. Rising in the Warm Bokkeveld, it pierces the mountains by Mitchell's Pass, flows by the picturesque towns of Ceres and Worcester, and receives, beyond the last-named place,

the waters which descend from the famous Hex River Pass. The Breede thence follows the line of the Langeberg mountains as far as Swellendam, where it turns south, and traversing the coast plain, reaches the sea in St Sebastian Bay. From its mouth the river is navigable by small vessels for from 30 to 40 m. East of the Breede the following rivers, all having their rise on the inner mountain chain, are passed in the order named:—Gouritz (200 m.),[1] Gamtoos (290 m.), Sunday (190 m.), Great Salt (230 m.), Kei (150 m.), Bashee (90 m.) and Umzimvuba or St John's (140 m.).

The Gouritz is formed by the junction of two streams, the Gamka and the Olifants. The Gamka rises in the Nieuwveld not far from Beaufort West, traverses the Great Karroo from north to south, and forces a passage through the Zwarteberg. Crossing the Little Karroo, it is joined from the east by the Olifants (115 m.), a stream which rises in the Great Karroo, being known in its upper course as the Traka, and pierces the Zwarteberg near its eastern end. Thence it flows west across the Little Karroo past Oudtshoorn to its junction with the Gamka. The united stream, which takes the name of Gouritz, flows south, and receives from the west, a few miles above the point where it breaks through the coast range, a tributary (125 m.) bearing the common name Groote, but known in its upper course as the Buffels. Its headwaters are in the Komsberg. The Touws (90 m.), which rises in the Great Karroo not far from the sources of the Hex river, is a tributary of the Groote river. Below the Groote the Gouritz receives no important tributaries and enters the Indian Ocean at a point 20 m. south-west of Mossel Bay.

The Gamtoos is also formed by the junction of two streams, the Kouga, an unimportant river which rises in the coast hills, and the Groote river. This, *the* Groote river of Cape Colony, has its rise in the Nieuwveld near Nels Poort, being known in its upper course as the Salt river. Flowing south-east, it is joined by the Kariega on the left, and breaking through the escarpment of the Great Karroo, on the lower level changes its name to the Groote, the hills which overhang it to the north-east being known as Groote River Heights. Bending south, the Groote river passes through the coast chain by Cockscomb mountain, and being joined by the Kouga, flows on as the Gamtoos to the sea at St Francis Bay.

Sunday river does not, like so many of the Cape streams, change its name on passing from the Great to the Little Karroo and again on reaching the coast plain. It rises in the Sneeuwberg north-west of Graaff Reinet, flows south-east through one of the most fertile districts of the Great Karroo, which it pierces at the western end of the Zuurberg (of the coast chain), and reaches the ocean in Algoa Bay.

Great Salt river is formed by the junction of the Kat with the Great Fish river, which is the main stream. Several small streams rising in the Zuurberg (of the inner chain) unite to form the Great Fish river which passes through Cradock, and crossing the Karroo, changes its general direction from south to east, and is joined by the Kooner (or Koonap) and Kat, both of which rise in the Winterberg. Thence, as the Great Salt river, it winds south to the sea. Great Fish river is distinguished for the sudden and great rise of its waters after heavy rain and for its exceedingly sinuous course. Thus near Cookhouse railway station it makes an almost circular bend of 20 m., the ends being scarcely 2 m. apart, in which distance it falls 200 ft. Although, like the other streams which cross the Karroo, the river is sometimes dry in its upper course, it has an estimated annual discharge of 51,724,000,000 cubic ft.

The head-streams of the Kei, often called the Great Kei, rise in the Stormberg, and the river, which resembles the Great Fish in its many twists, flows in a general south-east direction through mountainous country until it reaches the coast plain. Its mouth is 40 m. in a direct line north-east of East London. In the history of the Cape the Kei plays an important part as long marking the boundary between the colony and the independent Kaffir tribes. (For the Umzimvuba and other Transkei rivers see KAFFRARIA.)

Of the rivers rising in the coast chain the Knysna (30 m.), Kowie (40 m.), Keiskama (75 m.) and Buffalo (45 m.) may be mentioned. The Knysna rises in the Uiteniquas hills and is of importance as a feeder of the lagoon or estuary of the same name, one of the few good harbours on the coast. The banks of the Knysna are very picturesque. Kowie river, which rises in the Zuurberg mountains near Graham's Town, is also noted for the beauty of its banks. At its mouth is Port Alfred. The water over the bar permits the entrance of vessels of 10 to 12 ft. draught. The Buffalo river rises in the hilly country north of King William's Town, past which it flows. At the mouth of the river, where the scenery is very fine, is East London, third in importance of the ports of Cape Colony.

The frequency of "fontein" among the place names of the colony bears evidence of the number of springs in the country. They are often found on the flat-topped hills which dot the Karroo. Besides the ordinary springs, mineral and thermal springs are found in several places.

Lakes and Caves.—Cape Colony does not possess any lakes properly so called. There are, however, numerous natural basins which, filled after heavy rain, rapidly dry up, leaving an incrustation of salt on the ground, whence their name of salt pans. The largest, Commissioner's Salt Pan, in the arid north-west district, is 18 to 20 m. in circumference. Besides these pans there are in the interior plateaus many shallow pools or *vleis* whose extent varies according to the dryness or moisture of the climate. West of Knysna, and separated from the seashore by a sandbank only, are a series of five *vleis*, turned in flood times into one sheet of water and sending occasional spills to the ocean. These *vleis* are known collectively as "the lakes." In the Zwarteberg of the central chain are the Cango Caves, a remarkable series of caverns containing many thousand of stalactites and stalagmites. These caves, distant 20 m. from Oudtshoorn, have been formed in a dolomite limestone bed about 800 ft. thick. There are over 120 separate chambers, the caverns extending nearly a mile in a straight line.

Climate.—The climate of Cape Colony is noted for its healthiness. Its chief characteristics are the dryness and clearness of the atmosphere and the considerable daily range in temperature; whilst nevertheless the extremes of heat and cold are rarely encountered. The mean annual temperature over the greater part of the country is under 65° F. The chief agents in determining the climate are the vast masses of water in the southern hemisphere and the elevation of the land. The large extent of ocean is primarily responsible for the lower temperature of the air in places south of the tropics compared with that experienced in countries in the same latitude north of the equator. Thus Cape Town, about 34° S., has a mean temperature, 63° F., which corresponds with that of the French and Italian Riviera, in 41° to 43° N. For the dryness of the atmosphere the elevation of the country is responsible. The east and south-east winds, which contain most moisture, dissipate their strength against the Drakensberg and other mountain ranges which guard the interior. Thus while the coast-lands, especially in the south-east, enjoy an ample rainfall, the winds as they advance west and north contain less and less moisture, so that over the larger part of the country drought is common and severe. Along the valley of the lower Orange rain does not fall for years together. The drought is increased in intensity by the occasional hot dry wind from the desert region in the north, though this wind is usually followed by violent thunderstorms.

Whilst the general characteristics of the climate are as here outlined, in a country of so large an area as Cape Colony there are many variations in different districts. In the coast-lands the daily range of the thermometer is less marked than in the interior and the humidity of the atmosphere is much greater. Nevertheless, the west coast north of the Olifants river is practically rainless and there is great difference between day and night

[1] The distances given after the names of rivers indicate the length of the river valleys, including those of the main upper branch. In nearly all instances the rivers, owing to their sinuous course, are much longer.

temperatures, this part of the coast sharing the characteristics of the interior plateau. The division of the year into four seasons is not clearly marked save in the Cape peninsula, where exceptional conditions prevail. In general the seasons are but two—summer and winter, summer lasting from September to April and winter filling up the rest of the year. The greatest heat is experienced in December, January and February, whilst June and July are the coldest months. In the western part of the colony the winter is the rainy season, in the eastern part the chief rains come is summer. A line drawn from Port Elizabeth north-west across the Karroo in the direction of Walfish Bay roughly divides the regions of the winter and summer rains. All the country north of the central mountain chain and west of 23° E., including the western part of the Great Karroo, has a mean annual rainfall of under 12 in. East of the 23° E. the plateaus have a mean annual rainfall ranging from 12 to 25 in. The western coastlands and the Little Karroo have a rainfall of from 10 to 20 in.; the Cape peninsula by exception having an average yearly rainfall of 40 in. (see CAPE TOWN). Along the south coast and in the south-east the mean annual rainfall exceeds 25 in., and is over 50 in. at some stations. The rain falls, generally, in heavy and sudden storms, and frequently washes away the surface soil. The mean annual temperature of the coast region, which, as stated, is 63° F. at Cape Town, increases to the east, the coast not only trending north towards the equator but feeling the effect of the warm Mozambique or Agulhas current.

On the Karroo the mean maximum temperature is 77° F., the mean minimum 49°, the mean daily range about 27°. In summer the drought is severe, the heat during the day great, the nights cool and clear. In winter frost at night is not uncommon. The climate of the northern plains is similar to that of the Karroo, but the extremes of cold and heat are greater. In the summer the shade temperature reaches 110° F., whilst in winter nights 12° of frost have been registered. The hot westerly winds of summer make the air oppressive, though violent thunderstorms, in which form the northern districts receive most of their scanty rainfall, occasionally clear the atmosphere. Mirages are occasionally seen. The keen air, accompanied by the brilliant sunshine, renders the winter climate very enjoyable. Snow seldom falls in the coast region, but it lies on the higher mountains for three or four months in the year, and for as many days on the Karroo. Violent hailstorms, which do great damage, sometimes follow periods of drought. The most disagreeable feature of the climate of the colony is the abundance of dust, which seems to be blown by every wind, and is especially prevalent in the rainy season.

That white men can thrive and work in Cape Colony the history of South Africa amply demonstrates. Ten generations of settlers from northern Europe have been born, lived and died there, and the race is as strong and vigorous as that from which it sprang. Malarial fever is practically non-existent in Cape Colony, and diseases of the chest are rare. (F. R. C.)

Geology.—The colony affords the typical development of the geological succession south of the Zambezi. The following general arrangement has been determined:—

TABLE OF FORMATIONS.

Post-Cretaceous and Recent.

Cretaceous System	Pondoland Cretaceous Series Uitenhage Series	Cretaceous
Karroo System	Stormberg Series Beaufort Series Ecca Series Dwyka Series	Carboniferous to Jurassic
Cape System	Witteberg Series Bokkeveld Series Table Mountain Sandstone Series	Devonian
Pre-Cape Rocks	Includes several independent unfossiliferous formations of pre-Devonian age	Archaean to Silurian(?)

The general structure of the colony is simple. It may be regarded as a shallow basin occupied by the almost horizontal rocks of the Karroo. These form the plains and plateaus of the interior. Rocks of pre-Cape age rise from beneath them on the north and west; on the south and east the Lower Karroo and Cape systems are bent up into sharp folds, beneath which, but in quite limited areas, the pre-Cape rocks emerge. In the folded regions the strike conforms to the coastal outline on the south and east.

Pre-Cape rocks occur in three regions, presenting a different development in each:—

North.	West.	South.
Matsap Series Ongeluk Volcanic Series Griquatown Series Campbell Rand Series Black Reef Series Pniel Volcanic Series Keis Series Namaqualand Schists	Nieuwerust Beds Ibiquas Beds Namaqualand Schists and Malmesbury Beds	Cango Beds Malmesbury Beds

The pre-Cape rocks are but little understood. They no doubt represent formations of widely different ages, but all that can be said is that they are greatly older than the Cape System. The hope that they will yield fossils has been held out but not yet fulfilled. Their total thickness amounts to several thousand feet. The rocks have been greatly changed by pressure in most cases and by the intrusion of great masses of igneous material, the Namaqualand schists and Malmesbury beds being most altered.

The most prominent member of the Cango series is a coarse conglomerate; the other rocks include slates, limestone and porphyroids. The Ibiquas beds consist of conglomerates and grits. Both the Cango and Ibiquas series have been invaded by granite of older date than the Table Mountain series. The Nieuwerust beds contain quartzite, arkose and shales. They rest indifferently on the Ibiquas series or Malmesbury beds.

The pre-Cape rocks of the northern region occur in the Campbell Rand, Asbestos mountains, Matsap and Langebergen, and in the Schuftebergen. They contain a great variety of sediments and igneous rocks. The oldest, or Keis, series consists of quartzites, quartz-schists, phyllites and conglomerates. These are overlain, perhaps unconformably, by a great thickness of lavas and volcanic breccias (Pniel volcanic series, Beer Vley and Zeekoe Baard amygdaloids), and these in turn by the quartzites, grits and shales of the Black Reef series. The chief rocks of the Campbell Rand series are limestones and dolomites, with some interbedded quartzites. Among the Griquatown series of quartzites, limestones and shales are numerous bands of jasper and large quantities of crocidolite (a fibrous amphibole); while at Blink Klip a curious breccia, over 200 ft. thick, is locally developed. Evidences of one of the oldest known glaciations have been found near the summit in the district of Hay. The Ongeluk volcanic series, consisting of lavas and breccias, conformably overlies the Griquatown series; while the grits, quartzites and conglomerates of the Matsap series rest on them with a great discordance.

Rocks of the Cape System have only been met with in the southern and eastern parts of South Africa. The lowest member (Table Mountain Sandstone) consists of sandstones with subordinate bands of shale. It forms the upper part of Table Mountain and enters largely into the formation of the southern mountainous folded belt. It is unfossiliferous except for a few obscure sheils obtained near the base. A bed of conglomerate is regarded as of glacial origin.

The Table Mountain Sandstone passes up conformably into a sequence of sandstones and shales (Bokkeveld Beds), well exposed in the Cold and Warm Bokkevelds. The lowest beds contain many fossils, including *Phacops*, *Homalonotus*, *Leptocoelia*, *Spirifer*, *Chonetes*, *Orthothetes*, *Orthoceras*, *Bellerophon*. Many of the species are common to the Devonian rocks of the Falkland Islands, North and South America and Europe, with perhaps a closer resemblance to the Devonian fauna of South America than to that of any other country.

The Bokkeveld beds are conformably succeeded by the sandstones, quartzites and shales of the Witteberg series. So far

imperfect remains of plants (*Spirophyton*) are the only fossils, and these are not sufficient to determine if the beds belong to the Devonian or Carboniferous System.

The thickness of the rocks of the Cape System exceeds 5000 ft.

The Karroo System is *par excellence* the geological formation of South Africa. The greater part of the colony belongs to it, as do large tracts in the Orange Free State and Transvaal. It includes the following well-defined subdivisions:—

		Feet.	
Stormberg Series	Volcanic Beds	4000	Jurassic
	Cave Sandstone	800	
	Red Beds	1400	
	Molteno Beds	2000	
Beaufort Series	Burghersdorp Beds		Trias
	Dicynodon Beds	5000	
	Pareiasaurus Beds		Permian
Ecca Series	Shales and Sandstones		
	Laingsburg Beds	2600	
	Shales		
Dwyka Series	Upper Shales	600	Carboniferous
	Conglomerates	1000	
	Lower Shales	700	

In the southern areas the Karroo formation follows the Cape System conformably; in the north it rests unconformably on very much older rocks. The most remarkable deposits are the conglomerates of the Dwyka series. These afford the clearest evidences of glaciation on a great scale in early Carboniferous times. The deposit strictly resembles a consolidated modern boulder clay. It is full of huge glaciated blocks, and in different regions (Prieska chiefly) the underlying pavement is remarkably striated and shows that the ice was moving southward. The upper shales contain the small reptile *Mesosaurus tenuidens*.

Plants constitute the chief fossils of the Ecca series; among others they include *Glossopteris*, *Gangamopteris*, *Phyllotheca*. The Beaufort series is noted for the numerous remains of remarkable and often gigantic reptiles it contains. The genera and species are numerous, *Dicynodon*, *Oudenodon*, *Pareiasaurus* being the best known. Among plants *Glossopteris* occurs for the last time. The Stormberg series occurs in the mountainous regions of the Stormberg and Drakensberg. The Molteno beds contain several workable seams of coal. The most remarkable feature of the series is the evidence of volcanic activity on an extensive scale. The greater part of the volcanic series is formed by lava streams of great thickness. Dykes and intrusive sheets, most of which end at the folded belt, are also numerous. The age of the intrusive sheets met with in the Beaufort series is usually attributed to the Stormberg period. They form the kopjes, or characteristic flat-topped hills of the Great Karroo. The Stormberg series contains the remains of numerous reptiles. A true crocodile, *Notochampsa*, has been discovered in the Red Beds and Cave Sandstone. Among the plants, *Thinnfeldia* and *Taeniopteris* are common. Three genera of fossil fishes, *Cleithrolepis*, *Semionotus* and *Ceratodus*, ascend from the Beaufort series into the Cave Sandstone.

Cretaceous rocks occur only near the coast. The plants of the Uitenhage beds bear a close resemblance to those of the Wealden. The marine fauna of Sunday river indicates a Neocomian age. The chief genera are *Hamites*, *Baculites*, *Crioceras*, *Olcostephanus* and certain *Trigoniae*.

The superficial post-Cretaceous and Recent deposits are widely spread. High-level gravels occur from 600 to 2000 ft. above the sea. The remains of a gigantic ox, *Bubalus Baini*, have been obtained from the alluvium near the Modder river. The recent deposits indicate that the land has risen for a long period. (W. G.*)

Fauna.—The fauna is very varied, but some of the wild animals common in the early days of the colony have been exterminated (*e.g.* quagga and blaauwbok), and others (*e.g.* the lion, rhinoceros, giraffe) driven beyond the confines of the Cape. Other game have been so reduced in numbers as to require special protection. This class includes the elephant (now found only in the Knysna and neighbouring forest regions), buffalo and zebra (strictly preserved, and confined to much the same regions as the elephant), eland, oribi, koodoo, haartebeest and other kinds of antelope and gnu. The leopard is not protected, but lingers in the mountainous districts. Cheetahs are also found, including a rare woolly variety peculiar to the Karroo. Both the leopards and cheetahs are commonly spoken of in South Africa as tigers. Other carnivora more or less common to the colony are the spotted hyena, aard-wolf (or *Proteles*), silver jackal, the *Otocyon* or Cape wild dog, and various kinds of wild cats. Of ungulata, besides a few hundreds of rare varieties, there are the springbuck, of which great herds still wander on the open veld, the steinbok, a small and beautiful animal which is sometimes coursed like a hare, the klipspringer or "chamois of South Africa," common in the mountains, the wart-hog and the dassie or rock rabbit. There are two or three varieties of hares, and a species of jerboa and several genera of mongooses. The English rabbit has been introduced into Robben Island, but is excluded from the mainland. The ant-bear, with very long snout, tongue and ears, is found on the Karroo, where it makes inroads on the ant-heaps which dot the plain. There is also a scaly ant-eater and various species of pangolins, of arboreal habit, which live on ants. Baboons are found in the mountains and forests, otters in the rivers. Of reptiles there are the crocodile, confined to the Transkei rivers, several kinds of snakes, including the cobra di capello and puff adder, numerous lizards and various tortoises, including the leopard tortoise, the largest of the continental land forms. Of birds the ostrich may still be found wild in some regions. The great kori bustard is sometimes as much as 5 ft. high. Other game birds include the francolin, quail, guinea-fowl, sand-grouse, snipe, wild duck, wild goose, widgeon, teal, plover and rail. Birds of prey include the bearded vulture, aasvogel and several varieties of eagles, hawks, falcons and owls. Cranes, storks, flamingoes and pelicans are found in large variety.

Parrots are rarely seen. The greater number of birds belong to the order Passeres; starlings, weavers and larks are very common, the Cape canary, long-tailed sugar bird, pipits and wagtails are fairly numerous. The English starling is stated to be the only European bird to have thoroughly established itself in the colony. The Cape sparrow has completely acclimatized itself to town life and prevented the English sparrow obtaining a footing.

Large toads and frogs are common, as are scorpions, tarantula spiders, butterflies, hornets and stinging ants. In some districts the tsetse fly causes great havoc. The most interesting of the endemic insectivora is the *Chrysochloris* or "golden mole," so called from the brilliant yellow lustre of its fur. There are not many varieties of freshwater fish, the commonest being the baba or cat-fish and the yellow fish. Both are of large size, the baba weighing as much as 70 lb. The smallest variety is the culper or burrowing perch. In some of the *vleis* and streams in which the water is intermittent the fish preserve life by burrowing into the ooze. Trout have been introduced into several rivers and have become acclimatized. Of sea fish there are more than forty edible varieties. The snock, the steenbrass and geelbeck are common in the estuaries and bays. Seals and sharks are also common in the waters of the Cape. Whales visit the coast for the purpose of calving.

Of the domestic animals, sheep, cattle and dogs were possessed by the natives when the country was discovered by Europeans. The various farm animals introduced by the whites have thriven well (see below, *Agriculture*).

Flora.—The flora is rich and remarkably varied in the coast districts. On the Karroo and the interior plateau there is less variety. In all, some 10,000 different species have been noted in the colony, about 450 genera being peculiar to the Cape. The bush of the coast districts and lower hills consists largely of heaths, of which there are over 400 species. The heaths and the rhenoster or rhinoceros wood, a plant 1 to 2 ft. high resembling heather, form the characteristic features of the flora of the districts indicated. The prevailing bloom is pink coloured. The deciduous plants lose their foliage in the dry season but revive with the winter rains. Notable among the flowers are the arum lily and the iris. The pelargonium group, including many varieties of geranium, is widely represented. In

the eastern coast-lands the vegetation becomes distinctly sub-tropical. Of pod-bearing plants there are upwards of eighty genera: Cape "everlasting" flowers (generally species of *Helichrysum*) are in great numbers. Several species of aloe are indigenous to the Cape. The so-called American aloe has also been naturalized. The castor-oil plant and many other plants of great value in medicine are indigenous in great abundance. Among plants remarkable in their appearance and structure may be noted the cactus-like Euphorbiae or spurge plants, the *Stapelia* or carrion flower, and the elephant's foot or Hottentots' bread, a plant of the same order as the yam. Hooks, thorns and prickles are characteristic of many South African plants.

Forests are confined to the seaward slopes of the coast ranges facing south. They cover between 500 and 600 sq. m. The forests contain a great variety of useful woods, affording excellent timber; among the commonest trees are the yellow wood, which is also one of the largest, belonging to the yew species; black iron wood; heavy, close-grained and durable stinkhout; melkhout, a white wood used for wheelwork; nieshout; and the assegai or Cape lancewood. Forest trees .rarely exceed 30 ft. in height and scarcely any attain a greater height than 60 ft. A characteristic Cape tree is *Leucadendron argenteum* or silver tree, so named from the silver-like lustre of stem and leaves. The so-called cedars, whence the Cedarberg got its name, exist no longer. Among trees introduced by the Dutch or British colonists the oak, poplar, various pines, the Australian blue-gum (eucalyptus) and wattle flourish. The silver wattle grows freely in shifting sands and by its means waste lands, *e.g.* the Cape Flats, have been reclaimed. The oak grows more rapidly and more luxuriantly than in Europe. There are few indigenous fruits; the kei apple is the fruit of a small tree or shrub found in Kaffraria and the eastern districts, where also the wild and Kaffir plums are common; hard pears, gourds, water melons and species of almond, chestnut and lemon are also native. Almost all the fruits of other countries have been introduced and flourish. On the Karroo the bush consists of dwarf mimosas, wax-heaths and other shrubs, which after the spring rains are gorgeous in blossom (see KARROO). The grass of the interior plains is of a coarse character and yellowish colour, very different from the meadow grasses of England. The "Indian" doab grass is also indigenous.

With regard to mountain flora arborescent shrubs do not reach beyond about 4000 ft. Higher up the slopes are covered with small heath, *Bruniaceae*, *Rutaceae*, &c. All plants with permanent foliage are thickly covered with hair. Above 6000 ft. over seventy species of plants of Alpine character have been found.

Races and Population.—The first inhabitants of Cape Colony of whom there is any record were Bushmen and Hottentots (*q.v.*). The last-named were originally called Quaequaes, and received the name Hottentots from the Dutch. They dwelt chiefly in the south-west and north-west parts of the country; elsewhere the inhabitants were of Bantu negroid stock, and to them was applied the name Kaffir. When the Cape was discovered by Europeans, the population, except along the coast, was very scanty and it is so still. The advent of Dutch settlers and a few Huguenot families in the 17th century was followed in the 19th century by that of English and German immigrants. The Bushmen retreated before the white races and now few are to be found in the colony. These live chiefly in the districts bordering the Orange river. The tribal organization of the Hottentots has been broken up, and probably no *pure bred* representatives of the race survive in the colony.

Half-breeds of mixed Hottentot, Dutch and Kaffir blood now form the bulk of the native population west of the Great Fish river. Of Kaffir tribes the most important living north of the Orange river are the Bechuanas, whilst in the eastern province and Kaffraria live the Fingoes, Tembus and Pondos. The Amaxosa are the principal Kaffir tribe in Cape Colony proper. The Griquas (or Bastaards) are descendants of Dutch-Hottentot half-castes. They give their name to two tracts of country. During the slavery period many thousands of negroes were imported, chiefly from the Guinea coast. The negroes have been largely assimilated by the Kaffir tribes. (For particulars of the native races see their separate articles.) Of the white races in the Colony the French element has been completely absorbed in the Dutch. They and the German settlers are mainly pastoral people. The Dutch, who have retained in a debased form their own language, also engage largely in agriculture and viticulture. Of fine physique and hardy constitution, they are of strongly independent character; patriarchal in their family life; shrewd, *slim* and courageous; in religion Protestants of a somewhat austere type. Education is somewhat neglected by them, and the percentage of illiteracy among adults is high. They are firm believers in the inferiority of the black races and regard servitude as their natural lot. The British settlers have developed few characteristics differing from the home type. The British element of the community is largely resident in the towns, and is generally engaged in trade or in professional pursuits; but in the eastern provinces the bulk of the farmers are English or German; the German farmers being found in the district between King William's Town and East London, and on the Cape Peninsula. Numbers of them retain their own language. The term "Africander" is sometimes applied to all white residents in Cape Colony and throughout British South Africa, but is often restricted to the Dutch-speaking colonists. "Boer," *i.e.* farmer, as a synonym for "Dutch," is not in general use in Cape Colony.

Besides the black and white races there is a large colony of Malays in Cape Town and district, originally introduced by the Dutch as slaves. These people are largely leavened with foreign elements and, professing Mahommedanism, religion rather than race is their bond of union. They add greatly by their picturesque dress to the gaiety of the street scenes. They are generally small traders, but many are wealthy. There are also a number of Indians in the colony. English is the language of the towns; elsewhere, except in the eastern provinces, the *taal* or vernacular Dutch is the tongue of the majority of the whites, as it is of the natives in the western provinces.

The first census was taken in 1865 when the population of the colony, which then had an area of 195,000 sq. m., and did not include the comparatively densely-populated Native Territories, was 566,158. Of these the Europeans numbered 187,400 or about 33% of the whole. Of the coloured races the Hottentots and Bushmen were estimated at 82,000, whilst the Kaffirs formed about 50% of the population. Since 1865 censuses have been taken—in 1875, 1891 and 1904. In 1875 Basutoland formed part of the colony; in 1891 Transkei, Tembuland, Griqualand East, Griqualand West and Walfish Bay had been incorporated, and Basutoland had been disannexed; and in 1904 Pondoland and British Bechuanaland had been added. The following table gives the area and population at each of the three periods.

1875.		1891.		1904.	
Area. sq. m.	Pop.	Area. sq. m.	Pop.	Area. sq. m.	Pop.
201,136	849,160	260,918	1,527,224	276,995	2,409,804

The 1875 census gave the population of the colony proper at 720,984, and that of Basutoland at 128,176. The colony is officially divided into nine provinces, but is more conveniently treated as consisting of three regions, to which may be added the detached area of Walfish Bay and the islands along the coast of Namaqualand. The table on the next page shows the distribution of population in the various areas.

The white population, which as stated was 187,400 in 1865 and 579,741 in 1904, was at the intermediate censuses 236,783 in 1875 and 376,987 in 1891. The proportion of Dutch descended whites to those of British origin is about 3 to 2. No exact comparison can be made showing the increase in the native population owing to the varying areas of the colony, but the natives have multiplied more rapidly than the whites; the increase in the numbers of the last-named being due, in considerable measure, to immigration. The whites who form about 25 %

of the total population are in the proportion of 4 to 6 in the colony proper. The great bulk of the people inhabit the coast region. The population is densest in the south-west corner (which includes Cape Town, the capital) where the white outnumbers the coloured population. Here in an area of 1711 sq. m. the inhabitants exceed 264,000, being 154 to the sq. m. The urban population, reckoning as such dwellers in the nine largest towns and their suburbs, exceeds 331,000, being nearly 25 % of the total population of the colony proper. Of the coloured inhabitants at the 1904 census 15,682 were returned as Malay, 8489 as Indians, 85,892 as Hottentots,[1] 4168 as Bushmen and 6289 as Griquas. The Kaffir and Bechuana tribes numbered 1,114,067 individuals, besides 310,720 Fingoes separately classified, while 279,662 persons were described as of mixed race. Divided by sex (including white and black) the males numbered (1904) 1,218,940, the females 1,190,864, females being in the proportion of 97·70 to 100 males. By race the proportion is:—whites, 82·16 females to every 100 males (a decrease of 10 % compared with 1891); coloured, 103·22 females to every 100 males. Of the total population over 14 years old—1,409,975—the number married was 738,563 or over 50 %. Among the white population this percentage was only reached in adults over 17.

	Population (1904).				
	Area in sq. m.	White.	Coloured.	Total.	Per sq. m.
Cape Colony Proper . .	206,613	553,452	936,239	1,489,691	7·21
British Bechuanaland. .	51,424	9,368	75,104	84,472	1·64
Native Territories . .	18,310	16,777	817,867	834,644	45·50
Walfish Bay and Islands .	648	144	853	997	1·50
Total .	276,995	579,741	1,830,063	2,409,804	8·70

The professional, commercial and industrial occupations employ about ¼th of the white population. In 1904 whites engaged in such pursuits numbered respectively only 32,202, 46,750 and 67,278, whereas 99,319 were engaged in domestic employment, and 111,175 in agricultural employment, while 214,982 (mostly children) were dependants. The natives follow domestic and agricultural pursuits almost exclusively.

Registration of births and deaths did not become compulsory till 1895. Among the European population the birth-rate is about 33·00 per thousand, and the death-rate 14·00 per thousand. The birth-rate among the coloured inhabitants is about the same as with the whites, but the death-rate is higher—about 25·00 per thousand.

Immigration and Emigration.—From 1873 to 1884 only 23,337 persons availed themselves of the government aid to immigrants from England to the Cape, and in 1886 this aid was stopped. The total number of adult immigrants by sea, however, steadily increased from 11,559 in 1891 to 38,669 in 1896, while during the same period the number of departures by sea only increased from 8415 to 17,695, and most of this increase took place in the last year. But from 1896 onwards the uncertainty of the political position caused a falling off in the number of immigrants, while the emigration figures still continued to grow; thus in 1900 there were 29,848 adult arrivals by sea, as compared with 21,163 departures. Following the close of the Anglo-Boer War the immigration figures rose in 1903 to 61,870, whereas the departures numbered 29,615. This great increase proved transitory; in 1904 and 1905 the immigrants numbered 32,282 and 33,775 respectively, while in the same years the emigrants numbered 33,651 and 34,533. At the census of 1904, 21·68 % of the European population was born outside Africa, persons of Russian extraction constituting the strongest foreign element.

Provinces.—The first division of the colony for the purposes of administration and election of members for the legislative council was into two provinces, a western and an eastern, the western being largely Dutch in sentiment, the eastern chiefly British. With the growth of the colony these provinces were found to be inconveniently large, and by an act of government, which became law in 1874, the country was portioned out into seven provinces; about the same time new fiscal divisions were formed within them by the reduction of those already existing. The seven provinces are named from their geographical position: western, north-western, south-western, eastern, north-eastern, south-eastern and midland. In general usage the distinction made is into western and eastern provinces, according to the area of the primary division. Griqualand West on its incorporation with the colony in 1880 became a separate province, and when the crown colony of British Bechuanaland was taken over by the Cape in 1895 it also became a separate province (see GRIQUALAND and BECHUANALAND). For electoral purposes the Native Territories (see KAFFRARIA) are included in the eastern province.

Chief Towns.—With the exception of Kimberley the principal towns (see separate notices) are on the coast. The capital, Cape Town, had a population (1904) of 77,668, or including the suburbs, 169,641. The most important of these suburbs, which form separate municipalities, are Woodstock (28,990), Wynberg (18,477), and Claremont (14,972). Kimberley, the centre of the diamond mining industry, 647 m. up country from Cape Town, had a pop. of 34,331, exclusive of the adjoining municipality of Beaconsfield (9378). Port Elizabeth, in Algoa Bay, had 32,959 inhabitants, East London, at the mouth of the Buffalo river, 25,220. Cambridge (pop. 3480) is a suburb of East London. Uitenhage (pop. 12,193) is 21 m. N.N.W. of Port Elizabeth. Of the other towns Somerset West (2613), Somerset West Strand (3059), Stellenbosch (4969), Paarl (11,293), Wellington (4881), Ceres (2410), Malmesbury (3811), Caledon (3508), Worcester (7885), Robertson (3244) and Swellendam (2406) are named in the order of proximity to Cape Town, from which Swellendam is distant 134 m. Other towns in the western half of the colony are Riversdale (2643), Oudtshoorn (8849), Beaufort West (5478), Victoria West (2762), De Aar (3271), and the ports of Mossel Bay (4206) and George (3506). Graaff Reinet (10,083), Middleburg (6137), Cradock (7762), Aberdeen (2553), Steynsburg (2250) and Colesberg (2668) are more centrally situated, while in the east are Graham's Town (13,887), King William's Town (9506), Queenstown (9616), Molteno (2725), Burghersdorp (2894), Tarkastad (2270), Dordrecht (2052), Aliwal North (5566), the largest town on the banks of the Orange, and Somerset East (5216). Simon's Town (6643) in False Bay is a station of the British navy. Mafeking (2713), in the extreme north of the colony near the Transvaal frontier, Taungs (2715) and Vryburg (2985) are in Bechuanaland. Kokstad (2903) is the capital of Griqualand East, Umtata (2342) the capital of Tembuland.

Port Nolloth is the seaport for the Namaqualand copper mines, whose headquarters are at O'okiep (2106). Knysna, Port Alfred and Port St Johns are minor seaports. Barkly East and Barkly West are two widely separated towns, the first being E.S.E. of Aliwal North and Barkly West in Griqualand West. Hopetown and Prieska are on the south side of the middle course of the Orange river. Upington (2508) lies further west on the north bank of the Orange and is the largest town in the western part of Bechuanaland. Indwe (2608) is the centre of the coal-mining region in the east of the colony. The general plan of the small country towns is that of streets laid out at right angles, and a large central market square near which are the chief church, town hall and other public buildings. In several of the towns, notably those founded by the early Dutch settlers, the streets are tree-lined. Those towns for which no population figures are given had at the 1904 census fewer than 2000 inhabitants.

Agriculture and Allied Industires.—Owing to the scarcity of water over a large part of the country the area of land under cultivation is restricted. The farmers, in many instances, are pastoralists, whose wealth consists in their stock of cattle, sheep and goats, horses, and, in some cases, ostriches. In the lack of adequate irrigation much fertile soil is left untouched.

The principal cereal crops are wheat, with a yield of 1,701,000

[1] This is an overstatement. The director of the census estimated the true number of Hottentots at about 56,000.

bushels in 1904, oats, barley, rye, mealies (Indian corn) and Kaffir corn (a kind of millet). The principal wheat-growing districts are in the south-western and eastern provinces. The yield per acre is fully up to the average of the world's yield, computed at twelve bushels to the acre. The quality of Cape wheat is stated to be unsurpassed. Rye gives its name to the Roggeveld, and is chiefly grown there and in the lower hills of Namaqualand. Mealies (extensively used as food for cattle and horses) are very largely grown by the coloured population and Kaffir corn almost exclusively so. Oats are grown over a wider area than any other crop, and next to mealies are the heaviest crop grown. They are often cut whilst still tender, dried and used as forage being known as oat hay (67,742,000 bundles of about 5½ lb each were produced in 1904). The principal vegetables cultivated are potatoes, onions, mangold and beet, beans and peas. Farms in tillage are comparatively small, whilst those devoted to the rearing of sheep are very large, ranging from 3000 acres to 15,000 acres and more. For the most part the graziers own the farms they occupy.

The rearing of sheep and other live-stock is one of the chief occupations followed. At the census of 1904 over 8,465,000 woolled and 3,353,000 other sheep were enumerated. There were 2,775,000 angora and 4,386,000 other goats, some 2,000,000 cattle, 250,000 horses and 100,000 asses. These figures showed in most cases a large decrease compared with those obtained in 1891, the cause being largely the ravages of rinderpest. Lucerne and clover are extensively grown for fodder. Ostrich farms are maintained in the Karroo and in other parts of the country, young birds having been first enclosed in 1857. A farm of 6000 acres supports about 300 ostriches. The number of domesticated ostriches in 1904 was 357,000, showing an increase of over 200,000 since 1891. There are large mule-breeding establishments on the veld.

Viticulture plays an important part in the life of the colony. It is doubtful whether or not a species of vine is indigenous to the Cape. The first Dutch settlers planted small vineyards, while the cuttings of French vines introduced by the Huguenots about 1688 have given rise to an extensive culture in the south-western districts of the colony. The grapes are among the finest in the world, whilst the fruit is produced in almost unrivalled abundance. It is computed that over 600 gallons of wine are produced from 1000 vines. The vines number about 80,000,000, and the annual output of wine is about 6,000,000 gallons, besides 1,500,000 gallons of brandy. The Cape wines are chiefly those known as Hermitage, Muscadel, Pontac, Stein and Hanepoot. The high reputation which they had in the first half of the 19th century was afterwards lost to a large extent. Owing to greater care on the part of growers, and the introduction of French-American resistant stocks to replace vines attacked by the phylloxera, the wines in the early years of the 20th century again acquired a limited sale in England. By far the greater part of the vintage has been, however, always consumed in the colony. The chief wine-producing districts are those of the Paarl, Worcester, Robertson, Malmesbury, Stellenbosch and the Cape, all in the south-western regions. Beyond the colony proper there are promising vine stocks in the Gordonia division of Bechuanaland and in the Umtata district of Tembuland.

Fruit culture has become an important industry with the facilities afforded by rapid steamers for the sale of produce in Europe. The trees whose fruit reaches the greatest perfection and yield the largest harvest are the apricot, peach, orange and apple. Large quantities of table grapes are also grown. Many millions of each of the fruits named are produced annually. The pear, lemon, plum, fig and other trees likewise flourish. Cherry trees are scarce. The cultivation of the olive was begun in the western provinces, *c.* 1900. In the Oudtshoorn, Stockenstroom, Uniondale, Piquetberg and other districts tobacco is grown. The output for 1904 was 5,309,000 lb.

Flour-milling is an industry second only in importance to that of diamond mining (see below). The chief milling centres are Port Elizabeth and the Cape district. In 1904 the output of the mills was valued at over £2,200,000, more than 7,000,000 bushels of wheat being ground.

Forestry is a growing industry. Most of the forests are crown property and are under the care of conservators. Fisheries were little developed before 1897 when government experiments were begun, which proved that large quantities of fish were easily procurable by trawling. Large quantities of soles are obtained from a trawling ground near Cape Agulhas. The collection of guano from the islands near Walfish Bay is under government control.

Mining.—The mineral wealth of the country is very great. The most valuable of the minerals is the diamond, found in Griqualand West and also at Hopetown, and other districts along the Orange river. The diamond-mining industry is almost entirely under the control of the De Beers Mining Company. From the De Beers mines at Kimberley have come larger numbers of diamonds than from all the other diamond mines of the world combined. Basing the calculation on the figures for the ten years 1896–1905, the average annual production is slightly over two and a half million carats, of the average annual value of £4,250,000, the average price per carat being £1 : 13 : 3. From the other districts alluvial diamonds are obtained of the average annual value of £250,000-£400,000. They are finer stones than the Kimberley diamonds, having an average value of £3 : 2 : 7 per carat.

Next in importance among mineral products are coal and copper. The collieries are in the Stormberg district and are of considerable extent. The Indwe mines are the most productive. The colonial output increased from 23,000 tons in 1891 to 188,000 tons in 1904. The copper mines are in Namaqualand, an average of 50,000 to 70,000 tons of ore being mined yearly. Copper was the first metal worked by white men in the colony, operations beginning in 1852.

Gold is obtained from mines on the Madibi Reserve, near Mafeking—the outcrop extending about 30 m.—and, in small quantities, from mines in the Knysna district. In the Cape and Paarl districts are valuable stone and granite quarries. Asbestos is mined near Prieska, in which neighbourhood there are also nitrate beds. Salt is produced in several districts, there being large pans in the Prieska, Hopetown and Uitenhage divisions. Tin is obtained from Kuils river, near Cape Town. Many other minerals exist but are not put to industrial purposes.

Trade.—The colony has not only a large trade in its own commodities, but owes much of its commerce to the transit of goods to and from the Transvaal, Orange River Colony and Rhodesia. The staple exports are diamonds, gold (from the Witwatersrand mines), wool, copper ore, ostrich feathers, mohair, hides and skins. The export of wool, over 23,000,000 lb in 1860, had doubled by 1871, and was over 63,473,000 lb in 1905 when the export was valued at £1,887,459. In the same year (1905) 471,024 lb of ostrich feathers were exported valued at £1,081,187. The chief imports are textiles, food stuffs, wines and whisky, timber, hardware and machinery. The value of the total imports rose from £13,612,405 in 1895 to £33,761,831 in 1903, but dropped to £20,000,913 in 1905. The exports in 1895 were valued at £16,798,137 and rose to £23,247,258 in 1899. The dislocation of trade caused by the war with the Boer Republics brought down the exports in 1900 to £7,646,682 (in which year the value of the gold exported was only £336,795). They rose to £10,000,000 and £16,000,000 in 1901 and 1902 respectively, and in 1905 had reached £33,812,210. (This figure included raw gold valued at £20,731,159.) About 75 % of the imports come from the United Kingdom or British colonies, and nearly the whole of the exports go to the United Kingdom. The tonnage of ships entered and cleared at colonial ports rose from 10,175,903 in 1895 to 22,518,286 in 1905. In that year $\frac{9}{10}$ths of the tonnage was British. It is interesting to compare the figures already given with those of earlier days, as they illustrate the growth of the colony over a longer period. In 1836 the total trade of the country was under £1,000,000, in 1860 it had risen to over £4,500,000, in 1874 it exceeded £10,500,000. It remained at about this

figure until the development of the Witwatersrand gold mines. The consequent great increase in the carrying trade with the Transvaal led to some neglect of the internal resources of the colony. Trade depression following the war of 1899–1902 turned attention to these resources, with satisfactory results. The value of imports for local consumption in 1906 was £12,847,188, the value of exports, the produce of the colony being £15,302,854. A "trade balance-sheet" for 1906 drawn up for the Cape Town chamber of commerce by its president showed, however, a debtor account of £18,751,000 compared with a credit account of £17,931,000, figures representing with fair accuracy the then economic condition of the country.

Cape Colony is a member of the South African Customs Union. The tariff, revised in 1906, is protective with a general *ad valorem* rate of 15% on goods not specifically enumerated. On machinery generally there is a 3% *ad valorem* duty. Books, engravings, paintings, sculptures, &c., are on the free list. There is a rebate of 3% on most goods from the United Kingdom, machinery from Great Britain thus entering free.

Communications.—There is regular communication between Europe and the colony by several lines of steamships. The British mails are carried under contract with the colonial government by packets of the Union-Castle Steamship Co., which leave Southampton every Saturday and Cape Town every Wednesday. The distance varies from 5866 m. to 6146 m., according to the route followed, and the mail boats cover the distance in seventeen days. From Cape Town mail steamers sail once a week, or oftener, to Port Elizabeth (436 m., two days) East London (543 m., three days) and Durban (823 m., four or five days); Mossel Bay being called at once a fortnight. Steamers also leave Cape Town at frequent and stated intervals for Port Nolloth.

Steamers of the D.O.A.L. (*Deutsche Ost Afrika Linie*), starting from Hamburg circumnavigate Africa, touching at the three chief Cape ports. The western route is via Dover to Cape Town, the eastern route is via the Suez Canal and Natal. Several lines of steamers ply between Cape Town and Australian ports, and others between Cape Colony and India.

There are over 8000 m. of roads in the colony proper and rivers crossing main routes are bridged. The finest bridge in the colony is that which spans the Orange at Hopetown. It is 1480 ft. long and cost £114,000. Of the roads in general it may be said that they are merely tracks across the veld made at the pleasure of the traveller. The ox is very generally used as a draught animal in country districts remote from railways; sixteen or eighteen oxen being harnessed to a wagon carrying 3 to 4 tons. Traction-engines have in some places supplanted the ox-wagon for bringing agricultural produce to market. The "Scotch cart," a light two-wheeled vehicle is also much used.

Railways.—Railway construction began in 1859 when a private company built a line from Cape Town to Wellington. This line, 64 m. long, was the only railway in the colony for nearly fifteen years. In 1871 parliament resolved to build railways at the public expense, and in 1873 (the year following the conferment of responsible government on the colony) a beginning was made with the work, £5,000,000 having been voted for the purpose. In the same year the Cape Town–Wellington line was bought by the state. Subsequently powers were again given to private companies to construct lines, these companies usually receiving subsidies from the government, which owns and works the greater part of the railways in the colony.

The plan adopted in 1873 was to build independent lines from the seaports into the interior, and the great trunk lines then begun determined the development of the whole system. The standard gauge in South Africa is 3 ft., 6 in. and all railways mentioned are of that gauge unless otherwise stated.

The railways, which have a mileage exceeding 4000, are classified under three great systems:—the Western, the Midland and the Eastern.

The Western system—the southern section of the Cape to Cairo route—starts from Cape Town and runs by Kimberley (647 m.) to Vryburg (774 m.), whence it is continued by the Rhodesia Railway Co. to Mafeking (870 m.), Bulawayo (1360 m.), the Victoria Falls on the Zambezi (1623 m.) and the Belgian Congo frontier, whilst a branch from Bulawayo runs via Salisbury to Beira, 2037 m. from Cape Town. From Fourteen Streams, a station 47 m. north of Kimberley, a line goes via Klerksdorp to Johannesburg and Pretoria, this being the most direct route between Cape Town and the Transvaal. (Distance from Cape Town to Johannesburg, 955 m.)

The Midland system starts from Port Elizabeth, and the main line runs by Cradock and Naauwpoort to Norval's Pont on the Orange river, whence it is continued through the Orange River Colony and the Transvaal by Bloemfontein to Johannesburg (714 m. from Port Elizabeth) and Pretoria (741 m.). From Kroonstad, a station midway between Bloemfontein and Johannesburg, a railway, opened in 1906, goes via Ladysmith to Durban, and provides the shortest railway route between Cape Town and Port Elizabeth and Natal. From Port Elizabeth a second line (186 m.) runs by Uitenhage and Graaff Reinet, rejoining the main line at Rosmead, from which a junction line (83 m.) runs eastwards, connecting with the Eastern system at Stormberg. From Naauwpoort another junction line (69 m.) runs north-west, connecting the Midland with the Western system at De Aar, and affords an alternative route to that via Kimberley from Cape Town to the Transvaal. (Distance from Cape Town to Johannesburg via Naauwpoort, 1012 m.)

The Eastern system starts from East London, and the principal line runs to Springfontein (314 m.) in the Orange River Colony, where it joins the line to Bloemfontein and the Transvaal. (Distance from East London to Johannesburg, 665 m.) From Albert junction (246 m. from East London) a branch, originally the main line, goes east to Aliwal North (280 m.).

The west to east connexion is made by a series of railways running for the most part parallel with the coast. Starting from Worcester, 109 m. from Cape Town on the western main line a railway runs to Mossel Bay via Swellendam and Riversdale. From Mossel Bay another line runs by George, Oudtshoorn and Willowmore to Klipplaat, a station on the line from Graaff Reinet to Port Elizabeth. (Distance from Cape Town 666 m.) From Somerset East a line (164 m.) goes via King William's Town to Blaney junction on the eastern main line and 31 m. from East London. The Somerset East line crosses, at Cookhouse station, the Midland main line from Port Elizabeth to the north, and by this route the distance between Port Elizabeth and East London is 307 m. Before the completion in 1905 of the Somerset East–King William's Town line, the nearest railway connexion between the two seaports was via Rosmead and Stormberg junction—a distance of 547 m. From Sterkstroom junction on the eastern main line a branch railway goes through the Transkei to connect at Riverside, the frontier station, with the Natal railways. It runs via the Indwe coal-mines (66 m. from Sterkstroom), Maclear (173 m.) and Kokstad. From Kokstad to Durban is 232 m. The eastern system is also connected with the Transkei by another railway. From Amabele, a station 51 m. from East London, a line goes east to Umtata (180 m. distant). Thence the line is continued to Port St Johns (307 m. from East London), whence another line 142 m. long goes to Kokstad.

Besides the main lines there are many smaller lines. Thus all the towns within a 50 m. radius of Cape Town are linked to it by railway. Longer branches run from the capital S.E. to Caledon (87 m.) and N.W. via Malmesbury (47 m.), and Piquetberg (107 m.) to Graaf Water (176 m.). A line runs N.W. across the veld from Hutchinson on the western main line via Victoria West to Carnarvon (86 m.). From De Aar junction, a line (111 m.) goes N.W. via Britstown to Prieska on the Orange river. From Port Elizabeth a line (35 m.) runs east to Grahamstown, whence another line (43 m.) goes south-east to Port Alfred at the mouth of the Kowie river. Another line (179 m.) on a two-foot gauge runs N.W. from Port Elizabeth via Humansdorp to Avontuur.

A line, unconnected with any other in the colony, runs from

Port Nolloth on the west coast to the O'okiep copper mines (92 m.). It has a gauge of 2 ft. 6 in.

The railways going north have to cross, within a comparatively short distance of the coast, the mountains which lead to the Karroo. The steepest gradient is on the western main line. Having entered the hilly district at Tulbagh Road, where the railway ascends 500 ft. in 9 m., the Hex River Pass is reached soon after leaving Worcester, 794 ft. above the sea. In the next 36 m. the line rises 2400 ft., over 20 m. of that distance being at gradients of 1 in 40 to 1 in 45. The eastern line is the most continuously steep in the colony. In the first 18 m. from East London the railway rises 1000 ft.; at Kei Road, 46 m. from its starting-point, it has reached an altitude of 2332 ft., at Cathcart (109 m.) it is 3906 ft. above the sea, and at Cyphergat, where it pierces the Stormberg, 204 m. from East London, the rails are 5450 ft. above the sea. From Sterkstroom to Cyphergat, 15 m., the line rises 1044 ft. The highest railway station in the colony is Krom Hooghte, 5543 ft., in the Zuurberg, on the branch line connecting the Eastern and Western systems. The capital expended on government railways to the end of 1905 was £29,973,024, showing a cost per mile of £10,034. The gross earnings in 1905 were £4,047,065 (as compared with £3,390,093 in 1895); the expenses £3,076,920 (as compared with £1,596,013 in 1895). Passengers conveyed in 1905 numbered 20,611,384, and the tonnage of goods 1,836,946 (of 2000 lb).

Posts and Telegraphs.—Direct telegraphic communication between London and Cape Town was established on Christmas day 1879. Cables connect the colony with Europe (1) via Loanda and Bathurst, (2) via St Helena, Ascension and St Vincent; with Europe and Asia (3) via Natal, Zanzibar and Aden, and with Australia (4) via Natal, Mauritius and Cocos.

An overland telegraph wire connects Cape Town and Ujiji, on Lake Tanganyika, via Rhodesia and Nyasaland. Other lines connect Cape Town with all other South African states, while within the colony there is a complete system of telegraphic communication, over 8000 m. of lines being open in 1906. The telephone service is largely developed in the chief towns. The telegraph lines are owned and have been almost entirely built, at a cost up to 1906 of £865,670, by the government, which in 1873 took over the then existing lines (781 m.).

The postal service is well organized, and to places beyond the reach of the railway there is a service of mail carts, and in parts of Gordonia (Bechuanaland) camels are used to carry the mails. Since 1890 a yearly average of over 50,000,000 has passed through the post. Of these about four-fifths are letters.

Constitution and Government.—Under the constitution established in 1872 Cape Colony enjoyed self-government. The legislature consisted of two chambers, a Legislative Council and a House of Assembly. Members of the Legislative Council or Upper House represented the provinces into which the colony was divided and were elected for seven years; members of the House of Assembly, a much more numerous body, elected for five years, represented the towns and divisions of the provinces. At the head of the executive was a governor appointed by the crown. By the South Africa Act 1909 this constitution was abolished as from the establishment of the Union of South Africa in 1910. Cape Colony entered the Union as an original province, being represented in the Union parliament by eight members in the Senate and fifty-one in the House of Assembly. The qualifications of voters for the election of members of the House of Assembly are the same as those existing in Cape Colony at the establishment of the Union, and are as follows:—Voters must be born or naturalized British subjects residing in the Cape province at least twelve months, must be males aged 21 (no distinction being made as to race or colour), must be in possession of property worth £75, or in receipt of salary or wages of not less than £50 a year. No one not an elector in 1892 can be registered as a voter unless he can sign his name and write his address and occupation. A share in tribal occupancy does not qualify for a vote. A voter of non-European descent is not qualified for election to parliament (see further SOUTH AFRICA). The number of registered electors in 1907 was 152,135, of whom over 20,000 were non-Europeans.

For provincial purposes there is a provincial council consisting of the same number of members as are elected by the province to the House of Assembly. The qualifications of voters for the council are the same as for the House of Assembly. All voters, European and non-European, are eligible for seats on the council, but any councillor who becomes a member of parliament thereupon ceases to be a member of the provincial council. The council passes ordinances dealing with direct taxation within the province for purely local purposes, and generally controls all matters of a merely local or private nature in the province. The council was also given, for five years following the establishment of the Union, control of elementary education. All ordinances passed by the council must have the sanction of the Union government before coming into force. The council is elected for three years and is not subject to dissolution save by effluxion of time. The chief executive officer is an official appointed by the Union government and styled administrator of the province. The administrator holds his post for a period of five years. He is assisted by an executive committee consisting of four persons elected by the provincial council but not necessarily members of that body.

To the provincial council is entrusted the oversight of the divisional and municipal councils of the province, but the powers of such subordinate bodies can also be varied or withdrawn by the Union parliament acting directly. Divisional councils, which are elected triennially, were established in 1855. In 1908 they numbered eighty-one. The councils are presided over by a civil commissioner who is also usually resident magistrate. They have to maintain all roads in the division; can nominate field cornets (magistrates); may borrow money on the security of the rates for public works; and return three members yearly to the district licensing court. Their receipts in 1908 were £269,000; their expenditure in the same period was £283,000. The electors to the divisional councils are the owners or occupiers of immovable property. Members of the councils must be registered voters and owners of immovable property in the division valued at not less than £500.

Municipalities at the Cape date from 1836, and are now, for the most part, subject to the provisions of the General Municipal Act of 1882. Certain municipalities have, however, obtained special acts for their governance. In 1907 there were 119 municipalities in the province. Under the act of 1882 the municipalities were given power to levy annually an owner's rate assessed upon the capital value of rateable property, and a tenant's rate assessed upon the annual value of such property. No rate may exceed 2d. in the £ on the capital value or 8d. in the £ on the annual value. The receipts of the municipalities in 1907 amounted to £1,430,000. During the same period the expenditure amounted to £1,539,000.

Law and Justice.—The basis of the judicial system is the Roman-Dutch law, which has been, however, modified by legislation of the Cape parliament. In each division of the province there is a resident magistrate with primary jurisdiction in civil and criminal matters. The South Africa Act 1909 created a Supreme Court of South Africa, the supreme court of the Cape of Good Hope, which sits at Cape Town, becoming a provincial division of the new supreme court, presided over by a judge-president. The two other superior courts of Cape Colony, namely the eastern districts court which sits at Graham's Town, and the high court of Griqualand which sits at Kimberley, became local divisions of the Supreme Court of South Africa. Each of these courts consists of a judge-president and two puisne judges. The provincial and local courts, besides their original powers, have jurisdiction in all matters in which the government of the Union is a party and in all matters in which the validity of any provincial ordinance shall come into question. From the decisions of these courts appeals may be made to the appellate division of the Supreme Court. The judges of the divisional courts go on circuit twice a year. In addition, since 1888 a special court has been held at

Kimberley for trying cases relating to illicit diamond buying ("I.D.B."). This court consists of two judges of the supreme court and one other member, hitherto the civil commissioner or the resident magistrate of Kimberley. The Transkeian territories, which fall under the jurisdiction of the eastern district court, are subject to a Native Territories Penal Code, which came into force in 1887. Besides the usual magistrates in these territories, there is a chief magistrate, resident at Cape Town, with two assistants in the territories.

Religion.—Up to the year 1876 government provided an annual grant for ecclesiastical purposes which was divided among the various churches, Congregationalists alone declining to receive state aid. From that date, in accordance with the provisions of the Voluntary Act of 1875, grants were only continued to the then holders of office. The Dutch Reformed Church, as might be anticipated from the early history of the country, is by far the most numerous community. Next in number of adherents among the white community come the Anglicans—Cape Colony forming part of the Province of South Africa. In 1847 a bishop of Cape Town was appointed to preside over this church, whose diocese extended not only over Cape Colony and Natal, but also over the Island of St Helena. Later, however, separate bishops were appointed for the eastern province (with the seat at Graham's Town) and for Natal. Subsequently another bishopric, St John's, Kaffraria, was created and the Cape Town diocesan raised to the rank of archbishop. Of other Protestant bodies the Methodists outnumber the Anglicans, eight-ninths of their members being coloured people. The Roman Catholics have bishops in Cape Town and Graham's Town, but are comparatively few. There are, besides, several foreign missions in the colony, the most important being the Moravian, London and Rhenish missionary societies. The Moravians have been established since 1732.

The following figures are extracted from the census returns of 1904:—Protestants, 1,305,453; Roman Catholics, 38,118; Jews, 19,537; Mahommedans, 22,623; other sects, 4297; "no religion," 1,016,255. In this last category are placed the pagan natives. The figures for the chief Protestant sects were:—Dutch Reformed Church, 399,487; Gereformeerde Kerk, 6209; Lutherans, 80,902; Anglicans, 281,433; Presbyterians, 88,660; Congregationalists, 112,202; Wesleyan and other Methodists, 290,264; Baptists, 14,105. Of the Hottentots 77%, of the Fingoes 50%, of the mixed races 89%, and of the Kaffirs and Bechuanas 26% were returned as Christians.

Education.—There is a state system of primary education controlled by a superintendent-general of education and the education department which administers the parliamentary grants. As early as 1839 a scheme of public schools, drawn up by Sir John Herschel, the astronomer, came into operation, and was continued until 1865, when a more comprehensive scheme was adopted. In 1905 an act was passed dividing the colony into school districts under the control of popularly elected school boards, which were established during 1905–1906. These boards levy, through municipal or divisional councils, a rate for school purposes and supervise all public and poor schools. The schools are divided into public undenominational elementary schools; day schools and industrial institutions for the natives; mission schools to which government aid for secular instruction is granted; private farm schools, district boarding schools, training schools for teachers, industrial schools for poor whites, &c. In 1905 2930 primary schools of various classes were open. Education is not compulsory, but at the 1904 census 95% of the white population over fourteen years old could read and write. In the same year 186,000 natives could read and write, and 53,000 could read but not write. There are also numbers of private schools receiving no government aid. These include schools maintained by the German community, in which the medium of instruction is German.

The university of the Cape of Good Hope, modelled on that of London, stands at the head of the educational system of the colony. It arose out of and superseded the board of public examiners (which had been constituted in 1858), was established in 1874 and was granted a royal charter in 1877. It is governed by a chancellor, a vice-chancellor (who is chairman of the university council) and a council consisting (1909) of 38 members, including representatives of Natal. The university is empowered to grant degrees ranking equally with those of any university in Great Britain. Originally only B.A., M.A., LL.B., LL.D., M.B., and M.D. degrees were conferred, but degrees in literature, science and music and (in 1908) in divinity were added. The number of students who matriculated rose from 34 in 1875 to 118 in 1885, 242 in 1895 and 539 in 1905. The examinations are open to candidates irrespective of where they have studied, but under the Higher Education Act grants are paid to seven colleges that specially devote themselves to preparing students for the graduation courses. These are the South African College at Cape Town (founded in 1829), the Victoria College at Stellenbosch, the Diocesan College at Rondebosch, Rhodes University College, Graham's Town, Gill College at Somerset East, the School of Mines at Kimberley and the Huguenot Ladies' College at Wellington. Several denominational colleges, receiving no government aid, do the same work in a greater or less degree, the best known being St Aidan's (Roman Catholic) College and Kingswood (Wesleyan) College, both at Graham's Town. Graaff Reinet College, Dale College, King William's Town, and the Grey Institute, Port Elizabeth, occupy the place of high schools under the education department. The Theological Seminary at Stellenbosch prepares theological students for the ministry of the Dutch Church. At Cape Town is a Royal Observatory, founded in 1829, one of the most important institutions of its kind in the world. It is under the control of a royal astronomer and its expenses are defrayed by the British admiralty.

Defence.—The Cape peninsula is fortified with a view to repelling attacks from the sea. Simon's Town, which is on the east side of the peninsula, is the headquarters of the Cape and West Coast naval squadron. It is strongly fortified, as is also Table Bay. Port Elizabeth is likewise fortified against naval attack. A strong garrison of the British army is stationed in the colony, with headquarters at Cape Town. The cost of this garrison is borne by the imperial government. For purposes of local defence a force named the Frontier Armed and Mounted Police was organized in 1853, and a permanent colonial force has been maintained since that date. It is now known as the Cape Mounted Riflemen and is about 700 strong. Its ordinary duty is to preserve order in the Transkeian territories. The Cape Mounted Police, over 1600 strong, are also available for the defence of the colony and are fully armed. There are numerous volunteer corps, which receive a capitation grant from the government. By a law passed in 1878 every able-bodied man between eighteen and fifty is liable to military service without as well as within the limits of the state. There is also a volunteer naval force.

Revenue, Debt, &c.—The following table shows the total receipts (including loans) and payments (including that under Loan Acts) of the colony in various financial years, from 1880 to 1905:—

Year ending 30th June.	Receipts.		Payments.
	Total.	Loans (included in total).	
1880	£3,556,601		£3,742,665
1885	£3,814,947	£496,795	4,211,832
1890	5,571,907	1,141,857	5,327,496
1895	5,416,611	26,441	5,388,157
1900	6,565,752	128,376	7,773,230
1905	13,856,247	5,214,290	10,914,784

The colony had a public debt of £42,109,561 on the 31st of December 1905, including sums raised for corporate bodies, harbour boards, &c., but guaranteed in the general revenue. The greater part of the loans were issued at 3½ or 4% interest. Nearly the whole of the loans raised have been spent on railways, harbours, irrigation and other public works. The value of assessed property for divisional council purposes was returned in 1905 at £87,078,268. The total revenue of the divisional councils increased from £160,558 in 1901 to £273,543 in 1905, and the

expenditure from £170,892 in 1901 to £243,241 in 1905. The receipts from municipal rates and taxes rose from £520,587 in 1901 to £700,103 in 1905; the total municipal receipts in the same period from £978,867 to £1,752,105. At the end of 1905 the total indebtedness of the municipalities was £5,775,420, and the value of assessed property within the municipal bounds £53,948,224.

Banks.—The following table gives statistics of the banks under trust laws:—

31st December.	Including Head Offices.			Circulation, Colony only.	Assets and Liabilities, Colony only.
	Capital Subscribed.	Capital Paid up.	Reserve.		
1890	£5,780,610	£1,558,612	£850,489	£740,210	£9,221,661
1895	7,189,090	2,382,003	1,008,837	612,266	11,864,152
1900	12,166,800	6,508,308	1,810,621	1,361,637	20,537,343
1905	11,510,900	4,456,925	2,948,428	1,065,251	20,749,988

Standard Time, Money, Weights and Measures.—Since 1903 a standard time has been adopted throughout South Africa, being that of 30° or two hours east of Greenwich. In other words noon in South Africa corresponds to 10.0 A.M. in London. The actual difference between the meridians of Greenwich and Cape Town is one hour fourteen minutes. The monetary system is that of Great Britain and the coins in circulation are exclusively British. Though all the standard weights and measures are British, the following old Dutch measures are still used:—*Liquid Measure*: Leaguer = about 128 imperial gallons; half aum = 15½ imperial gallons; anker = 7½ imperial gallons. *Capacity*: Muid = 3 bushels. The general surface measure is the old Amsterdam *Morgen*, reckoned equal to 2·11654 acres; 1000 Cape lineal feet are equal to 1033 British imperial feet. The Cape ton is 2000 lb.

The Press.—The first newspaper of the colony, written in Dutch and English, was published in 1824, and its appearance marked an era not only in the literary but in the political history of the colony, since it drew to a crisis the disputes which had arisen between the colonists and the governor, Lord Charles Somerset, who had issued a decree prohibiting all persons from convening or attending public meetings. Its criticisms on public affairs soon led to its suppression by the governor, and a memorial from the colonists to the king petitioning for a free press was the result. This boon was secured to the colony in 1828, and the press soon became a powerful agent, characterized by public spirit and literary ability. In politics the newspapers are divided, principally on racial lines, appealing either to the British or the Dutch section of the community, rarely to both sides. There are about one hundred newspapers in English or Dutch published in the colony.

The chief papers are the *Cape Times*, *Cape Argus*, *South African News* (Bond), both daily and weekly; the *Diamond Fields Advertiser* (Kimberley) and the *Eastern Province Herald* (Port Elizabeth). *Ons Land* and *Het Dagblad* are Dutch papers published at Cape Town. (F. R. C.)

History

Discovery and Settlement.—Bartholomew Diaz, the Portuguese navigator, discovered the Cape of Good Hope in 1488, and Vasco da Gama in 1497 sailed along the whole coast of South Africa on his way to India. The Portuguese, attracted by the riches of the East, made no permanent settlement at the Cape. But the Dutch, who, on the decline of the Portuguese power, established themselves in the East, early saw the importance of the place as a station where their vessels might take in water and provisions. They did not, however, establish any post at the Cape until 1652, when a small garrison under Jan van Riebeek were sent there by the Dutch East India Company. Riebeek landed at Table Bay and founded Cape Town. In 1671 the first purchase of land from the Hottentots beyond the limits of the fort built by Riebeek marked the beginning of the Colony proper. The earliest colonists were for the most part people of low station or indifferent character, but as the result of the investigations of a commissioner sent out in 1685 a better class of immigrants was introduced. About 1686 the European population was increased by a number of the French refugees who left their country on the revocation of the edict of Nantes. The influence of this small body of immigrants on the character of the Dutch settlers was marked. The Huguenots, however, owing to the policy of the Company, which in 1701 directed that Dutch only should be taught in the schools, ceased by the middle of the 18th century to be a distinct body, and the knowledge of French disappeared. Advancing north and east from their base at Cape Town the colonists gradually acquired—partly by so-called contracts, partly by force—all the land of the Hottentots, large numbers of whom they slew. Besides those who died in warfare, whole tribes of Hottentots were destroyed by epidemics of smallpox in 1713 and in 1755. Straggling remnants still maintained their independence, but the mass of the Hottentots took service with the colonists as herdsmen, while others became hangers-on about the company's posts and grazing-farms or roamed about the country. In 1787 the Dutch government passed a law subjecting these wanderers to certain restrictions. The effect of this law was to place the Hottentots in more immediate dependence upon the farmers, or to compel them to migrate northward beyond the colonial border. Those who chose the latter alternative had to encounter the hostility of their old foes, the Bushmen, who were widely spread over the plains from the Nieuwveld and Sneeuwberg mountains to the Orange river. The colonists also, pressing forward to those territories, came in contact with these Ishmaelites—the farmers' cattle and sheep, guarded only by a Hottentot herdsman, offering the strongest temptation to the Bushman. Reprisals followed; and the position became so desperate that the extermination of the Bushmen appeared to the government the only safe alternative. "Commandoes" or war-bands were sent out against them, and they were hunted down like wild beasts. Within a period of six years, it is said, upwards of 3000 were either killed or captured. Out of the organization of these commandoes, with their field-commandants and field-cornets, has grown the common system of local government in the Dutch-settled districts of South Africa.

It was not to the hostility of the natives, nor to the hard struggle with nature necessary to make agriculture profitable on Karroo or veld, that the slow progress made by the colonists was due, so much as to the narrow and tyrannical policy adopted by the East India Company, which closed the colony against free immigration, kept the whole of the trade in its own hands, combined the administrative, legislative and judicial powers in one body, prescribed to the farmers the nature of the crops they were to grow, demanded from them a large part of their produce, and harassed them with other exactions tending to discourage industry and enterprise. (See further SOUTH AFRICA, where the methods and results of Dutch colonial government are considered in their broader aspects.) To this mischievous policy is ascribed that dislike to orderly government, and that desire to escape from its control, which characterized for many generations the "boer" or farmer class of Dutch settlers—qualities utterly at variance with the character of the Dutch in their native country. It was largely to escape oppression that the farmers trekked farther and farther from the seat of government. The company, to control the emigrants, established a magistracy at Swellendam in 1745 and another at Graaff Reinet in 1786. The Gamtoos river had been declared, *c.* 1740, the eastern frontier of the colony, but it was soon passed. In 1780, however, the Dutch, to avoid collision with the warlike Kaffir tribes advancing south and west from east central Africa, agreed with them to make the Great Fish river the common boundary. In 1795 the heavily taxed burghers of the frontier districts, who were afforded no protection against the Kaffirs, expelled the officials of the East India Company, and set up independent governments at Swellendam and Graaff Reinet. In the same

year, Holland having fallen under the revolutionary government of France, a British force under General Sir James Craig was sent to Cape Town to secure the colony for the prince of Orange—a refugee in England—against the French. The governor of Cape Town at first refused to obey the instructions from the prince, but on the British proceeding to take forcible possession he capitulated.[1] His action was hastened by the fact that the Hottentots, deserting their former masters, flocked to the British standard. The burghers of Graaff Reinet did not surrender until a force had been sent against them, while in 1799 and again in 1801 they rose in revolt. In February 1803, as a result of the peace of Amiens, the colony was handed over to the Batavian Republic, which introduced many needful reforms, as had the British during their eight years' rule. (One of the first acts of General Craig had been to abolish torture in the administration of justice.) War having again broken out, a British force was once more sent to the Cape. After an engagement (Jan. 1806) on the shores of Table Bay the Dutch garrison of Cape Castle surrendered to the British under Sir David Baird, and in 1814 the colony was ceded outright by Holland to the British crown. At that time the colony extended to the line of mountains guarding the vast central plateau, then called Bushmansland, and had an area of about 120,000 sq. m. and a population of some 60,000, of whom 27,000 were whites, 17,000 free Hottentots and the rest slaves. These slaves were mostly imported negroes and Malays. Their introduction was the chief cause leading the white settlers to despise manual labour.

The First and Second Kaffir Wars.—At the time of the cession to Great Britain the first of several wars with the Kaffirs had been fought. (The numerous minor conflicts which since 1789 had taken place between the colonists and the Kaffirs—the latter sometimes aided by Hottentot allies—are not reckoned in the usual enumeration of the Kaffir wars.) The Kaffirs, who had crossed the colonial frontier, had been expelled from the district between the Sunday and Great Fish rivers known as the Zuurveld, which became a sort of neutral ground. For some time previous to 1811 the Kaffirs, however, had taken possession of the neutral ground and committed depredations on the colonists. In order to expel them from the Zuurveld, Colonel John Graham took the field with a mixed force in December 1811, and in the end the Kaffirs were driven beyond the Fish river. On the site of Colonel Graham's headquarters arose the town which bears his name. In 1817 further trouble arose with the Kaffirs, the immediate cause of quarrel being an attempt by the colonial authorities to enforce the restitution of some stolen cattle. Routed in 1818 the Kaffirs rallied, and in the early part of 1819 poured into the colony in vast hordes. Led by a prophet-chief named Makana, they attacked Graham's Town on the 22nd of April, then held by a handful of white troops. Help arrived in time and the enemy were beaten back. It was then arranged that the land between the Fish and Keiskamma rivers should be neutral territory.

The British Settlers of 1820.—The war of 1817–19 led to the first introduction of English settlers on a considerable scale, an event fraught with far-reaching consequences. The then governor, Lord Charles Somerset, whose treaty arrangements with the Kaffir chiefs had proved unfortunate, desired to erect a barrier against the Kaffirs by settling white colonists in the border district. In 1820, on the advice of Lord Charles, parliament voted £50,000 to promote emigration to the Cape, and 4000 British were sent out. These people formed what was known as the Albany settlement, founding Port Elizabeth and making Graham's Town their headquarters. Intended primarily as a measure to secure the safety of the frontier, and regarded by the British government chiefly as a better means of affording a livelihood to a few thousands of the surplus population, this emigration scheme accomplished a far greater work than its authors contemplated. The new settlers, drawn from every part of the British Isles and from almost every grade of society, retained, and their descendants retain, strong sympathy with their native land. In course of time they formed a valuable counterpoise to the Dutch colonists, and they now constitute the most progressive element in the colony. The advent of these immigrants was also the means of introducing the English language at the Cape. In 1825, for the first time, ordinances were issued in English, and in 1827 its use was extended to the conduct of judicial proceedings. Dutch was not, however, ousted, the colonists becoming to a large extent bilingual.

Dislike of British Rule.—Although the colony was fairly prosperous, many of the Dutch farmers were as dissatisfied with British rule as they had been with that of the Dutch East India Company, though their ground of complaint was not the same. In 1792 Moravian missions had been established for the benefit of the Hottentots,[2] and in 1799 the London Missionary Society began work among both Hottentots and Kaffirs. The championship of Hottentot grievances by the missionaries caused much dissatisfaction among the majority of the colonists, whose views, it may be noted, temporarily prevailed, for in 1812 an ordinance was issued which empowered magistrates to bind Hottentot children as apprentices under conditions differing little from that of slavery. Meantime, however, the movement for the abolition of slavery was gaining strength in England, and the missionaries at length appealed from the colonists to the mother country. An incident which occurred in 1815–1816 did much to make permanent the hostility of the frontiersmen to the British. A farmer named Bezuidenhout refused to obey a summons issued on the complaint of a Hottentot, and firing on the party sent to arrest him, was himself killed by the return fire. This caused a miniature rebellion, and on its suppression five ringleaders were publicly hanged at the spot—Slachters Nek—where they had sworn to expel "the English tyrants." The feeling caused by the hanging of these men was deepened by the circumstances of the execution—for the scaffold on which the rebels were simultaneously swung, broke down from their united weight and the men were afterwards hanged one by one. An ordinance passed in 1827, abolishing the old Dutch courts of *landroost* and *heemraden* (resident magistrates being substituted) and decreeing that henceforth all legal proceedings should be conducted in English; the granting in 1828, as a result of the representations of the missionaries, of equal rights with whites to the Hottentots and other free coloured people; the imposition (1830) of heavy penalties for harsh treatment of slaves, and finally the emancipation of the slaves in 1834,[3]—all these things increased the dislike of the farmers to the government. Moreover, the inadequate compensation awarded to slave-owners, and the suspicions engendered by the method of payment, caused much resentment, and in 1835 the trekking of farmers into unknown country in order to escape from an unloved government, which had characterized the 18th century, recommenced. Emigration beyond the colonial border had in fact been continuous for 150 years, but it now took on larger proportions.

The Third Kaffir War.—On the eastern border further trouble arose with the Kaffirs, towards whom the policy of the Cape government was marked by much vacillation. On the 11th of December 1834 a chief of high rank was killed while resisting a commando party. This set the whole of the Kaffir tribes in a blaze. A force of 10,000 fighting men, led by Macomo, a brother of the chief who was killed, swept across the frontier, pillaged and burned the homesteads and murdered all who dared to resist. Among the worst sufferers were a colony of freed Hottentots who, in 1829, had been settled in the Kat river valley by the British authorities. The fighting power of the colony was scanty, but the governor, Sir Benjamin D'Urban (*q.v.*), acted with promptitude, and all available forces were mustered under Colonel (afterwards Sir Harry) Smith, who reached Graham's Town on the 6th of January 1835, six days after news of the rising reached Cape Town. The enemy's

[1] It is stated that Colonel R. J. Gordon (the explorer of the Orange river), who commanded the Dutch forces at the Cape, chagrined by the occupation of the country by the British, committed suicide.

[2] From 1737 to 1744 George Schmidt, "The apostle to the Hottentots," had a mission at Genadendal—"The Vale of Grace."

[3] Masters were allowed to keep their ex-slaves as "apprentices" until the 1st of December 1838.

territory was invaded, and after nine months' fighting the Kaffirs were completely subdued, and a new treaty of peace concluded (on the 17th of September). By this treaty all the country as far as the river Kei was acknowledged to be British, and its inhabitants declared British subjects. A site for the seat of government was selected and named King Wiliam's Town.

The Great Trek.—The action of Sir Benjamin D'Urban was not approved by the home government, and on the instruction of Lord Glenelg, secretary for the colonies, who declared that "the great evil of the Cape Colony consists in its magnitude," the colonial boundary was moved back to the Great Fish river, and eventually (in 1837) Sir Benjamin was dismissed from office. "The Kaffirs" in the opinion of Lord Glenelg, "had an ample justification for war; they had to resent, and endeavoured justly, though impotently, to avenge a series of encroachments" (despatch of the 26th of December 1835). This attitude towards the Kaffirs was one of the many reasons given by the Trek Boers for leaving Cape Colony. The Great Trek, as it is called, lasted from 1836 to 1840, the trekkers, who numbered about 7000, founding communities with a republican form of government beyond the Orange and Vaal rivers, and in Natal, where they had been preceded, however, by British emigrants. From this time Cape Colony ceased to be the only civilized community in South Africa, though for long it maintained its predominance. Up to 1856 Natal was, in fact, a dependency of the Cape (see SOUTH AFRICA). Considerable trouble was caused by the emigrant Boers on either side of the Orange river, where the new comers, the Basutos and other Kaffir tribes, Bushmen and Griquas contended for mastery. The Cape government endeavoured to protect the rights of the natives. On the advice of the missionaries, who exercised great influence with all the non-Dutch races, a number of native states were recognized and subsidized by the Cape government, with the object—not realized—of obtaining peace on this northern frontier. The first of these "Treaty States" recognized was that of the Griquas of Griqualand West. Others were recognized in 1843 and 1844—in the last-named year a treaty was made with the Pondoes on the eastern border. During this period the condition of affairs on the eastern frontier was deplorable, the government being unable or unwilling to afford protection to the farmers from the depredations of the Kaffirs. Elsewhere, however, the colony was making progress. The change from slave to free labour proved to be advantageous to the farmers in the western provinces; an efficient educational system, which owed its initiation to Sir John Herschel, the astronomer (who lived in Cape Colony from 1834 to 1838), was adopted; Road Boards were established and did much good work; to the staple industries—the growing of wheat, the rearing of cattle and the making of wine—was added sheep-raising; and by 1846 wool became the most valuable export from the country. The creation, in 1835, of a legislative council, on which unofficial members had seats, was the first step in giving the colonists a share in the government.

The War of the Axe.—Another war with the Kaffirs broke out in 1846 and was known as the War of the Axe, from the murder of a Hottentot, to whom an old Kaffir thief was manacled, while being conveyed to Graham's Town for trial for stealing an axe. The escort was attacked by a party of Kaffirs and the Hottentot killed. The surrender of the murderer was refused, and war was declared in March 1846. The Gaikas were the chief tribe engaged in the war, assisted during the course of it by the Tambukies. After some reverses the Kaffirs were signally defeated on the 7th of June by General Somerset on the Gwangu, a few miles from Fort Peddie. Still the war went on, till at length Sandili, the chief of the Gaikas, surrendered, followed gradually by the other chiefs; and by the beginning of 1848 the Kaffirs were again subdued, after twenty-one months' fighting.

Extension of British Sovereignty.—In the last month of the war (December 1847) Sir Harry Smith reached Cape Town as governor of the colony, and with his arrival the Glenelg policy was reversed. By proclamation, on the 17th of December, he extended the frontier of the colony northward to the Orange river and eastward to the Keiskamma river, and on the 23rd, at a meeting of the Kaffir chiefs, announced the annexation of the country between the Keiskamma and the Kei rivers to the British crown, thus reabsorbing the territory abandoned by order of Lord Glenelg. It was not, however, incorporated with the Cape, but made a crown dependency under the name of British Kaffraria. For a time the Kaffirs accepted quietly the new order of things. The governor had other serious matters to contend with, including the assertion of British authority over the Boers beyond the Orange river, and the establishment of amicable relations with the Transvaal Boers. In the colony itself a crisis arose out of the proposal to make it a convict station.

The Convict Agitation and Granting of a Constitution.—In 1848 a circular was sent by the 3rd Earl Grey, then colonial secretary, to the governor of the Cape (and to other colonial governors), asking him to ascertain the feelings of the colonists regarding the reception of a certain class of convicts, the intention being to send to South Africa Irish peasants who had been driven into crime by the famine of 1845. Owing to some misunderstanding, a vessel, the "Neptune," was despatched to the Cape before the opinion of the colonists had been received, having on board 289 convicts, among whom were John Mitchell, the Irish rebel, and his colleagues. When the news reached the Cape that this vessel was on her way, the people of the colony became violently excited; and they established an anti-convict association, by which they bound themselves to cease from all intercourse of every kind with persons in any way connected "with the landing, supplying or employing convicts." On the 19th of September 1849 the "Neptune" arrived in Simon's Bay. Sir Harry Smith, confronted by a violent public agitation, agreed not to land the convicts, but to keep them on board ship in Simon's Bay till he received orders to send them elsewhere. When the home government became aware of the state of affairs orders were sent directing the "Neptune" to proceed to Tasmania, and it did so after having been in Simon's Bay for five months. The agitation did not, however, pass away without other important results, since it led to another movement, the object of which was to obtain a free representative government for the colony. This concession, which had been previously promised by Lord Grey, was granted by the British government, and, in 1854, a constitution was established of almost unprecedented liberality.

The Kaffir War of 1850–1853.—The anti-convict agitation had scarcely ceased when the colony was once again involved in war. The Kaffirs bitterly resented their loss of independence, and ever since the last war had been secretly preparing to renew the struggle. Sir Harry Smith, informed of the threatening attitude of the natives, proceeded to the frontier, and summoned Sandili and the other chiefs to an interview. Sandili refused obedience; upon which, at an assembly of other chiefs (October 1850), the governor declared him deposed from his chiefship, and appointed an Englishman, Mr Brownlee, a magistrate, to be temporary chief of the Gaika tribe. The governor appears to have believed that the measures he took would prevent a war and that Sandili could be arrested without armed resistance. On the 24th of December Col. Geo. Mackinnon, being sent with a small force with the object of securing the chief, was attacked in a narrow defile by a large body of Kaffirs, and compelled to retreat with some loss. This was the signal for a general rising of the Gaika tribe. The settlers in the military villages, which had been established along the frontier, assembled in fancied security to celebrate Christmas Day, were surprised, many of them murdered, and their houses given to the flames. Other disasters followed in quick succession. A small patrol of military was cut off to a man. The greater part of the Kaffir police deserted, many of them carrying off their arms and accoutrements. Emboldened by success, the enemy in immense force surrounded and attacked Fort Cox, where the governor was stationed with an inconsiderable force. More than one unsuccessful attempt was made to relieve Sir Harry; but his dauntless spirit was equal to the occasion. At the head of 150 mounted riflemen, accompanied by Colonel Mackinnon, he dashed out of the fort,

and, through a heavy fire of the enemy, rode to King William's Town—a distance of 12 m. Meantime, a new enemy appeared. Some 900 of the Kat river Hottentots, who had in former wars been firm allies of the British, threw in their lot with their hereditary enemies—the Kaffirs. They were not without excuses. They complained that while doing burgher duty in former wars—the Cape Mounted Rifles consisted largely of Hottentot levies—they had not received the same treatment as others serving in defence of the colony, that they got no compensation for the losses they had sustained, and that they were in various ways made to feel they were a wronged and injured race. A secret combination was formed with the Kaffirs to take up arms to sweep the Europeans away and establish a Hottentot republic. Within a fortnight of the attack on Colonel Mackinnon the Kat river Hottentots were also in arms. Their revolt was followed by that of the Hottentots at other missionary stations; and part of the Hottentots of the Cape Mounted Rifles followed their example, including the very men who had escorted the governor from Fort Cox. But numbers of Hottentots remained loyal and the Fingo Kaffirs likewise sided with the British.

After the confusion caused by the sudden outbreak had subsided, and preparations had been made, Sir Harry Smith and his gallant force turned the tide of war against the Kaffirs. The Amatola mountains were stormed; and the paramount chief Kreli, who all along covertly assisted the Gaikas, was severely punished. In April 1852 Sir Harry Smith was recalled by Earl Grey, who accused him—unjustly, in the opinion of the duke of Wellington—of a want of energy and judgment in conducting the war, and he was succeeded by Lieutenant-General Cathcart. Kreli was again attacked and reduced to submission. The Amatolas were finally cleared of the Kaffirs, and small forts erected among them to prevent their reoccupation. The British commanders were hampered throughout by the insufficiency of their forces, and it was not till March 1853 that this most sanguinary of Kaffir wars was brought to a conclusion, after a loss of many hundred British soldiers. Shortly afterwards, British Kaffraria was made a crown colony. The Hottentot settlement at Kat river remained, but the Hottentot power within the colony was now finally crushed.

The Great Amaxosa Delusion.—From 1853 the Kaffir tribes on the east gave little trouble to the colony. This was due, in large measure, to an extraordinary delusion which arose among the Amaxosa in 1856, and led in 1857 to the death of some 50,000 persons. This incident is one of the most remarkable instances of misplaced faith recorded in history. The Amaxosa had not accepted their defeat in 1853 as decisive and were preparing to renew the struggle with the white men. At this juncture, May 1856, a girl named Nongkwase told her father that on going to draw water from a stream she had met strangers of commanding aspect. The father, Mhlakza, went to see the men, who told him that they were spirits of the dead, who had come, if their behests were obeyed, to aid the Kaffirs with their invincible power to drive the white man from the land. Mhlakza repeated the message to his chief, Sarili, one of the most powerful Kaffir rulers. Sarili ordered the commands of the spirits to be obeyed. These orders were, at first, that the Amaxosa were to destroy their fat cattle. The girl Nongkwase, standing in the river where the spirits had first appeared, heard unearthly noises, interpreted by her father as orders to kill more and more cattle. At length the spirits commanded that not an animal of all their herds was to be left alive, and every grain of corn was to be destroyed. If that were done, on a given date myriads of cattle more beautiful than those destroyed would issue from the earth, while great fields of corn, ripe and ready for harvest, would instantly appear. The dead would rise, trouble and sickness vanish, and youth and beauty come to all alike. Unbelievers and the hated white man would on that day utterly perish. The people heard and obeyed. Sarili is believed by many persons to have been the instigator of the prophecies. Certainly some of the principal chiefs regarded all that was done simply as the preparation for a last struggle with the whites, their plan being to throw the whole Amaxosa nation fully armed and in a famishing condition upon the colony. There were those who neither believed the predictions nor looked for success in war, but destroyed their last particle of food in unquestioning obedience to their chief's command. Either in faith that reached the sublime, or in obedience equally great, vast numbers of the people acted. Great kraals were also prepared for the promised cattle, and huge skin sacks to hold the milk that was soon to be more plentiful than water. At length the day dawned which, according to the prophecies, was to usher in the terrestrial paradise. The sun rose and sank, but the expected miracle did not come to pass. The chiefs who had planned to hurl the famished warrior host upon the colony had committed an incredible blunder in neglecting to call the nation together under pretext of witnessing the resurrection. This error they realized too late, and endeavoured by fixing the resurrection for another day to gather the clans, but blank despair had taken the place of hope and faith, and it was only as starving suppliants that the Amaxosa sought the British. The colonists did what they could to save life, but thousands perished miserably. In their extremity many of the Kaffirs turned cannibals, and one instance of parents eating their own child is authenticated. Among the survivors was the girl Nongkwase; her father perished. A vivid narrative of the whole incident will be found in G. M. Theal's *History and Geography of South Africa* (3rd ed., London, 1878), from which this account is condensed. The country depopulated as the result of this delusion was afterwards peopled by European settlers, among whom were members of the German legion which had served with the British army in the Crimea, and some 2000 industrious North German emigrants, who proved a valuable acquisition to the colony.

Sir George Grey's Governorship.—In 1854 Sir George Grey became governor of the Cape, and the colony owed much to his wise administration. The policy, imposed by the home government, of abandoning responsibility beyond the Orange river, was, he perceived, a mistaken one, and the scheme he prepared in 1858 for a confederation of all South Africa (*q.v.*) was rejected by Great Britain. By his energetic action, however, in support of the missionaries Moffat and Livingstone, Sir George kept open for the British the road through Bechuanaland to the far interior. To Sir George was also due the first attempt, missionary effort apart, to educate the Kaffirs and to establish British authority firmly among them, a result which the self-destruction of the Amaxosa rendered easy. Beyond the Kei the natives were left to their own devices. Sir George Grey left the Cape in 1861. During his governorship the resources of the colony had been increased by the opening up of the copper mines in Little Namaqualand, the mohair wool industry had been established and Natal made a separate colony. The opening, in November 1863, of the railway from Cape Town to Wellington, begun in 1859, and the construction in 1860 of the great breakwater in Table Bay, long needed on that perilous coast, marked the beginning in the colony of public works on a large scale. They were the more or less direct result of the granting to the colony of a large share in its own government. In 1865 the province of British Kaffraria was incorporated with the colony, under the title of the Electoral Divisions of King William's Town and East London. The transfer was marked by the removal of the prohibition of the sale of alcoholic liquors to the natives, and the free trade in intoxicants which followed had most deplorable results among the Kaffir tribes. A severe drought, affecting almost the entire colony for several years, caused great depression of trade, and many farmers suffered severely. It was at this period (1869) that ostrich-farming was successfully established as a separate industry.

Whether by or against the wish of the home government, the limits of British authority continued to extend. The Basutos, who dwelt in the upper valleys of the Orange river, had subsisted under a semi-protectorate of the British government from 1843 to 1854; but having been left to their own resources on the abandonment of the Orange sovereignty, they fell into a long exhaustive warfare with the Boers of the Free State. On the urgent petition of their chief Moshesh, they were proclaimed British subjects in 1868, and their territory became part of the

colony in 1871 (see BASUTOLAND). In the same year the south-eastern part of Bechuanaland was annexed to Great Britain under the title of Griqualand West. This annexation was a consequence of the discovery there of rich diamond mines, an event which was destined to have far-reaching results. (F. R. C.)

Development of Modern Conditions.—The year 1870 marks the dawn of a new era in South Africa. From that date the development of modern South Africa may be said to have fairly started, and in spite of political complications, arising from time to time, the progress of Cape Colony down to the outbreak of the Transvaal War of 1899 was steadily forward. The discovery of diamonds on the Orange river in 1867, followed immediately afterwards by the discovery of diamonds on the Vaal river, led to the rapid occupation and development of a tract of country which had hitherto been but sparsely inhabited. In 1870 Dutoitspan and Bultfontein diamond mines were discovered, and in 1871 the still richer mines of Kimberley and De Beers. These four great deposits of mineral wealth are still richly productive, and constitute the greatest industrial asset which the colony possesses. At the time of the beginning of the diamond industry, not only the territory of Cape Colony and the Boer Republics, but all South Africa, was in a very depressed condition. Ostrich-farming was in its infancy, and agriculture but little developed. The Boers, except in the immediate vicinity of Cape Town, were a primitive people. Their wants were few, they lacked enterprise, and the trade of the colony was restricted. Even the British colonists at that time were far from rich. The diamond industry therefore offered considerable attractions, especially to colonists of British origin. It was also the means at length of demonstrating the fact that South Africa, barren and poor on the surface, was rich below the surface. It takes ten acres of Karroo to feed a sheep, but it was now seen that a few square yards of diamondiferous blue ground would feed a dozen families. By the end of 1871 a large population had already gathered at the diamond fields, and immigration continued steadily, bringing new-comers to the rich fields. Among the first to seek a fortune at the diamond fields was Cecil Rhodes.

In 1858 the scheme of Sir George Grey for the federation of the various colonies and states of South Africa had been rejected, as has been stated, by the home authorities. In 1874 the 4th earl of Carnarvon, secretary of state for the colonies, who had been successful in aiding to bring about the federation of Canada, turned his attention to a similar scheme for the confederation of South Africa. The representative government in Cape Colony had been replaced in 1872 by responsible, *i.e.* self-government, and the new parliament at Cape Town resented the manner in which Lord Carnarvon propounded his suggestions. A resolution was passed (June 11, 1875) stating that any scheme in favour of confederation must in its opinion originate within South Africa itself. James Anthony Froude, the distinguished historian, was sent out by Lord Carnarvon to further his policy in South Africa. As a diplomatist and a representative of the British government, the general opinion in South Africa was that Froude was not a success, and he entirely failed to induce the colonists to adopt Lord Carnarvon's views. In 1876, Fingoland, the Idutywa reserve, and Noman's-land, tracts of country on the Kaffir frontier, were annexed by Great Britain, on the understanding that the Cape government should provide for their government. Lord Carnarvon, still bent on confederation, now appointed Sir Bartle Frere governor of Cape Colony and high commissioner of South Africa.

Frere had no sooner taken office as high commissioner than he found himself confronted with serious native troubles in Zululand and on the Kaffir frontier of Cape Colony. In 1877 there occurred an outbreak on the part of the Galekas and the Gaikas. A considerable force of imperial and colonial troops was employed to put down this rising, and the war was subsequently known as the Ninth Kaffir war. It was in this war that the famous Kaffir chief, Sandili, lost his life. At its conclusion the Transkei, the territory of the Galeka tribe, under Kreli, was annexed by the British. In the meantime Lord Carnarvon had resigned his position in the British cabinet, and the scheme for confederation which he had been pushing forward was abandoned. As a matter of fact, at that time Cape Colony was too fully occupied with native troubles to take into consideration very seriously so great a question as confederation. A wave of feeling spread amongst the different Kaffir tribes on the colonial frontier, and after the Gaika-Galeka War there followed in 1879 a rising in Basutoland under Moirosi, whose cattle-raiding had for some time past caused considerable trouble. His stronghold was taken after very severe fighting by a colonial force, but, their defeat notwithstanding, the Basutos remained in a restless and aggressive condition for several years. In 1880 the colonial authorities endeavoured to extend to Basutoland the Peace Preservation Act of 1878, under which a general disarmament of the Basutos was attempted. Further fighting followed on this proclamation, which was by no means successful, and although peace was declared in the country in December 1882, the colonial authorities were very glad in 1884 to be relieved of the administration of a country which had already cost them £3,000,000. The imperial government then took over Basutoland as a crown colony, on the understanding that Cape Colony should contribute for administrative purposes £18,000 annually. In 1880, Sir Bartle Frere, who by his energetic and statesmanlike attitude on the relations with the native states, as well as on all other questions, had won the esteem and regard of loyal South African colonists, was recalled by the 1st earl of Kimberley, the liberal secretary of state for the colonies, and was succeeded by Sir Hercules Robinson. Griqualand West, which included the diamond fields, was now incorporated as a portion of Cape Colony.

Origin of the Afrikander Bond.—The Boer War of 1881, with its disastrous termination, naturally reacted throughout South Africa; and as one of the most important results, in the year 1882 the first Afrikander Bond congress was held at Graaff Reinet. The organization of the Bond developed into one embracing the Transvaal, the Orange Free State and Cape Colony. Each country had a provincial committee with district committees, and branches were distributed throughout the whole of South Africa. At a later date the Bond in the Cape Colony dissociated itself from its Republican branches. The general lines of policy which this organization endeavoured to promote may best be gathered from *De Patriot*, a paper published in the colony, and an avowed supporter of the organization. The following extracts from articles published in 1882 will illustrate, better than anything else, the ambition entertained by some of the promoters of this remarkable organization.

"The Afrikander Bond has for its object the establishment of a South African nationality by spreading a true love for what is really our fatherland. No better time could be found for establishing the Bond than the present, when the consciousness of nationality has been thoroughly aroused by the Transvaal war." . . . "The British government keep on talking about a confederation under the British flag, but that will never be brought about. They can be quite certain of that. There is just one obstacle in the way of confederation, and that is the British flag. Let them remove that, and in less than a year the confederation would be established under the Free Afrikander flag." "After a time the English will realize that the advice given them by Froude was the best—they must just have Simon's Bay as a naval and military station on the way to India, and give over all the rest of South Africa to the Afrikanders." . . . "Our principal weapon in the social war must be the destruction of English trade by our establishing trading companies for ourselves." . . . "It is the duty of each true Afrikander not to spend anything with the English that he can avoid."

De Patriot afterwards became imperialist, but *Ons Land*, another Bond organ, continued in much the same strain.

In addition to having its press organs, the Bond from time to time published official utterances less frank in their tone than the statements of its press. Some of the Articles of the Bond's original manifesto are entirely praiseworthy, *e.g.* those referring to the administration of justice, the honour of the people, &c.; such clauses as these, however, were meaningless in view of the enlightened government which obtained in Cape Colony, and for the true "inwardness" of this document it is necessary to note Article 3, which distinctly speaks of the promotion of South Africa's independence (*Zelfstandigheid*). If the Bond aroused

disloyalty and mistaken aspirations in one section of the Cape inhabitants, it is equally certain that it caused a great wave of loyal and patriotic enthusiasm to pass through another and more enlightened section. A pamphlet written in 1885 for an association called the Empire League by Mr Charles Leonard, who afterwards consistently championed the cause of civil equality and impartial justice in South Africa, maintained as follows:—

"(1) That the establishment of the English government here was beneficial to all classes; and (2) that the withdrawal of that government would be disastrous to every one having vested interests in the colony. . . . England never can, never will, give up this colony, and we colonists will never give up England. . . . Let us, the inhabitants of the Cape Colony, be swift to recognize that we are one people, cast together under a glorious flag of liberty, with heads clear enough to appreciate the freedom we enjoy, and hearts resolute to maintain our true privileges; let us desist from reproaching and insulting one another, and, rejoicing that we have this goodly land as a common heritage, remember that by united action only can we realize its grand possibilities. We belong both of us to a home-loving stock, and the peace and prosperity of every home in the land is at stake. On our action now depends the question whether our children shall curse or bless us; whether we shall live in their memory as promoters of civil strife, with all its miserable consequences, or as joint architects of a happy, prosperous and united state. Each of us looks back to a noble past. United, we may ensure to our descendants a not unworthy future. Disunited, we can hope for nothing but stagnation, misery and ruin. Is this a light thing?"

It is probable that many Englishmen reading Mr Leonard's manifesto at the time regarded it as unduly alarming, but subsequent events proved the soundness of the views it expressed. The fact is that, from 1881 onwards, two great rival ideas came into being, each strongly opposed to the other. One was that of Imperialism—full civil rights for every civilized man, whatever his race might be, under the supremacy and protection of Great Britain. The other was nominally republican, but in fact exclusively oligarchical and Dutch. The policy of the extremists of this last party was summed up in the appeal which President Kruger made to the Free State in February 1881, when he bade them "Come and help us. God is with us. It is his will to unite us as a people"—"to make a united South Africa free from British authority." The two actual founders of the Bond party were Mr Borckenhagen, a German who was residing in Bloemfontein, and Mr Reitz, afterwards state secretary of the Transvaal. Two interviews have been recorded which show the true aims of these two promoters of the Bond at the outset. One occurred between Mr Borckenhagen and Cecil Rhodes, the other between Mr Reitz and Mr T. Schreiner, whose brother became, at a later date, prime minister of Cape Colony. In the first interview Mr Borckenhagen remarked to Rhodes: "We want a united Africa," and Rhodes replied: "So do I." Mr Borckenhagen then continued: "There is nothing in the way; we will take you as our leader. There is only one small thing: we must, of course, be independent of the rest of the world." Rhodes replied: "You take me either for a rogue or a fool. I should be a rogue to forfeit all my history and my traditions; and I should be a fool, because I should be hated by my own countrymen and mistrusted by yours." But as Rhodes truly said at Cape Town in 1898, "The only chance of a true union is the overshadowing protection of a supreme power, and any German, Frenchman, or Russian would tell you that the best and most liberal power is that over which Her Majesty reigns." The other interview took place at the beginning of the Bond's existence. Being approached by Mr Reitz, Mr T. Schreiner objected that the Bond aimed ultimately at the overthrow of British rule and the expulsion of the British flag from South Africa. To this Mr Reitz replied: "Well, what if it is so?" Mr Schreiner expostulated in the following terms: "You do not suppose that that flag is going to disappear without a tremendous struggle and hard fighting?" "Well, I suppose not, but even so, what of that?" rejoined Mr Reitz. In the face of this testimony with reference to two of the most prominent of the Bond's promoters, it is impossible to deny that from its beginning the great underlying idea of the Bond was an independent South Africa.

Mr Hofmeyr's Policy.—In 1882 an act was passed in the Cape legislative assembly, empowering members to speak in the Dutch language on the floor of the House, if they so desired. The intention of this act was a liberal one, but the moment of its introduction was inopportune, and its effect was to give an additional stimulus to the policy of the Bond. It was probably also the means of bringing into the House a number of Dutchmen, by no means well educated, who would not have been returned had they been obliged to speak English. By this act an increase of influence was given to the Dutch leaders. The head of the Afrikander Bond at this time in Cape Colony, and the leader of Dutch opinion, was Mr J. H. Hofmeyr, a man of undoubted ability and astuteness. Although he was recognized leader of the Dutch party in Cape Colony, he consistently refused to take office, preferring to direct the policy and the action of others from an independent position. Mr Hofmeyr sat in the house of assembly as member for Stellenbosch, a strong Dutch constituency. His influence over the Dutch members was supreme, and in addition to directing the policy of the Bond within the Cape Colony, he supported and defended the aggressive expansion policy of President Kruger and the Transvaal Boers. In 1883, during a debate on the Basutoland Dis-annexation Bill, Rhodes openly charged Mr Hofmeyr in the House with a desire to see a "United States of South Africa under its own flag." In 1884 Mr Hofmeyr led the Bond in strongly supporting the Transvaal Boers who had invaded Bechuanaland (*q.v.*), proclaiming that if the Bechuanaland freebooters were not permitted to retain the territories they had seized, in total disregard of the terms of the conventions of 1881 and 1884, there would be rebellion among the Dutch of Cape Colony. Fortunately, however, for the peace of Cape Colony at that time, Sir Charles Warren, sent by the imperial government to maintain British rights, removed the invading Boers from Stellaland and Goshen—two so-called republics set up by the Boer freebooters—in March 1885 and no rebellion occurred. Nevertheless the Bond party was so strong in the House that they compelled the ministry under Sir Thomas Scanlen to resign in 1884. The logical and constitutional course for Mr Hofmeyr to have followed in these circumstances would have been to accept office and himself form a government. This he refused to do. He preferred to put in a nominee of his own who should be entirely dependent on him. Mr Upington, a clever Irish barrister, was the man he selected, and under him was formed in 1884 what will always be known in Cape history as the "Warming-pan" ministry. This action was denounced by many British colonists, who were sufficiently loyal, not only to Great Britain, but also to that constitution which had been conferred by Great Britain upon Cape Colony, to desire to see the man who really wielded political power also acting as the responsible head of the party. It was Mr Hofmeyr's refusal to accept this responsibility, as well as the nature of his Bond policy, which won for him the political sobriquet of the "Mole." Open and responsible exercise of a power conferred under the constitution of the country, Englishmen and English colonists would have accepted and even welcomed. But that subterranean method of Dutch policy which found its strongest expression in Pretoria, and which operated from Pretoria to Cape Town, could not but be resented by loyal colonists. From 1881 down to 1898, Mr Hofmeyr practically determined how Dutch members should vote, and also what policy the Bond should adopt at every juncture in its history. In 1895 he resigned his seat in parliament—an action which made his political dictatorship still more remarkable. This influence on Cape politics was a demoralizing one. Other well-known politicians at the Cape subsequently found it convenient to adapt their views a good deal too readily to those held by the Bond. In justice to Mr Hofmeyr, however, it is only fair to say that after the Warren expedition in 1885, which was at least evidence that Great Britain did not intend to renounce her supremacy in South Africa altogether, he adopted a less hostile or anti-British attitude. The views and attitude of Mr Hofmeyr between 1881 and 1884—when even loyal British colonists, looking to the events which followed Majuba, had almost come to believe that Great Britain had little desire to maintain her supremacy—can scarcely be wondered at.

Rhodes and Dutch Sentiment.—Recognizing the difficulties of the position, Cecil Rhodes from the outset of his political career showed his desire to conciliate Dutch sentiment by considerate treatment and regard for Dutch prejudices. Rhodes was first returned as member of the House of Assembly for Barkly West in 1880, and in spite of all vicissitudes this constituency remained loyal to him. He supported the bill permitting Dutch to be used in the House of Assembly in 1882, and early in 1884 he first took office, as treasurer-general, under Sir Thomas Scanlen. Rhodes had only held this position for six weeks when Sir Thomas Scanlen resigned, and in August of the same year he was sent by Sir Hercules Robinson to British Bechuanaland as deputy-commissioner in succession to the Rev. John Mackenzie, the London Missionary Society's representative at Kuruman, who in the previous May had proclaimed the queen's authority over the district. Rhodes's efforts to conciliate the Boers failed—hence the necessity for the Warren mission. In 1885 the territories of Cape Colony were farther extended, and Tembuland, Bomvanaland and Galekaland were formally added to the colony. In 1886 Sir Gordon Sprigg succeeded Sir Thomas Upington as prime minister.

South African Customs Union.—The period from 1878 to 1885 in Cape Colony had been one of considerable unrest. In this short time, in addition to the chronic troubles with the Basutos—which led the Cape to hand them over to the imperial authorities—there occurred a series of native disturbances which were followed by the Boer War of 1881, and the Bechuanaland disturbances of 1884. In spite, however, of these drawbacks, the development of the country proceeded. The diamond industry was flourishing. In 1887 a conference was held in London for "promoting a closer union between the various parts of the British empire by means of an imperial tariff of customs." At this conference it is worthy of note that Mr Hofmeyr propounded a sort of "Zollverein" scheme, in which imperial customs were to be levied independently of the duties payable on all goods entering the empire from abroad. In making the proposition he stated that his objects were "to promote the union of the empire, and at the same time to obtain revenue for the purposes of general defence." The scheme was not at the time found practicable. But its authorship, as well as the sentiments accompanying it, created a favourable view of Mr Hofmeyr's attitude. In the year 1888, in spite of the failure of statesmen and high commissioners to bring about political confederation, the members of the Cape parliament set about the establishment of a South African Customs Union. A Customs Union Bill was passed, and this in itself constituted a considerable development of the idea of federation. Shortly after the passing of the bill the Orange Free State entered the union. An endeavour was also made then, and for many years afterwards, to get the Transvaal to join. But President Kruger, consistently pursuing his own policy, hoped through the Delagoa Bay railway to make the South African Republic entirely independent of Cape Colony. The endeavour to bring about a customs union which would embrace the Transvaal was also little to the taste of President Kruger's Hollander advisers, interested as they were in the schemes of the Netherlands Railway Company, who owned the railways of the Transvaal.

Diamonds and Railways.—Another event of considerable commercial importance to the Cape Colony, and indeed to South Africa, was the amalgamation of the diamond-mining companies, chiefly brought about by Cecil Rhodes, Alfred Beit and "Barney" Barnato, in 1889. One of the principal and most beneficent results of the discovery and development of the diamond mines was the great impetus which it gave to railway extension. Lines were opened up to Worcester and Beaufort West, to Graham's Town, Graaff Reinet and Queenstown. Kimberley was reached in 1885. In 1890 the line was extended northwards on the western frontier of the Transvaal as far as Vryburg in Bechuanaland. In 1889 the Free State entered into an arrangement with the Cape Colony whereby the main trunk railway was extended to Bloemfontein, the Free State receiving half the profits. Subsequently the Free State bought at cost price the portion of the railway in its own territory. In 1891 the Free State railway was still farther extended to Viljoen's Drift on the Vaal river, and in 1892 it reached Pretoria and Johannesburg.

Rhodes as Prime Minister: Native Policy.—In 1889 Sir Henry Loch was appointed high commissioner and governor of Cape Colony in succession to Sir Hercules Robinson. In 1890 Sir Gordon Sprigg, the premier of the colony, resigned, and a Rhodes government was formed. Prior to the formation of this ministry (see table at end of article), and while Sir Gordon Sprigg was still in office, Mr Hofmeyr approached Rhodes and offered to put him in office as a Bond nominee. This offer was declined. When, however, Rhodes was invited to take office after the downfall of the Sprigg ministry, he asked the Bond leaders to meet him and discuss the situation. His policy of customs and railway unions between the various states, added to the personal esteem in which he was at this time held by many of the Dutchmen, enabled him to undertake and to carry on successfully the business of government.

The colonies of British Bechuanaland and Basutoland were now taken into the customs union existing between the Orange Free State and Cape Colony. Pondoland, another native territory, was added to the colony in 1894, and the year was marked by the Glen Grey Act, a departure in native policy for which Rhodes was chiefly responsible. It dealt with the natives residing in certain native reserves, and in addition to providing for their interests and holdings, and in other ways protecting the privileges accorded to them, the principle of the duty of some degree of labour devolving upon every able-bodied native enjoying these privileges was asserted, and a small labour tax was levied.[1] This is in many respects the most statesmanlike act dealing with natives on the statute-book; and in the session of 1895 Rhodes was able to report to the Cape parliament that the act then applied to 160,000 natives. In 1905 the labour clauses of this act, which had fallen into desuetude, were repealed. The clauses had, however, achieved success, in that they had caused many thousands of natives to fulfil the conditions requisite to claim exemption.

In other respects Rhodes's native policy was marked by combined consideration and firmness. Ever since the granting of self-government the natives had enjoyed the franchise. An act passed in 1892, at the instance of Rhodes, imposed an educational test on applicants for registration, and made other provisions, all tending to restrict the acquisition of the franchise by "tribal" natives, the possible danger arising from a large native vote being already obvious (see section *Constitution*).

Rhodes opposed the native liquor traffic, and at the risk of offending some of his supporters among the brandy-farmers of the western provinces, he suppressed it entirely on the diamond mines, and restricted it as far as he was able in the native reserves and territories. Nevertheless the continuance of this traffic on colonial farms, as well as to some extent in the native territories and reserves, is a black spot in the annals of the Cape Colony. The Hottentots have been terribly demoralized, and even partially destroyed by it in the western province.

Another and little-known instance of Rhodes's keen insight in dealing with native affairs—an action which had lasting results on the history of the colony—may be given. After the native territories east of the Kei had been added to Cape Colony, a case of claim to inheritance came up for trial, and in accordance with the law of the colony, the court held that the eldest son of a native was his heir. This decision created the strongest resentment among the people of the territory, as it was in distinct

[1] The act enjoined that "every male native residing in the district, exclusive of natives in possession of lands under ordinary quit-rent titles, or in freehold, who, in the judgment of the resident magistrate, is fit for and capable of labour, shall pay to the public revenue a tax of ten shillings per annum unless he can show to the satisfaction of the magistrate that he has been in service beyond the borders of the district for at least three months out of the previous twelve, when he will be exempt from the tax for that year, or unless he can show that he has been employed for a total period of three years, when he will be exempt altogether."

contradiction to native tribal law, which recognized the great son, or son of the chief wife, as heir. The government were threatened with a native disturbance, when Rhodes telegraphed his assurance that compensation should be granted, and that such a decision should never be given again. This assurance was accepted and tranquillity restored. At the close of the next session (that of 1894), after this incident had occurred, Rhodes laid on the table a bill drafted by himself, the shortest the House had ever seen. It provided that all civil cases were to be tried by magistrates, an appeal to lie only to the chief magistrate of the territory with an assessor. Criminal cases were to be tried before the judges of supreme court on circuit. The bill was passed, and the effect of it was, inasmuch as the magistrates administered according to native law, that native marriage customs and laws (including polygamy) were legalized in these territories. Rhodes had retrieved his promise, and no one who has studied and lived amongst the Bantu will question that the action taken was both beneficent and wise.

During 1895 Sir Hercules Robinson was reappointed governor and high commissioner of South Africa in succession to Sir Henry Loch, and in the same year Mr Chamberlain became secretary of state for the colonies.

Movement for Commercial Federation.—With the development of railways, and the extension of trade between Cape Colony and the Transvaal, there had grown up a closer relationship on political questions. Whilst premier of Cape Colony, by means of the customs union and in every other way, Rhodes endeavoured to bring about a friendly measure of at least commercial federation among the states and colonies of South Africa. He hoped to establish both a commercial and a railway union, and a speech which he made in 1894 at Cape Town admirably describes this policy:—

"With full affection for the flag which I have been born under, and the flag I represent, I can understand the sentiment and feeling of a republican who has created his independence, and values that before all; but I can say fairly that I believe in the future that I can assimilate the system, which I have been connected with, with the Cape Colony, and it is not an impossible idea that the neighbouring republics, retaining their independence, should share with us as to certain general principles. If I might put it to you, I would say the principles of tariffs, the principle of railway connexion, the principle of appeal in law, the principle of coinage, and in fact all those principles which exist at the present moment in the United States, irrespective of the local assemblies which exist in each separate state in that country."

To this policy President Kruger and the Transvaal government offered every possible opposition. Their action in what is known as the Vaal River Drift question will best illustrate the line of action which the Transvaal government believed it expedient to adopt. A difficulty arose at the termination of the agreement in 1894 between the Cape government railway and the Netherlands railway. The Cape government, for the purposes of carrying the railway from the Vaal river to Johannesburg, had advanced the sum of £600,000 to the Netherlands railway and the Transvaal government conjointly; at the same time it was stipulated that the Cape government should have the right to fix the traffic rate until the end of 1894, or until such time as the Delagoa Bay–Pretoria line was completed. These rates were fixed by the Cape government at 2d. per ton per mile, but at the beginning of 1895 the rate for the 52 m. of railway from the Vaal river to Johannesburg was raised by the Netherlands railway to no less a sum than 8d. per ton per mile. It is quite evident from the action which President Kruger subsequently took in the matter that this charge was put on with his approval, and with the object of compelling traffic to be brought to the Transvaal by the Delagoa route, instead of as heretofore by the colonial railway. In order to compete against this very high rate, the merchants of Johannesburg began removing their goods from the Vaal river by waggon. Thereupon President Kruger arbitrarily closed the drifts (fords) on the Vaal river, and thus prevented through waggon traffic, causing an enormous block of waggons on the banks of the Vaal. A protest was then made by the Cape government against the action of the Transvaal, on the ground that it was a breach of the London Convention. President Kruger took no notice of this remonstrance, and an appeal was made to the imperial government; whereupon the latter entered into an agreement with the Cape government, to the effect that if the Cape would bear half the cost of any expedition which should be necessary, assist with troops, and give full use of the Cape railway for military purposes if required, a protest should be sent to President Kruger on the subject. These terms were accepted by Rhodes and his colleagues, of whom Mr W. P. Schreiner was one, and a protest was then sent by Mr Chamberlain stating that the government would regard the closing of the drifts as a breach of the London Convention, and as an unfriendly action calling for the gravest remonstrance. President Kruger at once reopened the drifts, and undertook that he would issue no further proclamation on the subject except after consultation with the imperial government.

On the 29th of December 1895 Dr Jameson (*q.v.*) made his famous raid into the Transvaal, and Rhodes's complicity in this movement compelled him to resign the premiership of Cape Colony in January 1896, the vacant post being taken by Sir Gordon Sprigg. As Rhodes's complicity in the raid became known, there naturally arose a strong feeling of resentment and astonishment among his colleagues in the Cape ministry, who had been kept in complete ignorance of his connexion with any such scheme. Mr Hofmeyr and the Bond were loud in their denunciation of him, nor can it be denied that the circumstances of the raid greatly embittered againstEngland the Dutch element in Cape Colony, and influenced their subsequent attitude towards the Transvaal Boers.

In 1897 a native rising occurred under Galeshwe, a Bantu chief, in Griqualand West. Galeshwe was arrested and the rebellion repressed. On cross-examination Galeshwe stated that Bosman, a magistrate of the Transvaal, had supplied ammunition to him, and urged him to rebel against the government of Cape Colony. There is every reason to suppose that this charge was true, and it is consistent with the intrigues which the Boers from time to time practised among the natives.

In 1897 Sir Alfred Milner was appointed high commissioner of South Africa and governor of Cape Colony, in succession to Sir Hercules Robinson, who had been created a peer under the title of Baron Rosmead in August 1896.

Mr Schreiner's Policy.—In 1898 commercial federation in South Africa advanced another stage, Natal entering the customs union. A fresh convention was drafted at this time, and under it "a uniform tariff on all imported goods consumed within such union, and an equitable distribution of the duties collected on such goods amongst the parties to such union, and free trade between the colonies and state in respect of all South African products," was arranged. In the same year, too, the Cape parliamentary election occurred, and the result was the return to power of a Bond ministry under Mr W. P. Schreiner. From this time, until June 1900, Mr Schreiner remained in office as head of the Cape government. During the negotiations (see TRANSVAAL) which preceded the war in 1899, feeling at the Cape ran very high, and Mr Schreiner's attitude was very freely discussed. As head of a party, dependent for its position in power on the Bond's support, his position was undoubtedly a trying one. At the same time, as prime minister of a British colony, it was strongly felt by loyal colonists that he should at least have refrained from openly interfering between the Transvaal and the imperial government during the course of most difficult negotiations. His public expressions of opinion were hostile in tone to the policy pursued by Mr Chamberlain and Sir Alfred Milner. The effect of them, it was believed, might conceivably be to encourage President Kruger in persisting in his rejection of the British terms. Mr Schreiner, it is true, used directly what influence he possessed to induce President Kruger to adopt a reasonable course. But however excellent his intentions, his publicly expressed disapproval of the Chamberlain-Milner policy probably did more harm than his private influence with Mr Kruger could possibly do good. On the 11th of June 1899, shortly after the Bloemfontein conference, from which Sir Alfred Milner had just returned, Mr Schreiner asked the high

commissioner to inform Mr Chamberlain that he and his colleagues agreed in regarding President Kruger's Bloemfontein proposals as "practical, reasonable and a considerable step in the right direction." Early in June, however, the Cape Dutch politicians began to realize that President Kruger's attitude was not so reasonable as they had endeavoured to persuade themselves, and Mr Hofmeyr, accompanied by Mr Herholdt, the Cape minister of agriculture, visited Pretoria. On arrival, they found that the Transvaal Volksraad, in a spirit of defiance and even levity, had just passed a resolution offering four new seats in the Volksraad to the mining districts, and fifteen to exclusively burgher districts. Mr Hofmeyr, on meeting the executive, freely expressed indignation at these proceedings. Unfortunately, Mr Hofmeyr's influence was more than counterbalanced by an emissary from the Free State, Mr Abraham Fischer, who, while purporting to be a peacemaker, practically encouraged the Boer executive to take extreme measures. Mr Hofmeyr's established reputation as an astute diplomatist, and as the trusted leader for years of the Cape Dutch party, made him as powerful a delegate as it was possible to find. If any emissary could accomplish anything in the way of persuading Mr Kruger, it was assuredly Mr Hofmeyr. Much was looked for from his mission by moderate men of all parties, and by none more so, it is fair to believe, than by Mr Schreiner. But Mr Hofmeyr's mission, like every other mission to Mr Kruger to induce him to take a reasonable and equitable course, proved entirely fruitless. He returned to Cape Town disappointed, but probably not altogether surprised at the failure of his mission. Meanwhile a new proposal was drafted by the Boer executive, which, before it was received in its entirety, or at least before it was clearly understood, elicited from Mr Schreiner a letter on the 7th of July to the *South African News*, in which, referring to his government, he said:—

"While anxious and continually active with good hope in the cause of securing reasonable modifications of the existing representative system of the South African Republic, this government is convinced that no ground whatever exists for active interference in the internal affairs of that republic."

This letter was precipitate and unfortunate. On the 11th of July, after seeing Mr Hofmeyr on his return, Mr Schreiner made a personal appeal to President Kruger to approach the imperial government in a friendly spirit. At this time an incident occurred which raised the feeling against Mr Schreiner to a very high pitch. On the 7th of July 500 rifles and 1,000,000 rounds of ammunition were landed at Port Elizabeth, consigned to the Free State government, and forwarded to Bloemfontein. Mr Schreiner's attention was called to this consignment at the time, but he refused to stop it, alleging as his reason that, inasmuch as Great Britain was at peace with the Free State, he had no right to interdict the passage of arms through the Cape Colony. The British colonist is as capable of a grim jest as the Transvaal Boer, and this action of Mr Schreiner's won for him the nickname "Ammunition Bill." At a later date he was accused of delay in forwarding artillery and rifles for the defence of Kimberley, Mafeking and other towns of the colony. The reason he gave for delay was that he did not anticipate war; and that he did not wish to excite unwarrantable suspicions in the minds of the Free State. His conduct in both instances was perhaps technically correct, but it was much resented by loyal colonists.

On the 28th of July Mr Chamberlain sent a conciliatory despatch to President Kruger, suggesting a meeting of delegates to consider and report on his last franchise proposals, which were complex to a degree. Mr Schreiner, on the 3rd of August, telegraphed to Mr Fischer begging the Transvaal to welcome Mr Chamberlain's proposal. At a later date, on receiving an inquiry from the Free State as to the movements of British troops, Mr Schreiner curtly refused any information, and referred the Free State to the high commissioner. On the 28th of August Sir Gordon Sprigg in the House of Assembly moved the adjournment of the debate, to discuss the removal of arms to the Free State. Mr Schreiner, in reply, used expressions which called down upon him the severest censure and indignation, both in the colony and in Great Britain. He stated that, should the storm burst, he would keep the colony aloof with regard both to its forces and its people. In the course of the speech he also read a telegram from President Steyn, in which the president repudiated all contemplated aggressive action on the part of the Free State as absurd. The speech created a great sensation in the British press. It was probably forgotten at the time (though Lord Kimberley afterwards publicly stated it) that one of the chief reasons why the Gladstone government had granted the retrocession of the Transvaal after Majuba, was the fear that the Cape Colonial Dutch would join their kinsmen if the war continued. What was a danger in 1881, Mr Schreiner knew to be a still greater danger in 1899. At the same time it is quite obvious, from a review of Mr Schreiner's conduct through the latter half of 1899, that he took an entirely mistaken view of the Transvaal situation. He evinced, as premier of the Cape Colony, the same inability to understand the Uitlanders' grievances, the same futile belief in the eventual fairness of President Kruger, as he had shown when giving evidence before the British South Africa Select Committee into the causes of the Jameson Raid. Actual experience taught him that President Kruger was beyond an appeal to reason, and that the protestations of President Steyn were insincere. War had no sooner commenced with the ultimatum of the Transvaal Republic on the 9th of October 1899, than Mr Schreiner found himself called upon to deal with the conduct of Cape rebels. The rebels joined the invading forces of President Steyn, whose false assurances Mr Schreiner had offered to an indignant House of Assembly only a few weeks before. The war on the part of the Republics was evidently not to be merely one of self-defence. It was one of aggression and aggrandisement. Mr Schreiner ultimately addressed, as prime minister, a sharp remonstrance to President Steyn for allowing his burghers to invade the colony. He also co-operated with Sir Alfred Milner, and used his influence to restrain the Bond.

The War of 1899–1902.[1]—The first shot actually fired in the war was at Kraipan, a small railway station within the colony, 40 m. south of Mafeking, a train being derailed, and ammunition intended for Colonel Baden-Powell seized. The effect of this was entirely to cut off Mafeking, the northernmost town in Cape Colony, and it remained in a state of siege for over seven months. On the 16th of October Kimberley was also isolated. Proclamations by the Transvaal and Free State annexing portions of Cape Colony were actually issued on the 18th of October, and included British Bechuanaland and Griqualand West, with the diamond fields. On the 28th of October Mr Schreiner signed a proclamation issued by Sir Alfred Milner as high commissioner, declaring the Boer annexations of territory within Cape Colony to be null and void.

Then came the British reverses at Magersfontein (on the 11th of December) and Stormberg (on the 10th of December). The effect of these engagements at the very outset of the war, occurring as they did within Cape Colony, was to offer every inducement to a number of the frontier colonial Boers to join their kinsmen of the republics. The Boers were prolific, and their families large. Many younger sons from the colony, with nothing to lose, left their homes with horse and rifle to join the republican forces.

Meanwhile the loyal Cape colonists were chafing at the tardy manner in which they were enrolled by the imperial authorities. It was not until after the arrival of Lord Roberts and Lord Kitchener at Cape Town on the 10th of January 1900 that these invaluable, and many of them experienced, men were freely invited to come forward. So strongly did Lord Roberts feel on the subject, that he at once made Colonel Brabant, a well-known and respected colonial veteran and member of the House of Assembly, a brigadier-general, and started recruiting loyal colonists in earnest. On the 15th of February Kimberley was relieved by General French, and the Boer general, Cronje, evacuated Magersfontein, and retreated towards Bloemfontein. Cecil Rhodes was shut up in Kimberley during the whole of the siege, and his presence there undoubtedly offered an additional

[1] See also TRANSVAAL.

incentive to the Boers to endeavour to capture the town, but his unique position and influence with the De Beers workmen enabled him to render yeoman service, and infused enthusiasm and courage into the inhabitants. The manufacture of a big gun, which was able to compete with the Boer "Long Tom," at the De Beers workshops, under Rhodes's orders, and by the ingenuity of an American, Mr. Labram, who was killed a few days after its completion, forms one of the most striking incidents of the period.

With the relief of Mafeking on the 17th of May, the Cape rebellion ended, and the colony was, at least for a time, delivered of the presence of hostile forces.

On the 20th of March Mr (afterwards Sir James) Rose-Innes, a prominent member of the House of Assembly, who for several years had held aloof from either party, and who also had defended Mr Schreiner's action with regard to the passage of arms to the Free State, addressed his constituents at Claremont in support of the annexation of both republics; and in the course of an eloquent speech he stated that in Canada, in spite of rebellions, loyalty had been secured from the French Canadians by free institutions. In South Africa they might hope that a similar policy would attain a similar result with the Boers. In June, Mr Schreiner, whose recent support of Sir Alfred Milner had incensed many of his Bond followers, resigned in consequence of the refusal of some of his colleagues to support the disfranchisement bill which he was prepared, in accordance with the views of the home government, to introduce for the punishment of Cape rebels. The bill certainly did not err on the side of severity, but disfranchisement for their supporters in large numbers was more distasteful to the Bond extremists than any stringency towards individuals. Sir Gordon Sprigg, who after a political crisis of considerable delicacy, succeeded Mr Schreiner and for the fourth time became prime minister, was able to pass the Bill with the co-operation of Mr Schreiner and his section. Towards the end of the year 1900 the war entered on a new phase, and took the form of guerilla skirmishes with scattered forces of marauding Boers. In December some of these bands entered the Cape Colony and endeavoured to induce colonial Boers to join them. In this endeavour they met at first with little or no success; but as the year 1901 progressed and the Boers still managed to keep the various districts in a ferment, it was deemed necessary by the authorities to proclaim martial law over the whole colony, and this was done on the 9th of October 1901.

On the 4th of January 1901 Sir Alfred Milner was gazetted governor of the Transvaal and Orange River Colony, being shortly afterwards created a peer as Lord Milner, and Sir Walter Hely-Hutchinson, governor of Natal, was appointed his successor as governor of the Cape Colony. The office of high commissioner in South Africa was now separated from the governorship of the Cape and associated with that of the Transvaal— an indication of the changed conditions in South Africa. The division of the colonists into those who favoured the Boer states and those firmly attached to the British connexion was reflected, to the detriment of the public weal, in the parties in the Cape parliament. Proposals were made to suspend the constitution, but this drastic course was not adopted. The Progressive party, the name taken by those who sought a permanent settlement under the British flag, lost their leader, and South Africa its foremost statesman by the death, in May 1902, of Cecil Rhodes, a few weeks before the end of the war.

After the War.—The acknowledgment of defeat by the Boers in the field, and the surrender of some 10,000 rebels, did not weaken the endeavours of the Dutch to obtain political supremacy in the colony. Moreover, in the autumn of 1902 Sir Gordon Sprigg, the prime minister, nominally the leader of the Progressives, sought to maintain his position by securing the support of the Bond party in parliament. In the early part of 1903 Mr Chamberlain included Cape Town in his visit to South Africa, and had conferences with the political leaders of all parties. Reconciliation between the Bond and British elements in the colony was, however, still impossible, and the two parties concentrated their efforts in a struggle for victory at the coming election. Mr Hofmeyr, who had chosen to spend the greater part of the war period in Europe, returned to the Cape to reorganize the Bond. On the other side Dr Jameson came forward as the leader of the Progressives. Parliament was dissolved in September 1903. It had passed, since the war, two measures of importance—one (1902) restricting alien immigration, the other (1903) ratifying the first customs convention between all the South African colonies. This convention was notable for its grant of preferential treatment (in general, a rebate of 25% on the customs already levied) to imports from the United Kingdom.

The election turned on the issue of British or Bond supremacy. It was fought on a register purged of the rebel voters, many of whom, besides being disfranchised, were in prison. The issue was doubtful, and each side sought to secure the support of the native voters, who in several constituencies held the balance of power. The Bondsmen were more lavish than their opponents in their promises to the natives and even invited a Kaffir journalist (who declined) to stand for a seat in the Assembly. In view of the agitation then proceeding for the introduction of Chinese coolies to work the mines on the Rand, the Progressives declared their intention, if returned, to exclude them from the colony, and this declaration gained them some native votes. The polling (in January and February 1904) resulted in a Progressive majority of five in a house of 95 members. The rejected candidates included prominent Bond supporters like Mr Merriman and Mr Sauer, and also Sir Gordon Sprigg and Mr A. Douglass, another member of the cabinet. Mr W. P. Schreiner, the ex-premier, who stood as an Independent, was also rejected.

The Jameson Ministry.—On the 18th of February Sir Gordon Sprigg resigned and was succeeded by Dr L. S. Jameson, who formed a ministry wholly British in character. The first task of the new government was to introduce (on the 4th of March) an Additional Representation Bill, to rectify—in part—the disparity in electoral power of the rural and urban districts. Twelve new seats in the House of Assembly were divided among the larger towns, and three members were added to the legislative council. The town voter being mainly British, the bill met with the bitter opposition of the Bond members, who declared that its object was the extinction of their parliamentary power. In fact, the bill was called for by the glaring anomalies in the distribution of seats by which a minority of voters in the country districts returned a majority of members, and it left the towns still inadequately represented. The bill was supported by two or three Dutch members, who were the object of violent attack by the Bondsmen. It became law, and the elections for the additional seats were held in July, after the close of the session. They resulted in strengthening the Progressive majority both in the House of Assembly and in the legislative council—where the Progressives previously had a majority of one only.

At the outset of its career the Jameson ministry had to face a serious financial situation. During the war the supplying of the army in the field had caused an artificial inflation of trade, and the Sprigg ministry had pursued a policy of extravagant expenditure not warranted by the finances of the colony. The slow recovery of the gold-mining and other industries in the Transvaal after the war was reflected in a great decline in trade in Cape Colony during the last half of 1903, the distress being aggravated by severe drought. When Dr Jameson assumed office he found an empty treasury, and considerable temporary loans had to be raised. Throughout 1904, moreover, revenue continued to shrink—compared with 1903 receipts dropped from £11,701,000 to £9,913,000. The government, besides cutting down official salaries and exercising strict economy, contracted (July 1904) a loan for £3,000,000. It also passed a bill imposing a graduated tax (6d. to 1s. in the £) on all incomes over £1000. A substantial excise duty was placed on spirits and beer, measures of relief for the brandy-farmers being taken at the same time. The result was that while there was a deficit on the budget of 1904–1905 of £731,000, the budget of 1905–1906 showed a surplus of £5161. This small surplus was obtained notwithstanding a further shrinkage in revenue.

Dr Jameson's programme was largely one of material development. In the words of the speech opening the 1905 session of parliament, "without a considerable development of our agricultural and pastoral resources our position as a self-sustaining colony cannot be assured." This reliance on its own resources was the more necessary for the Cape because of the keen rivalry of Natal and Delagoa Bay for the carrying trade of the Transvaal. The opening up of backward districts by railways was vigorously pursued, and in other ways great efforts were made to assist agriculture. These efforts to help the country districts met with cordial recognition from the Dutch farmers, and the release, in May 1904, of all rebel prisoners was another step towards reconciliation. On the exclusion of Chinese from the colony the Bond party were also in agreement with the ministry. An education act passed in 1905 established school boards on a popular franchise and provided for the gradual introduction of compulsory education. The cultivation of friendly relations with the neighbouring colonies was also one of the leading objects of Dr Jameson's policy. The Bond, on its side, sought to draw closer to Het Volk, the Boer organization in the Transvaal, and similar bodies, and at its 1906 congress, held in March that year at Ceres, a resolution with that aim was passed, the design being to unify, in accordance with the original conception of the Bond, Dutch sentiment and action throughout South Africa.

Native affairs proved a source of considerable anxiety. In January 1905 an inter-colonial native affairs commission reported on the native question as it affected South Africa as a whole, proposals being made for an alteration of the laws in Cape Colony respecting the franchise exercised by natives. In the opinion of the commission the possession of the franchise by the Cape natives under existing conditions was sure to create in time an intolerable situation, and was an unwise and dangerous thing. (The registration of 1905 showed that there were over 23,000 coloured voters in the colony.) The commission proposed separate voting by natives only for a fixed number of members of the legislature—the plan adopted in New Zealand with the Maori voters. The privileged position of the Cape native was seen to be an obstacle to the federation of South Africa. The discussion which followed, based partly on the reports that the ministry contemplated disfranchising the natives, led, however, to no immediate results.

Another disturbing factor in connexion with native affairs was the revolt of the Hottentots and Hereros in German South-West Africa (*q.v.*). In 1904 and the following years large numbers of refugees, including some of the most important chiefs, fled into British territory, and charges were made in Germany that sufficient control over these refugees was not exercised by the Cape government. This trouble, however, came to an end in September 1907. In that month Morenga, a chief who had been interned by the colonial authorities, but had escaped and recommenced hostilities against the Germans, was once more on the British side of the frontier and, refusing to surrender, was pursued by the Cape Mounted Police and killed after a smart action. The revolt in the German protectorate had been, nearly a year before the death of Morenga, the indirect occasion of a "Boer raid" into Cape Colony. In November 1906 a small party of Transvaal Boers, who had been employed by the Germans against the Hottentots, entered the colony under the leadership of a man named Ferreira, and began raiding farms and forcibly enrolling recruits. Within a week the filibusters were all captured. Ferreira and four companions were tried for murder and convicted, February 1907, the death sentences being commuted to terms of penal servitude.

As the result of an inter-colonial conference held in Pietermaritzburg in the early months of 1906, a new customs convention of a strongly protective character came into force on the 1st of June of that year. At the same time the rebate on goods from Great Britain and reciprocating colonies was increased. The session of parliament which sanctioned this change was notable for the attention devoted to irrigation and railway schemes. But one important measure of a political character was passed in 1906, namely an amnesty act. Under its provisions over 7000 ex-rebels, who would otherwise have had no vote at the ensuing general election, were readmitted to the franchise in 1907.

While the efforts made to develop the agricultural and mineral resources of the country proved successful, the towns continued to suffer from the inflation—over-buying, over-building and over-speculation—which marked the war period. As a consequence, imports further declined during 1906–1907, and receipts being largely dependent on customs the result was a considerably diminished revenue. The accounts for the year ending 30th of June 1907 showed a deficit of £640,455. The decline in revenue, £4,000,000 in four years, while not a true reflection of the economic condition of the country—yearly becoming more self-supporting by the increase in home produce—caused general disquietude and injuriously affected the position of the ministry. In the session of 1907 the Opposition in the legislative council brought on a crisis by refusing to grant supplies voted by the lower chamber. Dr Jameson contested the constitutional right of the council so to act, and on his advice the governor dissolved parliament in September. Before its dissolution parliament passed an act imposing a profit tax of 10% on diamond- and copper-mining companies earning over £50,000 per annum, and another act establishing an agricultural credit bank.

Mr Merriman, Premier.—The elections for the legislative council were held in January 1908 and resulted in a Bond victory. Its supporters, who called themselves the South African party, the Progressives being renamed Unionists, obtained 17 seats out of a total of 26. Dr Jameson thereupon resigned (31st of January), and a ministry was formed with Mr J. X. Merriman as premier and treasurer, and Mr J. W. Sauer as minister of public works. Neither of these politicians was a member of the Bond, and both had held office under Cecil Rhodes and W. P. Schreiner. They had, however, been the leading parliamentary exponents of Bond policy for a considerable time. The elections for the legislative assembly followed in April and, partly in consequence of the reinfranchisement of the ex-rebels, resulted in a decisive majority for the Merriman ministry. There were returned 69 members of the South African party, 33 Unionists and 5 Independents, among them the ex-premiers Sir Gordon Sprigg and Mr Schreiner. The change of ministry was not accompanied by any relief in the financial situation. While the country districts remained fairly prosperous (agricultural and pastoral products increasing), the transit trade and the urban industries continued to decline. The depression was accentuated by the financial crisis in America, which affected adversely the wool trade, and in a more marked degree the diamond trade, leading to the partial stoppage of the Kimberley mines. (The "slump" in the diamond trade is shown by a comparison of the value of diamonds exported from the Cape in the years 1907 and 1908; in 1907 they were valued at £8,973,148, in 1908 at £4,796,655.) This seriously diminished the revenue returns, and the public accounts for the year 1907–1908 showed a deficit of £996,000, and a prospective deficit for the ensuing year of an almost equal amount. To balance the budget, Mr Merriman proposed drastic remedies, including the suspension of the sinking fund, the reduction of salaries of all civil servants, and taxes on incomes of £50 per annum. Partly in consequence of the serious economic situation the renewed movement for the closer union of the various South African colonies, formally initiated by Dr Jameson in 1907, received the support of the Cape parliament. During 1907–1908 a national convention decided upon unification, and in 1910 the Union of South Africa was established (see SOUTH AFRICA: *History*).

Leading Personalities.—The public life of Cape Colony has produced many men of singular ability and accomplishments. The careers of Cecil Rhodes, of Jan Hendrik Hofmeyr, and of Dr L. S. Jameson have been sufficiently indicated (see also their separate biographies). Sir Gordon Sprigg, four times premier, was associated with the Cape parliament from 1873 to 1904, and was once more elected to that assembly in 1908. In and out of office his zeal was unflagging, and if he lacked those

qualities which inspire enthusiasm and are requisite in a great leader, he was at least a model of industry. Among other prominent politicians were Sir James Rose-Innes, Mr J. X. Merriman and Mr W. P. Schreiner. The two last named both held the premiership; their attitude and views have been indicated in the historical sketch. Sir James Rose-Innes, a lawyer whose intellectual gifts and patriotism have never been impugned, was not a "party man," and this made him, on more than one occasion, a somewhat difficult political ally. On the native question he held a consistently strong attitude, defending their rights, and uncompromisingly opposing the native liquor traffic. In 1901 he went to the Transvaal as chief justice of that colony. Sir Thomas Fuller, a Cape Town representative, though he remained outside office, gave staunch support to every enlightened liberal and progressive measure which was brought forward. A man of exceptional culture and eloquence, he made his influence felt, not only in politics, but in journalism and the best social life of the Cape peninsula. From 1902 to 1908 he held the office of agent-general of the colony in London.

In literature, the colony has produced at least two authors whose works have taken their place among those of the best English writers of their day. The *History of South Africa*, by Mr G. McCall Theal, will remain a classic work of reference. The careful industry and the lucidity which characterize Mr Theal's work stamp him as a historian of whom South Africa may well be proud. In fiction, Olive Schreiner (Mrs Cronwright-Schreiner) produced, while still in her teens, the *Story of an African Farm*, a work which gave great promise of original literary genius. Unfortunately, she, in common with the rest of South Africa, was subsequently swept into the seething vortex of contemporary politics and controversy. In music and painting there have been artists of talent in the Cape Colony, but the country is still too young, and the conditions of life too disturbed, to allow such a development as has already occurred in Australia.

GOVERNORS AT THE CAPE SINCE INTRODUCTION OF RESPONSIBLE GOVERNMENT

1870. Sir Henry Barkly.
1877. Sir Bartle Frere.
1880. Sir Hercules Robinson.
1889. Sir Henry Loch.
1895. Sir Hercules Robinson (Lord Rosmead).
1897. Sir Alfred Milner.
1901. Sir Walter Hely-Hutchinson.

PRIME MINISTERS.

1872. Mr J. C. Molteno.	1890. Mr C. J. Rhodes.
1878. Mr J. Gordon Sprigg.	1896. Sir J. Gordon Sprigg.
1881. Mr T. C. Scanlen.	1898. Mr W. P. Schreiner.
1884. Mr Upington.	1900. Sir J. Gordon Sprigg.
1886. Sir J. Gordon Sprigg.	1904. Dr L. S. Jameson.
1908. Mr J. X. Merriman.	

(A. P. H.; F. R. C.)

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(*a*) Descriptive accounts, geography, commerce and economics:—The best early accounts of the colony are found in de la Caille's *Journal historique du voyage fait au Cap de Bonne Espérance* (Paris, 1763), the *Nouvelle Description du Cap de Bonne Espérance* (Amsterdam, 1778); F. le Vaillant's *Voyage dans l'intérieur de l'Afrique* (Paris, 1790), and *Second Voyage* (Paris, *an* III. [1794–1795]); C. P. Thunberg's "Account of the Cape of Good Hope" in vol. xvi. of Pinkerton's *Travels* (London, 1814); A. Sparman's *Voyage to the Cape of Good Hope ... 1772–1776* (translated into English from the Swedish, London, 1785)—an excellent work; and W. Paterson's *A Narrative of Four Journeys ... 1777–1779* (London, 1789). P. Kolbe or Kolben's *Present State of the Cape of Good Hope* (English translation from the German, London, 1731) is less trustworthy. Sir J. Barrow's *Account of Travels into the Interior of Southern Africa in 1797–1798* (2 vols., London, 1801–1804); H. Lichtenstein's *Travels in Southern Africa in 1803–1806* (translated from the German, 2 vols., London, 1812–1815), and W. J. Burchell's *Travels in the Interior of Southern Africa* (2 vols., London, 1822–1824) are standard works. Burchell's book contains the best map of the Cape published up to that time. W. P. Greswell's *Geography of Africa south of the Zambesi* (Oxford, 1892) deals specially with Cape Colony; the *Illustrated Official Handbook of the Cape and South Africa* (Cape Town, 1893) includes chapters on the zoology, flora, productions and resources of the colony. A. R. E. Burton, *Cape Colony To-day* (Cape Town, 1907), a useful guide to the country and its resources. A *Statistical Register* is issued yearly by the Cape government. The *Census of the Colony, 1904: General Report* (Cape Town, 1905) and previous census reports contain much valuable matter.

(*b*) Special subjects:—For detailed information on special subjects consult *The Natives of South Africa* (London, 1901); R. Wallace, *Farming Industries of Cape Colony* (London, 1896); A. R. E. Burton, *Cape Colony for the Settler* (London, 1903); *The Agricultural Journal of the Cape of Good Hope*; Gardner F. Williams, *The Diamond Mines of South Africa*, revised ed. (New York, 1905), an authoritative work by a former manager of the De Beers mine; A. W. Rogers, *An Introduction to the Geology of Cape Colony* (London, 1905) and "The Campbell Rand and Griquatown Series in Hay," *Trans. Geol. Soc. S. Africa*, vol. ix. (1906); *Reports*, Geological Commission of the Cape of Good Hope (1896 et seq.); *Science in South Africa* (Cape Town, 1905); H. A. Bryden, *Kloof and Karoo*; sport, legend and natural history in Cape Colony (London, 1889); *South African Education Yearbook* (Cape Colony edition, Cape Town, 1906 et seq.). For books dealing with Roman-Dutch law, see SOUTH AFRICA.

(*c*) History:—H. C. V. Leibbrandt, *Précis of the Archives of the Cape of Good Hope* (15 vols., vols. v.-vii. contain van Riebeek's *Journal*, Cape Town, 1896–1902); *The Rebellion of 1815, generally known as Slachter's Nek* (Cape Town, 1902); G. M. Theal, *Chronicles of Cape Commanders ... 1651–1691 ...* (Cape Town, 1882), and *Records of the Cape Colony from February 1793 to April 1831*, from MS. in the Record Office, London (36 vols., Cape Town, 1897–1905); *History of South Africa under the Administration of the Dutch East India Company, 1652 to 1795* (2 vols., London, 1897); *History of South Africa from 1795 to 1834* (London, 1891); E. B. Watermeyer, *Three Lectures on the Cape ... under the ... Dutch East India Company* (Cape Town, 1857); A. Wilmot and J. C. Chase, *History of the ... Cape ... from its Discovery to ... 1868* (Cape Town, 1869); Lady Anne Barnard, *South Africa a Hundred Years Ago: Letters written from the Cape, 1797–1801* (London, 1901), a vivid picture of social life, &c.; Mrs A. F. Trotter, *Old Cape Colony ... Her Men and Houses from 1652 to 1806* (London, 1903); C. T. Campbell, *British South Africa, 1795–1825* (London, 1897), the story of the British settlers of 1820. Consult also J. Martineau's *Life of Sir Bartle Frere*; the *Autobiography* of Sir Harry Smith; P. A. Molteno's *Life and Times of Sir John Charles Molteno* (first premier of Cape Colony) (2 vols., London, 1900); A Wilmot's *Life of Sir Richard Southey* (London, 1904), and G. C. Henderson's *Sir George Grey* (London, 1907). B. Worsfold's *Lord Milner's Work in South Africa, 1897–1902* (London, 1906), is largely concerned with Cape politics. For Blue-books, &c., relating to the colony published by the British parliament, see the *Colonial Office List* (London, yearly).

(F. R. C.)

CAPEFIGUE, JEAN-BAPTISTE HONORÉ RAYMOND (1801–1872), French historian and biographer, was born at Marseilles in 1801. At the age of twenty he went to Paris to study law; but he soon deserted law for journalism. He became editor of the *Quotidienne*, and was afterwards connected, either as editor or leading contributor, with the *Temps*, the *Messager des Chambres*, the *Révolution de 1848* and other papers. During the ascendancy of the Bourbons he held a post in the foreign office, to which is due the royalism of some of his newspaper articles. Indeed all Capefigue's works receive their colour from his legitimist politics; he preaches divine right and non-resistance, and finds polite words even for the profligacy of Louis XV. and the worthlessness of his mistresses. He wrote biographies of Catherine and Marie de' Medici, Anne and Maria Theresa of Austria, Catherine II. of Russia, Elizabeth of England, Diana of Poitiers and Agnes Sorel—for he delighted in passing from "queens of the right hand" to "queens of the left." His historical works, besides histories of the Jews from the fall of the Maccabees to the author's time, of the first four centuries of the Christian church, and of European diplomatists, extend over the whole range of French history. He died at Paris in December 1872.

The general catalogue of printed books for the Bibliothèque Nationale contains no fewer than seventy-seven works (145 volumes) published by Capefigue during forty years. Of these only the *Histoire de Philippe-Auguste* (4 vols., 1829) and the *Histoire de la réforme, de la ligue et du règne de Henri IV* (8 vols., 1834–1835) perhaps deserve still to be remembered. For Capefigue's style bears evident marks of haste, and although he had access to an exceptionally large number of sources of information, including the state papers, neither his accuracy nor his judgment was to be trusted.

CAPEL (OF HADHAM), **ARTHUR CAPEL, BARON** (fl. 1640–1649), English royalist, son of Sir Henry Capel of Raines Hall,

Essex, and of Theodosia, daughter of Sir Edward Montagu of Broughton, Northamptonshire, was elected a member of the Short and Long Parliaments in 1640 for Hertfordshire. He at first supported the opposition to Charles's arbitrary government, but soon allied himself with the king's cause, on which side his sympathies were engaged, and was raised to the peerage by the title of Baron Capel of Hadham on the 6th of August 1641. On the outbreak of the war he was appointed lieutenant-general of Shropshire, Cheshire and North Wales, where he rendered useful military services, and later was made one of the prince of Wales's councillors, and a commissioner at the negotiations at Uxbridge in 1645. He attended the queen in her flight to France in 1646, but disapproved of the prince's journey thither, and retired to Jersey, subsequently aiding in the king's escape to the Isle of Wight. He was one of the chief leaders in the second Civil War, but met with no success, and on the 27th of August, together with Lord Norwich, he surrendered to Fairfax at Colchester on promise of quarter for life.[1] This assurance, however, was afterwards interpreted as not binding the civil authorities, and his fate for some time hung in the balance. He succeeded in escaping from the Tower, but was again captured, was condemned to death by the new "high court of justice" on the 8th of March 1649, and was beheaded together with the duke of Hamilton and Lord Holland the next day. He married Elizabeth, daughter and heir of Sir Charles Morrison of Cassiobury, Hertfordshire, through whom that estate passed into his family, and by whom besides four daughters he had five sons, the eldest Arthur being created earl of Essex at the Restoration. Lord Capel, who was much beloved, and who was a man of deep religious feeling and exemplary life, wrote *Daily Observations or Meditations: Divine, Morall*, published with some of his letters in 1654, and reprinted, with a short life of the author, under the title *Excellent Contemplations*, in 1683.

CAPEL CURIG, a tourist resort in Carnarvonshire, North Wales, 14½ m. from Bangor. It is a collection of a few houses, too scattered to form a village properly so called. At the Roberts hotel is shown on a window pane the supposed signature of Wellington. The road from Bettws y coed, past the Swallow Falls to Capel Curig, and thence to Llanberis and Carnarvon, is very interesting, grand and lonely. Excellent fishing is to be had here, chiefly for trout. In summer, coaching tours discharge numbers of visitors daily; the railway station is Bettws (London & North-Western railway). Capel Curig means "chapel of Curig," a British saint mentioned in Welsh poetry. The place is a centre for artists, geologists and botanists, for the ascent of Snowdon, Moel Siabod, Glydyr Fawr, Glydyr Fach, Tryfan, &c., and for visiting Llyn Ogwen, Llyn Idwal, Twll du (Devil's Kitchen), Nant Ffrancon and the Penrhyn quarries.

CAPELL, EDWARD (1713–1781), English Shakespearian critic, was born at Troston Hall in Suffolk on the 11th of June 1713. Through the influence of the duke of Grafton he was appointed to the office of deputy-inspector of plays in 1737, with a salary of £200 per annum, and in 1745 he was made groom of the privy chamber through the same influence. In 1760 appeared his *Prolusions, or Select Pieces of Ancient Poetry*, a collection which included *Edward III.*, placed by Capell among the doubtful plays of Shakespeare. Shocked at the inaccuracies which had crept into Sir Thomas Hanmer's edition of Shakespeare, he projected an entirely new edition, to be carefully collated with the original copies. After spending three years in collecting, and comparing scarce folio and quarto editions, he published his own edition in 10 vols. 8vo (1768), with an introduction written in a style of extraordinary quaintness, which was afterwards appended to Johnson's and Steevens's editions. Capell published the first part of his commentary, which included notes on nine plays with a glossary, in 1774. This he afterwards recalled, and the publication of the complete work, *Notes and Various Readings of Shakespeare* (1779–1783), the third volume of which bears the title of *The School of Shakespeare*, was completed, under the superintendence of John Collins, in 1783, two years after the author's death. It contains the results of his unremitting labour for thirty years, and throws considerable light on the history of the times of Shakespeare, as well as on the sources from which he derived his plots. Collins asserted that Steevens had stolen Capell's notes for his own edition, the story being that the printers had been bribed to show Steevens the sheets of Capell's edition while it was passing through the press. Besides the works already specified, he published an edition of *Antony and Cleopatra*, adapted for the stage with the help of David Garrick in 1758. His edition of Shakespeare passed through many editions (1768, 1771, 1793, 1799, 1803, 1813). Capell died in the Temple on the 24th of February 1781.

[1] Gardiner's *Hist. of the Civil War*, iv. 206; cf. article on Fairfax by C. H. Firth in the *Dict. of Nat. Biog.*

CAPELLA, MARTIANUS MINNEUS FELIX, Latin writer, according to Cassiodorus a native of Madaura in Africa, flourished during the 5th century, certainly before the year 439. He appears to have practised as a lawyer at Carthage and to have been in easy circumstances. His curious encyclopaedic work, entitled *Satyricon*, or *De Nuptiis Philologiae et Mercurii et de septem Artibus liberalibus libri novem*, is an elaborate allegory in nine books, written in a mixture of prose and verse, after the manner of the Menippean satires of Varro. The style is heavy and involved, loaded with metaphor and bizarre expressions, and verbose to excess. The first two books contain the allegory proper—the marriage of Mercury to a nymph named Philologia. The remaining seven books contain expositions of the seven liberal arts, which then comprehended all human knowledge. Book iii. treats of grammar, iv. of dialectics, v. of rhetoric, vi. of geometry, vii. of arithmetic, viii. of astronomy, ix. of music. These abstract discussions are linked on to the original allegory by the device of personifying each science as a courtier of Mercury and Philologia. The work was a complete encyclopaedia of the liberal culture of the time, and was in high repute during the middle ages. The author's chief sources were Varro, Pliny, Solinus, Aquila Romanus, and Aristides Quintilianus. His prose resembles that of Apuleius (also a native of Madaura), but is even more difficult. The verse portions, which are on the whole correct and classically constructed, are in imitation of Varro and are less tiresome.

A passage in book viii. contains a very clear statement of the heliocentric system of astronomy. It has been supposed that Copernicus, who quotes Capella, may have received from this work some hints towards his own new system.

Editio princeps, by F. Vitalis Bodianus, 1499; the best modern edition is that of F. Eyssenhardt (1866); for the relation of Martianus Capella to Aristides Quintilianus see H. Deiters, *Studien zu den griechischen Musikern* (1881). In the 11th century the German monk Notker Labeo translated the first two books into Old High German.

CAPE MAY, a city and watering-place of Cape May county, New Jersey, U.S.A., on the Atlantic coast, 2 m. E.N.E. of Cape May, the S. extremity of the state, and about 80 m. S. by E. of Philadelphia. Pop. (1890) 2136; (1900) 2257; (1905, state census) 3006. Cape May is served by the Maryland, Delaware & Virginia (by ferry to Lewes, Delaware), the West Jersey & Seashore (Pennsylvania system), and the Atlantic City (Reading system) railways, and, during the summer season, by steamboat to Philadelphia. The principal part of the city is on a peninsula (formerly Cape Island) between the ocean and Cold Spring inlet, which has been dredged and is protected by jetties to make a suitable harbour. The further improvement of the inlet and the harbour was authorized by Congress in 1907. On the ocean side, along a hard sand beach 5 m. long, is the Esplanade. There are numerous hotels and handsome cottages for summer visitors, who come especially from Philadelphia, from New York, from the South and from the West. Cape May offers good bathing, yachting and fishing, with driving and hunting in the wooded country inland from the coast. At Cape May Point is the Cape May lighthouse, 145 ft. high, built in 1800 and rebuilt in 1859. In the city are canneries of vegetables and fruit, glass-works and a gold-beating establishment. Fish and oysters are exported. Cape May was named by Cornelis Jacobsen Mey, director of the Prince Hendrick (Delaware) river for the West India Company of

Holland, who took possession of the river in 1623, and planted the short-lived colony of Fort Nassau 4 m. below Philadelphia, near the present Gloucester City, N.J. Cape May was settled about 1699,—a previous attempt to settle here made by Samuel Blommaert in 1631 was unsuccessful. It was an important whaling port early in the 18th century, and became prominent as a watering-place late in that century. It was incorporated as the borough of Cape Island in 1848, and chartered as the city of Cape Island in 1851; in 1869 the name was changed to Cape May.

CAPENA, an ancient city of southern Etruria, frequently mentioned with Veii and Falerii. Its exact site is, however, uncertain. According to Cato it was a colony of the former, and in the wars between Veii and Rome it appears as dependent upon Veii, after the fall of which town, however, it became subject to Rome. Out of its territory the *tribus Stellatina* was formed in 367 B.C. In later republican times the city itself is hardly mentioned, but under the empire a *municipium Capenatium foederatum* is frequently mentioned in inscriptions. Of these several were found upon the hill known as Civitucola, about 4 m. north-east of the post station of *ad Vicesimum* on the ancient Via Flaminia, a site which is well adapted for an ancient city. It lies on the north side of a dried-up lake, once no doubt a volcanic crater. Remains of buildings of the Roman period also exist there, while, in the sides of the hill of S. Martino which lies on the north-east,[1] rock-cut tombs belonging to the 7th and 6th centuries B.C. but used in Roman times for fresh burials, were excavated in 1859–1864, and again in 1904. Inscriptions in early Latin and in local dialect were also found (W. Henzen, *Bullettino dell' Istituto*, 1864, 143; R. Paribeni, *Notizie degli Scavi*, 1905, 301). Similar tombs have also been found on the hills south of Civitucola. G. B. de Rossi, however, supposed that the games of which records (fragments of the *fasti ludorum*) were also discovered at Civitucola, were those which were celebrated from time immemorial at the Lucus Feroniae, with which he therefore proposed to identify this site, placing Capena itself at S. Oreste, on the south-eastern side of Mount Soracte. But there are difficulties in the way of this assumption, and it is more probable that the Lucus Feroniae is to be sought at or near Nazzano, where, in the excavation of a circular building which some conjecture to have been the actual temple of Feronia, inscriptions relating to a municipality were found. Others, however, propose to place Lucus Feroniae at the church of S. Abbondio, 1 m. east of Rignano and 4 m. north-north-west of Civitucola, which is built out of ancient materials. On the Via Flaminia, 26 m. from Rome, near Rignano, is the Christian cemetery of Theodora.

See R. Lanciani, *Bullettino dell' Istituto*, 1870, 32; G. B. de Rossi, *Annali dell' Istituto*, 1883, 254; *Bullettino Cristiano*, 1883, 115; G. Dennis, *Cities and Cemeteries of Etruria* (London, 1883), i. 131; E. Bormann, *Corpus Inscriptionum Latinarum* (Berlin, 1888), xi. 571; H Nissen, *Italische Landeskunde* (Berlin, 1902), ii. 369; R. Paribeni, in *Monumenti dei Lincei*, xvi. (1906), 277 seq. (T. As.)

CAPER, FLAVIUS, Latin grammarian, flourished during the 2nd century. He devoted special attention to the early Latin writers, and is highly spoken of by Priscian. Caper was the author of two works—*De Lingua Latina* and *De Dubiis Generibus*. These works in their original form are lost; but two short treatises entitled *De Orthographia* and *De Verbis Dubiis* have come down to us under his name, probably excerpts from the original works, with later additions by an unknown writer.

See F. Osann, *De Flavio Capro* (1849), and review by W. Christ in *Philologus*, xviii. 165-170 (1862), where several editions of other important grammarians are noticed; G. Keil, "De Flavio Grammatico," in *Dissertationes Halenses*, x. (1889); text in H. Keil's *Grammatici Latini*, vii.

CAPERCALLY, or CAPERKALLY,[2] a bird's name commonly derived from the Gaelic *capull*, a horse (or, more properly, a mare), and *coille*, a wood, but with greater likelihood, according to the opinion of Dr M'Lauchlan, from *cabher*, an old man (and, by metaphor, an old bird), and *coille*, the name of *Tetrao urogallus*, the largest of the grouse family (*Tetraonidae*), and a species which was formerly indigenous to Scotland and Ireland. The word is frequently spelt otherwise, as capercalze, capercailzie (the *z*, a letter unknown in Gaelic, being pronounced like *y*), and capercaillie, and the English name of wood-grouse or cock-of-the-wood has been often applied to the same bird. The earliest notice of it as an inhabitant of North Britain seems to be by Hector Boethius, whose works were published in 1526, and it can then be traced through various Scottish writers, to whom, however, it was evidently but little known, for about 200 years, or may be more, and by one of them only, Bishop Lesley, in 1578, was a definite *habitat* assigned to it:—"In Rossia quoque Louguhabria [Lochaber], atque aliis montanis locis" (*De Origine Moribus de rebus gestis Scotorum.* Romae: ed. 1675, p. 24). Pennant, during one of his tours in Scotland, found that it was then (1769) still to be met with in Glen Moriston and in The Chisholm's country, whence he saw a cock-bird. We may infer that it became extinct about that time, since Robert Gray (*Birds of the West of Scotland*, p. 229) quotes the Rev. John Grant as writing in 1794: "The last seen in Scotland was in the woods of Strathglass about thirty-two years ago." Of its existence in Ireland we have scarcely more details. If we may credit the *Pavones sylvestres* of Giraldus Cambrensis with being of this species, it was once abundant there, and Willughby (1678) was told that it was known in that kingdom as the "cock-of-the-wood." A few other writers mention it by the same name, and John Rutty, in 1772, says (*Nat. Hist. Dublin*, i. p. 302) that "one was seen in the county of Leitrim about the year 1710, but they have entirely disappeared of late, by reason of the destruction of our woods." Pennant also states that about 1760 a few were to be found about Thomastown in Tipperary, but no later evidence is forthcoming, and thus it would seem that the species was exterminated at nearly the same period in both Ireland and Scotland.

When the practice of planting was introduced, the restoration of this fine bird to both countries was attempted. In Ireland the trial, of which some particulars are given by J. Vaughan Thompson (*Birds of Ireland*, ii. 32), was made at Glengariff, but it seems to have utterly failed, whereas in Scotland, where it was begun at Taymouth, it finally succeeded, and the species is now not only firmly established, but is increasing in numbers and range. Mr L. Lloyd, the author of several excellent works on the wild sports and natural history of Scandinavia, supplied the stock from Sweden, but it must be always borne in mind that the original British race was wholly extinct, and no remains of it are known to exist in any museum.

This species is widely, though intermittently, distributed on the continent of Europe, from Lapland to the northern parts of Spain, Italy and Greece, but is always restricted to pine-forests, which alone afford it food in winter. Its bones have been found in the kitchen-middens of Denmark, proving that country to have once been clothed with woods of that kind. Its remains have also been recognized from the caves of Aquitaine. Its eastern or southern limits in Asia cannot be precisely given, but it certainly inhabits the forests of a great part of Siberia. On the Stannovoi Mountains, however, it is replaced by a distinct though nearly allied species, the *T. urogalloides* of Dr von Middendorff,[3] which is smaller with a slenderer bill but longer tail.

The cock-of-the-wood is remarkable for his large size and dark plumage, with the breast metallic green. He is polygamous, and in spring mounts to the topmost bough of a tall tree, whence he challenges all comers by extraordinary sounds and gestures; while the hens, which are much smaller and mottled in colour, timidly abide below the result of the frequent duels, patiently submitting themselves to the victor. While this is going on it is the practice in many countries, though generally in defiance

[1] Some writers wrongly speak as though the two hills were identical.

[2] This is the spelling of the old law-books, as given by Pennant, the zoologist, who, on something more than mere report, first included this bird among the British fauna. The only one of the "Scots Acts," however, in which the present writer has been able to ascertain that the bird is named is No. 30 of James VI. (1621), which was passed to protect "powties, partrikes, moore foulles, blakcoks, gray hennis, termigantis, quailzies, *capercailzies*," &c.

[3] Not to be confounded with the bird so named previously by Prof. Nilsson, which is a hybrid.

of the law, for the so-called sportsman stealthily to draw nigh, and with well-aimed gun to murder the principal performer in the scene. The hen makes an artless nest on the ground, and lays therein from seven to nine or even more eggs. The young are able to fly soon after they are hatched, and towards the end of summer and beginning of autumn, from feeding on the fruit and leaves of the bilberries and other similar plants, which form the undercovert of the forests, get into excellent condition and become good eating. With the first heavy falls of snow they betake themselves to the trees, and then, feeding on the pine-leaves, their flesh speedily acquires so strong a flavour of turpentine as to be distasteful to most palates. The usual method of pursuing this species on the continent of Europe is by encouraging a trained dog to range the forest and spring the birds, which then perch on the trees; while he is baying at the foot their attention is so much attracted by him that they permit the near approach of his master, who thus obtains a more or less easy shot. A considerable number, however, are also snared. Hybrids are very frequently produced between the capercally and the black grouse (*T. tetrix*), and the offspring has been described by some authors under the name of *T. medius*, as though a distinct species. (A. N.)

CAPERN, EDWARD (1819–1894), English poet, was born at Tiverton, Devonshire, on the 21st of January 1819. From an early age he worked in a lace factory, but owing to failing eyesight he had to abandon this occupation in 1847 and he was in dire distress until he secured an appointment to be "the Rural Postman of Bideford," by which name he is usually known. He occupied his leisure in writing occasional poetry which struck the popular fancy. Collected in a volume and published by subscription in 1856, it received the warm praise of the reviews and many distinguished people. *Poems, by Edward Capern*, was followed by *Ballads and Songs* (1858), *The Devonshire Melodist* (a collection of the author's songs, some of them to his own music) and *Wayside Warbles* (1865), and resulted in a civil list pension being granted him by Lord Palmerston. He died on the 5th of June 1894.

CAPERNAUM (Καπερναούμ; probably, "the village of Naḥum"), an ancient city of Galilee. More than any other place, it was the home of Jesus after he began his mission; there he preached, called several of his disciples, and did many works, but without meeting with much response from the inhabitants, over whom he pronounced the heavy denunciation:—"And thou, Capernaum, which art exalted unto heaven, shalt be brought down to hell." The site of the city has been a matter of much dispute,—one party, headed by Dr E. Robinson, maintaining an identification with Khān Minyeh at the north-west corner of the Sea of Galilee, and another, represented especially by Sir C. W. Wilson, supporting the claims of Tell Hūm, midway between Khān Minyeh and the mouth of the Jordan. Khān Minyeh is beautifully situated in a "fertile plain formed by the retreat of the mountains about the middle of the western shore" of the Sea of Galilee. Its ruins are not very extensive, though they may have been despoiled for building the great Saracenic Khan from which they take their name. In the neighbourhood is a water-source, *Ain el-Tābighah*, an Arabic corruption of *Heptapegon* or Seven Springs (referred to by Josephus as being near Capernaum). Tell Hūm lies about 3 m. north of Khān Minyeh, and its ruins, covering an area of "half a mile long by a quarter wide," prove it to have been the site of no small town. It must be admitted that if it be not Capernaum it is impossible to say what ancient place it represents. But it is doubtful whether Tell Hūm can be considered as a corruption of *Kefr Naḥum*, the Semitic name which the Greek represents: and there is not here, as at Khān Minyeh, any spring that can be equated to the Heptapegon of Josephus. On the whole the probabilities of the two sites seem to balance, and it is practically impossible without further discoveries to decide between them. The sites of the neighbouring cities of Bethsaida and Chorazin are probably to be sought respectively at El-Bateiha, a grassy plain in the north-east corner of the lake, and at Kerazeh, 2 m. north of Tell Hūm. According to the so-called *Pseudo-Methodius* there was a tradition that Antichrist would be born at Chorazin, educated at Bethsaida and rule at Capernaum—hence the curse of Jesus upon these cities.

On the site of Capernaum see especially W. Sanday in *Journal of Theological Studies*, vol. v. p. 42. (R. A. S. M.)

CAPERS, the unexpanded flower-buds of *Capparis spinosa*, prepared with vinegar for use as a pickle. The caper plant is a trailing shrub, belonging to the Mediterranean region, resembling in habit the common bramble, and having handsome flowers of a pinkish white, with four petals, and numerous long tassel-like stamens. The leaves are simple and ovate, with spiny stipules. The plant is cultivated in Sicily and the south of France; and in commerce capers are valued according to the period at which the buds are gathered and preserved. The finest are the young tender buds called "nonpareil," after which, gradually increasing in size and lessening in value, come "superfine," "fine," "capucin" and "capot." Other species of *Capparis* are similarly employed in various localities, and in some cases the fruit is pickled.

CAPET, the name of a family to which, for nearly nine centuries, the kings of France, and many of the rulers of the most powerful fiefs in that country, belonged, and which mingled with several of the other royal races of Europe. The original significance of the name remains in dispute, but the first of the family to whom it was applied was Hugh, who was elected king of the Franks in 987. The real founder of the house, however, was Robert the Strong (*q.v.*), who received from Charles the Bald, king of the Franks, the countships of Anjou and Blois, and who is sometimes called duke, as he exercised some military authority in the district between the Seine and the Loire. According to Aimoin of Saint-Germain-des-Prés, and the chronicler, Richer, he was a Saxon, but historians question this statement. Robert's two sons, Odo or Eudes, and Robert II., succeeded their father successively as dukes, and, in 887, some of the Franks chose Odo as their king. A similar step was taken, in 922, in the case of Robert II., this too marking the increasing irritation felt at the weakness of the Carolingian kings. When Robert died in 923, he was succeeded by his brother-in-law, Rudolph, duke of Burgundy, and not by his son Hugh, who is known in history as Hugh the Great, duke of France and Burgundy, and whose domain extended from the Loire to the frontiers of Picardy. When Louis V., king of the Franks, died in 987, the Franks, setting aside the Carolingians, passed over his brother Charles, and elected Hugh Capet, son of Hugh the Great, as their king, and crowned him at Reims. Avoiding the pretensions which had been made by the Carolingian kings, the Capetian kings were content, for a time, with a more modest position, and the story of the growth of their power belongs to the history of France. They had to combat the feudal nobility, and later, the younger branches of the royal house established in the great duchies, and the main reason for the permanence of their power was, perhaps, the fact that there were few minorities among them. The direct line ruled in France from 987 to 1238, when, at the death of King Charles IV., it was succeeded by the younger, or Valois, branch of the family. Philip VI., the first of the Valois kings, was a son of Charles I., count of Valois and grandson of King Philip III. (see VALOIS). The Capetian-Valois dynasty lasted until 1498, when Louis, duke of Orleans, became king as Louis XII., on the death of King Charles VIII. (see ORLEANS). Louis XII. dying childless, the house of Valois-Angoulême followed from Francis I. to the death of Henry III. in 1589 (see ANGOULÊME), when the last great Capetian family, the Bourbons (*q.v.*) mounted the throne.

Scarcely second to the royal house is the branch to which belonged the dukes of Burgundy. In the 10th century the duchy of Burgundy fell into the hands of Hugh the Great, father of Hugh Capet, on whose death in 956 it passed to his son Otto, and, in 965, to his son Henry. In 1032 Robert, the second son of Robert the Pious, king of the Franks, and grandson of Hugh Capet, founded the first ducal house, which ruled until 1361. For two years the duchy was in the hands of the crown, but in 1363, the second ducal house, also Capetian, was founded by Philip the Bold, son of John II., king of France. This branch

of the Capetians is also distinguished by its union with the Habsburgs, through the marriage of Mary, daughter of Charles the Bold, duke of Burgundy, with Maximilian, afterwards the emperor Maximilian I. Of great importance also was the house of the counts of Anjou, which was founded in 1246, by Charles, son of the French king Louis VIII., and which, in 1630, was raised to the dignity of a dukedom (see ANJOU). Members of this family sat upon the thrones of two kingdoms. The counts and dukes of Anjou were kings of Naples from 1265 to 1442. In 1308 Charles Robert of Anjou was elected king of Hungary, his claim being based on the marriage of his grandfather Charles II., king of Naples and count of Anjou, with Maria, daughter of Stephen V., king of Hungary. A third branch formed the house of the counts of Artois, which was founded in 1238 by Robert, son of King Louis VIII. This house merged in that of Valois in 1383, by the marriage of Margaret, daughter of Louis, count of Artois, with Philip the Bold, duke of Burgundy. The throne of Navarre was also filled by the Capetians. In 1284 Jeanne, daughter and heiress of Henry I., king of Navarre, married Philip IV., king of France, and the two kingdoms were united until Philip of Valois became king of France as Philip VI. in 1328, when Jeanne, daughter of King Louis X., and heiress of Navarre, married Philip, count of Evreux (see NAVARRE).

In the 13th century the throne of Constantinople was occupied by a branch of the Capetians. Peter, grandson of King Louis VI., obtained that dignity in 1217 as brother-in-law of the two previous emperors, Baldwin, count of Flanders, and his brother Henry. Peter was succeeded successively by his two sons, Robert and Baldwin, from whom in 1261 the empire was recovered by the Greeks.

The counts of Dreux, for two centuries and a half (1132–1377), and the counts of Evreux, from 1307 to 1425, also belonged to the family of the Capets,—other members of which worthy of mention are the Dunois and the Longuevilles, illegitimate branches of the house of Valois, which produced many famous warriors and courtiers.

CAPE TOWN, the capital of the Cape Province, South Africa, in 33° 56′ S., 18° 28′ E. It is at the north-west extremity of the Cape Peninsula on the south shore of Table Bay, is 6181 m. by sea from London and 957 by rail south-west of Johannesburg. Few cities are more magnificently situated. Behind the bay the massive wall of Table Mountain, 2 m. in length, rises to a height of over 3500 ft., while on the east and west projecting mountains enclose the plain in which the city lies. The mountain to the east, 3300 ft. high, which projects but slightly seawards, is the Devil's Peak, that to the west the Lion's Head (over 2000 ft. high), with a lesser height in front called the Lion's Rump or Signal Hill. The city, at first confined to the land at the head of the bay, has extended all round the shores of the bay and to the lower spurs of Table Mountain.

The purely Dutch aspect which Cape Town preserved until the middle of the 19th century has disappeared. Nearly all the stucco-fronted brick houses, with flat roofs and cornices and wide spreading *stoeps*, of the early Dutch settlers have been replaced by shops, warehouses and offices in styles common to English towns. Of the many fine public buildings which adorn the city scarcely any date before 1860. The mixture of races among the inhabitants, especially the presence of numerous Malays, who on all festive occasions appear in gorgeous raiment, gives additional animation and colour to the street scenes. The mosques with their cupolas and minarets, and houses built in Eastern fashion contrast curiously with the Renaissance style of most of the modern buildings, the medieval aspect of the castle and the quaint appearance of the Dutch houses still standing.

Chief Public Buildings.—The castle stands near the shore at the head of the bay. Begun in 1666 its usefulness as a fortress has long ceased, but it serves to link the city to its past. West of the castle is a large oblong space, the Parade Ground. A little farther west, at the foot of the central jetty is a statue of Van Riebeek, the first governor of the Cape. In a line with the jetty is Adderley Street, and its continuation Government Avenue. Adderley Street and the avenue make one straight road a mile long, and at its end are "the Gardens," as the suburbs built on the rising ground leading to Table Mountain are called. The avenue itself is fully half a mile long and is lined on either side with fine oak trees. In Adderley Street are the customs house and railway station, the Standard bank, the general post and telegraph offices, with a tower 120 ft. high, and the Dutch Reformed church. The church dates from 1699 and is the oldest church in South Africa. Of the original building only the clock tower (sent from Holland in 1727) remains. Government Avenue contains, on the east side, the Houses of Parliament, government house, a modernized Dutch building, and the Jewish synagogue; on the west side are the Anglican cathedral and grammar schools, the public library, botanic gardens, the museum and South African college. Many of these buildings are of considerable architectural merit, the material chiefly used in their construction being granite from the Paarl and red brick. The botanic gardens cover 14 acres, contain over 8000 varieties of trees and plants, and afford a magnificent view of Table Mountain and its companion heights. In the gardens, in front of the library is a statue of Sir George Grey, governor of the Cape from 1854 to 1861. The most valuable portion of the library is the 5000 volumes presented by Sir George Grey. In Queen Victoria Street, which runs along the west side of the gardens, are the Cape University buildings (begun in 1906), the law courts, City club and Huguenot memorial hall. The Anglican cathedral, begun in 1901 to replace an unpretentious building on the same site, is dedicated to St George. It lies between the library and St George's Street, in which are the chief newspaper offices, and premises of the wholesale merchants. West of St George's Street is Greenmarket Square, the centre of the town during the Dutch period. From the balcony of the town house, which overlooks the square, proclamations were read to the burghers, summoned to the spot by the ringing of the bell in the small-domed tower. Still farther west, in Riebeek Square, is the old slave market, now used as a church and school for coloured people.

Facing the north side of the Parade Ground are the handsome municipal buildings, completed in 1906. The most conspicuous feature is the clock tower and belfry, 200 ft. high. The hall is 130 ft. by 62, and 55 ft. high. Opposite the main entrance is a statue of Edward VII. by William Goscombe John, unveiled in 1905. The opera house occupies the north-west corner of the Parade Ground. Plein Street, which leads south from the Parade Ground, is noted for its cheap shops, largely patronized on Saturday nights by the coloured inhabitants. In Sir Lowry Road, the chief eastern thoroughfare, is the large vegetable and fruit market. Immediately west of the harbour are the convict station and Somerset hospital. They are built at the town end of Greenpoint Common, the open space at the foot of Signal Hill. Cape Town is provided with an excellent water supply and an efficient drainage system.

The Suburbs.—The suburbs of Cape Town, for natural beauty of position, are among the finest in the world. On the west they extend about 3 m., by Green Point to Sea Point, between the sea and the foot of the Lion's Rump; on the east they run round the foot of the Devil's Peak, by Woodstock, Mowbray, Rondebosch, Newlands, Claremont, &c., to Wynberg, a distance of 7 m. Though these are managed by various municipalities, there is practically no break in the buildings for the whole distance. All the parts are connected by the suburban railway service, and by an electric tramway system. A tramway also runs from the town over the Kloof, or pass between Table Mountain and the Lion's Head, to Camp's Bay, on the west coast south of Sea Point, to which place it is continued, the tramway thus completely circling the Lion's Head and Signal Hill. Of the suburbs mentioned, Green Point and Sea Point are seaside resorts, Woodstock being both a business and residential quarter. Woodstock covers the ground on which the British, in 1806, defeated the Dutch, and contains the house in which the articles of capitulation were signed. Another seaside suburb is Milnerton on the north-east shores of Table Bay at the mouth of the Diep river. Near Maitland, and 3 m. from the city, is the Cape Town observatory, built in

1820 and maintained by the British government. Rondebosch, 5 m. from the city, contains some of the finest of the Dutch mansions in South Africa. Less than a mile from the station is Groote Schuur, a typical specimen of the country houses built by the Dutch settlers in the 17th century. The house was the property of Cecil Rhodes, and was bequeathed by him for the use of the prime minister of Federated South Africa. The grounds of the estate extend up the slopes of Table Mountain. At Newlands is Bishop's Court, the home of the archbishop of Cape Town. More distant suburbs to the south-east are Constantia, with a famous Dutch farm-house and wine farm, and Muizenberg and Kalk Bay, the two last villages on the shore of False Bay. At Muizenberg Cecil Rhodes died, 1902. Facing the Atlantic is Hout's Bay, 10 m. south-south-west of Wynberg.

Most of the suburbs and the city itself are exposed to the south-east winds which, passing over the flats which join the Cape Peninsula to the mainland, reach the city sand-laden. From its bracing qualities this wind, which blows in the summer, is known as the "Cape Doctor." During its prevalence Table Mountain is covered by a dense whitish-grey cloud, overlapping its side like a tablecloth.

The Harbour.—Table Bay, 20 m. wide at its entrance, is fully exposed to north and north-west gales. The harbour works, begun in 1860, afford sheltered accommodation for a large number of vessels. From the west end of the bay a breakwater extends north-east for some 4000 ft. East of the breakwater and parallel to it for 2700 ft. is the South pier. From breakwater and pier arms project laterally. In the area enclosed are the Victoria basin, covering 64 acres, the Alfred basin of 8½ acres, a graving dock 529 ft. long and a patent slip for vessels up to 1500 tons. There is good anchorage outside the Victoria basin under the lee of the breakwater, and since 1904 the foreshore east of the south pier has been reclaimed and additional wharfage provided. Altogether there are 2½ m. of quay walls, the wharfs being provided with electrical cranage. Cargo can be transferred direct from the ship into railway trucks. Vessels of the deepest draught can enter into the Victoria basin, the depth of water at low tide ranging from 24 to 36 ft.

Trade and Communication.—The port has a practical monopoly of the passenger traffic between the Cape and England. Several lines of steamers—chiefly British and German—maintain regular communication with Europe, the British mail boats taking sixteen days on the journey. By its railway connexions Cape Town affords the quickest means of reaching, from western Europe, every other town in South Africa. In the import trade Cape Town is closely rivalled by Port Elizabeth, but its export trade, which includes diamonds and bar gold, is fully 70% of that of the entire colony. In 1898, the year before the beginning of the Anglo-Boer war, the volume of trade was:—Imports £5,128,292, exports £15,881,952. In 1904, two years after the conclusion of the war the figures were:—imports £9,070,757; exports £17,471,760. In 1907 during a period of severe and prolonged trade depression the imports had fallen to £5,263,930, but the exports owing entirely to the increased output of gold from the Rand mines had increased to £37,994,658; gold and diamonds represented over £37,000,000 of this total. The tonnage of ships entering the harbour in 1887 was 801,033. In 1904 it had risen to 4,846,012 and in 1907 was 4,671,146. The trade of the port in tons was 1,276,350 in 1899 and 1,413,471 in 1904. In 1907 it had fallen to 658,721.

Defence.—Cape Town, being in the event of the closing of the Suez Canal on the main route of ships from Europe to the East, is of considerable strategic importance. It is defended by several batteries armed with modern heavy guns. It is garrisoned by Imperial and local troops, and is connected by railway with the naval station at Simon's Town on the east of the Cape Peninsula.

Population.—The Cape electoral division, which includes Cape Town, had in 1865 a population of 50,064, in 1875 57,319, in 1891 97,238, and in 1904 213,167, of whom 120,475 were whites. Cape Town itself had a population in 1875 of 33,000, in 1891 of 51,251 and in 1904 of 77,668. Inclusive of the nearer suburbs the population was 78,866 in 1891 and 170,083 in 1904. Of the inhabitants of the city proper 44,203 were white (1904). Of the coloured inhabitants 6561 were Malays; the remainder being chiefly of mixed blood. The most populous suburbs in 1904 were Woodstock with 28,990 inhabitants, and Wynberg with 18,477.

History and Local Government.—Cape Town was founded in 1652 by settlers sent from Holland by the Netherlands East India Co., under Jan van Riebeek. It came definitely into the possession of Great Britain in 1806. Its political history is indistinguishable from that of Cape Colony (*q.v.*). The town was granted municipal institutions in 1836. (Among the councillors returned at the election of 1904 was Dr Abdurrahman, a Mahommedan and a graduate of Edinburgh, this being, it is believed, the first instance of the election of a man of colour to any European representative body in South Africa.) The municipality owns the water and lighting services. The municipal rating value was, in 1880 £2,054,204, in 1901 £9,475,260, in 1908 (when the rate levied was 3d. in the £) £14,129,439. The total rateable value of the suburbs, not included in the above figures, is over £8,000,000. Rates are based on capital, not annual, value. The control of the port is vested in the Harbour and Railway Board of the Union.

Cape Town is the seat of the legislature of the Union of South Africa, of the provincial government, of the provincial division of the Supreme Court of South Africa, and of the Cape University; also of an archbishop of the Anglican and a bishop of the Roman Catholic churches.

CAPE VERDE ISLANDS (*Ilhas do Cabo Verde*), an archipelago belonging to Portugal; off the West African coast, between 17° 13′ and 14° 47′ N. and 22° 40′ and 25° 22′ W. Pop. (1905) about 138,620; area, 1475 sq. m. The archipelago consists of ten islands:—Santo Antão (commonly miswritten St Antonio), São Vicente, Santa Luzia, São Nicolao, Sal, Boa Vista, Maio, São Thiago (the St Jago of the English), Fogo, and Brava, besides four uninhabited islets. It forms a sort of broken crescent, with the concavity towards the west. The last four islands constitute

the leeward (Sotavento) group and the other six the windward (Barlavento). The distance between the coast of Africa and the nearest island (Boa Vista) is about 300 m. The islands derive their name, frequently but erroneously written "Cape Verd," or "Cape de Verd" Islands, from the African promontory off which they lie, known as Cape Verde, or the Green Cape. The entire archipelago is of volcanic origin, and on the island of Fogo there is an active volcano. No serious eruption has taken place since 1680, and the craters from which the streams of basalt issued have lost their outline.

Climate.—The atmosphere of the islands is generally hazy, especially in the direction of Africa. With occasional exceptions during summer and autumn, the north-east trade is the prevailing wind, blowing most strongly from November to May. The rainy season is during August, September and October, when there is thunder and a light variable wind from south-east or south-west. The Harmattan, a very dry east wind from the African continent, occasionally makes itself felt. The heat of summer is high, the thermometer ranging from 80° to 90° Fahr. near the sea. The unhealthy season is the period during and following the rains, when vegetation springs up with surprising rapidity, and there is much stagnant water, poisoning the air on the lower grounds. Remittent fevers are then common. The people of all the islands are also subject in May to an endemic of a bilious nature called locally *levadias*, but the cases rarely assume a dangerous form, and recovery is usually attained in three or four days without medical aid. On some of the islands rain has occasionally not fallen for three years. The immediate consequence is a failure of the crops, and this is followed by the death of great numbers from starvation, or the epidemics which usually break out afterwards.

Flora.—Owing largely to the widespread destruction of timber for fuel, and to the frequency of drought, the flora of the islands is poor when compared with that of the Canaries, the Azores or Madeira. It is markedly tropical in character; and although some seventy wild-flowers, grasses, ferns, &c., are peculiar to the archipelago, the majority of plants are those found on the neighbouring African littoral. Systematic afforestation has not been attempted, but the Portuguese have introduced a few trees, such as the baobab, eucalyptus and dragon-tree, besides many plants of economic value. Coffee-growing, an industry dating from 1790, is the chief resource of the people of Santo Antão, Fogo and São Thiago; maize, millet, sugar-cane, manioc, excellent oranges, pumpkins, sweet potatoes, and, to a less extent, tobacco and cotton are produced. On most of the islands coco-nut and date palms, tamarinds and bananas may be seen; orchil is gathered; and indigo and castor-oil are produced. Of considerable importance is the physic-nut (*Jatropha curcas*), which is exported.

Fauna.—Quails are found in all the islands; rabbits in Boa Vista, São Thiago and Fogo; wild boars in São Thiago. Both black and grey rats are common. Goats, horses and asses are reared, and goatskins are exported. The neighbouring sea abounds with fish, and coral fisheries are carried on by a colony of Neapolitans in São Thiago. Turtles come from the African coast to lay their eggs on the sandy shores. The Ilheu Branco, or White Islet, between São Nicolao and Santa Luzia, is remarkable as containing a variety of puffin unknown elsewhere, and a species of large lizard (*Macroscinctus coctei*) which feeds on plants.

Inhabitants.—The first settlers on the islands imported negro slaves from the African coast. Slavery continued in full force until 1854, when the Portuguese government freed the public slaves, and ameliorated the conditions of private ownership. In 1857 arrangements were made for the gradual abolition of slavery, and by 1876 the last slave had been liberated. The transportation of convicts from Portugal, a much-dreaded punishment, was continued until the closing years of the 19th century. It was the coexistence of these two forms of servitude, even more than the climate, which prevented any large influx of Portuguese colonists. Hence the blacks and mulattoes far outnumber the white inhabitants. They are, as a rule, taller than the Portuguese, and are of fine physique, with regular features but woolly hair. Slavery and the enervating climate have left their mark on the habits of the people, whose indolence and fatalism are perhaps their most obvious qualities. Their language is a bastard Portuguese, known as the *lingua creoula*. Their religion is Roman Catholicism, combined with a number of pagan beliefs and rites, which are fostered by the *curandeiros* or medicine men. These superstitions tend to disappear gradually before the advance of education, which has progressed considerably since 1867, when the first school, a lyceum, was opened in Ribeira Brava, the capital of São Nicolao. On all the inhabited islands, except Santa Luzia, there are churches and primary schools, conducted by the government or the priests. The children of the wealthier classes are sent to Lisbon for their education.

Government.—The archipelago forms one of the foreign provinces of Portugal, and is under the command of a governor-in-chief appointed by the crown. There are two principal judges, one for the windward and another for the leeward group, the former with his residence at São Nicolao, and the latter at Praia; and each island has a military commandant, a few soldiers, and a number of salaried officials, such as police, magistrates and custom-house directors. There is also an ecclesiastical establishment, with a bishop, dean and canons.

Industries.—The principal industries, apart from agriculture, are the manufacture of sugar, spirits, salt, cottons and straw hats and fish-curing. The average yearly value of the exports is about £60,000; that of the imports (including £200,000 for coal), about £350,000. The most important of the exports are coffee, physic-nuts, millet, sugar, spirits, salt, live animals, skins and fish. This trade is principally carried on with Lisbon and the Portuguese possessions on the west coast of Africa, and with passing vessels. The imports consist principally of coal, textiles, food-stuffs, wine, metals, tobacco, machinery, pottery and vegetables. Over 3000 vessels, with a total tonnage exceeding 3,500,000, annually enter the ports of the archipelago; the majority call at Mindello, on São Vicente, for coal, and do not receive or discharge any large quantities of cargo.

Santo Antão (pop. 25,000), at the extreme north-west of the archipelago, has an area of 265 sq. m. Its surface is very rugged and mountainous, abounding in volcanic craters, of which the chief is the Topoda Coroa (7300 ft.), also known as the Sugar-loaf. Mineral springs exist in many places. The island is the most picturesque, the healthiest, and, on its north-western slope, the best watered and most fertile of the archipelago. The south-eastern slope, shut out by lofty mountains from the fertilizing moisture of the trade-winds, has an entirely different appearance, black rocks, white pumice and red clay being its most characteristic features. Santo Antão produces large quantities of excellent coffee, besides sugar and fruit. It has several small ports, of which the chief are the sheltered and spacious Tarrafal Bay, on the south-west coast, and the more frequented Ponta do Sol, on the north-east, 8 m. from the capital, Ribeira Grande, a town of 4500 inhabitants. Cinchona is cultivated in the neighbourhood. In 1780 the slaves on Santo Antão were declared free, but this decree was not carried out. About the same time many white settlers, chiefly from the Canaries, entered the island, and introduced the cultivation of wheat.

São Vicente, or *St Vincent* (8000), lies near Santo Antão, on the south-east, and has an area of 75 sq. m. Its highest point is Monte Verde (2400 ft.). The whole island is as arid and sterile as the south-eastern half of Santo Antão, and for the same reason. It was practically uninhabited until 1795; in 1829 its population numbered about 100. Its harbour, an extinct crater on the north coast, with an entrance eroded by the sea, affords complete shelter from every wind. An English speculator founded a coaling station here in 1851, and the town of Mindello, also known as Porto Grande or St Vincent, grew up rapidly, and became the commercial centre of the archipelago. Most of the business is in English hands, and nine-tenths of the inhabitants understand English. Foodstuffs, wood and water are imported from Santo Antão, and the water is stored in a large reservoir at Mindello. São Vicente has a station for the submarine cable from Lisbon to Pernambuco in Brazil.

Santa Luzia, about 5 m. south-east, has an area of 18 sq. m., and forms a single estate, occupied only by the servants or the family of the proprietor. Its highest point is 885 ft. above sea-level. On the south-west it has a good harbour, visited by whaling and fishing boats. Much orchil was formerly gathered, and there is good pasturage for the numerous herds of cattle. A little to the south are the uninhabited islets of Branco and Razo.

São Nicolao, or *Nicolau* (12,000), a long, narrow, crescent-shaped island with an area of 126 sq. m., lies farther east, near the middle of the archipelago. Its climate is not very healthy. Maize, kidney-beans, manioc, sugar-cane and vines are cultivated; and in ordinary years grain is exported to the other islands. The interior is mountainous, and culminates in two peaks which can be seen for many leagues; one has the shape of a sugar-loaf, and is near the middle of the island; the other, Monte Gordo, is near the west end, and has a height of 4280 ft. All the other islands of the group can be seen from São Nicolao in clear weather. Vessels frequently enter Preguiça, or Freshwater Bay, near the south-east extremity of the island, for water and fresh provisions; and the custom-house is here. The island was one of the first colonized; in 1774 its inhabitants numbered 13,500, but famine subsequently caused a great decrease. The first capital, Lapa, at the end of a promontory on the south,

was abandoned during the period of Spanish ascendancy over Portugal (1580–1640) in favour of Ribeira Brava (4000), on the north coast, a town which now has a considerable trade.

Sal (750), in the north-east of the archipelago, has an area of 75 sq. m. It was originally named *Lana* or *Lhana* (" plain "), from the flatness of the greater part of its surface. It derives its modern name from a natural salt-spring, but most of the salt produced here is now obtained from artificial salt-pans. Towards the close of the 17th century it was inhabited only by a few shepherds, and by slaves employed in the salt-works. In 1705 it was entirely abandoned, owing to drought and consequent famine; and only in 1808 was the manufacture of salt resumed. A railway, the first built in Portuguese territory, was opened in 1835. The hostile Brazilian tariffs of 1889 for a time nearly destroyed the salt trade. Whales, turtles and fish are abundant, and dairy-farming is a prosperous industry. There are many small harbours, which render every part of the island easily accessible.

Boa Vista (2600), the most easterly island of the archipelago, has an area of 235 sq. m. It was named São Christovão by its discoverers in the 15th century. Its modern name, meaning " fair view," is singularly inappropriate, for with the exception of a few coco-nut trees there is no wood, and in the dry season the island seems nothing but an arid waste. The little vegetation that then exists is in the bottom of ravines, where corn, beans and cotton are cultivated. The springs of good water are few. The coast is indented by numerous shallow bays, the largest of which is the harbour of the capital, Porto Sal-Rei, on the western side (pop. about 1000). A chain of heights, flanked by inferior ranges, traverses the middle of Boa Vista, culminating in Monte Gallego (1250 ft.), towards the east. In the north-western angle of the island there is a low tract of loose sand, which is inundated with water during the rainy season; and here are some extensive salt-pans, where the sea-water is evaporated by the heat of the sun. Salt and orchil are exported. A good deal of fish is taken on the coast and supplies the impoverished islanders with much of their food.

Maio (1000) has an area of 70 sq. m., and resembles Sal and Boa Vista in climate and configuration, although it belongs to the Sotaveato group. Its best harbour is that of Nossa Senhora da Luz, on the south-west coast, and is commonly known as Porto Inglez or English Road, from the fact that it was occupied until the end of the 18th century by the British, who based their claim on the marriage-treaty between Charles II. and Catherine of Braganza (1662). The island is a barren, treeless waste, surrounded by rocks. Its inhabitants, who live chiefly by the manufacture of salt, by cattle-farming and by fishing, are compelled to import most of their provisions from São Thiago, with which, for purposes of local administration, Maio is included.

São Thiago (63,000) is the most populous and the largest of the Cape Verde Islands, having an area of 350 sq. m. It is also one of the most unhealthy, except among the mountains over 2000 ft. high. The interior is a mass of volcanic heights, formed of basalt covered with chalk and clay, and culminating in the central Pico da Antonia (4500 ft.), a sharply pointed cone. There are numerous ravines, furrowed by perennial streams, and in these ravines are grown large quantities of coffee, oranges, sugar-cane and physic-nuts, besides a variety of tropical fruits and cereals. Spirits are distilled from sugar-cane, and coarse sugar is manufactured. The first capital of the islands was Ribeira Grande, to-day called Cidade Velha or the Old City, a picturesque town with a cathedral and ruined fort. It was built in the 15th century on the south coast, was made an episcopal see in 1532, and became capital of the archipelago in 1592. In 1712 it was sacked by a French force, but despite its poverty and unhealthy situation it continued to be the capital until 1770, when its place was taken by Praia on the south-east. Praia (often written Praya) has a fine harbour, a population of 21,000 and a considerable trade. It contains the palace of the governor-general, a small natural history museum, a meteorological observatory and an important station for the cables between South America, Europe and West Africa. It occupies a basalt plateau, overlooking the bay (Porto da Praia), and has an attractive appearance, with its numerous coco-nut trees and the peak of Antonia rising in the background above successive steps of tableland. Its unhealthiness has been mitigated by the partial drainage of a marsh lying to the east.

Fogo (17,600) is a mass of volcanic rock, almost circular in shape and measuring about 190 sq. m. In the centre a still active volcano, the Pico do Cano, rises to a height of about 10,000 ft. Its crater, which stands within an older crater, measures 3 m. in circumference and is visible at sea for nearly 100 m. It emits smoke and ashes at intervals; and in 1680, 1785, 1799, 1816, 1846, 1852 and 1857 it was in eruption. After the first and most serious of these outbreaks, the island, which had previously been called São Felippe, was renamed Fogo, *i.e.* " Fire." The ascent of the mountain was first made in 1819 by two British naval officers, named Vidal and Mudge. The island is divided, like Santo Antão, into a fertile and a sterile zone. Its northern half produces fine coffee, beans, maize and sugar-cane; the southern half is little better than a desert, with oases of cultivated land near its few springs. São Felippe or Nossa Senhora da Luz (3000), on the west coast, is the capital. The islanders claim to be the aristocracy of the archipelago, and trace their descent from the original Portuguese settlers. The majority, however, are negroes or mulattoes. Drought and famine, followed by severe epidemics, have been especially frequent here, notably in the years 1887–1889.

Brava (9013), the most southerly of the islands, has an area of 23 sq. m. Though mountainous, and in some parts sterile, it is very closely cultivated, and, unlike the other islands, is divided into a multitude of small holdings. The desire to own land is almost universal, and as the population numbers upwards of 380 per sq. m., and the system of tenure gives rise to many disputes, the peasantry are almost incessantly engaged in litigation. The women, who are locally celebrated for their beauty, far outnumber the men, who emigrate at an early age to America. These emigrants usually return richer and better educated than the peasantry of the neighbouring islands. To the north of Brava lie a group of reefs among which two islets (Ilheus Seccos or Ilheus do Rombo) are conspicuous. These are usually known as the Ilheu de Dentro (Inner Islet) and the Ilheu de Fóra (Outer Islet). The first is used as a shelter for whaling and fishing vessels, and as pasturage for cattle; the second has supplied much guano for export.

History.—The earliest known discovery of the islands was made in 1456 by the Venetian captain Alvise Cadamosto (*q.v.*), who had entered the service of Prince Henry the Navigator. The archipelago was granted by King Alphonso V. of Portugal to his brother, Prince Ferdinand, whose agents completed the work of discovery. Ferdinand was an absolute monarch, exercising a commercial monopoly. In 1461 he sent an expedition to recruit slaves on the coast of Guinea and thus to people the islands, which were almost certainly uninhabited at the time. On his death in 1470 his privileges reverted to the crown, and were bestowed by John II. on Prince Emanuel, by whose accession to the throne in 1495 the archipelago finally became part of the royal dominions. Its population and importance rapidly increased; its first bishop was consecrated in 1532, its first governor-general appointed about the end of the century. It was enriched by the frequent visits of Portuguese fleets, on their return to Europe laden with treasure from the East, and by the presence of immigrants from Madeira, who introduced better agricultural methods and several new industries, such as dyeing and distillation of spirits. The failure to maintain an equal rate of progress in the 18th and 19th centuries was due partly to drought, famine and disease—in particular, to the famines of 1730–1733 and 1831–1833—and partly to gross misgovernment by the Portuguese officials.

The best general account of the islands is given in vols. xxiii. and xxvii. of the *Boletim* of the Lisbon Geographical Society (1905 and 1908), and in *Madeira, Cabo Verde, e Guiné*, by J. A. Martins (Lisbon, 1891). Official statistics are published in Lisbon at irregular intervals. See also *Über die Capverden* (Leipzig, 1884) and *Die Vulcane der Capverden* (Graz, 1882), both by C. Dölter. A useful map, entitled *Ocean Atlantico Norte, Archipelago do Cabo Verde*, was issued in 1900 by the *Commissão de Cartographia*, Lisbon.

CAPGRAVE, JOHN (1393–1464), English chronicler and hagiologist, was born at Lynn in Norfolk on the 21st of April 1393. He became a priest, took the degree of D.D. at Oxford, where he lectured on theology, and subsequently joined the order of Augustinian hermits. Most of his life he spent in the house of the order at Lynn, of which he probably became prior; he was certainly provincial of his order in England, which involved visits to other friaries, and he made at least one journey to Rome. He died on the 12th of August 1464.

Capgrave was an indefatigable student, and was reputed one of the most learned men of his age. The bulk of his works are theological: sermons, commentaries and lives of saints. His reputation as a hagiologist rests on his *Nova legenda Angliae*, or *Catalogus* of the English saints, but this was no more than a recension of the *Sanctilogium* which the chronicler John of Tinmouth, a monk of St Albans, had completed in 1366, which in its turn was largely borrowed from the *Sanctilogium* of Guido, abbot of St Denis. The *Nova legenda* was printed by Wynkyn de Worde in 1516 and again in 1527. Capgrave's historical works are *The Chronicle of England* (from the Creation to 1417), written in English and unfinished at his death, and the *Liber de illustribus Henricis*, completed between 1446 and 1453. The latter is a collection of lives of German emperors (918–1198), English kings (1100–1446) and other famous Henries in various parts of the world (1031–1406). The portion devoted to Henry VI. of England is a contemporary record, but consists mainly of ejaculations in praise of the pious king. The accounts of the

other English Henries are transferred from various well-known chroniclers. The *Chronicle* was edited for the "Rolls" Series by Francis Charles Hingeston (London, 1858); the *Liber de illustribus Henricis* was edited (London, 1858) for the same series by F. C. Hingeston, who published an English translation the same year. The editing of both the works is very uncritical and bad.

See Potthast, *Bibliotheka Med. Aev.*; and U. Chevalier, *Répertoire des sources hist. Bio-bibliographie, s.v.*

CAP HAITIEN, Cape Haïtien or Haytien, a seaport of Haiti, West Indies. Pop. about 15,000. It is situated on the north coast, 90 m. N. of Port au Prince, in 19° 46′ N. and 72° 14′ W. Its original Indian name was Guarico, and it has been known, at various times, as Cabo Santo, Cap Français and Cape Henri, while throughout Haiti it is always called Le Cap. It is the most picturesque town in the republic, and the second in importance. On three sides it is hemmed in by lofty mountains, while on the fourth it overlooks a safe and commodious harbour. Under the French rule it was the capital of the colony, and its splendour, wealth and luxury earned for it the title of the "Paris of Haiti." It was then the see of an archbishop and possessed a large and flourishing university. The last remains of its former glory were destroyed by the earthquake of 1842 and the British bombardment of 1865. Although now but a collection of squalid wooden huts, with here and there a well-built warehouse, it is the centre of a thriving district and does a large export trade. It was founded by the Spaniards about the middle of the 17th century, and in 1687 received a large French colony. In 1695 it was taken and burned by the British, and in 1791 it suffered the same fate at the hands of Toussaint L'Ouverture. It then became the capital of King Henri Christophe's dominions, but since his fall has suffered severely in numerous revolutions.

CAPILLARY ACTION.[1] A tube, the bore of which is so small that it will only admit a hair (Lat. *capilla*), is called a capillary tube. When such a tube of glass, open at both ends, is placed vertically with its lower end immersed in water, the water is observed to rise in the tube, and to stand within the tube at a higher level than the water outside. The action between the capillary tube and the water has been called capillary action, and the name has been extended to many other phenomena which have been found to depend on properties of liquids and solids similar to those which cause water to rise in capillary tubes.

The forces which are concerned in these phenomena are those which act between neighbouring parts of the same substance, and which are called forces of cohesion, and those which act between portions of matter of different kinds, which are called forces of adhesion. These forces are quite insensible between two portions of matter separated by any distance which we can directly measure. It is only when the distance becomes exceedingly small that these forces become perceptible. G. H. Quincke (*Pogg. Ann.* cxxxvii. p. 402) made experiments to determine the greatest distance at which the effect of these forces is sensible, and he found for various substances distances about the twenty-thousandth part of a millimetre.

Historical.—According to J. C. Poggendorff (*Pogg. Ann.* ci. p. 551), Leonardo da Vinci must be considered as the discoverer of capillary phenomena, but the first accurate observations of the capillary action of tubes and glass plates were made by Francis Hawksbee (*Physico-Mechanical Experiments*, London, 1709, pp. 139-169; and *Phil. Trans.*, 1711 and 1712), who ascribed the action to an attraction between the glass and the liquid. He observed that the effect was the same in thick tubes as in thin, and concluded that only those particles of the glass which are very near the surface have any influence on the phenomenon. Dr James Jurin (*Phil. Trans.*, 1718, p. 739, and 1719, p. 1083) showed that the height at which the liquid is suspended depends on the section of the tube at the surface of the liquid, and is independent of the form of the lower part of the tube. He considered that the suspension of the liquid is due to "the attraction of the periphery or section of the surface of the tube to which the upper surface of the water is contiguous and coheres." From this he showed that the rise of the liquid in tubes of the same substance is inversely proportional to their radii. Sir Isaac Newton devoted the 31st query in the last edition of his *Opticks* to molecular forces, and instanced several examples of the cohesion of liquids, such as the suspension of mercury in a barometer tube at more than double the height at which it usually stands. This arises from its adhesion to the tube, and the upper part of the mercury sustains a considerable tension, or negative pressure, without the separation of its parts. He considered the capillary phenomena to be of the same kind, but his explanation is not sufficiently explicit with respect to the nature and the limits of the action of the attractive force.

It is to be observed that, while these early speculators ascribe the phenomena to attraction, they do not distinctly assert that this attraction is sensible only at insensible distances, and that for all distances which we can directly measure the force is altogether insensible. The idea of such forces, however, had been distinctly formed by Newton, who gave the first example of the calculation of the effect of such forces in his theorem on the alteration of the path of a light-corpuscle when it enters or leaves a dense body.

Alexis Claude Clairault (*Théorie de la figure de la terre*, Paris, 1808, pp. 105, 128) appears to have been the first to show the necessity of taking account of the attraction between the parts of the fluid itself in order to explain the phenomena. He did not, however, recognize the fact that the distance at which the attraction is sensible is not only small but altogether insensible. J. A. von Segner (*Comment. Soc. Reg. Götting.* i. (1751) p. 301) introduced the very important idea of the surface-tension of liquids, which he ascribed to attractive forces, the sphere of whose action is so small "ut nullo adhuc sensu percipi potuerit." In attempting to calculate the effect of this surface-tension in determining the form of a drop of the liquid, Segner took account of the curvature of a meridian section of the drop, but neglected the effect of the curvature in a plane at right angles to this section.

The idea of surface-tension introduced by Segner had a most important effect on the subsequent development of the theory. We may regard it as a physical fact established by experiment in the same way as the laws of the elasticity of solid bodies. We may investigate the forces which act between finite portions of a liquid in the same way as we investigate the forces which act between finite portions of a solid. The experiments on solids lead to certain laws of elasticity expressed in terms of coefficients, the values of which can be determined only by experiments on each particular substance. Various attempts have also been made to deduce these laws from particular hypotheses as to the action between the molecules of the elastic substance. We may therefore regard the theory of elasticity as consisting of two parts. The first part establishes the laws of the elasticity of a finite portion of the solid subjected to a homogeneous strain, and deduces from these laws the equations of the equilibrium and motion of a body subjected to any forces and displacements. The second part endeavours to deduce the facts of the elasticity of a finite portion of the substance from hypotheses as to the motion of its constituent molecules and the forces acting between them. In like manner we may by experiment ascertain the general fact that the surface of a liquid is in a state of tension similar to that of a membrane stretched equally in all directions, and prove that this tension depends only on the nature and temperature of the liquid and not on its form, and from this as a secondary physical principle we may deduce all the phenomena of capillary action. This is one step of the investigation. The next step is to deduce this surface-tension from a hypothesis as to the molecular constitution of the liquid and of the bodies that surround it. The scientific importance of this step is to be measured by the degree of insight which it affords or promises into the molecular constitution of real bodies by the suggestion of experiments by which we may discriminate between rival molecular theories.

[1] In this revision of James Clerk Maxwell's classical article in the ninth edition of the *Encyclopaedia Britannica*, additions are marked by square brackets.

In 1756 J. G. Leidenfrost (*De aquae communis nonnullis qualitatibus tractatus*, Duisburg) showed that a soap-bubble tends to contract, so that if the tube with which it was blown is left open the bubble will diminish in size and will expel through the tube the air which it contains. He attributed this force, however, not to any general property of the surfaces of liquids, but to the fatty part of the soap which he supposed to separate itself from the other constituents of the solution, and to form a thin skin on the outer face of the bubble.

In 1787 Gaspard Monge (*Mémoires de l'Acad. des Sciences*, 1787, p. 506) asserted that "by supposing the adherence of the particles of a fluid to have a sensible effect only at the surface itself and in the direction of the surface it would be easy to determine the curvature of the surfaces of fluids in the neighbourhood of the solid boundaries which contain them; that these surfaces would be *lintearice* of which the tension, constant in all directions, would be everywhere equal to the adherence of two particles, and the phenomena of capillary tubes would then present nothing which could not be determined by analysis." He applied this principle of surface-tension to the explanation of the apparent attractions and repulsions between bodies floating on a liquid.

In 1802 John Leslie (*Phil. Mag.*, 1802, vol. xiv. p. 193) gave the first correct explanation of the rise of a liquid in a tube by considering the effect of the attraction of the solid on the very thin stratum of the liquid in contact with it. He did not, like the earlier speculators, suppose this attraction to act in an upward direction so as to support the fluid directly. He showed that the attraction is everywhere normal to the surface of the solid. The direct effect of the attraction is to increase the pressure of the stratum of the fluid in contact with the solid, so as to make it greater than the pressure in the interior of the fluid. The result of this pressure if unopposed is to cause this stratum to spread itself over the surface of the solid as a drop of water is observed to do when placed on a clean horizontal glass plate, and this even when gravity opposes the action, as when the drop is placed on the under surface of the plate. Hence a glass tube plunged into water would become wet all over were it not that the ascending liquid film carries up a quantity of other liquid which coheres to it, so that when it has ascended to a certain height the weight of the column balances the force by which the film spreads itself over the glass. This explanation of the action of the solid is equivalent to that by which Gauss afterwards supplied the defect of the theory of Laplace, except that, not being expressed in terms of mathematical symbols, it does not indicate the mathematical relation between the attraction of individual particles and the final result. Leslie's theory was afterwards treated according to Laplace's mathematical methods by James Ivory in the article on capillary action, under "Fluids, Elevation of," in the supplement to the fourth edition of the *Encyclopaedia Britannica*, published in 1819.

In 1804 Thomas Young (Essay on the "Cohesion of Fluids," *Phil. Trans.*, 1805, p. 65) founded the theory of capillary phenomena on the principle of surface-tension. He also observed the constancy of the angle of contact of a liquid surface with a solid, and showed how from these two principles to deduce the phenomena of capillary action. His essay contains the solution of a great number of cases, including most of those afterwards solved by Laplace, but his methods of demonstration, though always correct, and often extremely elegant, are sometimes rendered obscure by his scrupulous avoidance of mathematical symbols. Having applied the secondary principle of surface-tension to the various particular cases of capillary action, Young proceeded to deduce this surface-tension from ulterior principles. He supposed the particles to act on one another with two different kinds of forces, one of which, the attractive force of cohesion, extends to particles at a greater distance than those to which the repulsive force is confined. He further supposed that the attractive force is constant throughout the minute distance to which it extends, but that the repulsive force increases rapidly as the distance diminishes. He thus showed that at a curved part of the surface, a superficial particle would be urged towards the centre of curvature of the surface, and he gave reasons for concluding that this force is proportional to the sum of the curvatures of the surface in two normal planes at right angles to each other.

The subject was next taken up by Pierre Simon Laplace (*Mécanique céleste*, supplement to the tenth book, pub. in 1806). His results are in many respects identical with those of Young, but his methods of arriving at them are very different, being conducted entirely by mathematical calculations. The form into which he threw his investigation seems to have deterred many able physicists from the inquiry into the ulterior cause of capillary phenomena, and induced them to rest content with deriving them from the fact of surface-tension. But for those who wish to study the molecular constitution of bodies it is necessary to study the effect of forces which are sensible only at insensible distances; and Laplace has furnished us with an example of the method of this study which has never been surpassed. Laplace investigated the force acting on the fluid contained in an infinitely slender canal normal to the surface of the fluid arising from the attraction of the parts of the fluid outside the canal. He thus found for the pressure at a point in the interior of the fluid an expression of the form

$$p = K + \tfrac{1}{2}H(1/R + 1/R'),$$

where K is a constant pressure, probably very large, which, however, does not influence capillary phenomena, and therefore cannot be determined from observation of such phenomena; H is another constant on which all capillary phenomena depend; and R and R′ are the radii of curvature of any two normal sections of the surface at right angles to each other.

In the first part of our own investigation we shall adhere to the symbols used by Laplace, as we shall find that an accurate knowledge of the physical interpretation of these symbols is necessary for the further investigation of the subject. In the *Supplement to the Theory of Capillary Action*, Laplace deduced the equation of the surface of the fluid from the condition that the resultant force on a particle at the surface must be normal to the surface. His explanation, however, of the rise of a liquid in a tube is based on the *assumption* of the constancy of the angle of contact for the same solid and fluid, and of this he has nowhere given a satisfactory proof. In this supplement Laplace gave many important applications of the theory, and compared the results with the experiments of Louis Joseph Gay Lussac.

The next great step in the treatment of the subject was made by C. F. Gauss (*Principia generalia Theoriae Figurae Fluidorum in statu Aequilibrii*, Göttingen, 1830, or *Werke*, v. 29, Göttingen, 1867). The principle which he adopted is that of virtual velocities, a principle which under his hands was gradually transforming itself into what is now known as the principle of the conservation of energy. Instead of calculating the direction and magnitude of the resultant force on each particle arising from the action of neighbouring particles, he formed a single expression which is the aggregate of all the potentials arising from the mutual action between pairs of particles. This expression has been called the force-function. With its sign reversed it is now called the potential energy of the system. It consists of three parts, the first depending on the action of gravity, the second on the mutual action between the particles of the fluid, and the third on the action between the particles of the fluid and the particles of a solid or fluid in contact with it.

The condition of equilibrium is that this expression (which we may for the sake of distinctness call the potential energy) shall be a minimum. This condition when worked out gives not only the equation of the free surface in the form already established by Laplace, but the conditions of the angle of contact of this surface with the surface of a solid.

Gauss thus supplied the principal defect in the great work of Laplace. He also pointed out more distinctly the nature of the assumptions which we must make with respect to the law of action of the particles in order to be consistent with observed phenomena. He did not, however, enter into the explanation of particular phenomena, as this had been done already by Laplace, but he pointed out to physicists the advantages of the

method of Segner and Gay Lussac, afterwards carried out by Quincke, of measuring the dimensions of large drops of mercury on a horizontal or slightly concave surface, and those of large bubbles of air in transparent liquids resting against the under side of a horizontal plate of a substance wetted by the liquid.

In 1831 Siméon Denis Poisson published his *Nouvelle Théorie de l'action capillaire*. He maintained that there is a rapid variation of density near the surface of a liquid, and he gave very strong reasons, which have been only strengthened by subsequent discoveries, for believing that this is the case. He proceeded to an investigation of the equilibrium of a fluid on the hypothesis of uniform density, and arrived at the conclusion that on this hypothesis none of the observed capillary phenomena would take place, and that, therefore, Laplace's theory, in which the density is supposed uniform, is not only insufficient but erroneous. In particular he maintained that the constant pressure K, which occurs in Laplace's theory, and which on that theory is very large, must be in point of fact very small, but the equation of equilibrium from which he concluded this is itself defective. Laplace assumed that the liquid has uniform density, and that the attraction of its molecules extends to a finite though insensible distance. On these assumptions his results are certainly right, and are confirmed by the independent method of Gauss, so that the objections raised against them by Poisson fall to the ground. But whether the assumption of uniform density be physically correct is a very different question, and Poisson rendered good service to science in showing how to carry on the investigation on the hypothesis that the density very near the surface is different from that in the interior of the fluid.

The result, however, of Poisson's investigation is practically equivalent to that already obtained by Laplace. In both theories the equation of the liquid surface is the same, involving a constant H, which can be determined only by experiment. The only difference is in the manner in which this quantity H depends on the law of the molecular forces and the law of density near the surface of the fluid, and as these laws are unknown to us we cannot obtain any test to discriminate between the two theories.

We have now described the principal forms of the theory of capillary action during its earlier development. In more recent times the method of Gauss has been modified so as to take account of the variation of density near the surface, and its language has been translated in terms of the modern doctrine of the conservation of energy.[1]

J. A. F. Plateau (*Statique expérimentale et théorique des liquides*), who made elaborate study of the phenomena of surface-tension, adopted the following method of getting rid of the effects of gravity. He formed a mixture of alcohol and water of the same density as olive oil, and then introduced a quantity of oil into the mixture. It assumes the form of a sphere under the action of surface-tension alone. He then, by means of rings of iron-wire, disks and other contrivances, altered the form of certain parts of the surface of the oil. The free portions of the surface then assume new forms depending on the equilibrium of surface-tension. In this way he produced a great many of the forms of equilibrium of a liquid under the action of surface-tension alone, and compared them with the results of mathematical investigation. He also greatly facilitated the study of liquid films by showing how to form a liquid, the films of which will last for twelve or even for twenty-four hours. The debt which science owes to Plateau is not diminished by the fact that, while investigating these beautiful phenomena, he never himself saw them, having lost his sight in about 1840.

G. L. van der Mensbrugghe (*Mém. de l'Acad. Roy. de Belgique*, xxxvii., 1873) devised a great number of beautiful illustrations of the phenomena of surface-tension, and showed their connexion with the experiments of Charles Tomlinson on the figures formed by oils dropped on the clean surface of water.

Athanase Dupré in his 5th, 6th and 7th Memoirs on the Mechanical Theory of Heat (*Ann. de Chimie et de Physique*, 1866–1868) applied the principles of thermodynamics to capillary phenomena, and the experiments of his son Paul were exceedingly ingenious and well devised, tracing the influence of surface-tension in a great number of very different circumstances, and deducing from independent methods the numerical value of the surface-tension. The experimental evidence which Dupré obtained bearing on the molecular structure of liquids must be very valuable, even if our present opinions on this subject should turn out to be erroneous.

F. H. R. Lüdtge (*Pogg. Ann.* cxxxix. p. 620) experimented on liquid films, and showed how a film of a liquid of high surface-tension is replaced by a film of lower surface-tension. He also experimented on the effects of the thickness of the film, and came to the conclusion that the thinner a film is, the greater is its tension. This result, however, was tested by Van der Mensbrugghe, who found that the tension is the same for the same liquid whatever be the thickness, as long as the film does not burst. [The continued coexistence of various thicknesses, as evidenced by the colours in the same film, affords an instantaneous proof of this conclusion.] The phenomena of very thin liquid films deserve the most careful study, for it is in this way that we are most likely to obtain evidence by which we may test the theories of the molecular structure of liquids.

Sir W. Thomson (afterwards Lord Kelvin) investigated the effect of the curvature of the surface of a liquid on the thermal equilibrium between the liquid and the vapour in contact with it. He also calculated the effect of surface-tension on the propagation of waves on the surface of a liquid, and determined the minimum velocity of a wave, and the velocity of the wind when it is just sufficient to disturb the surface of still water.

Theory of Capillary Action

When two different fluids are placed in contact, they may either diffuse into each other or remain separate. In some cases diffusion takes place to a limited extent, after which the resulting mixtures do not mix with each other. The same substance may be able to exist in two different states at the same temperature and pressure, as when water and its saturated vapour are contained in the same vessel. The conditions under which the thermal and mechanical equilibrium of two fluids, two mixtures, or the same substance in two physical states in contact with each other, is possible belong to thermodynamics. All that we have to observe at present is that, in the cases in which the fluids do not mix of themselves, the potential energy of the system must be greater when the fluids are mixed than when they are separate.

It is found by experiment that it is only very close to the bounding surface of a liquid that the forces arising from the mutual action of its parts have any resultant effect on one of its particles. The experiments of Quincke and others seem to show that the extreme range of the forces which produce capillary action lies between a thousandth and a twenty-thousandth part of a millimetre.

We shall use the symbol ϵ to denote this extreme range, beyond which the action of these forces may be regarded as insensible. If χ denotes the potential energy of unit of mass of the substance, we may treat χ as sensibly constant except within a distance ϵ of the bounding surface of the fluid. In the interior of the fluid it has the uniform value χ_0. In like manner the density, ρ, is sensibly equal to the constant quantity ρ_0, which is its value in the interior of the liquid, except within a distance ϵ of the bounding surface. Hence if V is the volume of a mass M of liquid bounded by a surface whose area is S, the integral

$$M = \iiint \rho \, dx \, dy \, dz, \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where the integration is to be extended throughout the volume

[1] See Enrico Betti, *Teoria della Capillarità*: *Nuovo Cimento* (1867); a memoir by M. Stahl, "Ueber einige Punckte in der Theorie der Capillarerscheinungen," *Pogg. Ann.* cxxxix. p. 239 (1870); and J. D. Van der Waal's *Over de Continuiteit van den Gasen Vloeistoftoestand*. A good account of the subject from a mathematical point of view will be found in James Challis's "Report on the Theory of Capillary Attraction," *Brit. Ass. Report*, iv. p. 235 (1834).

V, may be divided into two parts by considering separately the thin shell or skin extending from the outer surface to a depth ϵ, within which the density and other properties of the liquid vary with the depth, and the interior portion of the liquid within which its properties are constant.

Since ϵ is a line of insensible magnitude compared with the dimensions of the mass of liquid and the principal radii of curvature of its surface, the volume of the shell whose surface is S and thickness ϵ will be $S\epsilon$, and that of the interior space will be $V-S\epsilon$.

If we suppose a normal ν less than ϵ to be drawn from the surface S into the liquid, we may divide the shell into elementary shells whose thickness is $d\nu$, in each of which the density and other properties of the liquid will be constant.

The volume of one of these shells will be $Sd\nu$. Its mass will be $Spd\nu$. The mass of the whole shell will therefore be $S\int_0^\epsilon \rho d\nu$, and that of the interior part of the liquid $(V-S\epsilon)\rho_0$. We thus find for the whole mass of the liquid

$$M = V\rho_0 - S\int_0^\epsilon (\rho_0 - \rho)d\nu. \quad . \quad . \quad . \quad . \quad . \quad (2)$$

To find the potential energy we have to integrate

$$E = \iiint \chi\rho \, dx \, dy \, dz. \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

Substituting $\chi\rho$ for ρ in the process we have just gone through, we find

$$E = V\chi_0\rho_0 - S\int_0^\epsilon (\chi_0\rho_0 - \chi\rho)d\nu. \quad . \quad . \quad . \quad . \quad . \quad (4)$$

Multiplying equation (2) by χ_0, and subtracting it from (4),

$$E - M\chi_0 = \chi_0 S\int_0^\epsilon (\chi - \chi_0)\rho d\nu. \quad . \quad . \quad . \quad . \quad . \quad (5)$$

In this expression M and χ_0 are both constant, so that the variation of the right-hand side of the equation is the same as that of the energy E, and expresses that part of the energy which depends on the area of the bounding surface of the liquid. We may call this the surface energy.

The symbol χ expresses the energy of unit of mass of the liquid at a depth ν within the bounding surface. When the liquid is in contact with a rare medium, such as its own vapour or any other gas, χ is greater than χ_0, and the surface energy is positive. By the principle of the conservation of energy, any displacement of the liquid by which its energy is diminished will tend to take place of itself. Hence if the energy is the greater, the greater the area of the exposed surface, the liquid will tend to move in such a way as to diminish the area of the exposed surface, or, in other words, the exposed surface will tend to diminish if it can do so consistently with the other conditions. This tendency of the surface to contract itself is called the surface-tension of liquids.

Dupré has described an arrangement by which the surface-tension of a liquid film may be illustrated. A piece of sheet metal is cut out in the form AA (fig. 1). A very fine slip of metal is laid on it in the position BB, and the whole is dipped into a solution of soap, or M. Plateau's glycerine mixture. When it is taken out the rectangle AACC if filled up by a liquid film. This film, however, tends to contract on itself, and the loose strip of metal BB will, if it is let go, be drawn up towards AA, provided it is sufficiently light and smooth.

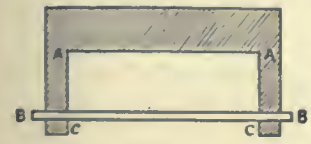

FIG. 1.

Let T be the surface energy per unit of area; then the energy of a surface of area S will be ST. If, in the rectangle AACC, $AA = a$, and $AC = b$, its area is $S = ab$, and its energy Tab. Hence if F is the force by which the slip BB is pulled towards AA,

$$F = \frac{d}{db}Tab = Ta, \quad . \quad . \quad . \quad . \quad . \quad . \quad (6)$$

or the force arising from the surface-tension acting on a length a of the strip is Ta, so that T represents the surface-tension acting transversely on every unit of length of the periphery of the liquid surface. Hence if we write

$$T = \int_c^\epsilon (\chi - \chi_0)\rho d\nu, \quad . \quad . \quad . \quad . \quad . \quad . \quad (7)$$

we may define T either as the surface-energy per unit of area, or as the surface-tension per unit of contour, for the numerical values of these two quantities are equal.

If the liquid is bounded by a dense substance, whether liquid or solid, the value of χ may be different from its value when the liquid has a free surface. If the liquid is in contact with another liquid, let us distinguish quantities belonging to the two liquids by suffixes. We shall then have

$$E_1 - M_1\chi_{01} = S\int_0^{\epsilon_1} (\chi_1 - \chi_{01})\rho_1 d\nu_1, \quad . \quad . \quad . \quad (8)$$

$$E_2 - M_2\chi_{02} = S\int_0^{\epsilon_2} (\chi_2 - \chi_{02})\rho_2 d\nu_2. \quad . \quad . \quad . \quad (9)$$

Adding these expressions, and dividing the second member by S, we obtain for the tension of the surface of contact of the two liquids

$$T_{1\cdot 2} = \int_0^{\epsilon_1} (\chi_1 - \chi_{01})\rho_1 d\nu_1 + \int_0^{\epsilon_2} (\chi_2 - \chi_{02})\rho_2 d\nu_2. \quad . \quad . \quad (10)$$

If this quantity is positive, the surface of contact will tend to contract, and the liquids will remain distinct. If, however, it were negative, the displacement of the liquids which tends to enlarge the surface of contact would be aided by the molecular forces, so that the liquids, if not kept separate by gravity, would at length become thoroughly mixed. No instance, however, of a phenomenon of this kind has been discovered, for those liquids which mix of themselves do so by the process of diffusion, which is a molecular motion, and not by the spontaneous puckering and replication of the bounding surface as would be the case if T were negative.

It is probable, however, that there are many cases in which the integral belonging to the less dense fluid is negative. If the denser body be solid we can often demonstrate this; for the liquid tends to spread itself over the surface of the solid, so as to increase the area of the surface of contact, even although in so doing it is obliged to increase the free surface in opposition to the surface-tension. Thus water spreads itself out on a clean surface of glass. This shows that $\int_0^\epsilon (\chi - \chi_0)\rho d\nu$ must be negative for water in contact with glass.

On the Tension of Liquid Films.—The method already given for the investigation of the surface-tension of a liquid, all whose dimensions are sensible, fails in the case of a liquid film such as a soap-bubble. In such a film it is possible that no part of the liquid may be so far from the surface as to have the potential and density corresponding to what we have called the interior of a liquid mass, and measurements of the tension of the film when drawn out to different degrees of thinness may possibly lead to an estimate of the range of the molecular forces, or at least of the depth within a liquid mass, at which its properties become sensibly uniform. We shall therefore indicate a method of investigating the tension of such films.

Let S be the area of the film, M its mass, and E its energy; σ the mass, and e the energy of unit of area; then

$$M = S\sigma, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (11)$$

$$E = Se. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (12)$$

Let us now suppose that by some change in the form of the boundary of the film its area is changed from S to $S+dS$. If its tension is T the work required to effect this increase of surface will be TdS, and the energy of the film will be increased by this amount. Hence

$$TdS = dE = Sde + ed\mathrm{S}. \quad . \quad . \quad . \quad . \quad . \quad (13)$$

But since M is constant,

$$dM = Sd\sigma + \sigma d\mathrm{S} = 0. \quad . \quad . \quad . \quad . \quad . \quad (14)$$

Eliminating dS from equations (13) and (14), and dividing by S, we find

$$T = e - \sigma\frac{de}{d\sigma}, \quad . \quad . \quad . \quad . \quad . \quad . \quad (15)$$

In this expression σ denotes the mass of unit of area of the film, and e the energy of unit of area.

If we take the axis of z normal to either surface of the film, the radius of curvature of which we suppose to be very great compared with its thickness c, and if ρ is the density, and χ the energy of unit of mass at depth z, then

$$\sigma = \int_0^c \rho dz, \quad . \quad . \quad . \quad . \quad . \quad . \quad (16)$$

and

$$e = \int_0^c \chi\rho dz, \quad . \quad . \quad . \quad . \quad . \quad . \quad (17)$$

Both ρ and χ are functions of z, the value of which remains the same when $z-c$ is substituted for z. If the thickness of the film is greater than 2ϵ, there will be a stratum of thickness $c-2\epsilon$ in the middle of the film, within which the values of ρ and χ will be ρ_0 and χ_0. In the two strata on either side of this the law, according to which ρ and χ depend on the depth, will be the same as in a liquid mass of large dimensions. Hence in this case

$$\sigma = (c-2\epsilon)\rho_0 + 2\int_0^\epsilon \rho d\nu, \quad . \quad . \quad . \quad . \quad (18)$$

$$e = (c-2\epsilon)\chi_0\rho_0 + 2\int_0^\epsilon \chi\rho d\nu, \quad . \quad . \quad . \quad . \quad (19)$$

$$\frac{d\sigma}{dc} = \rho_0, \quad \frac{de}{dc} = \chi_0\rho_0, \quad \therefore \frac{de}{d\sigma} = \chi_0,$$

$$T = 2\int_0^\epsilon \chi\rho d\nu - 2\chi_0\int_0^\epsilon \rho d\nu = 2\int_0^\epsilon (\chi - \chi_0)\rho d\nu. \quad . \quad . \quad (20)$$

Hence the tension of a thick film is equal to the sum of the tensions of its two surfaces as already calculated (equation 7). On the hypothesis of uniform density we shall find that this is true for films whose thickness exceeds ϵ.

The symbol χ is defined as the energy of unit of mass of the substance. A knowledge of the absolute value of this energy is not required, since in every expression in which it occurs it is under the

form $\chi-\chi_0$, that is to say, the difference between the energy in two different states. The only cases, however, in which we have experimental values of this quantity are when the substance is either liquid and surrounded by similar liquid, or gaseous and surrounded by similar gas. It is impossible to make direct measurements of the properties of particles of the substance within the insensible distance ϵ of the bounding surface.

When a liquid is in thermal and dynamical equilibrium with its vapour, then if ρ' and χ' are the values of ρ and χ for the vapour, and ρ_0 and χ_0 those for the liquid,

$$\chi'-\chi_0=\mathrm{JL}-p(1/\rho'-1/\rho_0), \quad . \quad . \quad . \quad . \quad (21)$$

where J is the dynamical equivalent of heat, L is the latent heat of unit of mass of the vapour, and p is the pressure. At points in the liquid very near its surface it is probable that χ is greater than χ_0, and at points in the gas very near the surface of the liquid it is probable that χ is less than χ', but this has not as yet been ascertained experimentally. We shall therefore endeavour to apply to this subject the methods used in Thermodynamics, and where these fail us we shall have recourse to the hypotheses of molecular physics.

We have next to determine the value of χ in terms of the action between one particle and another. Let us suppose that the force between two particles m and m' at the distance f is

$$\mathrm{F}=mm'(\phi(f)+\mathrm{C}f^{-2}), \quad . \quad . \quad . \quad . \quad . \quad (22)$$

being reckoned positive when the force is attractive. The actual force between the particles arises in part from their mutual gravitation, which is inversely as the square of the distance. This force is expressed by $m\,m'\,\mathrm{C}f^{-2}$. It is easy to show that a force subject to this law would not account for capillary action. We shall, therefore, in what follows, consider only that part of the force which depends on $\phi(f)$, where $\phi(f)$ is a function of f which is insensible for all sensible values of f, but which becomes sensible and even enormously great when f is exceedingly small.

If we next introduce a new function of f and write

$$\int_f^\infty \phi(f)df=\mathrm{II}(f), \quad . \quad . \quad . \quad . \quad . \quad . \quad (23)$$

then $m\,m'\,\mathrm{II}(f)$ will represent—(1) The work done by the attractive force on the particle m, while it is brought from an infinite distance from m' to the distance f from m'; or (2) The attraction of a particle m on a narrow straight rod resolved in the direction of the length of the rod, one extremity of the rod being at a distance f from m, and the other at an infinite distance, the mass of unit of length of the rod being m'. The function $\mathrm{II}(f)$ is also insensible for sensible values of f, but for insensible values of f it may become sensible and even very great.

If we next write

$$\int_z^\infty f\mathrm{II}(f)df=\psi(z), \quad . \quad . \quad . \quad . \quad . \quad . \quad (24)$$

then $2\pi m\sigma\psi(z)$ will represent—(1) The work done by the attractive force while a particle m is brought from an infinite distance to a distance z from an infinitely thin stratum of the substance whose mass per unit of area is σ; (2) The attraction of a particle m placed at a distance z from the plane surface of an infinite solid whose density is σ.

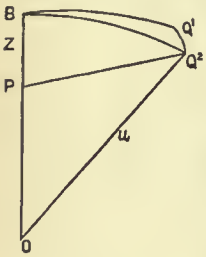

FIG. 2.

Let us examine the case in which the particle m is placed at a distance z from a curved stratum of the substance, whose principal radii of curvature are R_1 and R_2. Let P (fig. 2) be the particle and PB a normal to the surface. Let the plane of the paper be a normal section of the surface of the stratum at the point B, making an angle ω with the section whose radius of curvature is R_1. Then if O is the centre of curvature in the plane of the paper, and $\mathrm{BO}=u$,

$$\frac{1}{u}=\frac{\cos^2\omega}{\mathrm{R}_1}+\frac{\sin^2\omega}{\mathrm{R}_2}. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (25)$$

Let $\mathrm{POQ}=\theta$, $\mathrm{PO}=r$, $\mathrm{PQ}=f$, $\mathrm{BP}=z$,

$$f^2=u^2+r^2-2ur\cos\theta. \quad . \quad . \quad . \quad . \quad (26)$$

The element of the stratum at Q may be expressed by

$$\sigma u^2\sin\theta\,d\theta\,d\omega,$$

or expressing $d\theta$ in terms of df by (26),

$$\sigma ur^{-1}f\,df\,d\omega.$$

Multiplying this by m and by $\pi(f)$, we obtain for the work done by the attraction of this element when m is brought from an infinite distance to P_1,

$$m\sigma ur^{-1}f\mathrm{II}(f)df d\omega.$$

Integrating with respect to f from $f=z$ to $f=a$, where a is a line very great compared with the extreme range of the molecular force, but very small compared with either of the radii of curvature, we obtain for the work

$$\int m\sigma ur^{-1}(\psi(z)-\psi(a))d\omega,$$

and since $\psi(a)$ is an insensible quantity we may omit it. We may also write

$$ur^{-1}=1+zu^{-1}+\ \&c.,$$

since z is very small compared with u, and expressing u in terms of ω by (25), we find

$$\int_0^{2\pi} m\sigma\psi(z)\left\{1+z\left(\frac{\cos^2\omega}{\mathrm{R}_1}+\frac{\sin^2\omega}{\mathrm{R}_2}\right)\right\}d\omega=2\pi m\sigma\psi(z)\left\{1+\tfrac{1}{2}z\left(\frac{1}{\mathrm{R}_1}+\frac{1}{\mathrm{R}_2}\right)\right\}.$$

This then expresses the work done by the attractive forces when a particle m is brought from an infinite distance to the point P at a distance z from a stratum whose surface-density is σ, and whose principal radii of curvature are R_1 and R_2.

To find the work done when m is brought to the point P in the neighbourhood of a solid body, the density of which is a function of the depth ν below the surface, we have only to write instead of σ ρdz, and to integrate

$$2\pi m\int_z^\infty \rho\psi(z)dz+\pi m\left(\frac{1}{\mathrm{R}_1}+\frac{1}{\mathrm{R}_2}\right)\int_z^\infty \rho z\psi(z)dz,$$

where, in general, we must suppose ρ a function of z. This expression, when integrated, gives (1) the work done on a particle m while it is brought from an infinite distance to the point P, or (2) the attraction on a long slender column normal to the surface and terminating at P, the mass of unit of length of the column being m. In the form of the theory given by Laplace, the density of the liquid was supposed to be uniform. Hence if we write

$$\mathrm{K}=2\pi\int_0^\infty \psi(z)dz, \qquad \mathrm{H}=2\pi\int_0^\infty z\psi(z)dz,$$

the pressure of a column *of the fluid itself* terminating at the surface will be

$$\rho^2\{\mathrm{K}+\tfrac{1}{2}\mathrm{H}(1/\mathrm{R}_1+1/\mathrm{R}_2)\},$$

and the work done by the attractive forces when a particle m is brought to the surface of the fluid from an infinite distance will be

$$m\rho\{\mathrm{K}+\tfrac{1}{2}\mathrm{H}(1/\mathrm{R}_1+1/\mathrm{R}_2)\}.$$

If we write

$$\int_z^\infty \psi(z)dz=\theta(z),$$

then $2\pi m\rho\theta(z)$ will express the work done by the attractive forces, while a particle m is brought from an infinite distance to a distance z from the plane surface of a mass of the substance of density ρ and infinitely thick. The function $\theta(z)$ is insensible for all sensible values of z. For insensible values it may become sensible, but it must remain finite even when $z=0$, in which case $\theta(0)=\mathrm{K}$.

If χ' is the potential energy of unit of mass of the substance in vapour, then at a distance z from the plane surface of the liquid

$$\chi=\chi'-2\pi\rho\theta(z).$$

At the surface

$$\chi=\chi'-2\pi\rho\theta(0).$$

At a distance z within the surface

$$\chi=\chi'-4\pi\rho\theta(0)+2\pi\rho\theta(z).$$

If the liquid forms a stratum of thickness c, then

$$\chi=\chi'-4\pi\rho\theta(0)+2\pi\rho\theta(z)+2\pi\rho\theta(z-c).$$

The surface-density of this stratum is $\sigma=c\rho$. The energy per unit of area is

$$e=\int_0^c \chi\rho dz=c\rho(\chi'-4\pi\rho\theta(0))+2\pi\rho^2\int_0^c\theta(z)dz+2\pi\rho^2\int_c^c\theta(c-z)dz.$$

Since the two sides of the stratum are similar the last two terms are equal, and

$$e=c\rho(\chi'-4\pi\rho\theta(0))+4\pi\rho^2\int_0^c\theta(z)dz.$$

Differentiating with respect to c, we find

$$\frac{d\sigma}{dc}=\rho, \quad \frac{de}{dc}=\rho(\chi'-4\pi\rho\theta(0))+4\pi\rho^2\theta(c).$$

Hence the surface-tension

$$\mathrm{T}=e-\sigma\frac{de}{d\sigma}=4\pi\rho^2\left(\int_0^c\theta(z)dz-c\theta(c)\right).$$

Integrating the first term within brackets by parts, it becomes

$$c\theta(c)-0\theta(0)-\int_0^c z\frac{d\theta}{dz}dz.$$

Remembering that $\theta(0)$ is a finite quantity, and that $\frac{d\theta}{dz}=-\psi(z)$, we find

$$\mathrm{T}=4\pi\rho^2\int_0^c z\psi(z)dz. \quad . \quad . \quad . \quad . \quad . \quad . \quad (27)$$

When c is greater than ϵ this is equivalent to 2H in the equation of Laplace. Hence the tension is the same for all films thicker than ϵ, the range of the molecular forces. For thinner films

$$\frac{d\mathrm{T}}{dc}=4\pi\rho^2c\psi(c).$$

Hence if $\psi(c)$ is positive, the tension and the thickness will increase together. Now $2\pi m\rho\psi(c)$ represents the attraction between a particle m and the plane surface of an infinite mass of the liquid, when the distance of the particle outside the surface is c. Now, the force between the particle and the liquid is certainly, on the whole, attractive; but if between any two small values of c it should be repulsive, then for films whose thickness lies between these values the tension will increase as the thickness diminishes, but for all other cases the tension will diminish as the thickness diminishes.

We have given several examples in which the density is assumed to be uniform, because Poisson has asserted that capillary

phenomena would not take place unless the density varied rapidly near the surface. In this assertion we think he was mathematically wrong, though in his own hypothesis that the density does actually vary, he was probably right. In fact, the quantity $4\pi\rho^2 K$, which we may call with van der Waals the molecular pressure, is so great for most liquids (5000 atmospheres for water), that in the parts near the surface, where the molecular pressure varies rapidly, we may expect considerable variation of density, even when we take into account the smallness of the compressibility of liquids.

The pressure at any point of the liquid arises from two causes, the external pressure P to which the liquid is subjected, and the pressure arising from the mutual attraction of its molecules. If we suppose that the number of molecules within the range of the attraction of a given molecule is very large, the part of the pressure arising from attraction will be proportional to the square of the number of molecules in unit of volume, that is, to the square of the density. Hence we may write

$$p = P + A\rho^2,$$

where A is a constant [equal to Laplace's intrinsic pressure K. But this equation is applicable only at points in the interior, where ρ is not varying.]

[The intrinsic pressure and the surface-tension of a uniform mass are perhaps more easily found by the following process. The former can be found at once by calculating the mutual attraction of the parts of a large mass which lie on opposite sides of an imaginary plane interface. If the density be σ, the attraction between the whole of one side and a layer upon the other distant z from the plane and of thickness dz is $2\pi\sigma^2\psi(z)dz$, reckoned per unit of area. The expression for the intrinsic pressure is thus simply

$$K = 2\pi\sigma^2\int_0^\infty \psi(z)dz. \quad \ldots\ldots\ldots \quad (28)$$

In Laplace's investigation σ is supposed to be unity. We may call the value which (28) then assumes K_0, so that as above

$$K_0 = 2\pi\int_0^\infty \psi(z)dz. \quad \ldots\ldots\ldots \quad (29)$$

The expression for the superficial tension is most readily found with the aid of the idea of superficial energy, introduced into the subject by Gauss. Since the tension is constant, the work that must be done to extend the surface by one unit of area measures the tension, and the work required for the generation of any surface is the product of the tension and the area. From this consideration we may derive Laplace's expression, as has been done by Dupré (*Théorie mécanique de la chaleur*, Paris, 1869), and Kelvin ("Capillary Attraction," *Proc. Roy. Inst.*, January 1886. Reprinted, *Popular Lectures and Addresses*, 1889). For imagine a small cavity to be formed in the interior of the mass and to be gradually expanded in such a shape that the walls consist almost entirely of two parallel planes. The distance between the planes is supposed to be very small compared with their ultimate diameters, but at the same time large enough to exceed the range of the attractive forces. The work required to produce this crevasse is twice the product of the tension and the area of one of the faces. If we now suppose the crevasse produced by direct separation of its walls, the work necessary must be the same as before, the initial and final configurations being identical; and we recognize that the tension may be measured by half the work that must be done per unit of area against the mutual attraction in order to separate the two portions which lie upon opposite sides of an ideal plane to a distance from one another which is outside the range of the forces. It only remains to calculate this work.

If σ_1, σ_2 represent the densities of the two infinite solids, their mutual attraction at distance z is per unit of area,

$$2\pi\sigma_1\sigma_2\int_z^\infty \psi(z)dz, \quad \ldots\ldots\ldots \quad (30)$$

or $2\pi\sigma_1\sigma_2\theta(z)$, if we write

$$\int_z^\infty \psi(z)dz = \theta(z). \quad \ldots\ldots\ldots \quad (31)$$

The work required to produce the separation in question is thus

$$2\pi\sigma_1\sigma_2\int_0^\infty \theta(z)dz; \quad \ldots\ldots\ldots \quad (32)$$

and for the tension of a liquid of density σ we have

$$T = \pi\sigma^2\int_0^\infty \theta(z)dz. \quad \ldots\ldots\ldots \quad (33)$$

The form of this expression may be modified by integration by parts. For

$$\int\theta(z)dz = \theta(z).z - \int z\frac{d\theta(z)}{dz}dz = \theta(z).z + \int z\psi(z)dz.$$

Since $\theta(0)$ is finite, proportional to K, the integrated term vanishes at both limits, and we have simply

$$\int_0^\infty \theta(z)dz = \int_0^\infty z\psi(z)dz, \quad \ldots\ldots \quad (34)$$

and

$$T = \pi\sigma^2\int_0^\infty z\psi(z)dz. \quad \ldots\ldots\ldots \quad (35)$$

In Laplace's notation the second member of (34), multiplied by 2π, is represented by H.

As Laplace has shown, the values for K and T may also be expressed in terms of the function ϕ, with which we started. Integrating by parts, we get

$$\int\psi(z)dz = z\psi(z) + \tfrac{1}{2}z^2\Pi(z) + \tfrac{1}{2}\int z^2\phi(z)dz,$$
$$\int z\psi(z)dz = \tfrac{1}{2}z^2\psi(z) + \tfrac{1}{4}z^4\Pi(z) + \tfrac{1}{8}\int z^4\phi(z)dz.$$

In all cases to which it is necessary to have regard the integrated terms vanish at both limits, and we may write

$$\int_0^\infty \psi(z)dz = \tfrac{1}{2}\int_0^\infty z^2\phi(z)dz, \quad \int_0^\infty z\psi(z)dz = \tfrac{1}{8}\int_0^\infty z^4\phi(z)dz; \quad (36)$$

so that

$$K_0 = \frac{2\pi}{3}\int_0^\infty z^3\phi(z)dz, \quad T_0 = \frac{\pi}{8}\int_0^\infty z^4\phi(z)dz. \quad \ldots\ldots \quad (37)$$

A few examples of these formulae will promote an intelligent comprehension of the subject. One of the simplest suppositions open to us is that

$$\phi(f) = e^{-\beta f}. \quad \ldots\ldots\ldots \quad (38)$$

From this we obtain

$$\Pi(z) = \beta^{-1}e^{-\beta z}, \quad \psi(z) = \beta^{-2}(\beta z + 1)e^{-\beta z}, \quad \ldots \quad (39)$$
$$K_0 = 4\pi\beta^{-4}, \quad T_0 = 3\pi\beta^{-5}. \quad \ldots\ldots \quad (40)$$

The range of the attractive force is mathematically infinite, but practically of the order β^{-1}, and we see that T is of higher order in this small quantity than K. That K is in all cases of the fourth order and T of the fifth order in the range of the forces is obvious from (37) without integration.

An apparently simple example would be to suppose $\phi(z) = z^n$. We get

$$\Pi(z) = -\frac{z^{n+1}}{n+1}, \quad \psi(z) = \frac{z^{n+2}}{n+3.n+1},$$
$$K_0 = \frac{2\pi z^{n+4}}{n+4.n+3.n+1}\Big|_0^\infty \quad \ldots\ldots \quad (41)$$

The intrinsic pressure will thus be infinite whatever n may be. If $n+4$ be positive, the attraction of infinitely distant parts contributes to the result; while if $n+4$ be negative, the parts in immediate contiguity act with infinite power. For the transition case, discussed by William Sutherland (*Phil. Mag.* xxiv. p. 113, 1887), of $n+4=0$, K_0 is also infinite. It seems therefore that nothing satisfactory can be arrived at under this head.

As a third example, we will take the law proposed by Young, viz.

$$\left.\begin{aligned} \phi(z) &= 1 \text{ from } z=0 \text{ to } z=a, \\ \phi(z) &= 0 \text{ from } z=a \text{ to } z=\infty; \end{aligned}\right\} \quad \ldots\ldots \quad (42)$$

and corresponding therewith,

$$\left.\begin{aligned} \Pi(z) &= a - z \text{ from } z=0 \text{ to } z=a, \\ \Pi(z) &= 0 \quad \text{from } z=a \text{ to } z=\infty, \end{aligned}\right\} \quad \ldots \quad (43)$$

$$\left.\begin{aligned} \psi(z) &= \tfrac{1}{2}a(a^2 - z^2) - \tfrac{1}{3}(a^3 - z^3) \\ &\quad \text{from } z=0 \text{ to } z=a, \\ \psi(z) &= 0 \quad \text{from } z=a \text{ to } z=\infty, \end{aligned}\right\} \quad \ldots \quad (44)$$

Equations (37) now give

$$K_0 = \frac{2\pi}{3}\int_0^a z^3dz = \frac{\pi a^4}{6}, \quad \ldots\ldots\ldots \quad (45)$$

$$T_0 = \frac{\pi}{8}\int_0^a z^4dz = \frac{\pi a^5}{40}. \quad \ldots\ldots\ldots \quad (46)$$

The numerical results differ from those of Young, who finds that "*the contractile force is one-third of the whole cohesive force of a stratum of particles, equal in thickness to the interval to which the primitive equable cohesion extends*," viz. $T = \frac{1}{3}aK$; whereas according to the above calculation $T = \frac{4}{15}aK$. The discrepancy seems to depend upon Young having treated the attractive force as operative in one direction only. For further calculations on Laplace's principles, see Rayleigh, *Phil. Mag.*, Oct. Dec. 1890, or *Scientific Papers*, vol. iii. p. 397.]

On Surface-Tension

Definition.—*The tension of a liquid surface across any line drawn on the surface is normal to the line, and is the same for all directions of the line, and is measured by the force across an element of the line divided by the length of that element.*

Experimental Laws of Surface-Tension.—1. For any given liquid surface, as the surface which separates water from air, or oil from water, the surface-tension is the same at every point of the surface and in every direction. It is also practically independent of the curvature of the surface, although it appears from the mathematical theory that there is a slight increase of tension where the mean curvature of the surface is concave, and a slight diminution where it is convex. The amount of this increase and diminution is too small to be directly measured, though it has a certain theoretical importance in the explanation of the equilibrium of the superficial layer of the liquid where it is inclined to the horizon.

2. The surface-tension diminishes as the temperature rises, and when the temperature reaches that of the critical point at which the distinction between the liquid and its vapour ceases, it has been observed by Andrews that the capillary action also vanishes. The early writers on capillary action supposed that the diminution of capillary action was due simply to the change of density corresponding to the rise of temperature, and, therefore, assuming the surface-tension to vary as the square of the

density, they deduced its variations from the observed dilatation of the liquid by heat. This assumption, however, does not appear to be verified by the experiments of Brunner and Wolff on the rise of water in tubes at different temperatures.

3. The tension of the surface separating two liquids which do not mix cannot be deduced by any known method from the tensions of the surfaces of the liquids when separately in contact with air.

When the surface is curved, the effect of the surface-tension is to make the pressure on the concave side exceed the pressure on the convex side by $T(1/R_1 + 1/R_2)$, where T is the intensity of the surface-tension and R_1, R_2 are the radii of curvature of any two sections normal to the surface and to each other.

If three fluids which do not mix are in contact with each other, the three surfaces of separation meet in a line, straight or curved. Let O (fig. 3) be a point in this line, and let the plane of the paper be supposed to be normal to the line at the point O. The three angles between the tangent planes to the three surfaces of separation at the point O are completely determined by the tensions of the three surfaces. For if in the triangle *abc* the side *ab* is taken so as to represent on a given scale the tension of the surface of contact of the fluids *a* and *b*, and if the other sides *bc* and *ca* are taken so as to represent on the same scale the tensions of the surfaces between *b* and *c* and between *c* and *a* respectively, then the condition of equilibrium at O for the corresponding tensions R, P and Q is that the angle ROP shall be the supplement of *abc*, POQ of *bca*, and, therefore, QOR of *cab*. Thus the angles at which the surfaces of separation meet are the same at all parts of the line of concourse of the three fluids. When three films of the same liquid meet, their tensions are equal, and, therefore, they make angles of 120° with each other. The froth of soap-suds or beaten-up eggs consists of a multitude of small films which meet each other at angles of 120°.

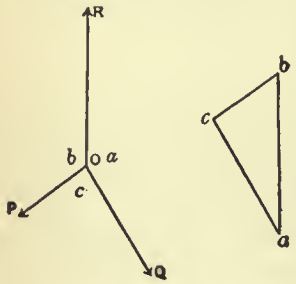

FIG. 3.

If four fluids, *a*, *b*, *c*, *d*, meet in a point O, and if a tetrahedron ABCD is formed so that its edge AB represents the tension of the surface of contact of the liquids *a* and *b*, BC that of *b* and *c*, and so on; then if we place this tetrahedron so that the face ABC is normal to the tangent at O to the line of concourse of the fluids *abc*, and turn it so that the edge AB is normal to the tangent plane at O to the surface of contact of the fluids *a* and *b*, then the other three faces of the tetrahedron will be normal to the tangents at O to the other three lines of concourse of the liquids, and the other five edges of the tetrahedron will be normal to the tangent planes at O to the other five surfaces of contact.

If six films of the same liquid meet in a point the corresponding tetrahedron is a regular tetrahedron, and each film, where it meets the others, has an angle whose cosine is $-\frac{1}{3}$. Hence if we take two nets of wire with hexagonal meshes, and place one on the other so that the point of concourse of three hexagons of one net coincides with the middle of a hexagon of the other, and if we then, after dipping them in Plateau's liquid, place them horizontally, and gently raise the upper one, we shall develop a system of plane laminae arranged as the walls and floors of the cells are arranged in a honeycomb. We must not, however, raise the upper net too much, or the system of films will become unstable.

When a drop of one liquid, B, is placed on the surface of another, A, the phenomena which take place depend on the relative magnitude of the three surface-tensions corresponding to the surface between A and air, between B and air, and between A and B. If no one of these tensions is greater than the sum of the other two, the drop will assume the form of a lens, the angles which the upper and lower surfaces of the lens make with the free surface of A and with each other being equal to the external angles of the triangle of forces. Such lenses are often seen formed by drops of fat floating on the surface of hot water, soup or gravy. But when the surface-tension of A exceeds the sum of the tensions of the surfaces of contact of B with air and with A, it is impossible to construct the triangle of forces, so that equilibrium becomes impossible. The edge of the drop is drawn out by the surface-tension of A with a force greater than the sum of the tensions of the two surfaces of the drop. The drop, therefore, spreads itself out, with great velocity, over the surface of A till it covers an enormous area, and is reduced to such extreme tenuity that it is not probable that it retains the same properties of surface-tension which it has in a large mass. Thus a drop of train oil will spread itself over the surface of the sea till it shows the colours of thin plates. These rapidly descend in Newton's scale and at last disappear, showing that the thickness of the film is less than the tenth part of the length of a wave of light. But even when thus attenuated, the film may be proved to be present, since the surface-tension of the liquid is considerably less than that of pure water. This may be shown by placing another drop of oil on the surface. This drop will not spread out like the first drop, but will take the form of a flat lens with a distinct circular edge, showing that the surface-tension of what is still apparently pure water is now less than the sum of the tensions of the surfaces separating oil from air and water.

The spreading of drops on the surface of a liquid has formed the subject of a very extensive series of experiments by Charles Tomlinson; van der Mensbrugghe has also written a very complete memoir on this subject (*Sur la tension superficielle des liquides*, Bruxelles, 1873).

When a solid body is in contact with two fluids, the surface of the solid cannot alter its form, but the angle at which the surface of contact of the two fluids meets the surface of the solid depends on the values of the three surface-tensions. If *a* and *b* are the two fluids and *c* the solid then the equilibrium of the tensions at the point O depends only on that of thin components parallel to the surface, because the surface-tensions normal to the surface are balanced by the resistance of the solid. Hence if the angle ROQ (fig. 4) at which the surface of contact OP meets the solid is denoted by α,

$$T_{bc} - T_{ca} - T_{ab}\cos\alpha = 0,$$

Whence

$$\cos\alpha = (T_{bc} - T_{ca})/T_{ab}.$$

FIG. 4.

As an experiment on the angle of contact only gives us the difference of the surface-tensions at the solid surface, we cannot determine their actual value. It is theoretically probable that they are often negative, and may be called surface-pressures.

The constancy of the angle of contact between the surface of a fluid and a solid was first pointed out by Dr Young, who states that the angle of contact between mercury and glass is about 140°. Quincke makes it 128° 52′.

If the tension of the surface between the solid and one of the fluids exceeds the sum of the other two tensions, the point of contact will not be in equilibrium, but will be dragged towards the side on which the tension is greatest. If the quantity of the first fluid is small it will stand in a drop on the surface of the solid without wetting it. If the quantity of the second fluid is small it will spread itself over the surface and wet the solid. The angle of contact of the first fluid is 180° and that of the second is zero.

If a drop of alcohol be made to touch one side of a drop of oil on a glass plate, the alcohol will appear to chase the oil over the plate, and if a drop of water and a drop of bisulphide of carbon be placed in contact in a horizontal capillary tube, the bisulphide of carbon will chase the water along the tube. In both cases the liquids move in the direction in which the surface-pressure at the solid is least.

[In order to express the dependence of the tension at the interface of two bodies in terms of the forces exercised by the bodies upon themselves and upon one another, we cannot do better than follow the method of Dupré. If T_{12} denote the interfacial tension, the energy corresponding to unit of area of the interface

is also T_{12}, as we see by considering the introduction (through a fine tube) of one body into the interior of the other. A comparison with another method of generating the interface, similar to that previously employed when but one body was in question, will now allow us to evaluate T_{12}.

The work required to cleave asunder the parts of the first fluid which lie on the two sides of an ideal plane passing through the interior, is per unit of area $2T_1$, and the free surface produced is two units in area. So for the second fluid the corresponding work is $2T_2$. This having been effected, let us now suppose that each of the units of area of free surface of fluid (1) is allowed to approach normally a unit area of (2) until contact is established. In this process work is gained which we may denote by $4T'_{12}$, $2T'_{12}$ for each pair. On the whole, then, the work expended in producing two units of interface is $2T_1+2T_2-4T'_{12}$, and this, as we have seen, may be equated to $2T_{12}$. Hence

$$T_{12}=T_1+T_2-2T'_{12}. \quad . \quad . \quad . \quad . \quad . \quad (47)$$

If the two bodies are similar,

$$T_1=T_2=T'_{12};$$

and $T_{12}=0$, as it should do.

Laplace does not treat systematically the question of interfacial tension, but he gives incidentally in terms of his quantity H a relation analogous to (47).

If $2T'_{12}>T_1+T_2$, T_{12} would be negative, so that the interface would of itself tend to increase. In this case the fluids must mix. Conversely, if two fluids mix, it would seem that T'_{12} must exceed the mean of T_1 and T_2; otherwise work would have to be *expended* to effect a close alternate stratification of the two bodies, such as we may suppose to constitute a first step in the process of mixture (Dupré, *Théorie mécanique de la chaleur*, p. 372; Kelvin, *Popular Lectures*, p. 53).

The value of T'_{12} has already been calculated (32). We may write

$$T'_{12}=\pi\sigma_1\sigma_2\int_0^\infty \theta(z)dz=\tfrac{1}{4}\pi\sigma_1\sigma_2\int_0^\infty z^4\phi(z)dz; \quad . \quad . \quad (48)$$

and in general the functions θ, or ϕ, must be regarded as capable of assuming different forms. Under these circumstances there is no limitation upon the values of the interfacial tensions for three fluids, which we may denote by T_{12}, T_{23}, T_{31}. If the three fluids can remain in contact with one another, the sum of any two of the quantities must exceed the third, and by Neumann's rule the directions of the interfaces at the common edge must be parallel to the sides of a triangle, taken proportional to T_{12}, T_{23}, T_{31}. If the above-mentioned condition be not satisfied, the triangle is imaginary, and the three fluids cannot rest in contact, the two weaker tensions, even if acting in full concert, being incapable of balancing the strongest. For instance, if $T_{31}>T_{12}+T_{23}$, the second fluid spreads itself indefinitely upon the interface of the first and third fluids.

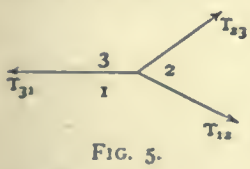

FIG. 5.

The experimenters who have dealt with this question, C. G. M. Marangoni, van der Mensbrugghe, Quincke, have all arrived at results inconsistent with the reality of Neumann's triangle. Thus Marangoni says (*Pogg. Annalen*, cxliii. p. 348, 1871):—"Die gemeinschaftliche Oberfläche zweier Flüssigkeiten hat eine geringere Oberflächenspannung als die Differenz der Oberflächenspannung der Flüssigkeiten selbst (mit Ausnahme des Quecksilbers)." Three pure bodies (of which one may be air) cannot accordingly remain in contact. If a drop of oil stands in lenticular form upon a surface of water, it is because the water-surface is already contaminated with a greasy film.

On the theoretical side the question is open until we introduce some limitation upon the generality of the functions. By far the simplest supposition open to us is that the functions are the same in all cases, the attractions differing merely by coefficients analogous to densities in the theory of gravitation. This hypothesis was suggested by Laplace, and may conveniently be named after him. It was also tacitly adopted by Young, in connexion with the still more special hypothesis which Young probably had in view, namely that the force in each case was constant within a limited range, the same in all cases, and vanished outside that range.

As an immediate consequence of this hypothesis we have from (28)

$$K=K_0\sigma^2, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (49)$$
$$T=T_0\sigma^2, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (50)$$

where K_0, T_0 are the same for all bodies.

But the most interesting results are those which Young (*Works*, vol. i. p. 463) deduced relative to the interfacial tensions of three bodies. By (37), (48),

$$T'_{12}=\sigma_1\sigma_2T_0; \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (51)$$

so that by (47), (50),

$$T_{12}=(\sigma_1-\sigma_2)^2T_0 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (52)$$

According to (52), the interfacial tension between any two bodies is proportional to the square of the difference of their densities. The densities σ_1, σ_2, σ_3 being in descending order of magnitude, we may write

$$T_{31}=(\sigma_1-\sigma_2+\sigma_2-\sigma_3)^2T_0$$
$$=T_{12}+T_{23}+2(\sigma_1-\sigma_2)\ (\sigma_2-\sigma_3)T_0;$$

so that T_{31} necessarily exceeds the sum of the other two interfacial tensions. We are thus led to the important conclusion that according to this hypothesis Neumann's triangle is necessarily imaginary, that one of three fluids will always spread upon the interface of the other two.

Another point of importance may be easily illustrated by this theory, viz. the dependency of capillarity upon abruptness of transition. "The reason why the capillary force should disappear when the transition between two liquids is sufficiently gradual will now be evident. Suppose that the transition from 0 to σ is made in two equal steps, the thickness of the intermediate layer of density $\frac{1}{2}\sigma$ being large compared to the range of the molecular forces, but small in comparison with the radius of curvature. At each step the difference of capillary pressure is only one-quarter of that due to the sudden transition from 0 to σ, and thus altogether half the effect is lost by the interposition of the layer. If there were three equal steps, the effect would be reduced to one-third, and so on. When the number of steps is infinite, the capillary pressure disappears altogether." ("Laplace's Theory of Capillarity," Rayleigh, *Phil. Mag.*, 1883, p. 315.)

According to Laplace's hypothesis the whole energy of any number of contiguous strata of liquids is least when they are arranged in order of density, so that this is the disposition favoured by the attractive forces. The problem is to make the sum of the interfacial tensions a minimum, each tension being proportional to the square of the difference of densities of the two contiguous liquids in question. If the order of stratification differ from that of densities, we can show that each step of approximation to this order lowers the sum of tensions. To this end consider the effect of the abolition of a stratum σ_{n+1}, contiguous to σ_n and σ_{n+2}. Before the change we have $(\sigma_n-\sigma_{n+1})^2+(\sigma_{n+1}-\sigma_{n+2})^2$, and afterwards $(\sigma_n-\sigma_{n+2})^2$. The second *minus* the first, or the increase in the sum of tensions, is thus

$$2(\sigma_n-\sigma_{n+1})\ (\sigma_{n+1}-\sigma_{n+2}).$$

Hence, if σ_{n+1} be intermediate in magnitude between σ_n and σ_{n+2}, the sum of tensions is increased by the abolition of the stratum; but, if σ_{n+1} be not intermediate, the sum is decreased. We see, then, that the removal of a stratum from between neighbours where it is out of order and its introduction between neighbours where it will be in order is doubly favourable to the reduction of the sum of tensions; and since by a succession of such steps we may arrive at the order of magnitude throughout, we conclude that this is the disposition of minimum tensions and energy.

So far the results of Laplace's hypothesis are in marked accordance with experiment; but if we follow it out further, discordances begin to manifest themselves. According to (52)

$$\sqrt{T_{31}}=\sqrt{T_{12}}+\sqrt{T_{23}}, \quad . \quad . \quad . \quad . \quad . \quad (53)$$

a relation not verified by experiment. What is more, (52) shows that according to the hypothesis T_{12} is necessarily positive;

so that, if the preceding argument be correct, no such thing as mixture of two liquids could ever take place.

There are two apparent exceptions to Marangoni's rule which call for a word of explanation. According to the rule, water, which has the lower surface-tension, should spread upon the surface of mercury; whereas the universal experience of the laboratory is that drops of water standing upon mercury retain their compact form without the least tendency to spread. To Quincke belongs the credit of dissipating the apparent exception. He found that mercury specially prepared behaves quite differently from ordinary mercury, and that a drop of water deposited thereon spreads over the entire surface. The ordinary behaviour is evidently the result of a film of grease, which adheres with great obstinacy.

The process described by Quincke is somewhat elaborate; but there is little difficulty in repeating the experiment if the mistake be avoided of using a free surface already contaminated, as almost inevitably happens when the mercury is poured from an ordinary bottle. The mercury should be drawn from underneath, for which purpose an arrangement similar to a chemical wash bottle is suitable, and it may be poured into watch-glasses, previously dipped into strong sulphuric acid, rinsed in distilled water, and dried over a Bunsen flame. When the glasses are cool, they may be charged with mercury, of which the first part is rejected. Operating in this way there is no difficulty in obtaining surfaces upon which a drop of water spreads, although from causes that cannot always be traced, a certain proportion of failures is met with. As might be expected, the grease which produces these effects is largely volatile. In many cases a very moderate preliminary warming of the watch-glasses makes all the difference in the behaviour of the drop.

The behaviour of a drop of carbon bisulphide placed upon clean water is also, at first sight, an exception to Marangoni's rule. So far from spreading over the surface, as according to its lower surface-tension it ought to do, it remains suspended in the form of a lens. Any dust that may be lying upon the surface is not driven away to the edge of the drop, as would happen in the case of oil. A simple modification of the experiment suffices, however, to clear up the difficulty. If after the deposition of the drop, a little lycopodium be scattered over the surface, it is seen that a circular space surrounding the drop, of about the size of a shilling, remains bare, and this, however often the dusting be repeated, so long as any of the carbon bisulphide remains. The interpretation can hardly be doubtful. The carbon bisulphide is really spreading all the while, but on account of its volatility is unable to reach any considerable distance. Immediately surrounding the drop there is a film moving outwards at a high speed, and this carries away almost instantaneously any dust that may fall upon it. The phenomenon above described requires that the water-surface be clean. If a very little grease be present, there is no outward flow and dust remains undisturbed in the immediate neighbourhood of the drop.]

On the Rise of a Liquid in a Tube.—Let a tube (fig. 6) whose internal radius is r, made of a solid substance c, be dipped into a liquid a. Let us suppose that the angle of contact for this liquid with the solid c is an acute angle. This implies that the tension of the free surface of the solid c is greater than that of the surface of contact of the solid with the liquid a. Now consider the tension of the free surface of the liquid a. All round its edge there is a tension T acting at an angle α with the vertical. The circumference of the edge is $2\pi r$, so that the resultant of this tension is a force $2\pi r\mathrm{T}\cos\alpha$ acting vertically upwards on the liquid. Hence the liquid will rise in the tube till the weight of the vertical column between the free surface and the level of the liquid in the vessel balances the resultant of the surface-tension. The upper surface of this column is not level, so that the height of the column cannot be directly measured, but let us assume that h is the mean height of the column, that is to say, the height of a column of equal weight, but with a flat top. Then if r is the radius of the tube at the top of the column, the volume of the suspended column is $\pi r^2 h$, and its weight is $\pi\rho g r^2 h$, when ρ is its density and g the intensity of gravity. Equating this force with the resultant of the tension

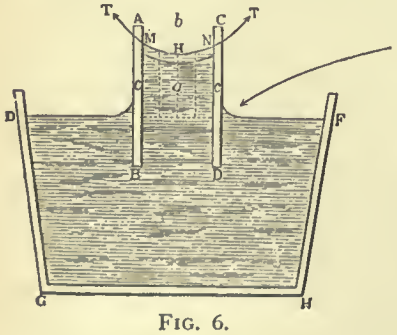

FIG. 6.

$$\pi\rho g r^2 h = 2\pi r\mathrm{T}\cos\alpha,$$

or

$$h = 2\mathrm{T}\cos\alpha/\rho g r.$$

Hence the mean height to which the fluid rises is inversely as the radius of the tube. For water in a clean glass tube the angle of contact is zero, and

$$h = 2\mathrm{T}/\rho g r.$$

For mercury in a glass tube the angle of contact is 128° 52′, the cosine of which is negative. Hence when a glass tube is dipped into a vessel of mercury, the mercury within the tube stands at a lower level than outside it.

Rise of a Liquid between Two Plates.—When two parallel plates are placed vertically in a liquid the liquid rises between them. If we now suppose fig. 6 to represent a vertical section perpendicular to the plates, we may calculate the rise of the liquid. Let l be the breadth of the plates measured perpendicularly to the plane of the paper, then the length of the line which bounds the wet and the dry parts of the plates inside is l for each surface, and on this the tension T acts at an angle α to the vertical. Hence the resultant of the surface-tension is $2l$ T cos α. If the distance between the inner surfaces of the plates is a, and if the mean height of the film of fluid which rises between them is h, the weight of fluid raised is $\rho ghla$. Equating the forces—

$$\rho ghla = 2l\mathrm{T}\cos\alpha,$$

whence

$$h = 2\mathrm{T}\cos\alpha/\rho g a.$$

This expression is the same as that for the rise of a liquid in a tube, except that instead of r, the radius of the tube, we have a the distance of the plates.

Form of the Capillary Surface.—The form of the surface of a liquid acted on by gravity is easily determined if we assume that near the part considered the line of contact of the surface of the liquid with that of the solid bounding it is straight and horizontal, as it is when the solids which constrain the liquid are bounded by surfaces formed by horizontal and parallel generating lines. This will be the case, for instance, near a flat plate dipped into the liquid. If we suppose these generating lines to be normal to the plane of the paper, then all sections of the solids parallel to this plane will be equal and similar to each other, and the section of the surface of the liquid will be of the same form for all such sections.

Let us consider the portion of the liquid between two parallel sections distant one unit of length. Let P_1, P_2 (fig. 7) be two points of the surface; θ_1, θ_2 the inclination of the surface to the horizon at P_1 and P_2; y_1, y_2 the heights of P_1 and P_2 above the level of the liquid at a distance from all solid bodies. The pressure at any point of the liquid which is above this level is negative unless another fluid as, for instance, the air, presses on the upper surface, but it is only the difference of pressures with which we have to do, because two equal pressures on opposite sides of the surface produce no effect.

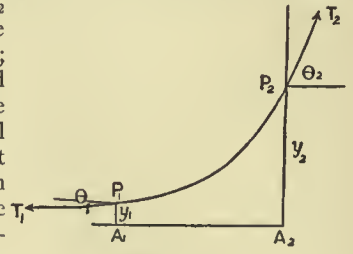

FIG. 7.

We may, therefore, write for the pressure at a height y

$$p = -\rho g y,$$

where ρ is the density of the liquid, or if there are two fluids the excess of the density of the lower fluid over that of the upper one.

The forces acting on the portion of liquid $P_1P_2A_2A_1$ are—first, the horizontal pressures, $-\frac{1}{2}\rho g y_1^2$ and $\frac{1}{2}\rho g y_2^2$; second, the surface-tension T acting at P_1 and P_2 in directions inclined θ_1 and θ_2 to the horizon. Resolving horizontally we find—

$$T(\cos\theta_2-\cos\theta_1)+\tfrac{1}{2}g\rho(y_2^2-y_1^2)=0,$$

whence

$$\cos\theta_2=\cos\theta_1+\frac{g\rho y_1^2}{2T}-\frac{g\rho y_2^2}{2T},$$

or if we suppose P_1 fixed and P_2 variable, we may write

$$\cos\theta=\text{constant}-\tfrac{1}{2}g\rho y^2/T.$$

This equation gives a relation between the inclination of the curve to the horizon and the height above the level of the liquid.

Resolving vertically we find that the weight of the liquid raised above the level must be equal to $T(\sin\theta_2-\sin\theta_1)$, and this is therefore equal to the area $P_1P_2A_2A_1$ multiplied by $g\rho$. The form of the capillary surface is identical with that of the "elastic curve," or the curve formed by a uniform spring originally straight, when its ends are acted on by equal and opposite forces applied either to the ends themselves or to solid pieces attached to them. Drawings of the different forms of the curve may be found in Thomson and Tait's *Natural Philosophy*, vol. i. p. 455.

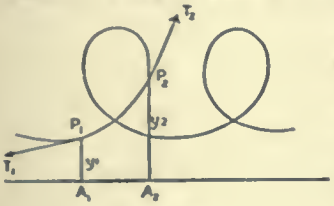

FIG. 8.

We shall next consider the rise of a liquid between two plates of different materials for which the angles of contact are α_1 and α_2, the distance between the plates being a, a small quantity. Since the plates are very near one another we may use the following equation of the surface as an approximation:—

$$y=h_1+Ax+Bx^2,\quad h_2=h_1+Aa+Ba^2,$$

whence

$$\cot\alpha_1=-A,\ \cot\alpha_2=A+2Ba$$
$$T(\cos\alpha_1+\cos\alpha_2)=\rho ga(h_1+\tfrac{1}{2}Aa+\tfrac{1}{3}Ba^2),$$

whence we obtain

$$h_1=\frac{T}{\rho ga}(\cos\alpha_1+\cos\alpha_2)+\frac{a}{6}(2\cot\alpha_1-\cot\alpha_2)$$
$$h_2=\frac{T}{\rho ga}(\cos\alpha_1+\cos\alpha_2)+\frac{a}{6}(2\cot\alpha_2-\cot\alpha_1).$$

Let X be the force which must be applied in a horizontal direction to either plate to keep it from approaching the other, then the forces acting on the first plate are T+X in the negative direction, and $T\sin\alpha_1+\frac{1}{2}g\rho h_1^2$ in the positive direction. Hence

$$X=\tfrac{1}{2}g\rho h_1^2-T(1-\sin\alpha_1).$$

For the second plate

$$X=\tfrac{1}{2}g\rho h_2^2-T(1-\sin\alpha_2).$$

Hence

$$X=\tfrac{1}{2}g\rho(h_1^2+h_2^2)-T\{1-\tfrac{1}{2}(\sin\alpha_1+\sin\alpha_2)\},$$

or, substituting the values of h_1 and h_2,

$$X=\frac{1}{2}\frac{T^2}{\rho ga^2}(\cos\alpha_1+\cos\alpha_2)^2$$
$$-T\{1-\tfrac{1}{2}(\sin\alpha_1+\sin\alpha_2)-\tfrac{1}{12}(\cos\alpha_1+\cos\alpha_2)(\cot\alpha_1+\cot\alpha_2)\},$$

the remaining terms being negligible when a is small. The force, therefore, with which the two plates are drawn together consists first of a positive part, or in other words an attraction, varying inversely as the square of the distance, and second, of a negative part of repulsion independent of the distance. Hence in all cases except that in which the angles α_1 and α_2 are supplementary to each other, the force is attractive when a is small enough, but when $\cos\alpha_1$ and $\cos\alpha_2$ are of different signs, as when the liquid is raised by one plate, and depressed by the other, the first term may be so small that the repulsion indicated by the second term comes into play. The fact that a pair of plates which repel one another at a certain distance may attract one another at a smaller distance was deduced by Laplace from theory, and verified by the observations of the abbé Haüy.

A Drop between Two Plates.—If a small quantity of a liquid which wets glass be introduced between two glass plates slightly inclined to each other, it will run towards that part where the glass plates are nearest together. When the liquid is in equilibrium it forms a thin film, the outer edge of which is all of the same thickness. If d is the distance between the plates at the edge of the film and H the atmospheric pressure, the pressure of the liquid in the film is $H-\frac{2T\cos\alpha}{d}$, and if A is the area of the film between the plates and B its circumference, the plates will be pressed together with a force

$$\frac{2AT\cos\alpha}{d}+BT\sin\alpha,$$

and this, whether the atmosphere exerts any pressure or not. The force thus produced by the introduction of a drop of water between two plates is enormous, and is often sufficient to press certain parts of the plates together so powerfully as to bruise them or break them. When two blocks of ice are placed loosely together so that the superfluous water which melts from them may drain away, the remaining water draws the blocks together with a force sufficient to cause the blocks to adhere by the process called *Regelation*.

[An effect of an opposite character may be observed when the fluid is mercury in place of water. When two pieces of flat glass are pressed together under mercury with moderate force they cohere, the mercury leaving the narrow crevasses, even although the alternative is a vacuum. The course of events is more easily followed if one of the pieces of glass constitutes the bottom, or a side, of the vessel containing the mercury.]

In many experiments bodies are floated on the surface of water in order that they may be free to move under the action of slight horizontal forces. Thus Sir Isaac Newton placed a magnet in a floating vessel and a piece of iron in another in order to observe their mutual action, and A. M. Ampère floated a voltaic battery with a coil of wire in its circuit in order to observe the effects of the earth's magnetism on the electric circuit. When such floating bodies come near the edge of the vessel they are drawn up to it, and are apt to stick fast to it. There are two ways of avoiding this inconvenience. One is to grease the float round its water-line so that the water is depressed round it. This, however, often produces a worse disturbing effect, because a thin film of grease spreads over the water and increases its surface-viscosity. The other method is to fill the vessel with water till the level of the water stands a little higher than the rim of the vessel. The float will then be repelled from the edge of the vessel. Such floats, however, should always be made so that the section taken at the level of the water is as small as possible.

[*The Size of Drops.*—The relation between the diameter of a tube and the weight of the drop which it delivers appears to have been first investigated by Thomas Tate (*Phil. Mag.* vol. xxvii. p. 176, 1864), whose experiments led him to the conclusion that "other things being the same, the weight of a drop of liquid is proportional to the diameter of the tube in which it is formed." Sufficient time must of course be allowed for the formation of the drops; otherwise no simple results can be expected. In Tate's experiments the period was never less than 40 seconds.

The magnitude of a drop delivered from a tube, even when the formation up to the phase of instability is infinitely slow, cannot be calculated a priori. The weight is sometimes equated to the product of the capillary tension (T) and the circumference of the tube ($2\pi a$), but with little justification. Even if the tension at the circumference of the tube acted vertically, and the whole of the liquid below this level passed into the drop, the calculation would still be vitiated by the assumption that the internal pressure at the level in question is atmospheric. It would be necessary to consider the curvatures of the fluid surface at the edge of attachment. If the surface could be treated as a cylindrical prolongation of the tube (radius a), the pressure would be T/a, and the resulting force acting downwards upon the drop would amount to one-half (πaT) of the direct upward pull of the tension along the circumference. At this

rate the drop would be but one-half of that above reckoned. But the truth is that a complete solution of the statical problem for all forms up to that at which instability sets in, would not suffice for the present purpose. The detachment of the drop is a *dynamical* effect, and it is influenced by collateral circumstances. For example, the bore of the tube is no longer a matter of indifference, even though the attachment of the drop occurs entirely at the outer edge. It appears that when the external diameter exceeds a certain value, the weight of a drop of water is sensibly different in the two extreme cases of a very small and of a very large bore.

But although a complete solution of the dynamical problem is impracticable, much interesting information may be obtained from the principle of dynamical similarity. The argument has already been applied by Dupré (*Théorie mécanique de la chaleur*, Paris, 1869, p. 328), but his presentation of it is rather obscure. We will assume that when, as in most cases, viscosity may be neglected, the mass (M) of a drop depends only upon the density (σ), the capillary tension (T), the acceleration of gravity (g), and the linear dimension of the tube (a). In order to justify this assumption, the formation of the drop must be sufficiently slow, and certain restrictions must be imposed upon the shape of the tube. For example, in the case of water delivered from a glass tube, which is cut off square and held vertically, a will be the external radius; and it will be necessary to suppose that the ratio of the internal radius to a is constant, the cases of a ratio infinitely small, or infinitely near unity, being included. But if the fluid be mercury, the flat end of the tube remains unwetted, and the formation of the drop depends upon the internal diameter only.

The "dimensions" of the quantities on which M depends are:—

$$\sigma = (\text{Mass})^1\,(\text{Length})^{-3},$$
$$T = (\text{Force})^1\,(\text{Length})^{-1} = (\text{Mass})^1\,(\text{Time})^{-2},$$
$$g = \text{Acceleration} = (\text{Length})^1\,(\text{Time})^{-2},$$

of which M, a mass, is to be expressed as a function. If we assume

$$M \propto T^z.g^y.\sigma^x.a^u,$$

we have, considering in turn length, time and mass,

$$y-3z+u=0,\ 2x+2y=0,\ x+z=1;$$

so that

$$y=-x,\ z=1-x,\ u=3-2x.$$

Accordingly

$$M \propto \frac{Ta}{g}\left(\frac{T}{g\sigma a^2}\right)^{x-1}.$$

Since x is undetermined, all that we can conclude is that M is of the form

$$M = \frac{Ta}{g}.F\left(\frac{T}{g\sigma a^2}\right), \quad \ldots\ldots\ldots \quad (1)$$

where F denotes an arbitrary function.

Dynamical similarity requires that $T/g\sigma a^2$ be constant; or, if g be supposed to be so, that a^2 varies as T/σ. If this condition be satisfied, the mass (or weight) of the drop is proportional to T and to a.

If Tate's law be true, that *ceteris paribus* M varies as a, it follows from (1) that F is constant. For all fluids and for all similar tubes similarly wetted, the weight of a drop would then be proportional not only to the diameter of the tube, but also to the superficial tension, and it would be independent of the density.

Careful observations with special precautions to ensure the cleanliness of the water have shown that over a considerable range, the departure from Tate's law is not great. The results give material for the determination of the function F in (1).

$T/9\sigma a^2$	gM/Ta
2·58	4·13
1·16	3·97
0·708	3·80
0·441	3·73
0·277	3·78
0·220	3·90
0·169	4·06

In the preceding table, applicable to thin-walled tubes, the first column gives the values of $T/g\sigma a^2$, and the second column those of gM/Ta, all the quantities concerned being in C.G.S. measure, or other consistent system. From this the weight of a drop of any liquid of which the density and surface tension are known, can be calculated. For many purposes it may suffice to treat F as a constant, say 3·8. The formula for the weight of a drop is then simply

$$Mg = 3{\cdot}8Ta, \quad \ldots\ldots\ldots \quad (2)$$

in which 3·8 replaces the 2π of the faulty theory alluded to earlier (see Rayleigh, *Phil. Mag.*, Oct. 1899).]

Phenomena arising from the Variation of the Surface-tension.— Pure water has a higher surface-tension than that of any other substance liquid at ordinary temperatures except mercury. Hence any other liquid if mixed with water diminishes its surface-tension. For example, if a drop of alcohol be placed on the surface of water, the surface-tension will be diminished from 80, the value for pure water, to 25, the value for pure alcohol. The surface of the liquid will therefore no longer be in equilibrium, and a current will be formed at and near the surface from the alcohol to the surrounding water, and this current will go on as long as there is more alcohol at one part of the surface than at another. If the vessel is deep, these currents will be balanced by counter currents below them, but if the depth of the water is only two or three millimetres, the surface-current will sweep away the whole of the water, leaving a dry spot where the alcohol was dropped in. This phenomenon was first described and explained by James Thomson, who also explained a phenomenon, the converse of this, called the "tears of strong wine."

If a wine-glass be half-filled with port wine the liquid rises a little up the side of the glass as other liquids do. The wine, however, contains alcohol and water, both of which evaporate, but the alcohol faster than the water, so that the superficial layer becomes more watery. In the middle of the vessel the superficial layer recovers its strength by diffusion from below, but the film adhering to the side of the glass becomes more watery, and therefore has a higher surface-tension than the surface of the stronger wine. It therefore creeps up the side of the glass dragging the strong wine after it, and this goes on till the quantity of fluid dragged up collects into a drop and runs down the side of the glass.

The motion of small pieces of camphor floating on water arises from the gradual solution of the camphor. If this takes place more rapidly on one side of the piece of camphor than on the other side, the surface-tension becomes weaker where there is most camphor in solution, and the lump, being pulled unequally by the surface-tensions, moves off in the direction of the strongest tension, namely, towards the side on which least camphor is dissolved.

If a drop of ether is held near the surface of water the vapour of ether condenses on the surface of the water, and surface-currents are formed flowing in every direction away from under the drop of ether.

If we place a small floating body in a shallow vessel of water and wet one side of it with alcohol or ether, it will move off with great velocity and skim about on the surface of the water, the part wet with alcohol being always the stern.

The surface-tension of mercury is greatly altered by slight changes in the state of the surface. The surface-tension of pure mercury is so great that it is very difficult to keep it clean, for every kind of oil or grease spreads over it at once.

But the most remarkable effects of change of surface-tension are those produced by what is called the electric polarization of the surface. The tension of the surface of contact of mercury and dilute sulphuric acid depends on the electromotive force acting between the mercury and the acid. If the electromotive force is from the acid to the mercury the surface-tension increases; if it is from the mercury to the acid, it diminishes. Faraday observed that a large drop of mercury, resting on the flat bottom of a vessel containing dilute acid, changes its form in a remarkable way when connected with one of the electrodes of a battery, the other electrode being placed in the acid. When the mercury

is made positive it becomes dull and spreads itself out; when it is made negative it gathers itself together and becomes bright again. G. Lippmann, who has made a careful investigation of the subject, finds that exceedingly small variations of the electromotive force produce sensible changes in the surface-tension. The effect of one of a Daniell's cell is to increase the tension from 30·4 to 40·6. He has constructed a capillary electrometer by which differences of electric potential less than 0·01 of that of a Daniell's cell can be detected by the difference of the pressure required to force the mercury to a given point of a fine capillary tube. He has also constructed an apparatus in which this variation in the surface-tension is made to do work and drive a machine. He has also found that this action is reversible, for when the area of the surface of contact of the acid and mercury is made to increase, an electric current passes from the mercury to the acid, the amount of electricity which passes while the surface increases by one square centimetre being sufficient to decompose ·000013 gramme of water.

[The movements of camphor scrapings referred to above afford a useful test of the condition of a water surface. If the contamination exceed a certain limit, the scrapings remain quite dead. In a striking form of the experiment, the water is contained, to the depth of perhaps one inch, in a large flat dish, and the operative part of the surface is limited by a flexible hoop of thin sheet brass lying in the dish and rising above the water-level. If the hoop enclose an area of (say) one-third of the maximum, and if the water be clean, camphor fragments floating on the interior enter with vigorous movements. A touch of the finger will then often reduce them to quiet; but if the hoop be expanded, the included grease is so far attenuated as to lose its effect. Another method of removing grease is to immerse and remove strips of paper by which the surface available for the contamination is in effect increased.

The thickness of the film of oil adequate to check the camphor movements can be determined with fair accuracy by depositing a weighed amount of oil (such as ·8 mg.) upon the surface of water in a large bath. Calculated as if the density were the same as in a normal state, the thickness of the film is found to be about two millionths of a millimetre.

Small as is the above amount of oil, the camphor test is a comparatively coarse one. Conditions of a contaminated surface may easily be distinguished, upon all of which camphor fragments spin vigorously. Thus, a shallow tin vessel, such as the lid of a biscuit box, may be levelled and filled with tap-water through a rubber hose. Upon the surface of the water a little sulphur is dusted. An application of the finger for 20 or 30 seconds to the under surface of the vessel will then generate enough heat to lower appreciably the surface-tension, as is evidenced by the opening out of the dust and the formation of a bare spot perhaps 1½ in. in diameter. When, however, the surface is but very slightly greased, a spot can no longer be cleared by the warmth of the finger, or even of a spirit lamp, held underneath. And yet the greasing may be so slight that camphor fragments move with apparently unabated vigour.

The varying degrees of contamination to which a water surface is subject are the cause of many curious phenomena. Among these is the *superficial viscosity* of Plateau. In his experiments a long compass needle is mounted so as to swing in the surface of the liquid under investigation. The cases of ordinary clean water and alcohol are strongly contrasted, the motion of the needle upon the former being comparatively sluggish. Moreover, a different behaviour is observed when the surfaces are slightly dusted over. In the case of water the whole of the surface in front of the needle moves with it, while on the other hand the dust floating on alcohol is scarcely disturbed until the needle actually strikes it. Plateau attributed these differences to a special quality of the liquids, named by him "superficial viscosity." It has been proved, however, that the question is one of contamination, and that a water surface may be prepared so as to behave in the same manner as alcohol.

Another consequence of the tendency of a moderate contamination to distribute itself uniformly is the calming effect of oil, investigated by B. Franklin. On pure water the propagation of waves would be attended by temporary extensions and contractions of the surface, but these, as was shown by O. Reynolds, are resisted when the surface is contaminated.

Indeed the possibility of the continued existence of films, such as constitute foam, depends upon the properties now under consideration. If, as is sometimes stated, the tension of a vertical film were absolutely the same throughout, the middle parts would of necessity fall with the acceleration of gravity. In reality, the tension adjusts itself automatically to the weight to be supported at the various levels.

Although throughout a certain range the surface-tension varies rapidly with the degree of contamination, it is remarkable that, as was first fully indicated by Miss Pockels, the earlier stages of contamination have little or no effect upon surface-tension. Lord Rayleigh has shown that the fall of surface-tension *begins* when the quantity of oil is about the half of that required to stop the camphor movements, and he suggests that this stage may correspond with a complete coating of the surface with a single layer of molecules.]

On the Forms of Liquid Films which are Figures of Revolution.—A soap bubble is simply a small quantity of soap-suds spread out so as to expose a large surface to the air. The bubble, in fact, has two surfaces, an outer and an inner surface, both exposed to air. It has, therefore, a certain amount of surface-energy depending on the area of these two surfaces. Since in the case of thin films the outer and inner surfaces are approximately equal, we shall consider the area of the film as representing either of them, and shall use the symbol T to denote the energy of unit of area of the film, both surfaces being taken together. If T′ is the energy of a single surface of the liquid, T the energy of the film is 2T′. When by means of a tube we blow air into the inside of the bubble we increase its volume and therefore its surface, and at the same time we do work in forcing air into it, and thus increase the energy of the bubble.

Spherical soap-bubble.

That the bubble has energy may be shown by leaving the end of the tube open. The bubble will contract, forcing the air out, and the current of air blown through the tube may be made to deflect the flame of a candle. If the bubble is in the form of a sphere of radius r this material surface will have an area

$$S = 4\pi r^2 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

If T be the energy corresponding to unit of area of the film the surface-energy of the whole bubble will be

$$ST = 4\pi r^2 T \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

The increment of this energy corresponding to an increase of the radius from r to $r+dr$ is therefore

$$T dS = 8\pi r T dr \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

Now this increase of energy was obtained by forcing in air at a pressure greater than the atmospheric pressure, and thus increasing the volume of the bubble.

Let II be the atmospheric pressure and $\Pi + p$ the pressure of the air within the bubble. The volume of the sphere is

$$V = \tfrac{4}{3}\pi r^3, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

and the increment of volume is

$$dV = 4\pi r^2 dr \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

Now if we suppose a quantity of air already at the pressure $\Pi + p$, the work done in forcing it into the bubble is $p\,dV$. Hence the equation of work and energy is

$$p\,dV = T ds \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (6)$$

or

$$4\pi p r^2 dr = 8\pi r dr T \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (7)$$

or

$$p = 2T/r \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (8)$$

This, therefore, is the excess of the pressure of the air within the bubble over that of the external air, and it is due to the action of the inner and outer surfaces of the bubble. We may conceive this pressure to arise from the tendency which the bubble has to contract, or in other words from the surface-tension of the bubble.

If to increase the area of the surface requires the expenditure

of work, the surface must resist extension, and if the bubble in contracting can do work, the surface must tend to contract. The surface must therefore act like a sheet of india-rubber when extended both in length and breadth, that is, it must exert surface-tension. The tension of the sheet of india-rubber, however, depends on the extent to which it is stretched, and may be different in different directions, whereas the tension of the surface of a liquid remains the same however much the film is extended, and the tension at any point is the same in all directions.

The intensity of this surface-tension is measured by the stress which it exerts across a line of unit length. Let us measure it in the case of the spherical soap-bubble by considering the stress exerted by one hemisphere of the bubble on the other, across the circumference of a great circle. This stress is balanced by the pressure p acting over the area of the same great circle: it is therefore equal to $\pi r^2 p$. To determine the intensity of the surface-tension we have to divide this quantity by the length of the line across which it acts, which is in this case the circumference of a great circle $2\pi r$. Dividing $\pi r^2 p$ by this length we obtain $\frac{1}{2}pr$ as the value of the intensity of the surface-tension, and it is plain from equation 8 that this is equal to T. Hence the numerical value of the intensity of the surface-tension is equal to the numerical value of the surface-energy per unit of surface. We must remember that since the film has two surfaces the surface-tension of the film is double the tension of the surface of the liquid of which it is formed.

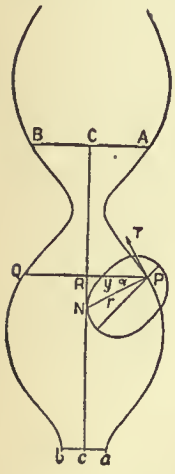

FIG. 9.

To determine the relation between the surface-tension and the pressure which balances it when the form of the surface is not spherical, let us consider the following case:—

Non-spherical soap-bubble.

Let fig. 9 represent a section through the axis Cc of a soap-bubble in the form of a figure of revolution bounded by two circular disks AB and ab, and having the meridian section APa. Let PQ be an imaginary section normal to the axis. Let the radius of this section PR by y, and let PT, the tangent at P, make an angle α with the axis.

Let us consider the stresses which are exerted across this imaginary section by the lower part on the upper part. If the internal pressure exceeds the external pressure by p, there is in the first place a force $\pi y^2 p$ acting upwards arising from the pressure p over the area of the section. In the next place, there is the surface-tension acting downwards, but at an angle α with the vertical, across the circular section of the bubble itself, whose circumference is $2\pi y$, and the downward force is therefore $2\pi y \mathrm{T} \cos\alpha$.

Now these forces are balanced by the external force which acts on the disk ACB, which we may call F. Hence equating the forces which act on the portion included between ACB and PRQ

$$\pi y^2 p - 2\pi y \mathrm{T} \cos\alpha = -\mathrm{F} \quad . \quad . \quad . \quad . \quad . \quad (9).$$

If we make CR$=z$, and suppose z to vary, the shape of the bubble of course remaining the same, the values of y and of α will change, but the other quantities will be constant. In studying these variations we may if we please take as our independent variable the length s of the meridian section AP reckoned from A. Differentiating equation 9 with respect to s we obtain, after dividing by 2π as a common factor,

$$py\frac{dy}{ds} - \mathrm{T}\cos\alpha\frac{dy}{ds} + \mathrm{T}y\sin\alpha\frac{d\alpha}{ds} = 0. \quad . \quad . \quad . \quad (10)$$

Now

$$\frac{dy}{ds} = \sin\alpha. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (11)$$

The radius of curvature of the meridian section is

$$\mathrm{R}_1 = -\frac{ds}{d\alpha}. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (12)$$

The radius of curvature of a normal section of the surface at right angles to the meridian section is equal to the part of the normal cut off by the axis, which is

$$\mathrm{R}_2 = \mathrm{PN} = y/\cos\alpha \quad . \quad . \quad . \quad . \quad . \quad (13).$$

Hence dividing equation 10 by $y \sin\alpha$, we find

$$p = \mathrm{T}(1/\mathrm{R}_1 + 1/\mathrm{R}_2) \quad . \quad . \quad . \quad . \quad . \quad (14).$$

This equation, which gives the pressure in terms of the principal radii of curvature, though here proved only in the case of a surface of revolution, must be true of all surfaces. For the curvature of any surface at a given point may be completely defined in terms of the positions of its principal normal sections and their radii of curvature.

Before going further we may deduce from equation 9 the nature of all the figures of revolution which a liquid film can assume. Let us first determine the nature of a curve, such that if it is rolled on the axis its origin will trace out the meridian section of the bubble. Since at any instant the rolling curve is rotating about the point of contact with the axis, the line drawn from this point of contact to the tracing point must be normal to the direction of motion of the tracing point. Hence if N is the point of contact, NP must be normal to the traced curve. Also, since the axis is a tangent to the rolling curve, the ordinate PR is the perpendicular from the tracing point P on the tangent. Hence the relation between the radius vector and the perpendicular on the tangent of the rolling curve must be identical with the relation between the normal PN and the ordinate PR of the traced curve. If we write r for PN, then $y = r\cos\alpha$, and equation 9 becomes

$$y^2\left(2\frac{\mathrm{T}}{pr} - 1\right) = \frac{\mathrm{F}}{\pi p}.$$

This relation between y and r is identical with the relation between the perpendicular from the focus of a conic section on the tangent at a given point and the focal distance of that point, provided the transverse and conjugate axes of the conic are $2a$ and $2b$ respectively, where

$$a = \frac{\mathrm{T}}{p}, \text{ and } b^2 = \frac{\mathrm{F}}{\pi p}.$$

Hence the meridian section of the film may be traced by the focus of such a conic, if the conic is made to roll on the axis.

On the different Forms of the Meridian Line.—1. When the conic is an ellipse the meridian line is in the form of a series of waves, and the film itself has a series of alternate swellings and contractions as represented in figs. 9 and 10. This form of the film is called the unduloid.

1*a*. When the ellipse becomes a circle, the meridian line becomes a straight line parallel to the axis, and the film passes into the form of a cylinder of revolution.

1*b*. As the ellipse degenerates into the straight line joining its foci, the contracted parts of the unduloid become narrower, till at last the figure becomes a series of spheres in contact.

In all these cases the internal pressure exceeds the external by $2\mathrm{T}/a$ where a is the semi-transverse axis of the conic. The resultant of the internal pressure and the surface-tension is equivalent to a tension along the axis, and the numerical value of this tension is equal to the force due to the action of this pressure on a circle whose diameter is equal to the conjugate axis of the ellipse.

2. When the conic is a parabola the meridian line is a catenary (fig. 11); the internal pressure is equal to the external pressure, and the tension along the axis is equal to $2\pi \mathrm{T}m$ where m is the distance of the vertex from the focus.

3. When the conic is a hyperbola the meridian line is in the form of a looped curve (fig. 12). The corresponding figure of the film is called the nodoid. The resultant of the internal pressure and the surface-tension is equivalent to a pressure along the axis equal to that due to a pressure p acting on a circle whose diameter is the conjugate axis of the hyperbola.

When the conjugate axis of the hyperbola is made smaller and smaller, the nodoid approximates more and more to the series of spheres touching each other along the axis. When the conjugate axis of the hyperbola increases without limit, the loops of the nodoid are crowded on one another, and each becomes more nearly a ring of circular section, without, however, ever

reaching this form. The only closed surface belonging to the series is the sphere.

These figures of revolution have been studied mathematically by C. W. B. Poisson,[1] Goldschmidt,[2] L. L. Lindelöf and F. M. N. Moigno,[3] C. E. Delaunay,[4] A. H. E. Lamarle,[5] A. Beer,[6] and V. M. A. Mannheim,[7] and have been produced experimentally by Plateau[8] in the two different ways already described.

FIG. 10.—Unduloid. FIG. 11.—Catenoid. FIG. 12.—Nodoid.

The limiting conditions of the stability of these figures have been studied both mathematically and experimentally. We shall notice only two of them, the cylinder and the catenoid.

Stability of the Cylinder.—The cylinder is the limiting form of the unduloid when the rolling ellipse becomes a circle. When the ellipse differs infinitely little from a circle, the equation of the meridian line becomes approximately $y=a+c \sin (x/a)$ where c is small. This is a simple harmonic wave-line, whose mean distance from the axis is a, whose wave-length is $2\pi a$, and whose amplitude is c. The internal pressure corresponding to this unduloid is as before $p=T/a$. Now consider a portion of a cylindric film of length x terminated by two equal disks of radius r and containing a certain volume of air. Let one of these disks be made to approach the other by a small quantity dx. The film will swell out into the convex part of an unduloid, having its largest section midway between the disks, and we have to determine whether the internal pressure will be greater or less than before. If A and C (fig. 13) are the disks, and if x the distance between the disks is equal to πr half the wave-length of the harmonic curve, the disks will be at the points where the curve is at its mean distance from the axis, and the pressure will therefore be T/r as before. If A_1, C_1 are the disks, so that the distance between them is less than πr, the curve must be produced beyond the disks before it is at its mean distance from the axis. Hence in this case the mean distance is less than r, and the pressure will be greater than T/r. If, on the other hand, the disks are at A_2 and C_2, so that the distance between them is greater than πr, the curve will reach its mean distance from the axis before it reaches the disks. The mean distance will therefore be greater than r, and the pressure will be less than T/r. Hence if one of the disks be made to approach the other, the internal pressure will be increased if the distance between the disks is less than half the circumference of either, and the pressure will be diminished if the distance is greater than this quantity. In the same way we may show that if the distance between the disks is increased, the pressure will be diminished or increased according as the distance is less or more than half the circumference of either.

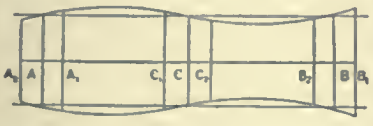

FIG. 13.

Now let us consider a cylindric film contained between two equal fixed disks A and B, and let a third disk, C, be placed midway between. Let C be slightly displaced towards A. If AC and CB are each less than half the circumference of a disk the pressure on C will increase on the side of A and diminish on the side of B. The resultant force on C will therefore tend to oppose the displacement and to bring C back to its original position. The equilibrium of C is therefore stable. It is easy to show that if C had been placed in any other position than the middle, its equilibrium would have been stable. Hence the film is stable as regards longitudinal displacements. It is also stable as regards displacements transverse to the axis, for the film is in a state of tension, and any lateral displacement of its middle parts would produce a resultant force tending to restore the film to its original position. Hence if the length of the cylindric film is less than its circumference, it is in stable equilibrium. But if the length of the cylindric film is greater than its circumference, and if we suppose the disk C to be placed midway between A and B, and to be moved towards A, the pressure on the side next A will diminish, and that on the side next B will increase, so that the resultant force will tend to increase the displacement, and the equilibrium of the disk C is therefore unstable. Hence the equilibrium of a cylindric film whose length is greater than its circumference is unstable. Such a film, if ever so little disturbed, will begin to contract at one secton and to expand at another, till its form ceases to resemble a cylinder, if it does not break up into two parts which become ultimately portions of spheres.

Instability of a Jet of Liquid.—When a liquid flows out of a vessel through a circular opening in the bottom of the vessel, the form of the stream is at first nearly cylindrical though its diameter gradually diminishes from the orifice downwards on account of the increasing velocity of the liquid. But the liquid after it leaves the vessel is subject to no forces except gravity, the pressure of the air, and its own surface-tension. Of these gravity has no effect on the form of the stream except in drawing asunder its parts in a vertical direction, because the lower parts are moving faster than the upper parts. The resistance of the air produces little disturbance until the velocity becomes very great. But the surface-tension, acting on a cylindric column of liquid whose length exceeds the limit of stability, begins to produce enlargements and contractions in the stream as soon as the liquid has left the orifice, and these inequalities in the figure of the column go on increasing till it is broken up into elongated fragments. These fragments as they are falling through the air continue to be acted on by surface-tension. They therefore shorten themselves, and after a series of oscillations in which they become alternately elongated and flattened, settle down into the form of spherical drops.

This process, which we have followed as it takes place on an individual portion of the falling liquid, goes through its several phases at different distances from the orifice, so that if we examine different portions of the stream as it descends, we shall find next the orifice the unbroken column, then a series of contractions and enlargements, then elongated drops, then flattened drops, and so on till the drops become spherical.

[The circumstances attending the resolution of a cylindrical jet into drops were admirably examined and described by F. Savart ("Mémoire sur la constitution des veines liquides lancées par des orifices circulaires en minces parois," *Ann. d. Chim.* t. liii., 1833) and for the most part explained with great sagacity by Plateau. Let us conceive an infinitely long circular cylinder of liquid, at rest (a motion common to every part of the fluid is necessarily without influence upon the stability, and may therefore be left out of account for convenience of conception and expression), and inquire under what circumstances it is stable or unstable, for small displacements, symmetrical about the axis of figure.

Whatever the deformation of the originally straight boundary of the axial section may be, it can be resolved by Fourier's theorem into deformations of the harmonic type. These component deformations are in general infinite in number, of very wave-length and of arbitrary phase; but in the first stages of the motion, with which alone we are at present concerned, each produces its effect independently of every other, and may be considered by itself. Suppose, therefore, that the equation of the boundary is

$$r=a+\alpha \cos kz, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where α is a small quantity, the axis of z being that of symmetry.

[1] *Nouvelle théorie de l'action capillaire* (1831).
[2] *Determinatio superficiei minimae rotatione curvae data duo puncta jungentis circa datum axem ortae* (Göttingen, 1831).
[3] *Leçons de calcul des variations* (Paris, 1861).
[4] "Sur la surface de révolution dont la courbure moyenne est constante," *Liouville's Journal*, vi.
[5] "Théorie géometrique des rayons et centres de courbure," *Bullet. de l'Acad. de Belgique*, 1857.
[6] *Tractatus de Theoria Mathematica Phaenomenorum in Liquidis actioni gravitatis detractis observatorum* (Bonn, 1857).
[7] *Journal de l'Institut*, No. 1260.
[8] *Statique expérimentale et théorique des liquides*, 1873.

The wave-length of the disturbance may be called λ, and is connected with k by the equation $k=2\pi/\lambda$. The capillary tension endeavours to contract the surface of the fluid; so that the stability, or instability, of the cylindrical form of equilibrium depends upon whether the surface (enclosing a given volume) be greater or less respectively after the displacement than before. It has been proved by Plateau (*vide supra*) that the surface is greater than before displacement if $ka>1$, that is, if $\lambda<2\pi a$; but less if $ka<1$, or $\lambda>2\pi a$. Accordingly, the equilibrium is stable if λ be less than the circumference; but unstable if λ be greater than the circumference of the cylinder. Disturbances of the former kind lead to *vibrations* of harmonic type, whose amplitudes always remain small; but disturbances, whose wave-length exceeds the circumference, result in a greater and greater departure from the cylindrical figure. The analytical expression for the motion in the latter case involves exponential terms, one of which (except in case of a particular relation between the initial displacements and velocities) increases rapidly, being equally multiplied in equal times. The coefficient (q) of the time in the exponential term (e^{qt}) may be considered to measure the degree of dynamical instability; its reciprocal $1/q$ is the time in which the disturbance is multiplied in the ratio $1:e$.

The degree of instability, as measured by q, is not to be determined from statical considerations only; otherwise there would be no limit to the increasing efficiency of the longer wave-lengths. The joint operation of superficial tension and *inertia* in fixing the wave-length of maximum instability was first considered by Lord Rayleigh in a paper (*Math. Soc. Proc.*, November 1878) on the "Instability of Jets." It appears that the value of q may be expressed in the form

$$q=\sqrt{\left(\frac{T}{\rho a^3}\right)}\,.\,F(ka), \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

where, as before, T is the superficial tension, ρ the density, and F is given by the following table:—

k^2a^2.	F(ka).	k^2a^2.	F(ka).
·05	·1536	·4	·3382
·1	·2108	·5	·3432
·2	·2794	·6	·3344
·3	·3182	·8	·2701
		·9	·2015

The greatest value of F thus corresponds, not to a zero value of k^2a^2, but approximately to $k^2a^2=\cdot4858$, or to $\lambda=4\cdot508\times2a$. Hence the maximum instability occurs when the wave-length of disturbance is about half as great again as that at which instability first commences.

Taking for water, in C.G.S. units, $T=81$, $\rho=1$, we get for the case of maximum instability

$$q^{-1}=\frac{a^{\frac{3}{2}}}{81\times\cdot343}=\cdot115d^{\frac{3}{2}} \quad . \quad . \quad . \quad . \quad . \quad (3),$$

if d be the diameter of the cylinder. Thus, if $d=1$, $q^{-1}=\cdot115$; or for a diameter of one centimetre the disturbance is multiplied 2·7 times in about one-ninth of a second. If the disturbance be multiplied 1000 fold in time, t, $qt=3\log_e 10=6\cdot9$, so that $t=\cdot79d^{\frac{3}{2}}$. For example, if the diameter be one millimetre, the disturbance is multiplied 1000 fold in about one-fortieth of a second. In view of these estimates the rapid disintegration of a fine jet of water will not cause surprise.

The relative importance of two harmonic disturbances depends upon their initial magnitudes, and upon the rate at which they grow. When the initial values are very small, the latter consideration is much the more important; for, if the disturbances be represented by $a_1e^{q_1t}$, $a_2e^{q_2t}$, in which q_1 exceeds q_2, their ratio is $(a_2/a_1)e^{-(q_1-q_2)t}$; and this ratio decreases without limit with the time, whatever be the initial (finite) ratio $a_2:a_1$. If the initial disturbances are small enough, that one is ultimately preponderant for which the measure of instability is greatest. The smaller the causes by which the original equilibrium is upset, the more will the cylindrical mass tend to divide itself regularly into portions whose length is equal to 4·5 times the diameter. But a disturbance of less favourable wave-length may gain the preponderance in case its magnitude be sufficient to produce disintegration in a less time than that required by the other disturbances present.

The application of these results to actual jets presents no great difficulty. The disturbances by which equilibrium is upset are impressed upon the fluid as it leaves the aperture, and the continuous portion of the jet represents the distance travelled during the time necessary to produce disintegration. Thus the length of the continuous portion necessarily depends upon the character of the disturbances in respect of amplitude and wave-length. It may be increased considerably, as F. Savart showed, by a suitable isolation of the reservoir from tremors, whether due to external sources or to the impact of the jet itself in the vessel placed to receive it. Nevertheless it does not appear to be possible to carry the prolongation very far. Whether the residuary disturbances are of external origin, or are due to friction, or to some peculiarity of the fluid motion within the reservoir, has not been satisfactorily determined. On this point Plateau's explanations are not very clear, and he sometimes expresses himself as if the time of disintegration depended only upon the capillary tension, without reference to initial disturbances at all.

Two laws were formulated by Savart with respect to the length of the continuous portion of a jet, and have been to a certain extent explained by Plateau. For a given fluid and a given orifice the length is approximately proportional to the square root of the head. This follows at once from theory, if it can be assumed that the disturbances remain always of the same character, so that the *time* of disintegration is constant. When the head is given, Savart found the length to be proportional to the diameter of the orifice. From (3) it appears that the time in which a disturbance is multiplied in a given ratio varies, not as d, but as $d^{\frac{3}{2}}$. Again, when the fluid is changed, the time varies as $\rho^{\frac{1}{2}}T^{-\frac{1}{2}}$. But it may be doubted whether the length of the continuous portion obeys any very simple laws, even when external disturbances are avoided as far as possible.

When the circumstances of the experiment are such that the reservoir is influenced by the shocks due to the impact of the jet, the disintegration usually establishes itself with complete regularity, and is attended by a musical note (Savart). The impact of the regular series of drops which is at any moment striking the sink (or vessel receiving the water), determines the rupture into similar drops of the portion of the jet at the same moment passing the orifice. The pitch of the note, though not absolutely definite, cannot differ much from that which corresponds to the division of the jet into wave-lengths of maximum instability; and, in fact, Savart found that the frequency was directly as the square root of the head, inversely as the diameter of the orifice, and independent of the nature of the fluid—laws which follow immediately from Plateau's theory.

From the pitch of the note due to a jet of given diameter, and issuing under a given head, the wave-length of the nascent divisions can be at once deduced. Reasoning from some observations of Savart, Plateau finds in this way 4·38 as the ratio of the length of a division to the diameter of the jet. The diameter of the orifice was 3 millims., from which that of the jet is deduced by the introduction of the coefficient ·8. Now that the length of a division has been estimated a priori, it is perhaps preferable to reverse Plateau's calculation, and to exhibit the frequency of vibration in terms of the other data of the problem. Thus

$$\text{frequency}=\frac{\sqrt{(2gh)}}{4\cdot508d}. \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

But the most certain method of obtaining complete regularity of resolution is to bring the reservoir under the influence of an external vibrator, whose pitch is approximately the same as that proper to the jet. H. G. Magnus (*Pogg. Ann.* cvi., 1859) employed a Neef's hammer, attached to the wooden frame which supported the reservoir. Perhaps an electrically maintained tuning-fork is still better. Magnus showed that the most important part of the effect is due to the forced vibration of that side of the vessel which contains the orifice, and that but little

of it is propagated through the air. With respect to the limits of pitch, Savart found that the note might be a fifth above, and more than an octave below, that proper to the jet. According to theory, there would be no well-defined lower limit; on the other side, the external vibration cannot be efficient if it tends to produce divisions whose length is less than the circumference of the jet. This would give for the interval defining the upper limit π: 4·508, which is very nearly a fifth. In the case of Plateau's numbers (π: 4·38) the discrepancy is a little greater.

The detached masses into which a jet is resolved do not at once assume and retain a spherical form, but execute a series of vibrations, being alternately compressed and elongated in the direction of the axis of symmetry. When the resolution is effected in a perfectly periodic manner, each drop is in the same phase of its vibration as it passes through a given point of space; and thence arises the remarkable appearance of alternate swellings and contractions described by Savart. The interval from one swelling to the next is the space described by the drop during one complete vibration, and is therefore (as Plateau shows) proportional *ceteris paribus* to the square root of the head.

The time of vibration is of course itself a function of the nature of the fluid and of the size of the drop. By the method of dimensions alone it may be seen that the time of infinitely small vibrations varies directly as the square root of the mass of the sphere and inversely as the square root of the capillary tension; and it may be proved that its expression is

$$\tau = \sqrt{\left(\frac{3\pi\rho V}{8\Gamma}\right)}, \quad \ldots\ldots\ldots \quad (5)$$

V being the volume of the vibrating mass.

In consequence of the rapidity of the motion some optical device is necessary to render apparent the phenomena attending the disintegration of a jet. Magnus employed a rotating mirror, and also a rotating disk from which a fine slit was cut out. The readiest method of obtaining instantaneous illumination is the electric spark, but with this Magnus was not successful. The electric spark had, however, been used successfully for this purpose some years before by H. Buff (*Liebigs Ann.* lxxviii. 1851), who observed the *shadow* of the jet on a white screen. Preferable to an opaque screen is a piece of ground glass, which allows the shadow to be examined from the farther side (Lord Rayleigh). Further, the jet may be very well observed directly, if the illumination is properly managed. For this purpose it is necessary to place it between the source of light and the eye. The best effect is obtained when the light of the spark is somewhat diffused by being passed (for example) through a piece of ground glass.

The spark may be obtained from the secondary of an induction coil, whose terminals are in connexion with the coatings of a Leyden jar. By adjustment of the contact breaker the series of sparks may be made to fit more or less perfectly with the formation of the drops. A still greater improvement may be effected by using an electrically maintained fork, which performs the double office of controlling the resolution of the jet and of interrupting the primary current of the induction coil. In this form the experiment is one of remarkable beauty. The jet, illuminated only in one phase of transformation, appears almost perfectly steady, and may be examined at leisure. In one experiment the jet issued horizontally from an orifice of about half a centimetre in diameter, and almost immediately assumed a rippled outline. The gradually increasing amplitude of the disturbance, the formation of the elongated ligament, and the subsequent transformation of the ligament into a spherule, could be examined with ease. In consequence of the transformation being in a more advanced stage at the forward than at the hinder end, the ligament remains for a moment connected with the mass behind, when it has freed itself from the mass in front, and thus the resulting spherule acquires a backwards relative velocity, which of necessity leads to a collision. Under ordinary circumstances the spherule rebounds, and may be thus reflected backwards and forwards several times between the adjacent masses. Magnus showed that the stream of spherules may be diverted into another path by the attraction of a powerfully electrified rod, held a little below the place of resolution.

Very interesting modifications of these phenomena are observed when a jet from an orifice in a thin plate (Tyndall has shown that a pinhole gas burner may also be used with advantage) is directed obliquely upwards. In this case drops which break away with different velocities are carried under the action of gravity into different paths; and thus under ordinary circumstances a jet is apparently resolved into a "sheaf," or bundle of jets all lying in one vertical plane. Under the action of a vibrator of suitable periodic time the resolution is regularized, and then each drop, breaking away under like conditions, is projected with the same velocity, and therefore follows the same path. The apparent gathering together of the sheaf into a fine and well-defined stream is an effect of singular beauty.

In certain cases where the tremor to which the jet is subjected is compound, the single path is replaced by two, three or even more paths, which the drops follow in a regular cycle. The explanation has been given with remarkable insight by Plateau. If, for example, besides the principal disturbance, which determines the size of the drops, there be another of twice the period, it is clear that the alternate drops break away under different conditions and therefore with different velocities. Complete periodicity is only attained after the passage of a *pair* of drops; and thus the odd series of drops pursues one path, and the even series another.

Electricity, as has long been known, has an extraordinary influence upon the appearance of a fine jet of water ascending in a nearly perpendicular direction. In its normal state the jet resolves itself into drops, which even before passing the summit, and still more after passing it, are scattered through a considerable width. When a feebly electrified body (such as a stick of sealing-wax gently rubbed upon the coat sleeve) is brought into its neighbourhood, the jet undergoes a remarkable transformation and appears to become coherent; but under more powerful electrical action the scattering becomes even greater than at first. The second effect is readily attributed to the mutual repulsion of the electrified drops, but the action of feeble electricity in producing apparent coherence was long unexplained.

It was shown by W. von Beetz that the coherence is apparent only, and that the place where the jet breaks into drops is not perceptibly shifted by the electricity. By screening the various parts with metallic plates in connexion with earth, Beetz further proved that, contrary to the opinion of earlier observers, the seat of sensitiveness is not at the root of the jet where it leaves the orifice, but at the place of resolution into drops. An easy way of testing this conclusion is to excite the extreme tip of a glass rod, which is then held in succession to the root of the jet, and to the place of resolution. An effect is observed in the latter, and not in the former position.

The normal scattering of a nearly vertical jet is due to the *rebound* of the drops when they come into collision with one another. Such collisions are inevitable in consequence of the different velocities acquired by the drops under the action of the capillary force, as they break away irregularly from the continuous portion of the jet. Even when the resolution is regularized by the action of external vibrations of suitable frequency, as in the beautiful experiments of Savart and Plateau, the drops must still come into contact before they reach the summit of their parabolic path. In the case of a continuous jet, the equation of continuity shows that as the jet loses velocity in ascending, it must increase in section. When the stream consists of drops following one another in single file, no such increase of section is possible; and then the constancy of the total stream requires a gradual approximation of the drops, which in the case of a nearly vertical direction of motion cannot stop short of actual contact. Regular vibration has, however, the effect of postponing the collisions and consequent scattering of the drops, and in the case of a direction of motion less nearly vertical, may prevent them altogether.

Under moderate electrical influence there is no material

change in the resolution into drops, nor in the subsequent motion of the drops up to the moment of collision. The difference begins here. Instead of rebounding after collision, as the unelectrified drops of clean water generally, or always, do, the electrified drops *coalesce*, and then the jet is no longer scattered about. When the electrical influence is more powerful, the repulsion between the drops is sufficient to prevent actual contact, and then, of course, there is no opportunity for amalgamation.

These experiments may be repeated with extreme ease, and with hardly any apparatus. The diameter of the jet may be about $\frac{1}{20}$ in., and it may issue from a glass nozzle. The pressure may be such as to give a fountain about 2 ft. high. The change in the sound due to the falling drops as they strike the bottom of the sink should be noticed, as well as that in the appearance of the jet.

The actual behaviour of the colliding drops becomes apparent under instantaneous illumination, *e.g.* by sparks from a Leyden jar. The jet should be situated between the sparks and the eye, and the observation is facilitated by a piece of ground glass held a little beyond the jet, so as to diffuse the light; or the *shadow* of the jet may be received on the ground glass, which is then held as close as possible on the side towards the observer.

In another form of the experiment, which, though perhaps less striking to the eye, lends itself better to investigation, the collision takes place between two still unresolved jets issuing horizontally from glass nozzles in communication with reservoirs containing water. One at least of the reservoirs must be insulated. In the absence of dust and greasy contamination, the obliquely colliding jets may rebound from one another without coalescence for a considerable time. In this condition there is complete electrical insulation between the jets, as may be proved by the inclusion in the circuit of a delicate galvanometer, and a low electro-motive force. But if the difference of potential exceed a small amount (1 or 2 volts), the jets instantaneously coalesce. There is no reason to doubt that in the case of the fountain also, coalescence is due to *differences* of potential between colliding drops.

If the water be soapy, and especially if it contain a small proportion of milk, coalescence ensues without the help of electricity. In the case of the fountain the experiment may be made by leading tap-water through a Woulfe's bottle in which a little milk has been placed. As the milk is cleared out, the scattering of the drops is gradually re-established.

In attempting to explain these curious phenomena, it is well to consider what occurs during a collision. As the liquid masses approach one another, the intervening air has to be squeezed out. In the earlier stages of approximation the obstacle thus arising may not be important; but when the thickness of the layer of air is reduced to the point at which the colours of thin plates are visible, the approximation must be sensibly resisted by the viscosity of the air which still remains to be got rid of. No change in the capillary conditions can arise until the interval is reduced to a small fraction of a wave-length of light; but such a reduction, unless extremely local, is strongly opposed by the remaining air. It is true that this opposition is temporary. The question is whether the air can everywhere be squeezed out during the short time over which the collision extends.

It would seem that the forces of electrical attraction act with peculiar advantage. If we suppose that upon the whole the air cannot be removed, so that the mean distance between the opposed surfaces remains constant, the electric attractions tend to produce an instability whereby the smaller intervals are diminished while the larger are increased. Extremely local contacts of the liquids, while opposed by capillary tension which tends to keep the surfaces flat, are thus favoured by the electrical forces, which moreover at the small distances in question act with exaggerated power.

A question arises as to the mode of action of milk or soap turbidity. The observation that it is possible for soap to be in excess may here have significance. It would seem that the surfaces, coming into collision within a fraction of a second of their birth, would still be subject to further contamination from the interior. A particle of soap rising accidentally to the surface would spread itself with rapidity. Now such an outward movement of the liquid is just what is required to hasten the removal of intervening air. It is obvious that the effect would fail if the contamination of the surface had proceeded too far previously to the collision.

This view is confirmed by experiments in which other gases are substituted for air as the environment of colliding jets. Oxygen and coal-gas were found to be without effect. On the other hand, the more soluble gases, carbon dioxide, nitrous oxide, sulphur dioxide, and steam, at once caused union.]

Stability of the Catenoid.—When the internal pressure is equal to the external, the film forms a surface of which the mean curvature at every point is zero. The only surface of revolution having this property is the catenoid formed by the revolution of a catenary about its directrix. This catenoid, however, is in stable equilibrium only when the portion considered is such that the tangents to the catenary at its extremities intersect before they reach the directrix.

To prove this, let us consider the catenary as the form of equilibrium of a chain suspended between two fixed points A and B. Suppose the chain hanging between A and B to be of very great length, then the tension at A or B will be very great. Let the chain be hauled in over a peg at A. At first the tension will diminish, but if the process be continued the tension will reach a minimum value and will afterwards increase to infinity as the chain between A and B approaches to the form of a straight line. Hence for every tension greater than the minimum tension there are two catenaries passing through A and B. Since the tension is measured by the height above the directrix these two catenaries have the same directrix. Every catenary lying between them has its directrix higher, and every catenary lying beyond them has its directrix lower than that of the two catenaries.

Now let us consider the surfaces of revolution formed by this system of catenaries revolving about the directrix of the two catenaries of equal tension. We know that the radius of curvature of a surface of revolution in the plane normal to the meridian plane is the portion of the normal intercepted by the axis of revolution.

The radius of curvature of a catenary is equal and opposite to the portion of the normal intercepted by the directrix of the catenary. Hence a catenoid whose directrix coincides with the axis of revolution has at every point its principal radii of curvature equal and opposite, so that the mean curvature of the surface is zero.

The catenaries which lie between the two whose direction coincides with the axis of revolution generate surfaces whose radius of curvature convex towards the axis in the meridian plane is less than the radius of concave curvature. The mean curvature of these surfaces is therefore convex towards the axis. The catenaries which lie beyond the two generate surfaces whose radius of curvature convex towards the axis in the meridian plane is greater than the radius of concave curvature. The mean curvature of these surfaces is, therefore, concave towards the axis.

Now if the pressure is equal on both sides of a liquid film, and if its mean curvature is zero, it will be in equilibrium. This is the case with the two catenoids. If the mean curvature is convex towards the axis the film will move from the axis. Hence if a film in the form of the catenoid which is nearest the axis is ever so slightly displaced from the axis it will move farther from the axis till it reaches the other catenoid.

If the mean curvature is concave towards the axis the film will tend to approach the axis. Hence if a film in the form of the catenoid which is nearest the axis be displaced towards the axis, it will tend to move farther towards the axis and will collapse. Hence the film in the form of the catenoid which is nearest the axis is in unstable equilibrium under the condition that it is exposed to equal pressures within and without. If, however, the circular ends of the catenoid are closed with solid disks, so that the volume of air contained between these disks and the film is determinate, the film will be in stable equilibrium however large a portion of the catenary it may consist of.

The criterion as to whether any given catenoid is stable or not may be obtained as follows:—

Let PABQ and ApqB (fig. 14) be two catenaries having the same directrix and intersecting in A and B. Draw Pp and Qq touching both catenaries, Pp and Qq will intersect at T, a point in the directrix; for since any catenary with its directrix is a similar figure to any other catenary with its directrix, if the directrix of the one coincides with that of the other the centre of similitude must lie on the common directrix. Also, since the curves at P and p are equally inclined to the directrix, P and p are corresponding points and the line P p must pass through the centre of similitude. Similarly Qq must pass through the centre of similitude. Hence T, the point of intersection of Pp and Qq, must be the centre of similitude and must be on the common directrix. Hence the tangents at A and B to the upper catenary must intersect above the directrix, and the tangents at A and B to the lower catenary must intersect below the directrix. The condition of stability of a catenoid is therefore that the tangents at the extremities of its generating catenary must intersect before they reach the directrix.

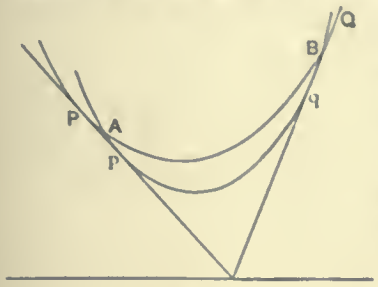

FIG. 14.

Stability of a Plane Surface.—We shall next consider the limiting conditions of stability of the horizontal surface which separates a heavier fluid above from a lighter fluid below. Thus, in an experiment of F. Duprez ("Sur un cas particulier de l'équilibre des liquides," *Nouveaux Mém. de l'Acad. de Belgique, 1851 et 1853*), a vessel containing olive oil is placed with its mouth downwards in a vessel containing a mixture of alcohol and water, the mixture being denser than the oil. The surface of separation is in this case horizontal and stable, so that the equilibrium is established of itself. Alcohol is then added very gradually to the mixture till it becomes lighter than the oil. The equilibrium of the fluids would now be unstable if it were not for the tension of the surface which separates them, and which, when the orifice of the vessel is not too large, continues to preserve the stability of the equilibrium.

When the equilibrium at last becomes unstable, the destruction of equilibrium takes place by the lighter fluid ascending in one part of the orifice and the heavier descending in the other. Hence the displacement of the surface to which we must direct our attention is one which does not alter the volume of the liquid in the vessel, and which therefore is upward in one part of the surface and downward in another. The simplest case is that of a rectangular orifice in a horizontal plane, the sides being a and b.

Let the surface of separation be originally in the plane of the orifice, and let the co-ordinates x and y be measured from one corner parallel to the sides a and b respectively, and let z be measured upwards. Then if ρ be the density of the upper liquid, and σ that of the lower liquid, and P the original pressure at the surface of separation, then when the surface receives an upward displacement z, the pressure above it will be $P-\rho gz$, and that below it will be $P-\sigma gz$, so that the surface will be acted on by an upward pressure $(\rho-\sigma)gz$. Now if the displacement z be everywhere very small, the curvature in the planes parallel to xz and yz will be d^2z/dx^2 and d^2z/dy^2 respectively, and if T is the surface-tension the whole upward force will be

$$T\left(\frac{d^2z}{dx^2}+\frac{d^2z}{dy^2}\right)+(\rho-\sigma)gz.$$

If this quantity is of the same sign as z, the displacement will be increased, and the equilibrium will be unstable. If it is of the opposite sign from z, the equilibrium will be stable. The limiting condition may be found by putting it equal to zero. One form of the solution of the equation, and that which is applicable to the case of a rectangular orifice, is

$$z=C\sin px\sin qy.$$

Substituting in the equation we find the condition

$$(p^2+q^2)\,T-(\rho-\sigma)g=\begin{cases}+\text{"} & \text{stable.}\\ 0 & \text{neutral.}\\ -\text{"} & \text{unstable.}\end{cases}$$

That the surface may coincide with the edge of the orifice, which is a rectangle, whose sides are a and b, we must have

$$pa=m\pi\quad,\quad qb=n\pi,$$

when m and n are integral numbers. Also, if m and n are both unity, the displacement will be entirely positive, and the volume of the liquid will not be constant. That the volume may be constant, either n or m must be an even number. We have, therefore, to consider the conditions under which

$$\pi^2\left(\frac{m^2}{a^2}+\frac{n^2}{b^2}\right)T-(\rho-\sigma)g$$

cannot be made negative. Under these conditions the equilibrium is stable for all small displacements of the surface. The smallest admissible value of $\frac{m^2}{a^2}+\frac{n^2}{b^2}$ is $\frac{4}{a^2}+\frac{1}{b^2}$, where a is the longer side of the rectangle. Hence the condition of stability is that

$$\pi^2\left(\frac{4}{a^2}+\frac{1}{b^2}\right)T-(\rho-\sigma)g$$

is a positive quantity. When the breadth b is less than $\sqrt{\frac{\pi^2T}{(\rho-\sigma)g}}$ the length a may be unlimited.

When the orifice is circular of radius a, the limiting value of a is $\sqrt{\frac{T}{g\rho}}z$, where z is the least root of the equation

$$\frac{2}{z}J_1(z)=1-\frac{z^2}{2\cdot4}+\frac{z^4}{2\cdot4^2\cdot6}-\frac{z^6}{2\cdot4^2\cdot6^2\cdot8}+\&c.,=0.$$

The least root of this equation is

$$z=3\cdot83171.$$

If h is the height to which the liquid will rise in a capillary tube of unit radius, then the diameter of the largest orifice is

$$2a=3\cdot8317\sqrt{(2h)}=5\cdot4188\sqrt{(h)}.$$

Duprez found from his experiments

$$2a=5\cdot485\sqrt{(h)}.$$

[The above theory may be well illustrated by a lecture experiment. A thin-walled glass tube of internal diameter equal to 14½ mm. is ground true at the lower end. The upper end is contracted and is fitted with a rubber tube under the control of a pinch-cock. Water is sucked up from a vessel of moderate size, the rubber is nipped, and by a quick motion the tube and vessel are separated, preferably by a downward movement of the latter. The inverted tube, with its suspended water, being held in a clamp, a beaker containing a few drops of ether is brought up from below until the free surface of the water is in contact with ether vapour. The lowering of tension, which follows the condensation of the vapour, is then strikingly shown by the sudden precipitation of the water.]

Effect of Surface-tension on the Velocity of Waves.—When a series of waves is propagated on the surface of a liquid, the surface-tension has the effect of increasing the pressure at the crests of the waves and diminishing it in the troughs. If the wave-length is λ, the equation of the surface is

$$y=b\sin 2\pi\frac{x}{\lambda}.$$

The pressure due to the surface tension T is

$$p=-T\frac{d^2y}{dx^2}=\frac{4\pi^2}{\lambda^2}Ty.$$

This pressure must be added to the pressure due to gravity $g\rho y$. Hence the waves will be propagated as if the intensity of gravity had been

$$f=g+\frac{4\pi^2T}{\lambda^2\rho}$$

instead of g. Now it is shown in hydrodynamics that the velocity of propagation of waves in deep water is that acquired by a heavy body falling through half the radius of the circle whose circumference is the wave-length, or

$$v^2=\frac{f\lambda}{2\pi}=\frac{g\lambda}{2\pi}+\frac{2\pi T}{\rho\lambda}\quad\ldots\ldots\quad(1)$$

This velocity is a minimum when

$$\lambda=2\pi\sqrt{\frac{T}{g\rho}},$$

and the minimum value is

$$v=\sqrt[4]{4\frac{Tg}{\rho}}.$$

For waves whose length from crest to crest is greater than λ, the principal force concerned in the motion is that of gravitation.

For waves whose length is less than λ the principal force concerned is that of surface-tension. Lord Kelvin proposed to distinguish the latter kind of waves by the name of ripples.

When a small body is partly immersed in a liquid originally at rest, and moves horizontally with constant velocity V, waves are propagated through the liquid with various velocities according to their respective wave-lengths. In front of the body the relative velocity of the fluid and the body varies from V where the fluid is at rest, to zero at the cutwater on the front surface of the body. The waves produced by the body will travel forwards faster than the body till they reach a distance from it at which the relative velocity of the body and the fluid is equal to the velocity of propagation corresponding to the wave-length. The waves then travel along with the body at a constant distance in front of it. Hence at a certain distance in front of the body there is a series of waves which are stationary with respect to the body. Of these, the waves of minimum velocity form a stationary wave nearest to the front of the body. Between the body and this first wave the surface is comparatively smooth. Then comes the stationary wave of minimum velocity, which is the most marked of the series. In front of this is a double series of stationary waves, the gravitation waves forming a series increasing in wave-length with their distance in front of the body, and the surface-tension waves or ripples diminishing in wave-length with their distance from the body, and both sets of waves rapidly diminishing in amplitude with their distance from the body.

If the current-function of the water referred to the body considered as origin is ψ, then the equation of the form of the crest of a wave of velocity w, the crest of which travels along with the body, is

$$d\psi = w\, ds$$

where ds is an element of the length of the crest. To integrate this equation for a solid of given form is probably difficult, but it is easy to see that at some distance on either side of the body, where the liquid is sensibly at rest, the crest of the wave will approximate to an asymptote inclined to the path of the body at an angle whose sine is w/V, where w is the velocity of the wave and V is that of the body.

The crests of the different kinds of waves will therefore appear to diverge as they get farther from the body, and the waves themselves will be less and less perceptible. But those whose wave-length is near to that of the wave of minimum velocity will diverge less than any of the others, so that the most marked feature at a distance from the body will be the two long lines of ripples of minimum velocity. If the angle between these is 2θ, the velocity of the body is $w \sec \theta$, where w for water is about 23 centimetres per second.

[Lord Kelvin's formula (1) may be applied to find the surface-tension of a clean or contaminated liquid from observations upon the length of waves of known periodic time, travelling over the surface. If $v = \lambda/\tau$ we have

$$T = \frac{\rho\lambda^3}{2\pi\tau^2} \coth \frac{2\pi h}{\lambda} - \frac{g\lambda^2\rho}{4\pi^2}, \quad . \quad . \quad . \quad . \quad (2)$$

h denoting the depth of the liquid. In observations upon ripples the factor involving h may usually be omitted, and thus in the case of water ($\rho = 1$)

$$T = \frac{\lambda^3}{2\pi\tau^2} - \frac{g\lambda^2}{4\pi^2} \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

simply. The method has the advantage of independence of what may occur at places where the liquid is in contact with solid bodies.

The waves may be generated by electrically maintained tuning-forks from which dippers touch the surface; but special arrangements are needed for rendering them visible. The obstacles are (1) the smallness of the waves, and (2) the changes which occur at speeds too rapid for the eye to follow. The second obstacle is surmounted by the aid of the stroboscopic method of observation, the light being intermittent in the period of vibration, so that practically only one phase is seen. In order to render visible the small waves employed, and which we may regard as deviations of a plane surface from its true figure, the method by which Foucault tested reflectors is suitable. The following results have been obtained

Clean	74·0
Greasy to the point where camphor motions nearly cease.	53·0
Saturated with olive oil	41·0
Saturated with sodium oleate	25·0

(*Phil. Mag.* November 1890) for the tensions of various water-surfaces at 18° C., reckoned in C. G. S. measure.

The tension for clean water thus found is considerably lower than that (81) adopted by Quincke, but it seems to be entitled to confidence, and at any rate the deficiency is not due to contamination of the surface.

A calculation analogous to that of Lord Kelvin may be applied to find the frequency of small transverse vibrations of a cylinder of liquid under the action of the capillary force. Taking the case where the motion is strictly in two dimensions, we may write as the polar equation of the surface at time t

$$r = a + a_n \cos n\theta \cos pt, \quad . \quad . \quad . \quad . \quad . \quad (4)$$

where p is given by

$$p^2 = (n^3 - n)\frac{T}{\rho a^3} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

If $n = 1$, the section remains circular, there is no force of restitution, and $p = 0$. The principal vibration, in which the section becomes elliptical, corresponds to $n = 2$.

Vibrations of this kind are observed whenever liquid issues from an elliptical or other non-circular hole, or even when it is poured from the lip of an ordinary jug; and they are superposed upon the general progressive motion. Since the phase of vibration depends upon the time elapsed, it is always the same at the same point in space, and thus the motion is *steady* in the hydrodynamical sense, and the boundary of the jet is a fixed surface. In so far as the vibrations may be regarded as isochronous, the distance between consecutive corresponding points of the recurrent figure, or, as it may be called, the *wave-length* of the figure, is directly proportional to the velocity of the jet, *i.e.* to the square root of the head. But as the head increases, so do the *lateral* velocities which go to form the transverse vibrations. A departure from the law of isochronism may then be expected to develop itself.

The transverse vibrations of non-circular jets allow us to solve a problem which at first sight would appear to be of great difficulty. According to Marangoni the diminished surface-tension of soapy water is due to the formation of a film. The formation cannot be instantaneous, and if we could measure the tension of a surface not more than $\frac{1}{100}$ of a second old, we might expect to find it undisturbed, or nearly so, from that proper to pure water. In order to carry out the experiment the jet is caused to issue from an elliptical orifice in a thin plate, about 2 mm. by 1 mm., under a head of 15 cm. A comparison under similar circumstances shows that there is hardly any difference in the wave-lengths of the patterns obtained with pure and with soapy water, from which we conclude that at this initial stage, the surface-tensions are the same. As early as 1869 Dupré had arrived at a similar conclusion from experiments upon the vertical rise of fine jets.

A formula, similar to (5), may be given for the frequencies of vibration of a spherical mass of liquid under capillary force. If, as before, the frequency be $p/2\Pi$, and a the radius of the sphere, we have

$$p^2 = n(n-1)(n+2)\frac{T}{\rho a^3}, \quad . \quad . \quad . \quad . \quad . \quad . \quad (6)$$

n denoting the order of the spherical harmonic by which the deviation from a spherical figure is expressed. To find the radius of the sphere of water which vibrates seconds, put $p = 2\Pi$, $T = 81$, $\rho = 1$, $n = 2$. Thus $a = 2.54$ cms., or one inch very nearly.]

Tables of Surface-Tension

In the following tables the units of length, mass and time are the centimetre, the gramme and the second, and the unit of force is that which if it acted on one gramme for one second would communicate to it a velocity of one centimetre per second:—

Table of Surface-Tension at 20° C. (Quincke).

Liquid.	Specific Gravity.	Tension of surface separating the liquid from			Angle of contact with glass in presence of		
		Air.	Water.	Mercury.	Air.	Water.	Mercury.
Water	1	81	..	418	25° 32′	..	26° 8′
Mercury	13·5432	540	418	..	51° 8′	26° 8′	..
Bisulphide of Carbon	1·2687	32·1	41·75	372·5	32° 16′	13° 8′	..
Chloroform	1·4878	30·6	29·5	399	..	..	..
Alcohol	0·7906	25·5	..	399	25° 12′	..	..
Olive Oil	0·9136	36·9	20·56	335	21° 50′	17°	47° 2′
Turpentine	0·8867	29·7	11·55	250·5	37° 44′	37° 44′	47° 2′
Petroleum	0·7977	31·7	27·8	284	36° 20′	42° 46′	..
Hydrochloric Acid	1·1	70·1	..	377	..	..	..
Solution of Hyposulphite of Soda	1·1248	77·5	..	442·5	23° 20′	..	10° 42′

Olive Oil and Alcohol, 12·2.

Olive oil and aqueous alcohol (sp. g. ·9231, tension of free surface 25·5), 6·8, angle 87° 48′.

Quincke has determined the surface-tension of a great many substances near their point of fusion or solidification. His method was that of observing the form of a large drop standing on a plane surface. If K is the height of the flat surface of the drop, and k that of the point where its tangent plane is vertical, then

$$T = \tfrac{1}{2}(K-k)^2 g\rho.$$

Quincke finds that for several series of substances the surface-tension is nearly proportional to the density, so that if we call

Surface-Tensions of Liquids at their Point of Solidification. From Quincke.

Substance.	Temperature of Solidification.	Surface-Tension.
Platinum	2000° C.	1658
Gold	1200°	983
Zinc	360°	860
Tin	230°	587
Mercury	−40°	577
Lead	330°	448
Silver	1000°	419
Bismuth	265°	382
Potassium	58°	364
Sodium	90°	253
Antimony	432°	244
Borax	1000°	212
Carbonate of Soda	1000°	206
Chloride of Sodium	..	114
Water	0°	86·2
Selenium	217°	70·4
Sulphur	111°	41·3
Phosphorus	43°	41·1
Wax	68°	33·4

$(K-k)^2 = 2T/g\rho$ the specific cohesion, we may state the general results of his experiments as follows:—

The bromides and iodides have a specific cohesion about half that of mercury. The nitrates, chlorides, sugars and fats, as also the metals lead, bismuth and antimony, have a specific cohesion nearly equal to that of mercury. Water, the carbonates and sulphates, and probably phosphates, and the metals platinum, gold, silver, cadmium, tin and copper have a specific cohesion double that of mercury. Zinc, iron and palladium, three times that of mercury, and sodium, six times that of mercury.

Relation of Surface-tension to Temperature

It appears from the experiments of Brunner and of Wolf on the ascent of water in tubes that at the temperature $t°$ centigrade

$T = 75·20\,(1-0·00187t)$ (Brunner);

$= 76·08\,(1-0·002t+0·00000415t^2)$, for a tube ·02346 cm. diameter (Wolf);

$= 77·34(1-0·00181t)$, for a tube ·03098 cm. diameter (Wolf).

Lord Kelvin has applied the principles of Thermodynamics to determine the thermal effects of increasing or diminishing the area of the free surface of a liquid, and has shown that in order to keep the temperature constant while the area of the surface increases by unity, an amount of heat must be supplied to the liquid which is dynamically equivalent to the product of the absolute temperature into the decrement of the surface-tension per degree of temperature. We may call this the *latent heat of surface-extension*.

It appears from the experiments of C. Brunner and C. J. E. Wolf that at ordinary temperatures the latent heat of extension of the surface of water is dynamically equivalent to about half the mechanical work done in producing the surface-extension.

References.—Further information on some of the matters discussed above will be found in Lord Rayleigh's *Collected Scientific Papers* (1901). In its full extension the subject of capillarity is very wide. Reference may be made to A. W. Reinold and Sir A. W. Rücker (*Phil. Trans.* 1886, p. 627); Sir W. Ramsay and J. Shields (*Zeitschr. physik. Chem.* 1893, 12, p. 433); and on the theoretical side, see papers by Josiah Willard Gibbs; R. Eötvös (*Wied. Ann.*, 1886, 27, p. 452); J. D. Van der Waals, G. Bakker and other writers of the Dutch school. (J. C. M.; R.)

CAPISTRANO, GIOVANNI DI (1386–1456), Italian friar, theologian and inquisitor, was born in the little village of Capistrano in the Abruzzi, of a family which had come to Italy with the Angevins. He lived at first a wholly secular life, married, and became a successful magistrate; he took part in the continual struggles of the small Italian states in such a way as to compromise himself. During his captivity he was practically ruined and lost his young wife. He then in despair entered the Franciscan order and at once gave himself up to the most rigorous asceticism, violently defending the ideal of strict observance. He was charged with various missions by the popes Eugenius IV. and Nicholas V., in which he acquitted himself with implacable violence. As legate or inquisitor he persecuted the last Fraticelli of Ferrara, the Jesuati of Venice, the Jews of Sicily, Moldavia and Poland, and, above all, the Hussites of Germany, Hungary and Bohemia; his aim in the last case was to make conferences impossible between the representatives of Rome and the Bohemians, for every attempt at conciliation seemed to him to be conniving at heresy. Finally, after the taking of Constantinople, he succeeded in gathering troops together for a crusade against the Turks (1455), which at least helped to raise the siege of Belgrade, which was being blockaded by Mahommed II. He died shortly afterwards (October 23, 1456), and was canonized in 1690. Capistrano, in spite of this restless life, found time to work both in the lifetime of his master St Bernardino of Siena and after, at the reform of the order of the minor Franciscans, and to uphold both in his writings and his speeches the most advanced theories upon the papal supremacy as opposed to that of the councils.

See E. Jacob, *Johannes von Capistrano*, vol. i.: "Das Leben und Wirken Capistrans;" vol. ii.: "Die handschriftlichen Aufzeichnungen von Reden und Tractaten Capistrans," (1st series, Breslau, 1903–1905). (P. A.)

CAPITAL (Lat. *caput*, head), in architecture, the crowning member of the column, which projects on each side as it rises, in order to support the abacus and unite the square form of the latter with the circular shaft. The bulk of the capital may either be convex, as in the Doric capital; concave, as in the bell of the Corinthian capital; or bracketed out, as in the Ionic capital. These are the three principal types on which all capitals are based. The capitals of Greek, Doric, Ionic and Corinthian orders are given in the article Order.

From the prominent position it occupies in all monumental buildings, it has always been the favourite feature selected for ornamentation, and consequently it has become the clearest indicator of any style.

The two earliest capitals of importance are those which are based on the lotus (fig. 1) and papyrus (fig. 2) plants respectively, and these, with the palm tree capital, were the chief types employed by the Egyptians down to the 3rd century B.C., when,

under the Ptolemaic dynasties, various river plants were employed decoratively and the lotus capital goes through

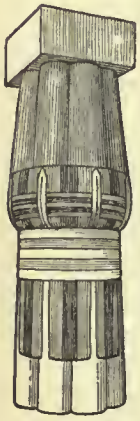

Fig. 1.—Lotus Capital from Karnak.

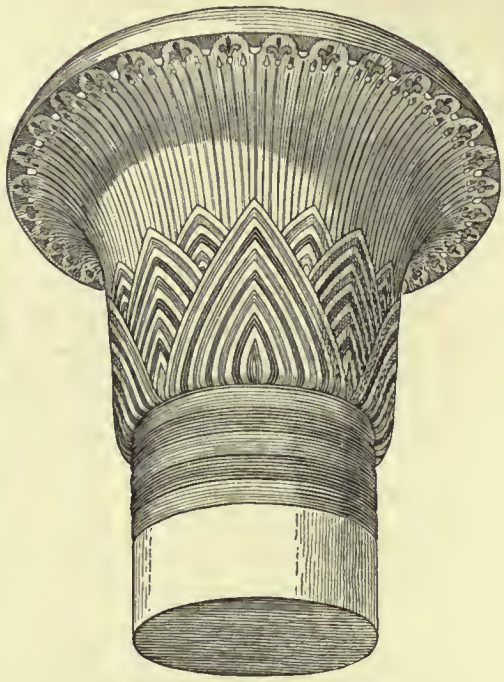

Fig. 2.—Papyrus Capital from Karnak.

various modifications (fig. 3). Some kind of volute capital is shown in the Assyrian bas-reliefs, but no Assyrian capital has ever been found; those exhibited as such in the British Museum are bases.

The Persian capital belongs to the third class above mentioned, the brackets are carved with the lion (fig. 4) or the griffin projecting right and left to support and lessen the bearing of the architrave, and on their backs carry other brackets at right angles to support the cross timbers. The profuse decoration underneath the bracket capital in the palace of Xerxes and

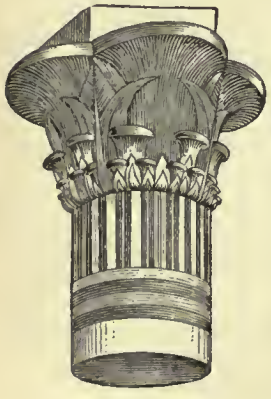

Fig. 3.—Modified Lotus Capital from Philae.

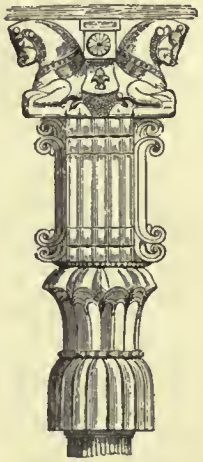

Fig. 4.—Persian Capital from Persepolis.

elsewhere, serves no structural function, but gives some variety to the extenuated shaft.

The earliest Greek capital is that shown in the Temple-fresco at Cnossus in Crete (1600 B.C.); it was of the first type—convex, and was probably moulded in stucco: the second is represented by the richly carved example of the columns (fig. 5) flanking the tomb of Agamemnon in Mycenae (*c.* 1100 B.C.), also convex, carved with the chevron device, and with an apophyge on which the buds of some flowers are sculptured. The Doric capital of the temple of Apollo at Syracuse (*c.* 700 B.C.) follows, in which the echinus moulding has become a more definite form: this in the Parthenon reaches its culmination, where the convexity is at the top and bottom with a delicate uniting curve. The sloping side of

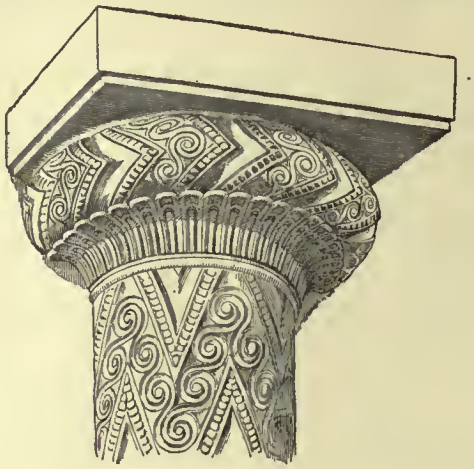

Fig. 5.—Early Greek Capital from the Tomb of Agamemnon, Mycenae.

the echinus becomes flatter in the later examples, and in the Colosseum at Rome forms a quarter round.

In the Ionic capital of the Archaic temple of Diana at Ephesus (560 B.C.) the width of the abacus is twice that of its depth, consequently the earliest Ionic capital known was virtually a

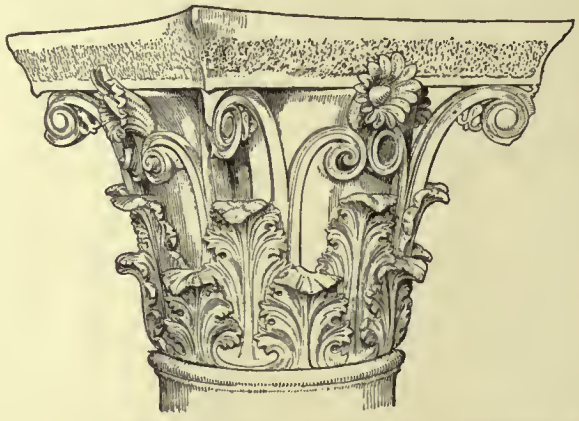

Fig. 6.—Corinthian Capital from the Tholos of Epidaurus.

bracket capital. A century later, in the temple on the Ilissus, published in Stuart and Revett, the abacus has become square. One of the most beautiful Corinthian capitals is that from the Tholos of Epidaurus (400 B.C.) (fig. 6); it illustrates the transition between the earlier Greek capital of Bassae and the Roman version of the temple of Mars Ultor (fig. 7).

The foliage of the Greek Corinthian capital was based on the Acanthus spinosus, that of the Roman on the Acanthus mollis; the capital of the temple of Vesta and other examples at Pompeii are carved with foliage of a different type.

Fig. 7.—Roman Capital from the Temple of Mars Ultor, Rome.

Byzantine capitals are of endless variety; the Roman composite capital would seem to have been the favourite type they followed at first: subsequently, the block of stone was left rough as it came from the quarry, and the sculptor, set to carve it, evolved

new types of design to his own fancy, so that one rarely

FIG. 8.—Byzantine Capitals from the central portal of St Mark's, Venice.

meets with many repetitions of the same design. One of the most remarkable is the capital in which the leaves are carved as if blown by the wind; the finest example being in Sta Sophia, Thessalonica; those in St Mark's, Venice (fig. 8) specially attracted Ruskin's fancy. Others are found in St Apollinare-in-classe, Ravenna. The Thistle and Pine capital is

FIG. 9.—Byzantine Capital from the Church of S. Vitale, Ravenna.

FIG. 10.—Byzantine Capital from the Church of S. Vitale, Ravenna.

FIG. 11.—Cushion Capital.

found in St Mark's, Venice; St Luke's, Delphi; the mosques of Kairawan and of Ibn Tūlūn, Cairo, in the two latter cases

FIG. 12.—Romanesque Capitals from the Cloister of Monreale, near Palermo, Sicily.

being taken from Byzantine churches. The illustration of the capital in S. Vitale, Ravenna (figs. 9 and 10) shows above it the dosseret required to carry the arch, the springing of which was much wider than the abacus of the capital.

The Romanesque and Gothic capitals throughout Europe present the same variety as in the Byzantine and for the same

FIG. 13.—Gothic Capitals from Wells Cathedral.

reason, that the artist evolved his conception of the design from the block he was carving, but in these styles it goes further on account of the clustering of columns and piers.

The earliest type of capital in Lombardy and Germany is that which is known as the cushion-cap, in which the lower portion of the cube block has been cut away to meet the circular shaft (fig. 11). These early types were generally painted at first with various geometrical designs, afterwards carved.

In Byzantine capitals, the eagle, the lion and the lamb are occasionally carved, but treated conventionally.

In the Romanesque and Gothic styles, in addition to birds and beasts, figures are frequently introduced into capitals, those in the Lombard work being rudely carved and verging on the grotesque; later, the sculpture reaches a higher standard; in the cloisters of Monreale (fig. 12) the birds being wonderfully true to nature. In England and France (figs. 13 and 14), the figures introduced into the capitals are sometimes full of character. These capitals, however, are not equal to those of the Early English school, in which the foliage is conventionally treated as if it had been copied from metal work, and is of infinite variety, being found in small village churches as well as in cathedrals.

FIG. 14.—Gothic Capitals from Amiens Cathedral.

FIG. 15.—Italian Renaissance Capital from S. Maria dei Miracoli, Venice.

Reference has only been made to the leading examples of the Roman capitals; in the Renaissance period (fig. 15) the feature became of the greatest importance and its variety almost as great as in the Byzantine and Gothic styles. The pilaster, which

was employed so extensively in the Revival, called for new combinations in the designs for its capitals. Most of the ornament can be traced to Roman sources, and although less vigorous, shows much more delicacy and refinement in its carving. (R. P. S.)

CAPITAL (*i.e.* capital stock or fund), in economics, generally, the accumulated wealth either of a man or a community, that is available for earning interest and producing fresh wealth. In social discussion it is sometimes treated as antithetical to labour, but it is in reality the accumulated savings of labour and of the profits accruing from the savings of labour. It is that portion of the annual produce reserved from consumption to supply future wants, to extend the sphere of production, to improve industrial instruments and processes, to carry out works of public utility, and, in short, to secure and enlarge the various means of progress necessary to an increasing community. It is the increment of wealth or means of subsistence analogous to the increment of population and of the wants of civilized man. Hence J. S. Mill and other economists, when seeking a graphic expression of the service of capital, have called it "abstinence." The labourer serves by giving physical and mental effort in order to supply his means of consumption. The capitalist, or labourer-capitalist, serves by abstaining from consumption, by denying himself the present enjoyment of more or less of his means of consumption, in the prospect of a future profit. This quality, apparent enough in the beginnings of capital, applies equally to all its forms and stages; because whether a capitalist stocks his warehouse with goods and produce, improves land, lends on mortgage or other security, builds a factory, opens a mine, or orders the construction of machines or ships, there is the element of self-deprival for the present, with the risk of ultimate loss of what is his own, and what, instead of saving and embodying in some productive form, he might choose to consume. On this ground rests the justification of the claims of capital to its industrial rewards, whether in the form of rent, interest or profits of trade and investment.

To any advance in the arts of industry or the comforts of life, a rate of production exceeding the rate of consumption, with consequent accumulation of resources, or in other words, the formation of capital, is indispensable. The primitive cultivators of the soil, whether those of ancient times or the pioneers who formed settlements in the forests of the New World, soon discovered that their labour would be rendered more effective by implements and auxiliary powers of various kinds, and that until the produce from existing means of cultivation exceeded what was necessary for their subsistence, there could be neither labour on their part to produce such implements and auxiliaries, nor means to purchase them. Every branch of industry has thus had a demand for capital within its own circles from the earliest times. The flint arrow-heads, the stone and bronze utensils of fossiliferous origin, and the rude implements of agriculture, war and navigation, of which we read in Homer, were the forerunners of that rich and wonderful display of tools, machines, engines, furnaces and countless ingenious and costly appliances, which represent so large a portion of the capital of civilized countries, and without the pre-existing capital could not have been developed. Nor in the cultivation of land, or the production simply of food, is the need of implements, and of other auxiliary power, whether animal or mechanical, the only need immediately experienced. The demands on the surplus of produce over consumption are various and incessant. Near the space of reclaimed ground, from which the cultivator derives but a bare livelihood, are some marshy acres that, if drained and enclosed, would add considerably in two or three years to the produce; the forest and other natural obstructions might also be driven farther back with the result, in a few more years, of profit; fences are necessary to allow of pasture and field crops, roads have to be made and farm buildings to be erected; as the work proceeds more artificial investments follow, and by these successive outlays of past savings in improvements, renewed and enhanced from generation to generation, the land, of little value in its natural state either to the owner and cultivator or the community, is at length brought into a highly productive condition. The history of capital in the soil is substantially the history of capital in all other spheres. No progress can be made in any sphere, small or large, without reserved funds possessed by few or more persons, in small or large amounts, and the progress in all cases is adventured under self-deprival in the meanwhile of acquired value, and more or less risk as to the final result.

Capital is necessarily to be distinguished from money, with which in ordinary nomenclature it is almost identical. Wealth may be in other things than money; oxen, wives, tools, have at different stages of civilization represented the recognized form of capital; and modern usage only treats capital as meaning the command of money because money is the ordinary form of it nowadays. The capital of a country can scarce be said to be less than the whole sum of its investments in a productive form, and possessing a recognized productive value.

Adam Smith's distinction of "fixed" and "circulating" capital in the *Wealth of Nations* (book ii. c. i.) cannot fail to be always useful in exhibiting the various forms and conditions under which capital is employed. Yet the principal phenomena of capital are found to be the same, whether the form of investment be more or less permanent or circulable. The machinery in which capital is "fixed," and which yields a profit without apparently changing hands, is in reality passing away day by day, until it is worn out, and has to be replaced. So also of drainage and other land improvements. When the natural forests have been consumed and the landowners begin to plant trees on the bare places, the plantations while growing are a source of health, shelter and embellishment—they are not without a material profit throughout their various stages to maturity—and when, at the lapse of twenty or more years, they are ready to be cut down, and the timber is sold for useful purposes, there is a harvest of the original capital expended as essentially as in the case of the more rapid yearly crops of wheat or oats. The chief distinction would appear to rest in the element of time elapsing between the outlay of capital and its return. Capital may be employed in short loans or bills of exchange at two or three months, in paying wages of labour for which there may be return in a day or not in less than a year or more, or in operations involving within themselves every form of capital expenditure, and requiring a few years or ninety-nine years for the promised fructification on which they proceed. But the common characteristic of capital is that of a fund yielding a return and reproducing itself whether the time to this end be long or short. The division of expenditure or labour (all expenditure having a destination to labour of one kind or another) into "productive" and "unproductive" by the same authority (book ii. c. 3) is also apposite both for purposes of political economy and practical guidance, though economists have found it difficult to define where "productive expenditure" ends and "unproductive expenditure" begins. Adam Smith includes in his enumeration of the "fixed capital" of a country "the acquired and useful abilities of all the inhabitants"; and in this sense expenditure on education, arts and sciences might be deemed expenditure of the most productive value, and yet be wanting in strict commercial account of the profit and loss. It must be admitted that there is a personal expenditure among all ranks of society, which, though not in any sense a capital expenditure, may become capital and receive a productive application, always to be preferred to the grossly unproductive form, in the interest both of the possessors and of the community.

The subject in its details is full of controversies, and a discussion of it at any length would embrace the whole field of economics. The subject will be found fully dealt with in every important economic work, but the following may be specially consulted:—J. S. Mill, *Principles of Political Economy*; J. E. Cairns, *Some Leading Principles of Political Economy*; F. A. Walker, *Political Economy*; A. Marshall, *Principles of Economics*; E. V. Böhm-Bawerk, *Capital and Interest*; K. Marx, *Capital*; J. B. Clark, *Capital and its Earnings*; see also the economic works of W. H. Mallock (*Critical Examination of Socialism*, 1908, &c.) for an insistence on the importance of "ability," or brain-work, as against much of modern socialist theorizing against "capitalism."

CAPITAL PUNISHMENT. By this term is now meant the infliction of the penalty of death for crime under the sentence of some properly constituted authority, as distinguished from killing the offender as a matter of self-defence or private vengeance, or under the order of some self-constituted or irregular tribunal unknown to the law, such as that of the Vigilantes of California, or of lynch law (*q.v.*). In the early stages of society a man-slayer was killed by the "avenger of blood" on behalf of the family of the man killed, and not as representing the authority of the state (Pollock and Maitland, *Hist. Eng. Law*, ii. 447.) This mode of dealing with homicide survives in the vendetta of Corsica and of the Mainotes in Greece, and in certain of the southern states of North America. The obligation or inclination to take vengeance depends on the fact of homicide, and not on the circumstances in which it was committed, *i.e.* it is a part of the *lex talionis*. The mischief of this system was alleviated under the Levitical law by the creation of cities of refuge, and in Greece and Italy, both in Pagan and Christian times, by the recognition of the right of sanctuary in temples and churches. A second mode of dealing with homicide was that known to early Teutonic and early Celtic law, where the relatives of the deceased, instead of the life of the slayer, received the wer of the deceased, *i.e.* a payment in proportion to the rank of the slain, and the king received the blood-wite for the loss of his man. But even under this system certain crimes were in Anglo-Saxon law bot-less, *i.e.* no compensation could be paid, and the offender must suffer the penalty of death. In the laws of Khammurabi, king of Babylon (2285–2242 B.C.), the death penalty is imposed for many offences. The modes for executing it specially named are burning, drowning and impalement (*Oldest Code of Laws*, by C. H. W. Johns, 1903). Under the Roman law, "capital" punishment also included punishments which deprived the offender of the status of Roman citizen (*capitis deminutio, capitis amissio*), *e.g.* condemnation to servitude in the mines or to deportation to an island (*Dig.* 48. 19).

United Kingdom.—The modes of capital punishment in England under the Saxon and Danish kings were various: banging, beheading, burning, drowning, stoning, and precipitation from rocks. The principle on which this variety depended was that where an offence was such as to entitle the king to outlaw the offender, he forfeited all, life and limb, lands and goods, and that the king might take his life and choose the mode of death. William the Conqueror would not allow judgment of death to be executed by hanging and substituted mutilation; but his successors varied somewhat in their policy as to capital punishment, and by the 13th century the penalty of death became by usage (without legislation) the usual punishment for high and petty treason and for all felonies (except mayhem and petty larceny, *i.e.* theft of property worth less than 1s.); see Stephen, *Hist. Cr. Law*, vol. i. 458; Pollock and Maitland, *Hist. Eng. Law*, vol. ii. 459. It therefore included all the more serious forms of crime against person or property, such as murder, manslaughter, arson, highway robbery, burglary (or hamesucken) and larceny; and when statutory felonies were created they were also punishable by death unless the statute otherwise provided. The death penalty was also extended to heretics under the writ *de heretico comburendo*, which was lawfully issuable under statute from 1382 (5 Ric. II. stat. 5) until 1677 (29 Chas. II. c. 9). For this purpose the legislature had adopted the civil law of the Roman Empire, which was not a part of the English common law (Stephen, *Hist. Cr. Law*, vol. ii. 438-469).

British and foreign laws and methods.

The methods of execution by crucifixion (as under the Roman law), or breaking on the wheel (as under the Roman Dutch law and the Holy Roman Empire), were never recognized by the common law, and would fall within the term "cruel and unusual punishments" in the English Bill of Rights, and in the United States would seem to be unconstitutional (see *Wilkinson* v. *Utah*, 1889, 136 U.S. 436, 446).

The severity of barbarian and feudal laws was mitigated, so far as common-law offences were concerned, by the influence of the Church as the inheritor of Christian traditions and Roman jurisprudence. The Roman law under the empire did not allow the execution of citizens except under the *Lex Porcia*. But the right of the emperors to legislate *per rescriptum principis* enabled them to disregard the ordinary law when so disposed. The 83rd novel of Justinian provided that criminal causes against clerics should be tried by the judges, and that the convicted cleric should be degraded by his bishop before his condemnation by the secular power, and other novels gave the bishops considerable influence, if not authority, over the lay judiciary. In western Europe the right given by imperial legislation in the Eastern Empire was utilized by the Papacy to claim privilege of clergy, *i.e.* that clerks must be remitted to the bishop for canonical punishment, and not subjected to civil condemnation at all. The history of benefit of clergy is given in Pollock and Maitland, *Hist. English Law*, vol. i. pp. 424-440, and Stephen, *Hist. Cr. Law*, vol. iii. 459, 463. By degrees the privilege was extended not only to persons who could prove ordination or show a genuine tonsure, but all persons who had sufficient learning to be able to read the neck-verse (Ps. li. v. 1). Before the Reformation the ecclesiastical courts had ceased to take any effective action with respect to clerks accused of offences against the king's laws; and by the time of Henry VII. burning on the hand under the order of the king's judges was substituted for the old process of compurgation in use in the spiritual courts.

The effect of the claim of benefit of clergy is said to have been to increase the number of convictions, though it mitigated the punishment; and it became, in fact, a means of showing mercy to certain classes of individuals convicted of crime as a kind of privilege to the educated, *i.e.* to all clerks whether secular or religious (25 Edw. III. stat. 3); and it was allowed only in case of a first conviction, except in the case of clerks who could produce their letters of orders or a certificate of ordination. To prevent a second claim it was the practice to brand murderers with the letter M, and other felons with the Tyburn T, and Ben Jonson was in 1598 so marked for manslaughter.

The reign of Henry VIII. was marked by extreme severity in the execution of criminals—as during this time 72,000 persons are said to have been hanged. After the formation of English settlements in America the severity of the law was mitigated by the practice of reprieving persons sentenced to death on condition of their consenting to be transported to the American colonies, and to enter into bond service there. The practice seems to have been borrowed from Spain, and to have been begun in 1597 (39 Eliz. c. 4). It was applied by Cromwell after his campaign in Ireland, and was in full force immediately after the Restoration, and is recognized in the Habeas Corpus Act 1677, and was used for the Cameronians during Claverhouse's campaign in south-west Scotland. In the 18th century the courts were empowered to sentence felons to transportation (see DEPORTATION) instead of to execution, and this state of the law continued until 1857 (6 *Law Quarterly Review*, p. 388). This power to sentence to transportation at first applied only to felonies with benefit of clergy; but in 1705, on the abolition of the necessity of proving capacity to read, all criminals alike became entitled to the benefit previously reserved to clerks. Benefit of clergy was finally abolished in 1827 as to all persons not having privilege of peerage, and in 1841 as to peers and peeresses. Its beneficial effect had now been exhausted, since no clergyable offences remained capital crimes.

At the end of the 18th century the criminal law of all Europe was ferocious and indiscriminate in its administration of capital punishment for almost all forms of grave crime; and yet owing to poverty, social conditions, and the inefficiency of the police, such forms of crime were far more numerous than they now are. The policy and righteousness of the English law were questioned as early as 1766 by Goldsmith through the mouth of the vicar of Wakefield: "Nor can I avoid even questioning the validity of that right which social combinations have assumed of capitally punishing offences of a slight nature. In cases of murder their right is obvious, as it is the duty of us all from the law of self-defence to cut off that man who has shown a disregard for the

life of another. Against such all nature rises in arms; but it is not so against him who steals my property." He adds later: "When by indiscriminate penal laws the nation beholds the same punishment affixed to dissimilar degrees of guilt, the people are led to lose all sense of distinction in the crime, and this distinction is the bulwark of all morality."

The opinion expressed by Goldsmith was strongly supported by Bentham, Romilly, Basil Montagu and Mackintosh in England, and resulted in considerable mitigation of the severity of the law. In 1800 over 200 and in 1819 about 180 crimes were capital. As the result of the labour of these eminent men and their disciples, and of Sir Robert Peel, there are now only four crimes (other than offences against military law or naval discipline) capitally punishable in England—high treason, murder, piracy with violence, and destruction of public arsenals and dockyards (The Dockyards, &c., Protection Act 1772). An attempt to abolish the death penalty for this last offence was made in 1837, but failed, and has not since been renewed. In the case of the last two offences sentence of death need not be pronounced, but may be recorded (4 Geo. IV. c. 48). Since 1838 it has in practice been executed only for murder; the method being by hanging.

The change in the severity of the law is best illustrated by the following statistics:—

Years.	Death Sentences.		Sentences Executed.	
	For all Crimes.	For Murder.	For all Crimes.	For Murder.
1831	1601	14	52	12
1833[1]	931	9	33	6
1838[1]	116	25	6	5
1862[1]	29	28	15	15

During the twelve years from 1893 to 1904, 788 persons were committed for trial for murder, being an average of 65. The highest number was in 1893 (82) and the lowest in 1900 (51). Of those tried in 1904, 28 (26 males and 2 females) were convicted of murder, 16 (all males) were executed; 9 males and 2 females had their sentences commuted to penal servitude for life.

In Scotland capital punishment can be imposed only for treason, murder and offences against 10 Geo. IV. c. 38, *i.e.* wilful shooting, stabbing, strangling or throwing corrosives with intent to murder, maim, disfigure, disable, or do grievous bodily harm, in all cases where if death had ensued the offence would have been murder. Prior to 1887 rape, robbery, wilful fire-raising and incest, and many other crimes, were also capital offences; but in practice the pains of law were restricted at the instance of the prosecution. The method is by hanging.

In Ireland capital punishment may be inflicted for the same offences as in England, except offences under the Dockyards Protection Act 1772, and it is carried out in the same manner.

Offences under Military Law.—Thus far only crimes against the ordinary law of the land have been dealt with. But both the Naval Discipline Act of 1866 and the Army Act empower courts-martial to pass sentence for a number of offences against military and naval laws. Such sentences are rarely if ever passed where an ordinary court is within reach, or except in time of war. The offences extend from traitorous communication with the enemy and cowardice on the field to falling asleep while acting as a sentinel on active service. It is for the authority confirming a sentence of death by court-martial to direct the mode of execution, which both in the British and United States armies is usually by shooting or hanging. During the Indian Mutiny some mutineers were executed by being blown from the mouth of cannon. As to the history of military punishments see Clode, *Military and Martial Law.*

[1] Each of these years followed upon legislation mitigating severity of punishment.

British Colonies and Possessions.—Under the Indian Penal Code sentence of death may be passed for waging war against the king (s. 121) and for murder (s. 302). If the murder is committed by a man under sentence of transportation for life the death penalty must be imposed (s. 303). In other cases it is alternative. This code has been in substance adopted in Ceylon, in Straits Settlements and Hong-Kong, and in the Sudan. In most of the British colonies and possessions the death penalty may be imposed only in the case of high treason, wilful murder and piracy with violence. But in New South Wales and Victoria sentence of death may be passed for rape and criminal abuse of girls under ten. In Queensland the law was the same until the passing of the Criminal Code of 1899.

Under the Canadian Criminal Code of 1892 the death sentence may be imposed for treason (s. 657), murder (s. 231), rape (s. 267), piracy with violence (s. 127), and upon subjects of a friendly power who levy war on the king in Canada (s. 68). But the judge is bound by statute to report on all death sentences, and the date of execution is fixed so as to give time for considering the report. The sentence is executed by hanging. In South Africa the criminal law is based on the Roman-Dutch law, under which capital punishment is liable for treason (*crimen perduellionis* or *laesae majestatis*), murder and rape (van Leeuwen, c. 36). In the Cape Colony rape is still capital (*R.* v. *Nonosi*, 1885; 1 Buchanan, 1898). In Natal rape may be punished by hanging (act no. 22, 1898). Though the Roman-Dutch modes of executing the sentence by decapitation or breaking on the wheel have not been formally abolished, in practice the sentence in the Cape Colony is executed by hanging. In the Transvaal hanging is now the sole mode of executing capital punishment (Criminal Procedure Code, 1903, s. 244). The Roman-Dutch law as to crime and punishments has been superseded in Ceylon and British Guiana by ordinance.

Austria-Hungary.—In Austria capital punishment was in 1787 for a time abolished, but was reintroduced in 1795 for high treason, and in 1803 for certain other crimes. Under the penal code still in force in 1906 it might be inflicted for the offences in the table given below, but not on offenders who were under twenty when they committed the offence. The annexed table indicates that the full sentence was sparingly executed. Under a Penal Code drafted in 1906, however, only two offences were made capital, viz. high treason against the person of the emperor and the graver cases of murder. The sentence is executed by hanging.

Crimes Punishable by Death.	1853 to 1873.		1875 to 1900.		1901 to 1903.	
	Condemned.	Executed.	Condemned.	Executed.	Condemned.	Executed.
High treason	4	0	1	0	0	0
Murder, s. 136	880	102	2085	81	180	9
Killing by robbers, s. 141 .	12	3	35	1	3	0
Public violence, ss. 85, 87 .	..	..	1	0	0	0
Incendiarism, s. 167 . .	5	0	0	0	0	0
Criminal use of explosives (explosives law, s. 4).	..	..	..	..	..	..

Belgium.—Under the Belgian Penal Code of 1867 the death penalty is retained for certain forms of high treason, and for assassination and parricide by poisoning. It may not be pronounced on a person under eighteen. The sentence is executed publicly by the guillotine. No execution seems to have taken place since 1863.

Denmark.—Sentence of death may be imposed for most forms of high treason, aggravated cases of murder, rape and piracy. It is executed publicly by the axe. Offenders under eighteen are not liable.

Finland.—In Finland the death penalty is alleged not to have been inflicted since 1824. It may be imposed for the assassination of the grand duke or grand duchess of the head of a friendly state, and wilful murder of other persons.

France.—Under the *ancien régime* in France, 115 crimes had become capital in 1789. The mode of execution varied, but in some cases it was effected by breaking on the wheel or burning,

and was coupled with mutilation. Under the Penal Code of 1810, as amended in or after 1832, even so late as 1871, thirty offences were capital, one being perjury against a prisoner resulting in his condemnation to death (art. 361). At present it may be imposed for wounding a public official with intent to murder (art. 233), assassination, parricide, poisoning, killing to commit a crime or escape from justice (arts. 302, 304). But juries freely exercise the power of acquitting in capital cases, or of defeating the capital sentence by finding extenuating circumstances in more than seven-eighths of the cases, which compels the court to reduce the punishment by one or more degrees, *i.e.* below the penalty of death. And in recent times the prerogative of mercy has been continually exercised by the president, even in gross cases where public opinion demanded the extreme penalty. The sentence is executed in public by the guillotine.

Germany.—In many of the states of Germany capital punishment had been abolished (Brunswick, Coburg, Nassau, Oldenburg in 1849; Saxe-Meiningen, Saxe-Weimar, 1862; Baden, 1863; Saxony, 1868). But it has been restored by the Imperial Criminal Code of 1872, in the case of attempts on the life of the emperor, or of the sovereign of any federal state in which the offender happens to be (s. 80), and for deliberate homicide (s. 211) —as opposed to intentional homicide without deliberation—and for certain treasonable acts committed when a state of siege has been proclaimed. The sentence is executed by beheading (s. 13).

Holland.—In Holland there have been no executions since 1860. Capital punishment (by hanging) was abolished in 1870, and was not reintroduced in the Penal Code of 1886.

Italy.—Capital punishment was abolished in Tuscany as far back as 1786, and from Italy has come the chief opposition to the death penalty, originated by Beccaria, and supported by many eminent jurists. Under the Penal Code of 1888 the death penalty was abrogated for all crimes, even for regicide. The cases of homicide in Italy are very numerous compared with those in England, amounting in 1905 to 105 per million as compared with 27 per million in the United Kingdom.

Japan.—The penalty of death is executed by hanging within a prison. It may be imposed for executing or contriving acts of violence against the mikado or certain of his family, and for seditious violence with the object of seizing the territory or subverting the government or laws of Japan, or conspiring with foreign powers to commence hostilities against Japan. It is inflicted for certain forms of homicide, substantially wilful murder in the first degree.

Norway.—Under Norwegian law, up to 1905, sentence of death might be passed for murder with premeditation, but the court might as an alternative decree penal servitude for life. Sentence of death had also to be passed in cases where a person under sentence of penal servitude for life committed murder or culpable homicide, or caused bodily injuries in circumstances warranting a sentence of penal servitude for life, or committed robbery or the graver forms of wilful fire-raising. The sentence was carried out by decapitation (see BEHEADING); but there had been no execution since 1876. The new Norwegian Code, which came into force on the 6th of January 1905, abolished capital punishment.

Portugal.—There has been considerable objection in Portugal to capital punishment, and it was abolished in 1867.

Rumania.—Capital punishment was abolished in 1864.

Russia.—In 1750, under the empress Elizabeth, capital punishment was abolished; but it was restored later and was freely inflicted, the sentence being executed by shooting, beheading or hanging. According to a Home Office Return in England in 1907 the death penalty is abolished, except in cases where the lives of the emperor, empress or heir to the throne are concerned.

Spain.—Under the Spanish Penal Code of 1870 the following crimes are capital:—inducing a foreign power to declare war against Spain, killing the sovereign, parricide and assassination. The method employed is execution in public by the garrote. But the death sentence is rarely imposed, the customary penalty for murder being penal servitude in chains for life, while a parricide is imprisoned in chains "in perpetuity until death."

Sweden.—The severity of the law in Sweden was greatly mitigated so far back as 1777. Under the Penal Code of 1864 the penalty of death may be imposed for certain forms of treason, including attempts on the life of the sovereign or on the independence of Sweden, and for premeditated homicide (*assassinat*), and in certain cases for offences committed by persons under sentence of imprisonment for life. In 1901 a bill to abolish capital punishment was rejected by both houses of the Swedish parliament.

Switzerland.—Capital punishment was abolished in Switzerland in 1874 by Federal legislation; but in 1879, in consequence of a plebiscite, each canton was empowered to restore the death penalty for offences in its territory. The Federal government was unwilling to take this course, but was impelled to it by the fact that, between 1874 and 1879, cases of premeditated murder had considerably increased. Seven of the cantons out of twenty-two have exercised the power given to restore capital punishment. But there do not seem to have been any cases in which the death penalty has been inflicted; and on the assassination of the empress of Austria at Geneva in 1898 it was found that the laws of the canton did not permit the execution of the assassin. The canton of Zug imposes the lowest minimum penalty known, *i.e.* three years' imprisonment for wilful homicide, the maximum being imprisonment for life.

United States of America.—Under the Federal laws sentence of death may be passed for treason against the United States and for piracy and for murder within the Federal jurisdiction. But for the most part the punishment of crime is regulated by the laws of the constituent states of the Union.

The death penalty was abolished in Michigan in 1846 except for treason, and wholly in Wisconsin in 1853. In Maine it was abolished and subsequently re-enacted, but again abolished in 1887. In Rhode Island it was abolished in 1852, but restored in 1882, only in case of murder committed by a person under sentence of imprisonment for life (Laws, 1896, c. 277, s. 2). In all the other states the death penalty may still be inflicted: in Alabama, Delaware, Georgia, Maryland, and West Virginia, for treason, murder, arson and rape; in Alaska, Arizona, Kansas, New Jersey, Mississippi, Montana, New York, North Dakota, Oregon, and South Dakota, for treason and murder; in Colorado, Idaho, Illinois, Iowa, Massachusetts, Minnesota, Nebraska, New Hampshire, New Mexico, Nevada, Ohio, Oklahoma, Pennsylvania, Utah and Wyoming, for murder only; in Kentucky and Virginia, for treason, murder and rape; in Vermont, for treason, murder and arson; in Indiana, for treason, murder, and for arson if death result; in California, for treason, murder and train-wrecking; in North Carolina, for murder, rape, arson and burglary; in Florida, Missouri, South Carolina, Tennessee and Texas, for murder and rape; in Arkansas and Louisiana, for treason, murder, rape, and administering poison or use of dangerous weapons with intent to murder. Louisiana is cited by Girardin (*le droit de punir*) as a state in which the death penalty was abolished in 1830. Under the influence of the eminent jurist, E. Livingston, who framed the state codes, the legislature certainly passed a resolution against capital punishment. But since as early as 1846 it has been there lawful, subject to a power given to the jury, to bring in a verdict of guilty, "but no capital punishment," which had the effect of imposing a sentence of hard labour for life. In certain states the jury has, under local legislation, the right to award the sentence. The constitutionality of such legislation has been doubted, but has been recognized by the courts of Illinois and Iowa. Sentence of death is executed by hanging, except in New York, Massachusetts and Ohio, where it is carried out by "electrocution" (*q.v.*).

The question of abolition.

With the mitigation of the law as to punishment, agitation against the theory of capital punishment has lost much of its force. But many European and American writers, and some English writers and associations, advocate the total abolition of the death punishment. The ultimate argument of the opponents of capital punishment is that society has no right to take the life of any one of its members on

any ground. But they also object to capital punishment: (1) on religious grounds, because it may deprive the sinner of his full time for repentance; (2) on medical grounds, because homicide is usually if not always evidence of mental disease or irresponsibility; (3) on utilitarian grounds, because capital punishment is not really deterrent, and is actually inflicted in so few instances that criminals discount the risks of undergoing it; (4) on legal grounds, *i.e.* that the sentence being irrevocable and the evidence often circumstantial only, there is great risk of gross injustice in executing a person convicted of murder; (5) on moral grounds, that the punishment does not fit the case nor effect the reformation of the offender. It is to be noted that the English Children Act 1908 expressly forbids the pronouncing or recording the sentence of death against any person under the age of sixteen (s. 103).

The punishment is probably retained, partly from ingrained habit, partly from a sense of its appropriateness for certain crimes, but also that the *ultima ratio* may be available in cases of sufficient gravity to the commonweal. The apparent discrepancy between the number of trials and convictions for murder is not in England any evidence of hostility on the part of juries to capital punishment, which has on the whole lessened rather than increased since the middle of the 19th century. It is rarely if ever necessary in England, though common in America, to question the jurors as to their views on capital punishment. The reasons for the comparatively small number of convictions for murder seem to be: (1) that court and jury in a capital case lean *in favorem vitae*, and if the offence falls short of the full gravity of murder, conviction for manslaughter only results; (2) that in the absence of a statutory classification of the degrees of murder, the prerogative of mercy is exercised in cases falling short of the highest degree of gravity recognized by lawyers and by public opinion; (3) that where the conviction rests on circumstantial evidence the sentence is not executed unless the circumstantial evidence is conclusive; (4) that charges of infanticide against the mothers of illegitimate children are treated mercifully by judge and jury, and usually terminate in acquittal, or in a conviction of concealment of birth; (5) that many persons tried as murderers are obviously insane; (6) that coroners' juries are somewhat recklessly free in returning inquisitions of murder without any evidence which would warrant the conviction of the person accused.

The medical doctrine, and that of Lombroso with respect to criminal atavism and irresponsibility, have probably tended to incline the public mind in favour of capital punishment, and Sir James Stephen and other eminent jurists have even been thereby tempted to advocate the execution of habitual criminals. It certainly seems strange that the community should feel bound carefully to preserve and tend a class of dangerous lunatics, and to give them, as Charles Kingsley says, "the finest air in England and the right to kill two gaolers a week."

The whole question of capital punishment in the United Kingdom was considered by a royal commission appointed in 1864, which reported in 1866 (Parl. Pap., 1866, 10,438). The commission took the opinions of all the judges of the supreme courts in the United Kingdom and of many other eminent persons, and collected the laws of other countries so far as this was ascertainable. The commissioners differed on the question of the expediency of abolishing or retaining capital punishment, and did not report thereon. But they recommended: (1) that it should be restricted throughout the United Kingdom to high treason and murder; (2) alteration of the law of homicide so as to classify homicides according to their gravity, and to confine capital punishment to murder in the first degree; (3) modification of the law as to child murder so as to punish certain cases of infanticide as misdemeanours; (4) authorizing judges to direct sentence of death to be recorded; (5) the abolition—since carried out—of public executions.

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CAPITO (or KÖPFEL), **WOLFGANG** [FABRICIUS] (1478–1541), German reformer, was born of humble parentage at Hagenau in Alsace. He was educated for the medical profession, but also studied law, and applied himself so earnestly to theology that he received the doctorate in that faculty also, and, having joined the Benedictines, taught for some time at Freiburg. He acted for three years as pastor in Bruchsal, and was then called to the cathedral church of Basel (1515). Here he made the acquaintance of Zwingli and began to correspond with Luther. In 1519 he removed to Mainz at the request of Albrecht, archbishop of that city, who soon made him his chancellor. In 1523 he settled at Strassburg, where he remained till his death in November 1541. He had found it increasingly difficult to reconcile the new religion with the old, and from 1524 was one of the leaders of the reformed faith in Strassburg. He took a prominent part in the earlier ecclesiastical transactions of the 16th century, was present at the second conference of Zürich and at the conference of Marburg, and along with Martin Bucer drew up the *Confessio Tetrapolitana*. Capito was always more concerned for the "unity of the spirit" than for dogmatic formularies, and from his endeavours to conciliate the Lutheran and Zwinglian parties in regard to the sacraments, he seems to have incurred the suspicions of his own friends; while from his intimacy with Martin Cellarius and other divines of the Socinian school he drew on himself the charge of Arianism. His principal works were:—*Institutionum Hebraicarum libri duo; Enarrationes in Habacuc et Hoseam Prophetas*; a life of Oecolampadius and an account of the synod of Berne (1532).

CAPITULARY (Med. Lat. *capitularium*), a series of legislative or administrative acts emanating from the Merovingian and Carolingian kings, so called as being divided into sections or chapters (*capitula*). With regard to these capitularies two questions arise: (1) as to the means by which they have been handed down to us; (2) as to their true character and scope.

(1) As soon as the capitulary was composed, it was sent to the various functionaries of the Frankish empire, archbishops, bishops, *missi* and counts, a copy being kept by the chancellor in the archives of the palace. At the present day we do not possess a single capitulary in its original form; but very frequently copies of these isolated capitularies were included in various scattered manuscripts, among pieces of a very different nature, ecclesiastical or secular. We find, therefore, a fair number of them in books which go back as far as the 9th or 10th centuries. In recent editions in the case of each capitulary it is carefully indicated from what manuscripts it has been collated.

These capitularies make provisions of a most varied nature; it was therefore found necessary at quite an early date to classify them into chapters according to the subject. In 827 Ansegisus, abbot of St Wandrille at Fontenelle, made such a collection. He embodied them in four books: one of the ecclesiastical capitularies of Charlemagne, one of the ecclesiastical capitularies of Louis the Pious, one of the secular capitularies of Charlemagne, and one of the secular capitularies of Louis, bringing together similar provisions and suppressing duplicates. This collection soon gained an official authority, and after 829 Louis the Pious refers to it, citing book and section.

After 827 new capitularies were naturally promulgated, and before 858 there appeared a second collection in three books, by an author calling himself Benedictus Levita. His aim was, he said, to complete the work of Ansegisus, and bring it up to date by continuing it from 827 to his own day; but the author has not only borrowed prescriptions from the capitularies; he has introduced other documents into his collection, fragments of Roman laws, canons of the councils and especially spurious provisions very similar in character to those of the same date found in the *False Decretals*. His contemporaries did not notice these spurious documents, but accepted the whole collection as

authentic, and incorporated the four books of Ansegisus and the three of Benedictus Levita into a single collection in seven books. The serious historian of to-day, however, is careful not to use books v., vi. and vii. for purposes of reference.

Early editors chose to republish this collection of Ansegisus and Benedictus as they found it. It was a distinguished French scholar, Étienne Baluze, who led the way to a fresh classification. In 1677 he brought out the *Capitularia regum francorum*, in two folio volumes, in which he published first the capitularies of the Merovingian kings, then those of Pippin, of Charles and of Louis the Pious, which he had found complete in various manuscripts. After the date of 840, he published as supplements the unreliable collection of Ansegisus and Benedictus Levita, with the warning that the latter was quite untrustworthy. He then gave the capitularies of Charles the Bald, and of other Carolingian kings, either contemporaries or successors of Charles, which he had discovered in various places. A second edition of Baluze was published in 1780 in 2 volumes folio by Pierre de Chiniac.

The edition of the Capitularies made in 1835 by George Pertz, in the *Monumenta Germaniae* (folio edition, vol. i., of the *Leges*) was not much advance on that of Baluze. A fresh revision was required, and the editors of the *Monumenta* decided to reissue it in their quarto series, entrusting the work to Dr Alfred Boretius. In 1883 Boretius published his first volume, containing all the detached capitularies up to 827, together with various appendices bearing on them, and the collection of Ansegisus. Boretius, whose health had been ruined by overwork, was unable to finish his work; it was continued by Victor Krause, who collected in vol. ii. the scattered capitularies of a date posterior to 828. Karl Zeumer and Albrecht Werminghoff drew up a detailed index of both volumes, in which all the essential words are noted. A third volume, prepared by Emil Seckel, was to include the collection of Benedictus Levita.

(2) Among the capitularies are to be found documents of a very varied kind. Boretius has divided them into several classes:—

(*a*) The *Capitula legibus addenda*.—These are additions made by the king of the Franks to the barbarian laws promulgated under the Merovingians, the Salic law, the Ripuarian or the Bavarian. These capitularies have the same weight as the law which they complete; they are particular in their application, applying, that is to say, only to the men subject to that law. Like the laws, they consist chiefly of scales of compensation, rules of procedure and points of civil law. They were solemnly promulgated in the local assemblies where the consent of the people was asked. Charlemagne and Louis the Pious seem to have made efforts to bring the other laws into harmony with the Salic law. It is also to be noted that by certain of the capitularies of this class, the king adds provisions affecting, not only a single law, but all the laws in use throughout the kingdom.

(*b*) The *Capitula ecclesiastica*.—These capitularies were elaborated in the councils of the bishops; the kings of the Franks sanctioned the canon of the councils, and made them obligatory on all the Christians in the kingdom.

(*c*) The *Capitula per se scribenda*.—These embodied political decrees which all subjects of the kingdom were bound to observe. They often bore the name of *edictum* or of *constitutio*, and the provisions made in them were permanent. These capitularies were generally elaborated by the king of the Franks in the autumn assemblies or in the committees of the spring assemblies. Frequently we have only the proposition made by the king to the committee, *capitula tractanda cum comitibus, episcopis, et abbatibus*, and not the final form which was adopted.

(*d*) The *Capitula missorum*, which are the instructions given by Charlemagne and his successors to the *missi* sent into the various parts of the empire. They are sometimes drawn up in common for all the *missi* of a certain year—*capitula missorum generalia*; sometimes for the *missi* sent only on a given circuit—*capitula missorum specialia*. These instructions sometimes hold good only for the circuit of the *missus*; they have no general application and are merely temporary.

(*e*) With the capitularies have been incorporated various documents; for instance, the rules to be observed in administering the king's private domain (the celebrated capitulary *de villis*, which is doubtless a collection of the instructions sent at various times to the agents of these domains); the partitions of the kingdom among the king's sons, as, the *Divisio regnorum* of 806, or the *Ordinatio imperii* of 817; the oaths of peace and brotherhood which were taken on various occasions by the sons of Louis the Pious, &c.

The merit of clearly establishing these distinctions belongs to Boretius. He has doubtless exaggerated the difference between the *Capitula missorum* and the *Capitula per se scribenda*; among the first are to be found provisions of a general and permanent nature, and among the second temporary measures are often included. But the idea of Boretius is none the less fruitful. In the capitularies there are usually permanent provisions and temporary provisions intermingled; and the observation of this fact has made it possible more clearly to understand certain institutions of Charlemagne, *e.g.* military service.

After the reign of Louis the Pious the capitularies became long and diffuse. Soon, from the 10th century onwards, no provision of general application emanates from the kings. Henceforth the kings only regulated private interests by charters; it was not until the reign of Philip Augustus that general provisions again appeared; but when they did so, they bore the name of ordinances (*ordonnances*).

There were also capitularies of the Lombards. These capitularies formed a continuation of the Lombard laws, and are printed as an appendix to these laws by Boretius in the folio edition of the *Monumenta Germaniae*, *Leges*, vol. iv.

AUTHORITIES.—Boretius, *Die Capitularien im Longobardenreich* (Halle, 1864); and *Beiträge zur Capitularienkritik* (Leipzig, 1874); G. Seeliger, *Die Kapitularien der Karolinger* (Munich, 1893). See also the histories of institutions or of law by Waitz, Brunner, Fustel de Coulanges, Viollet, Esmein. (C. PF.)

CAPITULATION (Lat. *capitulum*, a little head or division; *capitulare*, to treat upon terms), an agreement in time of war for the surrender to a hostile armed force of a particular body of troops, a town or a territory. It is an ordinary incident of war, and therefore no previous instructions from the captor's government are required before finally settling the conditions of capitulation. The most usual of such conditions are freedom of religion and security of private property on the one hand, and a promise not to bear arms within a certain period on the other. Such agreements may be rashly concluded with an inferior officer, on whose authority the enemy are not in the actual position of the war entitled to place reliance. When an agreement is made by an officer who has not the proper authority or who has exceeded the limits of his authority, it is termed a *sponsion*, and, to be binding, must be confirmed by express or tacit ratification. Article 35 of the Hague Convention (1899) on the laws and the customs of war lays down that "capitulations agreed on between the contracting parties must be in accordance with the rules of military honour. When once settled they must be observed by both the parties."

In another sense, capitulation is the name given to an arrangement by which foreigners are withdrawn, for most civil and criminal purposes, from the jurisdiction of the state making the capitulation. Thus in Turkey arrangements termed capitulations (*q.v.*), and treaties confirmatory of them, have been made between the Porte and other states by which foreigners resident in Turkey are subject to the laws of their respective countries. The term is also applied by French writers to the oath which on his election the Holy Roman emperor used to make to the college of electors; this related chiefly to such matters as regalian rights, appeals from local jurisdictions, the rights of the pope, &c.

CAPITULATIONS (from Lat. *caput*, or its Low-Latin diminutive *capitulum*, as indicating the form in which these acts were set down in "chapters"; the Gr. equivalent *cephaleosis*, κεφαλαίωσις, is occasionally used in works of the 17th century), treaties granted by a state and conferring the privilege of extra-territorial jurisdiction within its boundaries on the subjects of another state. Thus, in the 9th century, the caliph Harun-al-Rashid engaged to grant guarantees and commercial facilities to such

Franks, subjects of the emperor Charlemagne, as should visit the East with the authorization of their emperor. After the break-up of the Frank empire, similar concessions were made to some of the practically independent Italian city states that grew up on its ruins. Thus, in 1098, the prince of Antioch granted a charter of this nature to the city of Genoa; the king of Jerusalem extended the same privilege to Venice in 1123 and to Marseilles in 1136. Salah-ud-din (Saladin), sultan of Babylon (Cairo), granted a charter to the town of Pisa in 1173. The Byzantine emperors followed this example, and Genoa, Pisa and Venice all obtained capitulations. The explanation of the practice is to be found in the fact that the sovereignty of the state was held in those ages to apply only to its subjects; foreigners were excluded from its rights and obligations. The privilege of citizenship was considered too precious to be extended to the alien, who was long practically an outlaw. But when the numbers, wealth and power of foreigners residing within the state became too great, it was found to be politic to subject them to some law, and it was held that this law should be their own. When the Turkish rule was substituted for that of the Byzantine emperors, the system already in existence was continued; the various non-Moslem peoples were allowed their semi-autonomy in matters affecting their personal status, and the Genoese of Galata were confirmed in their privileges. But the first capitulation concluded with a foreign state was that of 1535 granted to the French. Lest it should be imagined that this was a concession wrested by the victorious Christian monarch from the decadent Turk, it should be borne in mind that Turkey was then at the height of her power, and that Francis I. had shortly before sustained a disastrous defeat at Pavia. His only hope of assistance lay in Suleiman I., whose attack on Vienna had been checked by the victorious Charles V. The appeal to Suleiman on the ground of the common interest of France and Turkey in overcoming Charles V.'s overweening power was successful; the secret mission of Frangipani, an unofficial envoy who could be disowned in case of failure, paved the way for De la Forest's embassy in 1534, and in 1536 the capitulations were signed.[1] They amounted to a treaty of commerce and a treaty allowing the establishment of Frenchmen in Turkey and fixing the jurisdiction to be exercised over them: individual and religious liberty is guaranteed to them, the king of France is empowered to appoint consuls in Turkey, the consuls are recognized as competent to judge the civil and criminal affairs of French subjects in Turkey according to French law, and the consuls may appeal to the officers of the sultan for their aid in the execution of their sentences. This, the first of the capitulations, is practically the prototype of its successors. Five years later, similar capitulations were concluded with Venice. The capitulations were at first held to be in force only during the lifetime of the sultan by whom they were granted; thus in 1569 Sultan Selim II. renewed the French capitulations granted by his predecessor. In 1583 England obtained her first capitulation, until which time France had been the official protector of all Europeans established in Turkey. Later on, England claimed to protect the subjects of other nations, a claim which is rejected in the French capitulations of 1597, 1604 and 1607, the last-named of which explicitly lays down that the subjects of all nations not represented at Constantinople by an ambassador shall be under French protection. In 1613 Holland obtained her first capitulation, with the assistance of the French ambassador, anxious to help a commercial rival of England. In 1673 the French, represented by the marquis de Nointel, succeeded in obtaining the renewal of the capitulations which, for various reasons, had remained unconfirmed since 1607. Louis XIV. had been anxious to secure the protectorate of all Catholics in Turkey, but was obliged to content himself with the recognition of his right to protect all Latins of non-Turkish nationality; his claims for the restoration to the Catholics of the Holy Places usurped by the Greeks was also rejected, the sultan only undertaking to promise to restore their churches to the Jesuit Capuchins. An important commercial gain was the reduction of the import duties from 5 to 3%; and all suits the value of which exceeded 4000 *aspres* in which French subjects sued, or were sued by, an Ottoman subject, were to be heard not by the ordinary tribunals but at the Porte itself. Later, France's friendship secured for Turkey a successful negotiation of the peace of Belgrade in 1739, and the result was the capitulation of 1740; this is no longer limited in duration to the sultan's lifetime but is made perpetual, and, moreover, declares that it cannot be modified without the assent of the French. It conferred on the French ambassador precedence over his colleagues. Austria had obtained capitulations in 1718, modified in 1784; Russia secured similar privileges in 1784. In the course of the 18th century nearly every European power had obtained these, and such newly-established countries as the United States of America, Belgium and Greece followed in the 19th century.

The chief privileges granted under the capitulations to foreigners resident in Turkey are the following: liberty of residence, inviolability of domicile, liberty to travel by land and sea, freedom of commerce, freedom of religion, immunity from local jurisdiction save under certain safeguards, exclusive extra-territorial jurisdiction over foreigners of the same nationality, and competence of the forum of the defendant in cases in which two foreigners are concerned (though the Sublime Porte has long claimed to exercise jurisdiction in criminal cases in which two foreigners of different nationality are concerned—the capitulations are silent on the point and the claim is resisted by the powers).

The same system has been followed by such countries as Persia, China, Japan and Siam.

The practical result of the capitulations in Turkey is to form each separate foreign colony into a sort of *imperium in imperio*, and to hamper the local jurisdiction very considerably. As the state granting the capitulations progresses in civilization it chafes under these restraints in its sovereignty. Turkey's former vassals, Rumania and Servia, though theoretically bound to respect the capitulations so long as they formed part of Turkey, had practically abrogated them long before securing their independence through the treaty of Berlin in 1878. The same may be said of Bulgaria. Japan was liberated from the burden of the capitulations some years ago.

The extra-territorial jurisdiction exercised by the foreign powers over their subjects in Turkey and other countries where capitulations exist is regulated by special legislative enactments; in the case of the United Kingdom by orders in council.

In Turkey the capitulations are practically the only treaties in force with the powers, since the expiration about 1889 of the commercial treaties concluded in 1861–1862. As they all contain the "most-favoured nation" clause, the privileges in any one apply to all the powers, though not always claimed. Thus America and Belgium claim under their treaties with Turkey the right to try all their subjects, even if accused of offences against Ottoman subjects—a claim recently made by Belgium in the case of the Belgian subject Joris, accused of participation in the bomb outrage of 1905 at Yildiz. One peculiar privilege granted in the capitulations of 1675 (Art. 74) authorizes the king of England to buy in Turkey with his own money two cargoes of figs and raisins, in fertile and abundant years and not in times of dearth or scarcity, and provides that after a duty of 3% has been paid thereon no obstacle or hindrance shall be given thereto.

CÁPIZ, a town and the capital of the province of Cápiz, Panay, Philippine Islands, on the Cápiz or Panay river, about 4 m. from its mouth on the N. coast. Pop. (1903) 18,525. Cápiz has a large and beautiful Roman Catholic church (of stone), a Protestant church (with a hospital) and good government buildings, and is the seat of the provincial high school. Alcohol of a superior quality is manufactured in large quantities from the fermented juice of the nipa palm, which grows plentifully in the neighbouring swamps. Fishing and the weaving of fabrics of cotton, hemp and pineapple fibre are important industries. Rice and sugar are raised in abundance. Tobacco, Indian corn

[1] La Forest, a knight of St John of Jerusalem, was the first resident ambassador of France at Constantinople. He died in 1537.

and cacao are produced to a limited extent; and rice, alcohol, sugar and copra are exported. Coasting vessels ascend the river to the town. The language is Visayan.

CAPMANY Y MONTPALAU, ANTONIO DE (1742–1813), Spanish polygraph, was born at Barcelona on the 24th of November 1742. He retired from the army in 1770, and was subsequently elected secretary of the Royal Academy of History at Madrid. His principal works are—*Memorias históricas sobre la marina, commercio, y artes de la antigua ciudad de Barcelona* (4 vols. 1779–1792); *Teatro histórico-crítico de la elocuencia Española* (1786); *Filiosofía de la elocuencia* (1776), and *Cuestiones críticas sobre varios puntos de historia económico, política, y militar* (1807). Capmany died at Barcelona on the 14th of November 1813. His monograph on the history of his birthplace still preserves much of its original value.

CAPO D'ISTRIA, GIOVANNI ANTONIO [JOANNES],[1] COUNT (1776–1831), Russian statesman and president of the Greek republic, was born at Corfu on the 11th of February 1776. He belonged to an ancient Corfiot family which had immigrated from Istria in 1373, the title of count being granted to it by Charles Emmanuel, duke of Savoy, in 1689. The father of Giovanni, Antonio Maria Capo d'Istria, was a man of considerable importance in the island, a stiff aristocrat of the old school, who in 1798, after the treaty of Campo Formio had placed the Ionian Islands under French rule, was imprisoned for his opposition to the new régime, his release next year being the earliest triumph of his son's diplomacy. On the establishment in 1800, under Turkish suzerainty, of the septinsular republic—a settlement negotiated at Constantinople by the elder Capo d'Istria—Giovanni, who had meanwhile studied medicine at Padua, entered the government service as secretary to the legislative council, and in one capacity or another exercised for the next seven years a determining voice in the affairs of the republic. At the beginning of 1807 he was appointed "extraordinary military governor" to organize the defence of Santa Maura against Ali Pasha of Iannina, an enterprise which brought him into contact with Theodoros Kolokotrones and other future chiefs of the war of Greek independence, and awoke in him that wider Hellenic patriotism which was so largely to influence his career.

Throughout the period of his official connexion with the Ionian government, Capo d'Istria had been a consistent upholder of Russian influence in the islands; and when the treaty of Tilsit (1807) dashed his hopes by handing over the Ionian republic to Napoleon, he did not relinquish his belief in Russia as the most reliable ally of the Greek cause. He accordingly refused the offers made to him by the French government, and accepted the invitation of the Russian chancellor Romanzov to enter the tsar's service. He went to St Petersburg in 1809, and was appointed to the honorary post of attaché to the foreign office, but it was not till two years after, in 1811, that he was actually employed in diplomatic work as attaché to Baron Stackelberg, the Russian ambassador at Vienna. His knowledge of the near East was here of great service, and in the following year he was attached, as chief of his diplomatic bureau, to Admiral Chichagov, on his mission to the Danubian principalities to stir up trouble in the Balkan peninsula as a diversion on the flank of Austria, and to attempt to supplement the treaty of Bucharest by an offensive and defensive alliance with the Ottoman empire. The Moscow campaign of 1812 intervened; Chichagov was disgraced in consequence of his failure to destroy Napoleon at the passage of the Beresina; but Capo d'Istria was not involved, was made a councillor of state and continued in his diplomatic functions. During the campaign of 1813 he was attached to the staff of Barclay de Tolly and was present at the battles of Lützen, Bautzen, Dresden and Leipzig. With the advance of the allies he was sent to Switzerland to secure the withdrawal of the republic from the French alliance. Here, in spite of his instructions to guarantee the neutrality of Switzerland, he signed on his own responsibility the proclamation issued by Prince Schwarzenberg, stating the intention of the allied troops to march through the country. His motive was to prevent any appearance of disagreement among the allies. The emperor Alexander, to whom he hastened to make an explanation in person, endorsed his action.

Capo d'Istria was present with the allies in Paris, and after the signing of the first peace of Paris he was rewarded by the tsar with the order of St Vladimir and his full confidence. At the congress of Vienna his influence was conspicuous; he represented the tsar on the Swiss committee, was associated with Rasumovsky in negotiating the tangled Polish and Saxon questions, and was the Russian plenipotentiary in the discussions with the Baron vom Stein on the affairs of Germany. His *Mémoire sur l'empire germanique*, of the 9th of February 1815, presented to the tsar, was based on the policy of keeping Germany weak in order to secure Russian preponderance in its councils. It was perhaps from a similar motive that, after the Waterloo campaign, he strenuously opposed the proposals for the dismemberment of France. It was on his advice that the duc de Richelieu persuaded Louis XVIII. to write the autograph letter in which he declared his intention of resigning rather than submit to any diminution of the territories handed down to him by his ancestors.[2] The treaty of the 20th of November 1815, which formed for years the basis of the effective concert of Europe, was also largely his work.

On the 26th of September 1815, after the proclamation of the Holy Alliance at the great review on the plain of Vertus, Capo d'Istria was named a secretary of state. On his return to St Petersburg, he shared the ministry of foreign affairs with Count Nesselrode, though the latter as senior signed all documents. Capo d'Istria, however, had sole charge of the newly acquired province of Bessarabia, which he governed conspicuously well. In 1818 he attended the emperor Alexander at the congress of Aix-la-Chapelle, and in the following year obtained leave to visit his home. He travelled by way of Venice, Rome and Naples, his progress exciting the liveliest apprehensions of the powers, notably of Austria. The "Jacobin" pose of the tsar was notorious, his all-embracing ambition hardly less so; and Russian travellers in Italy, notably the emperor's former tutor, César de Laharpe, were little careful in the expression of their sympathy for the ideals of the Carbonari. In Metternich's eyes Capo d'Istria, "the coryphaeus of liberalism," was responsible for the tsar's vagaries, the fount of all the ills of which the times were sick; and, for all the count's diplomatic reticence, the Austrian spies who dogged his footsteps earned their salaries by reporting sayings that set the reactionary courts in a flutter. For Metternich the overthrow of Capo d'Istria's influence became a necessity of political salvation. At Corfu Capo d'Istria became the repository of all the grievances of his countrymen against the robust administration of Sir Thomas Maitland. At the congress of Vienna the count had supported the British protectorate over the Ionian Islands, the advantages of which from the point of view of trade and security were obvious; but the drastic methods of "King Tom's" government, symbolized by a gallows for pirates and other evil-doers in every popular gathering place, offended his local patriotism. He submitted a memorandum on the subject to the tsar, and before returning to Russia travelled via Paris to England to lay the grievances of the Ionians before the British government. His reception was a cold one, mainly due to his own disingenuousness, for he refused to show British ministers the memorandum which he had already submitted to the Russian emperor, on the ground that it was intended only for his own private use. The whole thing seemed, rightly or wrongly, an excuse for the intervention of Russia in affairs which were by treaty wholly British.

On his return to St Petersburg in the autumn of 1819, Capo d'Istria resumed his influence in the intimate counsels of the tsar. The murder of the Russian agent, Kotzebue, in March, had shaken but not destroyed Alexander's liberalism, and it was Capo d'Istria who drew up the emperor's protest against the Carlsbad decrees and the declaration of his adherence to constitutional views (see ALEXANDER I.). In October 1820 Capo

[1] After his election to the Greek presidency in 1827, Capo d'Istria, whose baptismal names were Giovanni Antonio, signed himself Joannes Capodistrias, the form by which he is very commonly known.

[2] The letter was written by Michael Stourdza and *copied* by Louis.

d'Istria accompanied the tsar to the congress at Troppau. The events of the year—the murder of the duc de Berry in March, the Revolutions in Spain and in Naples—had produced their effect. Alexander was, in Metternich's exultant language, "a changed man," and Capo d'Istria apparently shared his conversion to reactionary principles. The Austrian chancellor now put forth all his powers to bring Alexander under his own influence, and to overthrow Capo d'Istria, whom he despised, distrusted and feared. In 1821 Alexander Ypsilanti's misguided raid into the Danubian principalities gave him his opportunity. The news reached the tsar at the congress of Laibach, and to Capo d'Istria was entrusted the task of writing the letter to Ypsilanti in which the tsar repudiated his claim, publicly proclaimed that he had the sympathy and support of Russia. For a while the position of Capo d'Istria was saved; but it was known that he had been approached by the agent of the Greek *Hetairia* before Ypsilanti, and that he had encouraged Ypsilanti to take up the ill-fated adventure which he himself had refused; he was hated at the Russian court as an upstart Greek, and Metternich was never weary of impressing on all and sundry that he was "using Russian policy for Greek ends." At last nothing but long habit and native loyalty to those who had served him well, prevented Alexander from parting with a minister who had ceased to possess his confidence. Capo d'Istria, anticipating his dismissal, resigned on the eve of the tsar's departure for the congress of Verona (1822), and retired into private life at Geneva.

On the 11th of April 1827, the Greek national assembly at Troezene elected Capo d'Istria president of the republic. The vote was a triumph for the Russian faction, for the count, even after his fall, had not lost the personal regard of the emperor Alexander, nor ceased to consider himself a Russian official. He accepted the offer, but was in no hurry to take up the thankless task. In July he visited the emperor Nicholas I. at Tsarskoye Selo, receiving permission to proceed and instructions as to the policy he should adopt, and he next made a tour of the courts of Europe in search of moral and material support. The news of the battle of Navarino (27th of October 1827) hastened his arrival; the British frigate "Warspite" was placed at his disposal to carry him to Greece, and on the 19th of January 1828 he landed at Nauplia.

Capo d'Istria's rule in Greece had to contend against immense difficulties—the utter poverty of the treasury, the barbarism of the people but recently emancipated, the continued presence of Ibrahim Pasha, with an unbroken army, in the south of the Morea. His strength lay in his experience of affairs and in the support of Russia; but he was by inheritance an aristocrat and by training an official, lacking in broad human sympathy, and therefore little fitted to deal with the wild and democratic elements of the society it was his task to control. The Greeks could understand the international status given to them by his presidency, and for a while the enthusiasm evoked by his arrival made him master of the situation. He thoroughly represented Greek sentiment, too, in his refusal to accept the narrow limits which the powers, in successive protocols, sought to impose on the new state (see GREECE). But the Russian administrative system by which he sought to restrain the native turbulence was bound in the end to be fatal to him. The wild chiefs of the revolution won over at first by their inclusion in his government, were offended by his European airs and Russian uniform, and alienated by his preference for the educated Greeks of the Phanar and of Corfu, his promotion of his brothers Viaro and Agostino to high commands causing special offence. Dissatisfaction ended in open rebellion; the islands revolted; Capo d'Istria called in the aid of the Russian admiral; and Miaoulis, the hero of the Greek war at sea, blew up the warships under his command to prevent their falling into the hands of the government. On land, so far as the president was concerned, the climax was reached with the attempt to coerce the Mavromichales of the Maina, the bravest and most turbulent of the mountain clans, whose chief, Petros Mavromichales, commonly known as Petrobey, had played a leading part in the War of Independence. The result was an insurrection in the Maina (Easter, 1830), and the imprisonment of those of the Mavromichales, including Petrobey, who happened to be in the power of the government. At the news of their chieftain's imprisonment the Mainots, who had for a while been pacified, once more flew to arms and threatened to march on Nauplia; but negotiations were opened, and on the advice of the Russian minister Petrobey consented to make his submission to the president. Unhappily, when he was brought under guard to the appointed interview, Capo d'Istria, in a moment of irritation and weariness, refused to see him. Maddened with rage at this insult from a man who had not struck a blow for Greece, the proud old chief, on his way back to prison, called out to two of his kinsmen, his son George and his brother Constantine, "You see how I fare," and passed on. According to the code of the Maina this was a command to take revenge. Next day, the 9th of October 1831, the two placed themselves at the door of the church where Capo d'Istria was accustomed to worship. As he passed in Constantine shot him down, and as he fell George thrust a dagger into his heart.

AUTHORITIES.—Carl W. P. Mendelssohn-Bartholdy's *Graf Johann Kapodistrias* (Berlin, 1864) is based on all the sources, printed and unprinted, available at the time of publication, and contains an excellent guide to these. This may be supplemented by the historical sections of F. de Marten's *Recueil des traités conclus par la Russie*, &c. (1874, &c.). A sketch of Capo d'Istria's activity as president will be found in W. Alison Phillips's *The War of Greek Independence* (London, 1897). Many of Capo d'Istria's despatches, &c., are published in the collections of diplomatic correspondence mentioned in the bibliography of the article EUROPE: *History*. Under the Russian title "Zapiska grapha Joanna Capodistrias" is published in the series of the Imperial Russian Historical Society, vol. iii. p. 163 (St Petersburg, 1868) the *Aperçu de ma carrière publique*, written by Capo d'Istria for presentation to the emperor Alexander, and dated at Geneva $\frac{13}{24}$ December 1826. Of unpublished materials may be mentioned the letters of Capo d'Istria to Sir Richard Church, vol. xvi. of the Church Papers in the British Museum (*Add. MSS.* 36453-36571). See further bibliography to chapter vi. of vol. x. of the *Cambridge Modern History* (1907). (W. A. P.)

CAPODISTRIA, a town and seaport of Austria, in Istria, 15 m. S.W. of Trieste by rail. Pop. (1900) 10,711, mostly Italians. It is situated on a small island, which occupies the end of a large bay in the Gulf of Trieste, and which is connected with the mainland by a causeway half a mile in length. Capodistria is an old town with small streets, and has preserved remarkably well its Italian, almost its Venetian character. The most noteworthy buildings are the cathedral, the town-hall and the *Loggia* or the old law-court, all situated in the principal square. In addition to the extraction of salt from the sea in the extensive salt works near the town, fishing and shipbuilding are the other principal occupations of the population. Trade is chiefly in sea-salt, wine and oil. Capodistria is usually identified with the town of Aegida, mentioned by Pliny, which appears by an inscription to have afterwards received (in the 6th century) the name of Justinopolis from Justin II. When at the beginning of the 13th century Istria fell into the hands of the patriarchs of Aquileia, they made this town the capital of the whole province. Thence it acquired its actual name, which means the capital of Istria. It was captured by the Venetians in 1279, and passed into Austrian possession in 1797.

CAPONIER (from the Fr. *caponnière*, properly a capon-cote or house), in fortification, a work constructed in the ditch of a fort. Its fire (musketry, machine-guns, case shot, &c.) sweeps the bottom of the ditch and prevents an enemy from establishing himself in it. The term is used in a military sense as early as in the late 17th century. In various bastioned systems of fortification a caponier served merely as a covered means of access to outworks, the bastion trace providing for the defence of the ditch by fire from the main parapet.

CAPPADOCIA, in ancient geography, an extensive inland district of Asia Minor. In the time of Herodotus the Cappadocians occupied the whole region from Mount Taurus to the Euxine. That author tells us that the name of the Cappadocians (Katpatouka) was applied to them by the Persians, while they were termed by the Greeks "Syrians," or "White Syrians" (*Leucosyri*). Under the later kings of the Persian empire they

were divided into two satrapies or governments, the one comprising the central and inland portion, to which the name of Cappadocia continued to be applied by Greek geographers, while the other was called Cappadocia *κατὰ Πόντον*, or simply Pontus (*q.v.*). This division had already come about before the time of Xenophon. As after the fall of the Persian government the two provinces continued to be separate, the distinction was perpetuated, and the name Cappadocia came to be restricted to the inland province (sometimes called Great Cappadocia), which alone will be considered in the present article.

Cappadocia, in this sense, was bounded S. by the chain of Mount Taurus, E. by the Euphrates, N. by Pontus, and W. vaguely by the great central salt "Desert" (*Axylon*). But it is impossible to define its limits with accuracy. Strabo, the only ancient author who gives any circumstantial account of the country, greatly exaggerated its dimensions; it was in reality about 250 m. in length by less than 150 in breadth. With the exception of a narrow strip of the district called Melitene, on the east, which forms part of the valley of the Euphrates, the whole of this region is a high upland tract, attaining to more than 3000 ft., and constituting the most elevated portion of the great tableland of Asia Minor (*q.v.*). The western parts of the province, where it adjoins Lycaonia, extending thence to the foot of Mount Taurus, are open treeless plains, affording pasture in modern as in ancient times to numerous flocks of sheep, but almost wholly desolate. But out of the midst of this great upland level rise detached groups or masses of mountains, mostly of volcanic origin, of which the loftiest are Mount Argaeus (still called by the Turks Erjish Dagh), (13,100 ft.), and Hassan Dagh to the south-west (8000 ft.).

The eastern portion of the province is of a more varied and broken character, being traversed by the mountain system called by the Greeks Anti-Taurus. Between these mountains and the southern chain of Taurus, properly so called, lies the region called in ancient times Cataonia, occupying an upland plain surrounded by mountains. This district in the time of Strabo formed a portion of Cappadocia and was completely assimilated; but earlier writers and the Persian military system regarded the Cataonians as a distinct people.

Cappadocia contained the sources of the Sarus and Pyramus rivers with their higher affluents, and also the middle course of the Halys (see Asia Minor), and the whole course of the tributary of Euphrates now called Tokhma Su. But as no one of these rivers was navigable or served to fertilize the lands along its torrential course, none has much importance in the history of the province.

The kingdom of Cappadocia, which was still in existence in the time of Strabo, as a nominally independent state, was divided, according to that geographer, into ten districts. Of these *Cataonia* has been described; the adjoining district of *Melitene*, which did not originally form part of Cappadocia at all, but was annexed to it by Ariarathes I., was a fertile tract adjoining the Euphrates; its chief town retains the name of Malatia. *Cilicia* was the name given to the district in which Caesarea, the capital of the whole country was situated, and in which rose the conspicuous Mount Argaeus. *Tyanitis*, the region of which Tyana was the capital, was a level tract in the extreme south, extending to the foot of Mount Taurus. *Garsauritis* appears to have comprised the western or south-western districts adjoining Lycaonia; its chief town was Archelais. *Laviansene* or *Laviniane* was the country south and south-east of Sivas, through which ran the road from Sebastea to Caesarea: *Sargarausene* lay south of the above, and included Uzun Yaila and the upper basin of the Tokhma Su; *Saravene* lay west of Laviansene and included the modern district of Ak Dagh; *Chamanene* lay west again of the above along the middle course of the Halys: *Morimene* was the north-western district extending along the edge of the central desert as far south as Melegob.

The only two cities of Cappadocia considered by Strabo to deserve that appellation were Mazaca, the capital of the kingdom under its native monarchs (see Caesarea-Mazaca); and Tyana, not far from the foot of the Taurus, the site of which is marked by a great mound at a place called Kiz (or Ekuz) Hissar, about 12 m. south-west of Nigdeh. Archelais, founded by Archelaus, the last king of the country, subsequently became a Roman colony, and a place of some importance. It is now Akserai.

Several localities in the Cappadocian country were the sites of famous temples. Among these the most celebrated were those of Comana (*q.v.*) and Venasa in Morimene, where a male god was served by over 3000 *hieroduli*. The local sanctity of Venasa has been perpetuated by the Moslem veneration for Haji Bektash, the founder of the order of dervishes to which the Janissaries used in great part to belong. Cappadocia was remarkable for the number of its slaves, which constituted the principal wealth of its monarchs. Large numbers were sent to Rome but did not enjoy a good reputation. The Cappadocian peasants are still in the habit of taking service in the west of the peninsula and only returning to their homes after long absences; their labour is now much valued by employers, as they are a strong sober folk. The province was celebrated for its horses, as well as for its vast flocks of sheep; but from its elevation above the sea, and the coldness of its climate, it could never have been rich and fertile.

History.—Nothing is known of the history of Cappadocia before it became subject to the Persian empire, except that the country was the home of a great "Hittite" power centred at Boghaz-Keui (see Pteria), which has left monuments at many places, *e.g.* Nevsheher, Fraktin, Gorun, Malatia, various points about Albistan and Derendeh, Bulgur Maden, Andaval and Tyana. Possibly the princes of the last named city were independent. With the decline of the Syro-Cappadocians after their defeat by Croesus, Cappadocia was left in the power of a sort of feudal aristocracy, dwelling in strong castles and keeping the peasants in a servile condition, which later made them apt for foreign slavery. It was included in the third Persian satrapy in the division established by Darius, but long continued to be governed by rulers of its own, none apparently supreme over the whole country and all more or less tributary to the Great King. Thoroughly subdued at last by the satrap Datames, Cappadocia recovered independence under a single ruler, Ariarathes (hence called Ariarathes I.), who was a contemporary of Alexander the Great, and maintained himself on the throne of Cappadocia after the fall of the Persian monarchy.

The province was not visited by Alexander, who contented himself with the tributary acknowledgment of his sovereignty made by Ariarathes before the conqueror's departure from Asia Minor; and the continuity of the native dynasty was only interrupted for a short time after Alexander's death, when the kingdom fell, in the general partition of the empire, to Eumenes. His claims were made good in 322 by the regent Perdiccas, who crucified Ariarathes; but in the dissensions following Eumenes's death, the son of Ariarathes recovered his inheritance and left it to a line of successors, who mostly bore the name of the founder of the dynasty. Under the fourth of the name Cappadocia came into relations with Rome, first as a foe espousing the cause of Antiochus the Great, then as an ally against Perseus of Macedon. The kings henceforward threw in their lot with the Republic as against the Seleucids, to whom they had been from time to time tributary. Ariarathes V. marched with the Roman proconsul Crassus against Aristonicus, a claimant to the throne of Pergammum, and their forces were annihilated (130 B.C.). The imbroglio which followed his death ultimately led to interference by the rising power of Pontus and the intrigues and wars which ended in the failure of the dynasty. The Cappadocians, supported by Rome against Mithradates, elected a native lord, Ariobarzanes, to succeed (93 B.C.); but it was not till Rome had disposed at once of the Pontic and Armenian kings that his rule was established (63 B.C.). In the civil wars Cappadocia was now for Pompey, now for Caesar, now for Antony, now against him. The Ariobarzanes dynasty came to an end and a certain Archelaus reigned in its stead, by favour first of Antony, then of Octavian, and maintained tributary independence till A.D. 17, when the emperor Tiberius, on Archelaus's death in disgrace, reduced Cappadocia at last to a province. Vespasian in A.D. 70

joined Armenia Minor to it and made the combined province a frontier bulwark. It remained, under various provincial redistributions, part of the Eastern Empire till late in the 11th century, though often ravaged both by Persians and Arabs. But before it passed into Seljuk hands (1074), and from them ultimately to the Osmanlis, it had already become largely Armenian in religion and speech; and thus we find the southern part referred to as "Hermeniorum terra" by crusading chroniclers. At this day the north-east and east parts of the province are largely inhabited by Armenians. The native kings had done much to Hellenize Cappadocia, which had previously received a strong Iranian colour; but it was left to Christianity to complete their work. Though pre-Hellenic usages long survived in the local cults and habits, a part of the people has remained more or less Hellenic to this day, in spite of its envelopment by Moslem conquerors and converts. The tradition of its early church, illuminated by the names of the two Gregories and Basil of Caesarea, has been perpetuated by the survival of a native Orthodox element throughout the west and north-west of the province; and in the remoter valleys Greek speech has never wholly died out. Its use has once more become general under Greek propagandist influence, and the Cappadocian "Greeks" are now a flourishing community.

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CAPPEL, a French family which produced some distinguished jurists and theologians in the 15th and 16th centuries. In 1491, Guillaume Cappel, as rector of the university of Paris, protested against a tithe which Innocent VIII. claimed from that body. His nephew, Jacques Cappel (d. 1541), the real founder of the family, was himself advocate-general at the parlement of Paris, and in a celebrated address delivered before the court in 1537, against the emperor Charles V., claimed for Francis I. the counties of Artois, Flanders and Charolais. He left nine children, of whom three became Protestants. The eldest, Jacques (1529–1586), sieur du Tilloy, wrote several treatises on jurisprudence. Louis (1534–1586), sieur de Moriambert, the fifth son, was a most ardent Protestant. In 1570 he presented a confession of faith to Charles IX. in the name of his co-religionists. He disputed at Sedan before the duc de Bouillon with the Jesuit, Jean Maldonat (1534–1583), and wrote in defence of Protestantism. The seventh son, Ange (1537–1623), seigneur du Luat, was secretary to Henry IV., and enjoyed the esteem of Sully. Among those who remained Catholic should be mentioned Guillaume, the translator of Machiavelli. The eldest son Jacques also left two sons, famous in the history of Protestantism:—Jacques (1570–1624), pastor of the church founded by himself on his fief of le Tilloy and afterwards at Sedan, where he became professor of Hebrew, distinguished as historian, philologist and exegetical scholar; and Louis (see below).

On the protest of Guillaume Cappel, see Du Bellay, *Historia Universitatis Parisiensis*, vol. v. On the family, see the sketch by another Jacques Cappel, "De Capellorum gente," in the *Commentarii et notae criticae in Vetus Testamentum* of Louis Cappel, his father (Amsterdam, 1689). Consult Eugène and Émile Haag, *La France protestante*, vol. iii. (new edition, 1881).

CAPPEL, LOUIS (1585–1658), French Protestant divine and scholar, a Huguenot whose descent is traced above, was born at St Elier, near Sedan, in 1585. He studied theology at Sedan and Saumur; and Arabic at Oxford, where he spent two years. At the age of twenty-eight he accepted the chair of Hebrew at Saumur, and twenty years afterwards was appointed professor of theology. Amongst his fellow lecturers were Moses Amyraut and Josué de la Place. As a Hebrew scholar he made a special study of the history of the Hebrew text, which led him to the conclusion that the vowel points and accents are not an original part of the Hebrew language, but were inserted by the Massorete Jews of Tiberias, not earlier than the 5th century A.D., and that the primitive Hebrew characters are those now known as the Samaritan, while the square characters are Aramaic and were substituted for the more ancient at the time of the captivity. These conclusions were hotly contested by Johannes Buxtorf, being in conflict with the views of his father, Johannes Buxtorf senior, notwithstanding the fact that Elias Levita had already disputed the antiquity of the vowel points and that neither Jerome nor the Talmud shows any acquaintance with them. His second important work, *Critica Sacra*, was distasteful from a theological point of view. He had completed it in 1634; but owing to the fierce opposition with which he had to contend, he was only able to print it at Paris in 1650, by aid of a son, who had turned Catholic. The various readings in the Old Testament text and the differences between the ancient versions and the Massoretic text convinced him that the idea of the integrity of the Hebrew text, as commonly held by Protestants, was untenable. This amounted to an attack on the verbal inspiration of Scripture. Bitter, however, as was the opposition to his views, it was not long before his results were accepted by scholars.

Cappel was also the author of *Annotationes et Commentarii in Vetus Testamentum*, *Chronologia Sacra*, and other biblical works, as well as of several other treatises on Hebrew, among which are the *Arcanum Punctuationis revelatum* (1624) and the *Diatriba de veris et antiquis Ebraeorum literis* (1645). His *Commentarius de Capellorum gente*, giving an account of the family to which he belonged, was published by his nephew James Cappel (1639–1722), who, at the age of eighteen, became professor of Hebrew at Saumur, but, on the revocation of the edict of Nantes, fled to England, where he died in 1722. See Herzog-Hauck, *Realencyklopädie*.

CAPPELLO, BIANCA (1548–1587), grand duchess of Tuscany, was the daughter of Bartolommeo Cappello, a member of one of the richest and noblest Venetian families, and was famed for her great beauty. At the age of fifteen she fell in love with Pietro Bonaventuri, a young Florentine clerk in the firm of Salviati, and on the 28th of November 1563 escaped with him to Florence, where they were married and she had a daughter named Pellegrina. The Venetian government made every effort to have Bianca arrested and brought back, but the grand duke Cosimo de' Medici intervened in her favour and she was left unmolested. However she did not get on well with her husband's family, who were very poor and made her do menial work, until at last her beauty attracted Francesco, the grand duke's son, a vicious and unprincipled rake. Although already married to the virtuous and charming Archduchess Giovanna of Austria, he seduced the fair Venetian and loaded her with jewels, money and other presents. Bianca's accommodating husband was given court employment, and consoled himself with other ladies; in 1572 he was murdered in the streets of Florence in consequence of some amorous intrigue, though possibly Bianca and Francesco were privy to the deed. On the death of Cosimo in 1574 Francesco succeeded to the grand duchy; he now installed Bianca in a fine palace close to his own and outraged his wife by flaunting his mistress before her. As Giovanna had borne Francesco no sons, Bianca was very anxious to present him with an heir, for otherwise her position would remain very insecure. But although she resorted to all sorts of expedients, even to that of trying to pass off a changeling as the grand duke's child, she was not successful. In 1578 Giovanna died; a few days later Francesco secretly married Bianca, and on the 10th of June, 1579, the marriage was publicly announced. The Venetian government now put aside its resentment and was officially represented at the magnificent wedding festivities, for it saw in Bianca Cappello an instrument for cementing good relations with Tuscany. But the long expected heir failed to come, and Bianca realized that if her husband were to die before her she was lost, for his family, especially his brother Cardinal

Ferdinand, hated her bitterly, as an adventuress and interloper. In October 1587 both the grand duke and his wife died of colic within a couple of days of each other. At the time poison was suspected, but documentary evidence has proved the suspicion to be unfounded.

See S. Romanin, *Lezioni di storia Veneta*, vol. ii. (Florence, 1875); G. E. Saltini, *Tragedie Medicee domestiche* (Florence, 1898). (L. V.*)

CAPPERONNIER, CLAUDE (1671–1744), French classical scholar, the son of a tanner, was born at Montdidier on the 1st of May 1671. He studied at Amiens and Paris, and took orders in the Church of Rome, but devoted himself almost entirely to classical studies. He declined a professorship in the university of Bâle, and was afterwards appointed (1722) to the Greek chair in the Collège de France. He published an edition of Quintilian (1725) and left behind him at his death an edition of the ancient Latin Rhetoricians, which was published in 1756. He furnished much material for Robert Estienne's *Thesaurus Linguae Latinae*. His nephew, Jean Capperonnier (1716–1775), his successor in the chair of Greek at the Collège de France, was also a distinguished scholar, and published valuable editions of classical authors—Caesar, Anacreon, Plautus, Sophocles.

CAPPONI, GINO, MARQUIS (1792–1876), Italian statesman and historian, was born on the 13th of September 1792. The Capponi family is one of the most illustrious Florentine houses, and is mentioned as early as 1250; it acquired great wealth as a mercantile and banking firm, and many of its members distinguished themselves in the service of the republic and the Medicis (see CAPPONI, PIERO), and later in that of the house of Lorraine. Gino was the son of the Marquis Pier Roberto Capponi, a nobleman greatly attached to the reigning grand duke of Tuscany, Ferdinand III. When that prince was deposed by the French in 1799 the Capponi family followed him into exile at Vienna, where they remained until he exchanged his rights to the grand duchy for a German principality (1803). The Capponi then returned to Florence, and in 1811 Gino married the marchesina Giulia Riccardi. Although the family were very anti-French Gino was chosen with other notables to pay homage to Napoleon in Paris in 1813. On the fall of Napoleon Ferdinand returned to Tuscany (September 1814), but the restoration proved less reactionary there than in any other part of Italy. Young Capponi was well received at court, but not being satisfied with the life of a mere man of fashion, he devoted himself to serious study and foreign travel. After sundry journeys in Italy he again visited Paris in 1818, and then went to England. He became deeply interested in English institutions, and carefully studied the constitution, the electoral system, university life, industrial organization, &c. At Edinburgh he met Francis Jeffrey, the editor of the *Edinburgh Review*, and conceived a desire to found a similar review in Italy. Besides knowing Jeffrey he made the acquaintance of many prominent statesmen and men of letters, including Lord John Russell, the duke of Bedford, Dugald Stewart, Ugo Foscolo, &c. This visit had a great effect in forming his character, and while it made him an ardent Anglophil, he realized more and more the distressing conditions of his own country. He returned to Italy in 1820, and on reaching Florence he set to work to found a review on the lines of the *Edinburgh*, which should attract the best literary talent. This he achieved with the help of the Swiss G. P. Vieusseux, and the result was the *Antologia*. He contributed largely to its columns, as well as to those of the *Archivio Storico*, another of Vieusseux's ventures. Capponi began to take a more active interest in politics, and entered into communication with the Liberals of all parts of Italy. He had discussed the possibility of liberating Italy with Prince Charles Albert of Savoy-Carignano, to whom he had introduced the Milanese revolutionist Count Confalonieri (*q.v.*). But the collapse of the rising of 1821 and the imprisonment of Confalonieri made Capponi despair of achieving anything by revolution, and he devoted himself to the economic development of Tuscany and to study. At his beautiful villa of Varramista he collected materials for a history of the Church; his work was interrupted by family troubles and by increasing blindness, but although by 1844 he had completely lost his sight he continued to work by means of amanuenses. In 1847 he again plunged into politics and discussed plans for an Italian alliance against Austria. When the grand duke Leopold II. decided in 1848 to grant his people a constitution, Capponi was made a member of the commission to draw it up, and he eventually became prime minister. During his short tenure of office he conducted foreign affairs with great skill, and made every effort to save the Italian situation after the defeat of Charles Albert on the Mincio. In October 1848 he resigned; soon afterwards the grand duke fled, anarchy followed, and then in 1849 he returned, but with an escort of Austrian soldiery. The blind statesman thanked God that he could not see the hated white uniforms in Florence. He returned to his studies and commenced his great *Storia della Repubblica di Firenze*; but he followed political affairs with great interest, and helped to convince Lord John Russell, who stayed with him in 1859, of the hopelessness of the grand duke's position. On Leopold's second flight (27th of April 1859) a Tuscan assembly was summoned, and Capponi elected member of it. He voted for the grand duke's deposition and for the union of Tuscany with Piedmont. King Victor Emmanuel made him senator in 1860. His last years were devoted almost exclusively to his Florentine history, which was published in 1875 and achieved an immediate success. This was Capponi's swan song, for on the 3rd of February 1876 he died at the age of eighty-four.

Capponi was one of the best specimens of the Tuscan landlord class. "He represents," wrote his biographer Tabarrini, "one of the most striking personalities of a generation, now wholly passed away, which did not resign itself to the beatitudes of 1815, but wished to raise Italy from the humble state to which the European peace of that year had condemned her; and he succeeded by first raising the character of the Italians in the opinion of foreigners, so as to deserve their esteem and respect." He knew nearly all the most interesting people in Italy, besides many distinguished foreigners: Giuseppe Giusti, the poet, A. Manzoni, the novelist, Niccolò Tommaseo, Richard Cobden, A. von Reumont, the historian, were among those whom he entertained at his palace or his villas, and many were the struggling students and revolutionists to whom he gave assistance. As a historian his reputation rests on his *Storia della Repubblica di Firenze* (Florence, 1875); it was the first comprehensive Italian book on the subject based on documents and written in a modern critical spirit, and if the chapters on the early history of the city are now obsolete in view of recent discoveries, yet, as a whole, it remains a standard work. Besides his history a large number of essays and pamphlets have been published in his *Scritti Inediti*.

See M. Tabarrini, *Gino Capponi* (Florence, 1879); and A. von Reumont, *Gino Capponi* (Gotha, 1880). (L. V.*)

CAPPONI, PIERO (1447–1496), Florentine statesman and warrior. He was at first intended for a business career, but Lorenzo de' Medici, appreciating his ability, sent him as ambassador to various courts, where he acquitted himself with distinction. On the death of Lorenzo (1492), who was succeeded by his son, the weak and incapable Piero, Capponi became one of the leaders of the anti-Medicean faction which two years later expelled him from Florence. Capponi was then made chief of the republic and conducted public affairs with great skill, notably in the difficult negotiations with Charles VIII. of France, who had invaded Italy in 1494 and in whose camp the exiled Medici had taken refuge. In November Charles, on his way to Naples, entered Florence with his army, and immediately began to behave as though he were the conqueror of the city, because he had entered it lance in rest. The signory was anxious to be on good terms with him, but when he spoke in favour of the Medici their temper changed at once, and the citizens were ordered to arm and be prepared for all emergencies. Tumults broke out between French soldiers and Florentine citizens, barricades were erected and stones began to fly from the windows. This alarmed Charles, who lowered his tone and said nothing more

about conquered cities or the Medici. The Florentines were willing to pay him a large sum of money, but in settling the amount further disagreements arose. Charles, who was full of the Medici's promises, made exorbitant demands, and finally presented an ultimatum to the signory, who rejected it. "Then we shall sound our trumpets," said the king, to which Capponi replied "And we shall toll our bells," and tore up the ultimatum in the king's face. Charles, who did not relish the idea of house-to-house fighting, was forced to moderate his claims, and concluded a more equitable treaty with the republic. On the 28th of November he departed, and Capponi was appointed to reform the government of Florence. But being more at home in the camp than in the council chamber, he was glad of the opportunity of leading the armies of the republic against the Pisan rebels. He proved a most capable general, but while besieging the castle of Soiana, he was killed on the 25th of September 1496. His death was greatly regretted, for the Florentines recognized in him their ablest statesman and warrior.

See under SAVONAROLA, FLORENCE, MEDICI, CHARLES VIII. The "Vita di Piero di Gino Capponi," by V. Acciaiuoli (published in the *Archivio Storico Italiano*, series 1, vol. iv. part 2ª, 1853), is the chief contemporary authority; see also P. Villari, *Savonarola*, vol. i. (Florence, 1887), and Gino Capponi, *Storia della Republica di Firenze*, vol. ii. (Florence, 1875). (L. V.*)

CAPRAIA (anc. *Capraria*, from Lat. *capra*, wild-goat), an island of Italy, off the N.W. coast (the highest point 1466 ft. above sea-level), belonging to the province of Genoa, 42 m. S.S.E. of Leghorn by sea. Pop. (1901) 547. It is of volcanic origin, and is partly occupied by a penal agricultural colony. It produces wine, and is a centre of the anchovy fishery. It became Genoese in 1527 and was strongly fortified. In 1796 it was occupied for a short time by Nelson. About 20 m. to the north is the island of Gorgona (highest point 836 ft.), also famous for its anchovies.

CAPRERA, an island off the N.E. coast of Sardinia, about 1 m. in length. It is connected by a bridge with La Maddalena. Its chief interest lies in its connexion with Garibaldi, who first established himself there in 1854, and died there on the 2nd of June 1882. His tomb is visited on this anniversary by Italians from all parts. Roman remains, including a bust of Maximian, have been found upon the island.

CAPRI (anc. *Capreae*), an island on the S. side of the Bay of Naples, of which it commands a fine view; it forms part of the province of Naples, and is distant about 20 m. S. of the town of Naples. Pop. (1901) of the commune of Capri, 3890, of Anacapri, 2316. It divides the exits from the bay into two, the Bocca Grande, about 16 m. wide, between Capri and Ischia, and the Bocca Piccola, 3 m. wide between Capri and the extreme south-west point of the peninsula of Sorrento. It is 4 m. in length and the greatest width is 1½ m., the total area being 5½ sq. m. The highest point is the Monte Solaro (1920 ft.) on the west, while at the east end the cliffs rise to a height of 900 ft. sheer from the sea. The only safe landing-place is on the north side. There are two small towns, Capri (450 ft.) and Anacapri (980 ft.), which until the construction of a carriage road in 1874 were connected only by a flight of 784 steps (the substructures of which at least are ancient). The island lacks water, and is dusty during drought, but is fertile, producing fruit, wine and olive oil; the indigenous flora comprises 800 species. The fishing industry also is important. But the prosperity of the island depends mainly upon foreign visitors (some 30,000 annually), who are attracted by the remarkable beauty of the scenery (that of the coast being especially fine), the views of the sea and of the Bay of Naples, and the purity of the air. The famous Blue Grotto, the most celebrated of the many caves in the rocky shores of the island, was known in Roman times, but lost until 1826, when it was rediscovered. Another beautiful grotto has green instead of blue refractions; the effect in both cases is due to the light entering by a small entrance.

The high land in the west of the island and the somewhat less elevated region in the east are formed of Upper Tithonian and Lower Cretaceous limestones, the latter containing Rudistes. The intervening depression, which seems to be bounded on the west by a fault, is filled to a large extent by sandstones and marls of Eocene age. A superficial layer of recent volcanic tuffs occurs in several parts of the island. The Blue Grotto is in the Tithonian limestones; it shows indications of recent changes of level.

The earliest mythical inhabitants (though some have localized the Sirens here) are the Teleboi from Acarnania under their king Telon. Neolithic remains were found in 1882 in the Grotta delle Felci, a cave on the south coast. In historical times we find the island occupied by Greeks. It subsequently fell into the hands of Neapolis, and remained so until the time of Augustus, who took it in exchange for Aenaria (Ischia) and often resided there. Tiberius, who spent the last ten years of his life at Capri, built no fewer than twelve villas there; to these the great majority of the numerous and considerable ancient remains on the island belong. All these villas can be identified with more or less certainty, the best preserved being those on the east extremity, consisting of a large number of vaulted substructures and the foundations perhaps of a *pharos* (lighthouse). One was known as Villa Jovis, and the other eleven were probably named after other deities. The existence of numerous ancient cisterns shows that in Roman as in modern times rain-water was largely used for lack of springs. After Tiberius's death the island seems to have been little visited by the emperors, and we hear of it only as a place of banishment for the wife and sister of Commodus. The island, having been at first the property of Neapolis, and later of the emperors, never had upon it any community with civic rights. Even in imperial times Greek was largely spoken there, for about as many Greek as Latin inscriptions have been found. The medieval town was on the north side at the chief landing-place (Marina Grande), and to it belonged the church of S. Costanzo, an early Christian building. It was abandoned in the 15th century on account of the inroads of pirates, and the inhabitants took refuge higher up at the two towns of Capri and Anacapri.

In 1806 the island was taken by the English fleet under Sir Sidney Smith, and strongly fortified, but in 1808 it was retaken by the French under Lamarque. In 1813 it was restored to Ferdinand I. of the Two Sicilies.

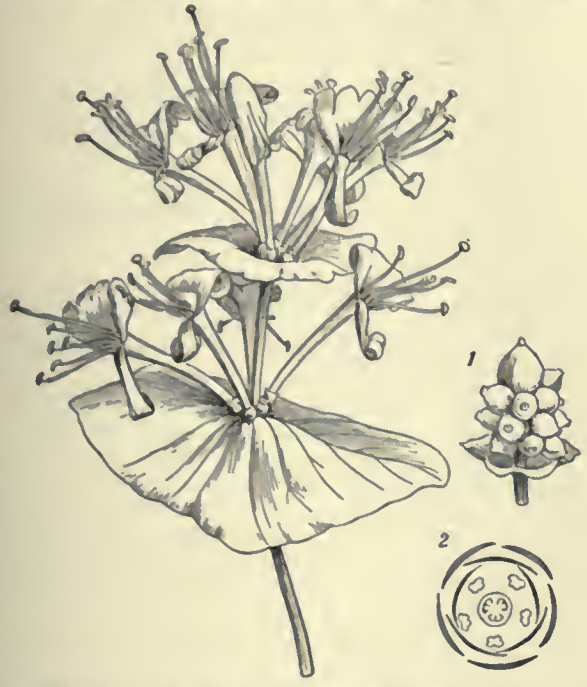
See J. Beloch, *Campanien* (Breslau, 1890), 278 seq.; G. Feola, *Rapporto sullo stato dei ruderi Augusto-Tiberiani*—MS. inedito, publicato dal Dott. Ignazio Cerio (Naples, 1894); F. Furchheim, *Bibliografia dell' Isola di Capri e della provincia Sorrentina* (Naples, 1899); C. Weichhardt, *Das Schloss des Tiberius und andere Römerbauten auf Capri* (Leipzig, 1900). (T. As.)

CAPRICCIO, or CAPRICE (Ital. for a sudden motion or fancy), a musical term for a lively composition of an original and fantastic nature, not following a set musical form, although the first known, written for the harpsichord, partook of the nature of a fugue. The word is also used for pieces of a fanciful type, in the nature of transcriptions and variations.

CAPRICORNUS ("THE GOAT"), in astronomy, the tenth sign of the zodiac (*q.v.*), represented by the symbol ♑ intended to denote the crooked horns of this animal. The word is derived from Lat. *caper*, a goat, and *cornu*, a horn. It is also a constellation of the southern hemisphere, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.); Ptolemy and Tycho Brahe catalogued 28 stars, Hevelius gave 29. It was represented by the ancients as a creature having the forepart a goat, and the hindpart a fish, or sometimes simply as a goat. An interesting member of this constellation is *α-Capricorni*, a pair of stars of 3rd and 4th magnitudes, each of which has a companion of the 9th magnitude.

CAPRIFOLIACEAE, a natural order of plants belonging to the sympetalous or higher division of Dicotyledons, that namely which is characterized by having the petals of the flower united. The plants are mainly shrubs and trees; British representatives are *Sambucus* (elder), *Viburnum* (guelder-rose and wayfaring tree), *Lonicera* (honeysuckle) (see fig.); *Adoxa* (moschatel), a small herb with a creeping stem and small yellowish-green flowers, is occasionally found on damp hedge-banks; *Linnaea*, a slender creeping evergreen with a thread-like stem and pink bell-shaped

flower, a northern plant, occurs in fir-forests and plantations in the north of England and Scotland. The leaves are opposite, simple as in honeysuckle, or compound as in elder; they have usually no stipules. The flowers are regular as in *Viburnum*



Flowering shoot of *Lonicera Caprifolium*, slightly reduced. 1, Fruit slightly reduced; 2, horizontal plan of arrangement of flower.

and *Sambucus*, more rarely two-lipped as in *Lonicera*; the sepals and petals are usually five in number and placed above the ovary, the five stamens are attached to the corolla-tube, there are three to five carpels, and the fruit is a berry as in honeysuckle or snowberry (*Symphoricarpus*), or a stone fruit, with several, usually three, stones, as in *Sambucus*.

In *Sambucus* and *Viburnum* the small white flowers are massed in heads; honey is secreted at the base of the styles and, the tube of the flower being very short, is exposed to the visits of flies and insects with short probosces. The flowers of *Lonicera*, which have a long tube, open in the evening, when they are sweet-scented and are visited by hawk-moths. The order contains about 250 species, chiefly natives of the north temperate zone and the mountains of the tropics. Several genera afford ornamental plants; such are *Lonicera*, erect shrubs or twiners with long-tubed white, yellow or red flowers; *Symphoricarpus*, a North American shrub, with small whitish pendulous flowers and white berries; *Diervilla* (also known as *Weigelia*), and *Viburnum*, including *V. Opulus*, guelder rose, in the cultivated forms of which the corolla has become enlarged at the expense of the essential organs and the flowers are neuter.

CAPRIVI DE CAPRERA DE MONTECUCCOLI, GEORG LEO VON, Count (1831–1899), German soldier and statesman, was born on the 24th of February 1831 at Charlottenburg. The family springs from Carniola, and the name was originally written Kopriva; in the 18th century one branch settled in Wernigerode, and several members entered the Prussian service; the father of the chancellor held a high judicial post, and was made a life member of the Prussian House of Lords. Caprivi was educated in Berlin, and entered the army in 1849; he took part in the campaign of 1866, being attached to the staff of the 1st army. In 1870 he served as chief of the staff to the 10th army corps, which formed part of the 2nd army, and took part in the battles before Metz as well as in those round Orleans, in which he highly distinguished himself. One of the most delicate strategical problems of the whole war was the question of whether to change the direction of the 10th corps on the morning of the 16th of August before Vionville, and in this, as well as in the actual manœuvres of the corps on that day, Caprivi, as representative of, and counsellor to, his chief, General v. Voigts-Rhetz, took a leading part. At the battle of Beaune-la-Rolande, the turning-point of the Orleans campaign, the 10th corps bore the brunt of the fighting. After the peace he held several important military offices, and in 1883 was made chief of the admiralty, in which post he had to command the fleet and to organize and represent the department in the Reichstag. He resigned in 1888, when the command was separated from the representation in parliament, and was appointed commander of the 10th army corps. Bismarck had already referred to him as a possible successor to himself, for Caprivi had shown great administrative ability, and was unconnected with any political party; and in March 1890 he was appointed chancellor, Prussian minister president and foreign minister. He was quite unknown to the public, and the choice caused some surprise, but it was fully justified. The chief events of his administration, which lasted for four years, are narrated elsewhere, in the article on Germany. He showed great ability in quickly mastering the business, with which he was hitherto quite unacquainted, as he himself acknowledged; his speeches in the Reichstag were admirably clear, dignified and to the point. His first achievement was the conclusion in July 1890 of a general agreement with Great Britain regarding the spheres of influence of the two countries in Africa. Bismarck had supported the colonial parties in Germany in pretensions to which it was impossible for Great Britain to give her consent, and the relations between the two powers were in consequence somewhat strained. Caprivi adopted a conciliatory attitude, and succeeded in negotiating terms with Lord Salisbury which gave to Germany all she could reasonably expect. But the abandonment of an aggressive policy in East Africa and in Nigeria, and in the withdrawal of German claims to Zanzibar (in exchange for Heligoland) aroused the hostility of the colonial parties, who bitterly attacked the new chancellor. Caprivi had, however, by making the frontiers of the Congo Free State and German East Africa meet, "cut" the Cape to Cairo connexion of the British, an achievement which caused much dismay in British colonial circles, regular treaties having been obtained from native chiefs over large areas which the chancellor secured for Germany. In Nigeria also Caprivi by the 1890 agreement, and by another concluded in 1893, made an excellent bargain for his country, while in South-West Africa he obtained a long but narrow extension eastward to the Zambezi of the German protectorate (this strip of territory being known as "Caprivi's Finger"). In his African policy the chancellor proved far-sighted, and gained for the new protectorates a period for internal development and consolidation. The Anglo-German agreement of 1890 was followed by commercial treaties with Austria, Rumania, &c.; by concluding them he earned the express commendation of the emperor and the title of count, but he was from this time relentlessly attacked by the Agrarians, who made it a ground for their distrust that he was not himself a landed proprietor; and from this time he had to depend much on the support of the Liberals and other parties who had been formerly in opposition. The reorganization of the army caused a parliamentary crisis, but he carried it through successfully, only, however, to earn the enmity of the more old-fashioned soldiers, who would not forgive him for shortening the period of service. His position was seriously compromised by the failure in 1892 to carry an education bill which he had defended by saying that the question at issue was Christianity or Atheism, and he resigned the presidency of the Prussian ministry, which was then given to Count Eulenburg. In 1894, a difference arose between Eulenburg and Caprivi concerning the bill for an amendment of the criminal code (the *Umsturz Vorlage*), and in October the emperor dismissed both. Caprivi's fall was probably the work of the Agrarians, but it was also due to the fact that, while he showed very high ability in conducting the business of the country, he made no attempt to secure his personal position by forming a party either in parliament or at court. He interpreted his position rather as a soldier; he did his duty, but did not think of defending himself. He

suffered much from the attacks made on him by the followers of Bismarck, and he was closely associated with the social ostracism of that statesman; we do not know, however, in regard either to this or to the other events of his administration, to what extent Caprivi was really the author of the policy he carried out, and to what extent he was obeying the orders of the emperor. With a loyalty which cannot be too highly praised, he always refused, even after his abrupt dismissal, to justify himself, and he could not be persuaded even to write memoirs for later publication. The last years of his life were spent in absolute retirement, for he could not return even to the military duties which he had left with great reluctance at the orders of the emperor. He died unmarried on the 6th of February 1899, at the age of sixty-eight.

See R. Arndt, *Die Reden des Grafen v. Caprivi* (Berlin, 1894), with a biography. (J. W. He.)

CAPRONNIER, JEAN BAPTISTE (1814–1891), Belgian stained-glass painter, was born in Brussels in 1814, and died there in 1891. He had much to do with the modern revival of glass-painting, and first made his reputation by his study of the old methods of workmanship, and his clever restorations of old examples, and copies made for the Brussels archaeological museum. He carried out windows for various churches in Brussels, Bruges, Amsterdam and elsewhere, and his work was commissioned also for France, Italy and England. At the Paris Exhibition of 1855 he won the only medal given for glass-painting.

CAPSICUM, a genus of plants, the fruits of which are used as peppers (see Cayenne Pepper for botany, &c.). As used in medicine, the ripe fruit of the *capsicum mimum* (or *frutescans*), containing the active principle capsaicin (capsacutin), first isolated by Thresh in 1876, has remarkable physiological properties. Applied locally to the skin or mucous membrane, it causes redness and later vesication. Internally in small doses it stimulates gastric secretions and causes dilatation of the vessels; but if used internally in excess for a long period it will cause subacute gastritis. In single doses in excess it causes renal irritation and inflammation and strangury. The administration of capsicum is valuable in atony of the stomach due to chronic alcoholism, its hot stimulating effect not only increasing the appetite but to a certain degree satisfying the craving for alcohol. It is also useful in the flatulency of the aged, where it prevents the development of gas, and has a marked effect on anorexia. It has been used in functional torpidity of the kidney. Externally capsicum plaster placed over the affected muscles is useful in rheumatism and lumbago. Capsicum wool, known as calorific wool, made by dissolving the oleoresin of capsicum in ether and pouring it on to absorbent cotton-wool, is useful in rheumatic affections.

CAPSTAN (also spelt in other forms, or as "capstock" and "cable stock," connected with the O. Fr. *capestan* or *cabestan*, from Lat. *capistrum*, a halter, *capere*, to take hold of; the conjecture that it came from the Span. *cabra*, goat, and *estanto*, standing, is untenable), an appliance used on board ship and on dock walls, for heaving-in or veering cables and hawsers, whether of iron, steel or hemp. It differs from a windlass, which is used for the same purposes, in having the axis on which the rope is wound vertical instead of horizontal. The word seems to have come into English (14th century) from French or Spanish shipmen at the time of the Crusades. The earlier forms were of a comparatively simple character, made of wood with an iron spindle and worked by manual labour with wooden capstan bars. As heavier cables were supplied to ships, difficulty was found, when riding at anchor, in holding, checking and veering cable. A cable-holder (W. H. Harfield's) was tested in H.M.S. "Newcastle" (wooden frigate) in 1870 and proved effective; its first development in 1876 was the application in the form of a windlass secured to the deck, driven by a messenger chain from the capstan, fitted in H.M.S. "Inflexible" (fig. 1).

The capstans and engine are shown at A,A,A, and the windlass B is driven by messenger chains C, C. The four cables (dotted line D, D) lead to their respective cable-holders, fitted with a brake, and by these means each cable-holder can be connected to the main driving shaft, and any cable hove-in or veered independently of the other; by using steam power instead of manual, the previous slow motion was obviated. In H.M.S. "Collingwood" steam power was used to work the windlass directly by means of worm gearing; the windlass was divided into two parts, so that the one on the port side could be worked independently of that on the starboard, and vice versa. An independent capstan in both ships, arranged to take either of the cables, could be worked by hand or steam. In the "Collingwood's" windlass the cables remained on their holders, and could be hove-in or veered without being touched.

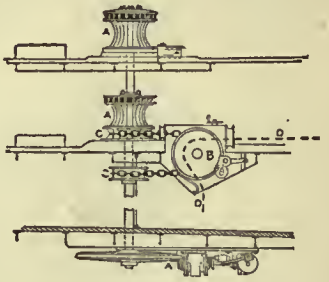


Fig. 1.

Napier's patent windlass for merchant ships (1906) resembles an appliance fitted in the earlier second-class cruisers of the British navy (1890 to 1900). Two cable wheels or cable-holders are mounted loose on a horizontal axle, one on each side of a worm wheel which is tightly keyed on the middle part of the axle. A vertical steam engine with two cylinders, placed one on each side of the framing, drives a second horizontal axle which is connected by a set of bevel gears to an upright worm shaft, which works the worm wheel. This worm wheel can be connected by means of sliding bolts to one or both of the cable wheels, enabling one or both cables to be hove-in or veered as necessary. A brake, of Napier's self-holding differential type, is fitted to each cable wheel, and is controlled by hand wheels on the aft side of the windlass. For warping purposes, warping drums are fitted (made portable if required). A third central capstan, fitted forward of the windlass, is connected to the upright worm shaft by a horizontal shaft and bevel wheels. It can also be worked by manual labour with capstan bars. Fig. 2 represents the arrangement of the capstans on the forecastle of a battleship, fitted by Napier Brothers. Deep-

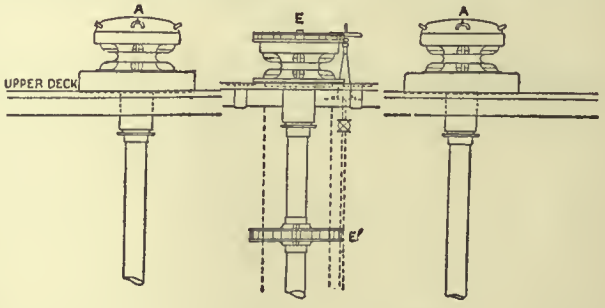


Fig. 2.—Elevation looking aft.

bodied capstans have been superseded by low drum-headed ones, over which the guns may be fired. The three capstans or cable-holders of cast steel, capable of taking $2\frac{1}{8}$ in. cables, are fitted on vertical spindles, which pass down through the main and armoured decks to the platform one, where the steam engine and gearing are placed. The gearing consists of worm and wheel gears, so arranged that the three capstans can be worked singly or in conjunction, when heaving-in or veering, and the brakes (of the type previously mentioned) are controlled by a portable hand wheel fitted on the aft side of each. The cable-holders can be used for riding at anchor (see Cable). The middle line capstan E is keyed to vertical spindles and can be coupled up to the capstan engine, by clutch and drop bolts in the capstan engine room; it is fitted with a cable-holder, to take either the port or starboard cables, and in addition is provided with portable whelps, enabling it to be used for warping. It can also be worked by manual labour with capstan bars, a drum-head E′, fitted on the spindle on the main deck, enabling additional capstan bars to be used if required.

To avoid carrying steam pipes aft, the after capstan is worked

by an electric motor which is kept below the water-line. Napier Brothers' capstan (fig. 3) is for warping purposes, for working the stern anchor with wire hawser and for coaling. It is placed on the upper deck, and is fitted with a drum-head for capstan bars, with pawls and pawl rim on the deck plate, the pawls A being lifted and placed on their rests B when working with the motor. The upper portion of the capstan, together with its drum-head, is portable, being fixed to the centre boss with keys and gun-metal screws. The centre boss is keyed to the spindle, which passes through the deck and carries at its lower end a coupling for connecting to the worm wheel gear. For working by motor, the additional security of two drop bolts is provided. The gearing consists of a single worm and worm wheel, working in an oil-bath, the worm shaft being coupled direct to the motor spindle. The motor is of the semi-enclosed type, the working and live parts being protected by a perforated metallic covering; it is worked off a 100-volt circuit, at a speed under full load conditions of 300 revolutions per minute. The motor is of a 4-pole type and compound wound, the shunt winding limiting the speed on light load to not more than 1000 revolutions per minute. A frictional break is provided, pulled off by means of a shunt-excited magnet. The controller is of the reversing drum type, with not less than four steps in either direction, and is fitted with a magnetic blow-out. The control is effected by a removable hand wheel on a portable pedestal, fitted on top with a circular dial plate and indicating pointer; the hand wheel reverses the current as well as graduates the speed in either direction. All capstans of the British navy, after being fitted on board ship, are tested for lifting power and speed; with foremost (steam) capstans, the steam being at 150 lb pressure, the anchor is usually let go in 16 to 25 fathoms water, and the speed ascertained by observing the time taken to heave-in not less than a length of cable, 75 ft.; the length must be hove-in in three minutes, or at the rate of 25 ft. per minute. With the after capstan (motor) of first-class battleships and cruisers, a weight is used instead of an anchor, the test being to lift 9 tons at the rate of 25 ft. per minute. Capstans on dock walls in British government dockyards are usually driven by hydraulic or air pressure, conveyed through pipes to small engines underneath the capstans. (J. W. D.)

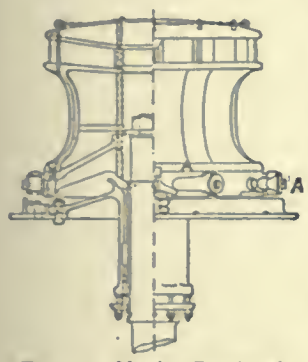


FIG. 3.—Napier Brothers' capstan.

CAPSULE (from the Lat. *capsula*, a small box), a term in botany for a dry seed vessel, as in the poppy, iris, foxglove, &c., containing one or more cells. When ripe the capsule opens and scatters the seed (see BOTANY). The word is used also for a small gelatinous case enclosing a dose of medicine, and for a metal cap or cover on bottles and jars. In anatomy the term is used to denote a cover or envelope partly or wholly surrounding a structure. Every diarthrodial joint possesses a fibrous or ligamentous capsule, lined with synovial membrane, attached to the adjacent ends of the articulating bones. The term is particularly applied to the sac which encloses the crystalline lens of the eye; to Glisson's capsule, a thin areolar coat of fibrous tissue lying inside the tunica serosa of the liver; to the glomerular capsules in the kidney substance; to the suprarenal capsules, two small flattened organs in the epigastric region; and to the internal and external capsules of the brain (see BRAIN, fig. 14 and explanation).

CAPTAIN (derived from Lat. *caput*, head, through the Low Lat. *capitanus*), a chief or leader, in various connexions, but particularly a grade officer in the army or navy.

At sea the name of captain is given to all who command ships whether they belong to the military navy of their country or not, or whether they hold the substantive rank or not. Thus a lieutenant when in command of a vessel is addressed as captain. In France a naval lieutenant is addressed as *mon capitaine*, because he has that comparative rank in the army. The master of a merchant ship is known as her captain. But the name is also used in the strict sense of foreman, or head man, to describe many of the minor or "petty" officers of a British or American man-of-war—the captain of a top, of the forecastle, or of a gun. The title "post captain" in the British navy means simply full captain, and is the equivalent of the French *capitaine de vaisseau*. It had its origin in the fact that captains appointed to a ship of twenty guns and upwards were included in, or "posted" on, the permanent list of captains from among whom the admirals were chosen. The captain of the fleet is an officer who acts as chief of the staff to an admiral commanding a large force. The position is equivalent to flag rank, but is held by a captain. Staff captain is the highest grade of the officers entrusted with the navigation of a ship or fleet.

The military rank of captain (Fr. *capitaine*, Ger. *Hauptmann*, or in the cavalry, *Rittmeister*), which was formerly the title of an officer of high rank corresponding to the modern general officer or colonel, has with the gradual subdivision and articulation of armies, come to be applied to the commanders of companies or squadrons, and in general to officers of the grade equivalent to this command (see OFFICERS).

The title of "captain-general" was formerly used in the general sense of a military commander-in-chief, and is still similarly used in Spain. In the Spanish army there are eight captains-general, each of whom has command of a "region" corresponding to an army corps district. The same title was formerly given to the Spanish governors of the colonial provinces in the New World. The official title of the governor of Jamaica is "captain-general and governor-in-chief."

CAPTAL (Lat. *capitalis*, "first," "chief"), a medieval feudal title in Gascony. According to Du Cange the designation captal (*capital, captau, capitau*) was applied loosely to the more illustrious nobles of Aquitaine, counts, viscounts, &c., probably as *capitales domini*, "principal lords," though he quotes more fanciful explanations. As an actual title the word was used only by the lords of Trene, Puychagut, Epernon and Buch. It is best known in connexion with the famous soldier, Jean de Grailly, captal of Bush (d. 1376), the "captal de Buch" *par excellence*, immortalized by Froissart as the confidant of the Black Prince and the champion of the English cause against France. His active part in the war began in 1364, when he ravaged the country between Paris and Rouen, but was beaten by Bertrand du Guesclin at Cocherel and taken prisoner. Released next year, he received the seigniory of Nemours and took the oath of fealty to the French king, Charles V., but soon resigned his new fief and returned to his allegiance to the English king. In 1367 he took part in the battle of Navarette, in which Du Guesclin was taken prisoner, the captal being entrusted with his safe-keeping. In 1371 Jean de Grailly was appointed constable of Aquitaine, but was taken prisoner next year and interned in the Temple at Paris where, resisting all the tempting offers of the French king, he remained till his death five years later.

CAPTION (Lat. *captio*, a taking or catching), a term still used in law, especially Scots, for arrest or apprehension. From the obsolete sense of a catching at any possible plea or objection comes the adjective "captious," *i.e.* sophistical or fault-finding. The term also has an old legal use, to signify the part of an indictment, &c., which shows where, when and by what authority it is taken, found or executed; so its opening or heading. From this is derived the modern sense of the heading of an article in a book or newspaper.

CAPTIVE (from Lat. *capere*, to take), one who is captured in warfare. As a term of International Law, it has been displaced by that of "prisoner of war." The position and treatment of captives or prisoners of war is now dealt with fully in chapter ii. of the regulations annexed to the Hague Convention respecting the Laws and Customs of War on Land, of the 18th of October 1907.

See PEACE CONFERENCE and WAR; also Sir T. Barclay, supplement to *Problems of International Practice and Diplomacy*, for comparison of texts of 1899 and 1907.

CAPTURE (from Lat. *capere*, to take; Fr. *prise maritime*; Ger. *Wegnahme*), in international law, the taking possession by a belligerent vessel of an enemy or neutral merchant or non-fighting ship. If an enemy ship is captured she becomes forthwith lawful prize (*q.v.*); when a neutral ship, the belligerent commander, in case her papers are not conclusive, has a right to search her. If he finds contraband on board or the papers or cargo or circumstances excite any serious suspicion in his mind, which the master of the ship has been unable to dispel, he places an officer and a few of his crew on board and sends her to the nearest port where there is a prize court for trial. The word is also used for the vessel thus captured (see BLOCKADE, CONTRABAND). (T. BA.)

CAPUA (anc. *Casilinum*), a town and archiepiscopal see of Campania, Italy, in the province of Caserta, 7 m. W. by rail from the town of Caserta. Pop. (1901) 14,285. It was erected in 856 by Bishop Landulf on the site of Casilinum (*q.v.*) after the destruction of the ancient Capua by the Saracens in 840, but it only occupies the site of the original pre-Roman town on the left (south) bank of the river.

The cathedral of S. Stefano, erected in 856, has a handsome atrium and a lofty Lombard campanile, and a (modernized) interior with three aisles; both it and the atrium have ancient granite columns. The Romanesque crypt, with ancient columns, has also been restored. It has a fine paschal candlestick, and the fragments of a pulpit with marble mosaic of the 13th century. There are also preserved in the cathedral a fine Exultet roll and an *evangelarium* of the end of the 12th century, bound in bronze decorated with gold filigree and enamels. The mosaics of the beginning of the 12th century in the apses of the cathedral and of S. Benedetto, were destroyed about 1720 and 1620 respectively. The small church of S. Marcello was also built in 856. In 1232–1240 Frederick II. erected a castle to guard the Roman bridge over the Volturno, composed of a triumphal arch with two towers. This was demolished in 1557. The statues with which it was decorated were contemporary imitations of classical sculptures. Some of them are still preserved in the Museo Campano (E. Bertaux, *L'Art dans l'Italie méridionale*, Paris, 1904, i. 707). The Museo Campano also contains a considerable collection of antiquities from the ancient Capua.

Capua changed hands frequently during the middle ages. One of the most memorable facts in its history is the terrible attack made on it in 1501 by Caesar Borgia, who had entered the town by treachery, in which 5000 lives were sacrificed. It remained a part of the kingdom of Naples until the 2nd of November 1860, when, a month after the battle of the Volturno, it surrendered to the Italian troops. (T. As.)

CAPUA (mod. *S. Maria di Capua Vetere*), the chief ancient city of Campania, and one of the most important towns of ancient Italy, situated 16 m. N. of Neapolis, on the N.E. edge of the Campanian plain. Its site in a position not naturally defensible, together with the regularity of its plan, indicates that it is not a very ancient town, though it very likely occupies the site of an early Oscan settlement. Its foundation is attributed by Cato to the Etruscans, and the date given as about 260 years before it was "taken" by Rome (Vell. i. 7). If this be referred, not to its capture in the second Punic War (211 B.C.) but to its submission to Rome in 338 B.C., we get about 600 B.C. as the date of its foundation, a period at which the Etruscan power was at its highest, and which may perhaps, therefore, be accepted.[1] The origin of the name is probably *Campus*, a plain,[2] as the adjective *Campanus* shows, *Capuanus* being a later form stigmatized as incorrect by Varro (*De L. L.* x. 16). The derivation from *κάπυς* (a vulture, Latinized into *Volturnum* by some authorities who tell us that this was the original name), and that from *caput* (as though the name had been given it as the "head" of the twelve Etruscan cities of Campania), must be rejected.

[1] G. Patroni, in *Atti del Congresso Internazionale di Scienze Storiche* (Rome, 1904), v. 217, is inclined to place it considerably earlier.

[2] Livy iv. 37, "Vulturnum Etruscorum urbem quae nunc Capua est, ab Samnitibus captam (425 B.C.) Capuamque ab duce eorum Capye, vel, quod propius vero est, a campestri agro appellatam."

The Etruscan supremacy in Campania came to an end with the Samnite invasion in the latter half of the 5th century B.C. (see CAMPANIA); these conquerors, however, entered into alliance with Rome for protection against the Samnite mountain tribes, and with Capua came the dependent communities Casilinum, Calatia, Atella, so that the greater part of Campania now fell under Roman supremacy. The citizens received the *civitas sine suffragio*. In the second Samnite War they proved untrustworthy, so that the Ager Falernus on the right bank of the Volturnus was taken from them and distributed among citizens of Rome, the *tribus Falerna* being thus formed; and in 318 the powers of the native officials (*meddices*) were limited by the appointment of officials with the title *praefecti Capuam Cumas* (taking their name from the most important towns of Campania); these were at first mere deputies of the *praetor urbanus*, but after 123 B.C. were elected Roman magistrates, four in number; they governed the whole of Campania until the time of Augustus, when they were abolished. In 312 B.C. Capua was connected with Rome by the construction of the Via Appia, the most important of the military highways of Italy. The gate by which it left the Servian walls of Rome bore the name Porta Capena—perhaps the only case in which a gate in this enceinte bears the name of the place to which it led. At what time the Via Latina was prolonged to Casilinum is doubtful (it is quite possible that it was done when Capua fell under Roman supremacy, *i.e.* before the construction of the Via Appia); it afforded a route only 6 m. longer, and the difficulties in connexion with its construction were much less; it also avoided the troublesome journey through the Pomptine Marshes (see T. Ashby in *Papers of the British School at Rome*, i. 217, London, 1902). The importance of Capua increased steadily during the 3rd century, and at the beginning of the second Punic War it was considered to be only slightly behind Rome and Carthage themselves, and was able to furnish 30,000 infantry and 4000 cavalry. Until after the defeat of Cannae it remained faithful to Rome, but, after a vain demand that one of the consuls should always be selected from it, it transferred its allegiance to Hannibal, who made it his winter-quarters, with bad results to the *morale* of his troops (see PUNIC WARS). After a long siege it was taken by the Romans in 211 B.C. and severely punished; its magistrates and communal organization were abolished, the inhabitants losing their civic rights, and its territory became Roman state domain. Parts of it were sold in 205 and 199 B.C., another part was divided among the citizens of the new colonies of Volturnum and Liternum established near the coast in 194 B.C., but the greater portion of it was reserved to be let by the state. Considerable difficulties occurred in preventing illegal encroachments by private persons, and it became necessary to buy a number of them out in 162 B.C. It was, after that period, let, not to large but to small proprietors. Frequent attempts were made by the democratic leaders to divide the land among new settlers. Brutus in 83 B.C. actually succeeded in establishing a colony, but it was soon dissolved; and Cicero's speeches *De Lege Agraria* were directed against a similar attempt by Servilius Rullus in 63 B.C. In the meantime the necessary organization of the inhabitants of this thickly-populated district was in a measure supplied by grouping them round important shrines, especially that of Diana Tifatina, in connexion with which a *pagus Dianae* existed, as we learn from many inscriptions; a *pagus Herculaneus* is also known. The town of Capua belonged to none of these organizations, and was entirely dependent on the *praefecti*. It enjoyed great prosperity, however, owing to its spelt, which was worked into groats, wine, roses, spices, unguents, &c., and also owing to its manufactures, especially of bronze objects, of which both the elder Cato and the elder Pliny speak in the highest terms (*De agr.* 135; *Hist. Nat.* xxiv. 95). Its luxury remained proverbial; and Campania is especially spoken of as the home of gladiatorial combats. From the gladiatorial schools of Campania came Spartacus and his followers in 73 B.C. Julius Caesar as consul in 59 B.C. succeeded in carrying out the establishment of a colony in connexion with his agrarian law, and 20,000 Roman citizens were settled in this territory. The number of colonists was increased by Mark

Antony, Augustus (who constructed an aqueduct from the Mons Tifata, and gave the town of Capua estates in the district of Cnossus in Crete to the value of 12 million sesterces—£120,000), and Nero. In the war of A.D. 69 it took the side of Vitellius. Under the later empire it is not often mentioned; but in the 4th century it was the seat of the *consularis Campaniae* and its chief town, though Ausonius puts it behind Mediolanum (Milan) and Aquileia in his *ordo nobilium urbium*. Under Constantine we hear of the foundation of a Christian church in Capua. In A.D. 456 it was taken and destroyed by Genseric, but must have been soon rebuilt: it was, however, finally destroyed by the Saracens in 840 and the church of S. Maria Maggiore, founded about 497, alone remained. It contains 52 ancient marble columns, but was modernized in 1766. The site was only occupied in the late middle ages by a village which has, however, outgrown the medieval Capua in modern days.

Remains.—No pre-Roman remains have been found within the town of Capua itself, but important cemeteries have been discovered on all sides of it, the earliest of which go back to the 7th or 6th century B.C. The tombs are of various forms, partly chambers with frescoes on the walls, partly cubical blocks of peperino, hollowed out, with grooved lids. The objects found within them consist mainly of vases of bronze (many of them without feet, and with incised designs of Etruscan style) and of clay, some of Greek, some of local manufacture, and of paintings. On the east of the town, in the Patturelli property, a temple has been discovered with Oscan votive inscriptions, some of them inscribed upon terra-cotta tablets, others on *cippi*, while of a group of 150 tufa statuettes (representing a matron holding one or more children in her lap) three bore Latin inscriptions of the early imperial period. The site of the town being in a perfectly flat plain, without natural defences, it was possible to lay it out regularly. Its length from east to west is accurately determined by the fact that the Via Appia, which runs from north-west to south-east from Casilinum to Calatia, turns due east very soon after passing the so-called Arco Campano (a triumphal arch of good brickwork, once faced with marble, with three openings, erected in honour of some emperor unknown), and continues to run in this direction for 5413½ English feet (= 6000 ancient Oscan feet). The west gate was the Porta Romana; remains of the east gate (the name of which we do not know) have been found. This fact shows that the main street of the town was perfectly orientated, and that before the Via Appia was constructed, *i.e.* in all probability in pre-Roman times. The width of the town from north to south cannot be so accurately determined as the line of the north and south walls is not known, though it can be approximately fixed by the absence of tombs (Beloch fixes it at 4000 Oscan feet = 3609 English feet), nor is it absolutely certain (though it is in the highest degree probable, for Cicero praises its regular arrangement and fine streets) that the plan of the town was rectangular. Within the town are remains of thermae on the north of the Via Appia and of a theatre opposite, on the south. The former consisted of a large crypto-porticus round three sides of a court, the south side being open to the road; it now lies under the prisons. Beloch (see below) attributes this to the Oscan period; but the construction as shown in Labruzzi's drawing (v. 17)[1] is partly of brick-work and *opus reticulatum*, which may, of course, belong to a restoration. The stage of the theatre had its back to the road; Labruzzi (v. 18) gives an interesting view of the *cavea*. It appears from inscriptions that it was erected after the time of Augustus. Other inscriptions, however, prove the existence of a theatre as early as 94 B.C., so that the existence of another elsewhere must be assumed. We know that the Roman colony was divided into regions and possessed a capitolium, with a temple of Jupiter, within the town, and that the market-place, for unguents especially, was called Seplasia; we also hear of an *aedes alba*, probably the original senate house, which stood in an open space known as *albana*. But the sites of all these are quite uncertain. Outside the town on the north is the amphitheatre, built in the time of Augustus, restored by Hadrian and dedicated by Antoninus Pius, as the inscription over the main entrance recorded. The exterior was formed by 80 Doric arcades of four storeys each, but only two arches now remain. The keystones were adorned with heads of divinities. The interior is better preserved; beneath the arena are subterranean passages like those in the amphitheatre at Puteoli. It is one of the largest in existence; the longer diameter is 185 yds., the shorter 152, and the arena measures 83 by 49 yds., the corresponding dimensions in the colosseum at Rome being 205, 170, 93 and 58 yds. To the east are considerable remains of baths—a large octagonal building, an apse against which the church of S. Maria delle Grazie is built, and several heaps of débris. On the Via Appia, to the south-east of the east gate of the town, are two large and well-preserved tombs of the Roman period, known as *le Carceri vecchie* and *la Conocchia*. To the east of the amphitheatre an ancient road, the Via Dianae, leads north to the Pagus Dianae, on the west slopes of the Mons Tifata, a community which sprang up round the famous and ancient temple of Diana, and probably received an independent organization after the abolition of that of Capua in 211 B.C. The place often served as a base for attacks on the latter, and Sulla, after his defeat of C. Norbanus, gave the whole of the mountain to the temple. Within the territory of the *pagus* were several other temples with their *magistri*. After the restoration of the community of Capua, we find *magistri* of the temple of Diana still existing, but they were probably officials of Capua itself. The site is occupied by the Benedictine church of S. Angelo in Formis[2] which dates from 944, and was reconstructed by the abbot Desiderius (afterwards Pope Victor III.) of Monte Cassino in 1073, with interesting paintings, dating from the end of the 11th century to the middle of the 12th, in which five different styles may be distinguished. They form a complete representation of all the chief episodes of the New Testament (see F. X. Kraus, *Jahrbuch d. k. preuss. Kunst-sammlungen*, xiv.). Deposits of votive objects (*favissae*), removed from the ancient temple from time to time as new ones came in and occupied all the available space, have been found, and considerable remains of buildings belonging to the Vicus Dianae (among them a triumphal arch and some baths, also a hall with frescoes, representing the goddess herself ready for the chase) still exist.

The ancient road from Capua went on beyond the Vicus Dianae to the Volturnus (remains of the bridge still exist) and then turned east along the river valley to Caiatia and Telesia. Other roads ran to Puteoli and Cumae (the so-called Via Campana) and to Neapolis, and as we have seen the Via Appia passed through Capua, which was thus the most important road centre of Campania (*q.v.*).

See Th. Mommsen in *Corpus Inscrip. Lat.* x. (Berlin, 1883), p. 365 seq.; J. Beloch, *Campanien* (Breslau, 1890), 295 seq.; Ch. Hülsen in Pauly-Wissowa, *Realencyclopädie* (Stuttgart, 1899), iii. 1555. (T. As.)

CAPUCHIN MONKEY, the English name of a tropical American monkey scientifically known as *Cebus capucinus*; the plural, capuchins, is extended to embrace all the numerous species of the same genus, whose range extends from Nicaragua to Paraguay. These monkeys, whose native name is sapajou, are the typical representatives of the family *Cebidae*, and belong to a sub-family in which the tail is generally prehensile. From the other genera of that group (*Cebinae*) with prehensile tails capuchins are distinguished by the comparative shortness of that appendage, and the absence of a naked area on the under surface of its extremity. The hair is not woolly, the general build is rather stout, and the limbs are of moderate length and slenderness. The name capuchin is derived from the somewhat cowl-like form assumed by the thick hair on the crown of the head of the sapajous. In their native haunts these monkeys go about in troops of considerable size, frequenting the summits of the tall forest-trees, from which they seldom, if ever, descend. In addition to fruits of various kinds, they consume tender shoots and buds, insects, eggs and young birds. Many of the

[1] For these drawings see T. Ashby, "Dessins inédits de Carlo Labruzzi," in *Mélanges de l'École française*, 1903, 414.

[2] The name comes from the aqueduct (*forma*) erected by Augustus for the supply of Capua, remains of which still exist.

species are difficult to distinguish, and very little is known of their habits in a wild state, although several members of the group are common in captivity (see PRIMATES). (R. L.*)

CAPUCHINS, an order of friars in the Roman Catholic Church, the chief and only permanent offshoot from the Franciscans. It arose about the year 1520, when Matteo di Bassi, an "Observant" Franciscan, became possessed of the idea that the habit worn by the Franciscans was not the one that St Francis had worn; accordingly he made himself a pointed or pyramidal hood and also allowed his beard to grow and went about barefooted. His superiors tried to suppress these innovations, but in 1528 he obtained the sanction of Clement VII. and also the permission to live as a hermit and to go about everywhere preaching to the poor; and these permissions were not only for himself, but for all such as might join him in the attempt to restore the most literal observance possible of St Francis's rule. Matteo was soon joined by others. The Observants opposed the movement, but the Conventuals supported it, and so Matteo and his companions were formed into a congregation, called the Hermit Friars Minor, as a branch of the Conventual Franciscans, but with a vicar of their own, subject to the jurisdiction of the general of the Conventuals. From their hood (*capuche*) they received the popular name of Capuchins. In 1529 they had four houses and held their first general chapter, at which their special rules were drawn up. The eremitical idea was abandoned, but the life was to be one of extreme austerity, simplicity and poverty—in all things as near an approach to St Francis's idea as was practicable. Neither the monasteries nor the congregation should possess anything, nor were any devices to be resorted to for evading this law; no large provision against temporal wants should be made, and the supplies in the house should never exceed what was necessary for a few days. Everything was to be obtained by begging, and the friars were not allowed even to touch money. The communities were to be small, eight being fixed as the normal number and twelve as the limit. In furniture and clothing extreme simplicity was enjoined and the friars were to go bare-footed without even sandals. Besides the choral canonical office, a portion of which was recited at midnight, there were two hours of private prayer daily. The fasts and disciplines were rigorous and frequent. The great external work was preaching and spiritual ministrations among the poor. In theology the Capuchins abandoned the later Franciscan school of Scotus, and returned to the earlier school of Bonaventura (*q.v.*). The new congregation at the outset of its history underwent a series of severe blows. The two founders left it, Matteo di Bassi to return to the Observants, while his first companion, on being superseded in the office of vicar, became so insubordinate that he had to be expelled. The case of the third vicar, Bernardino Ochino (*q.v.*), who became a Calvinist, 1543, and married, was even more disastrous. This mishap brought the whole congregation under the suspicion of heretical tendencies and the pope resolved to suppress it; he was with difficulty induced to allow it to continue, but the Capuchins were forbidden to preach. In a couple of years the authorities were satisfied as to the soundness of the general body of Capuchin friars, and the permission to preach was restored. The congregation at once began to multiply with extraordinary rapidity, and by the end of the 16th century the Capuchins had spread all over the Catholic parts of Europe, so that in 1619 they were freed from their dependence on the Conventual Franciscans and became an independent order, with a general of their own. They are said to have had at that time 1500 houses divided into fifty provinces. They were one of the chief factors in the Catholic Counter-reformation, working assiduously among the poor, preaching, catechizing, confessing in all parts, and impressing the minds of the common people by the great poverty and austerity of their life. By these means they were also extraordinarily successful in making converts from Protestantism to Catholicism. Nor were the activities of the Capuchins confined to Europe. From an early date they undertook missions to the heathen in America, Asia and Africa, and at the middle of the 17th century a Capuchin missionary college was founded in Rome for the purpose of preparing their subjects for foreign missions. A large number of Capuchins have suffered martyrdom for the Gospel. This activity in Europe and elsewhere continued until the close of the 18th century, when the number of Capuchin friars was estimated at 31,000.

Like all other orders, the Capuchins suffered severely from the secularizations and revolutions of the end of the 18th century and the first half of the 19th; but they survived the strain, and during the latter part of the 19th century rapidly recovered ground. At the beginning of the present century there were fifty provinces with some 500 monasteries and 300 hospices or lesser houses; and the number of Capuchin friars, including lay-brothers, was reckoned at 9500. In England there are ten or twelve Capuchin monasteries, and in Ireland three. The Capuchins now possess the church of the Portiuncula at Assisi. The Capuchins still keep up their missionary work and have some 200 missionary stations in all parts of the world—notably India, Abyssinia and the Turkish empire. Though "the poorest of all orders," it has attracted into its ranks an extraordinary number of the highest nobility and even of royalty. The celebrated Father Mathew, the apostle of Temperance in Ireland, was a Capuchin friar. Like the Franciscans the Capuchins wear a brown habit.

The Capuchines are Capuchin nuns. They were founded in 1538 in Naples. They lived according to the rules and regulations of the Capuchin friars, and so austere was the life that they were called "Sisters of Suffering." The order spread to France and Spain, and a few convents still exist.

In order fully to grasp the meaning of the Capuchin reform, it is necessary to know the outlines of Franciscan history (see FRANCISCANS). There does not appear to be any modern general history of the Capuchin order as a whole, though there are histories of various provinces and of the foreign missions. The references to all this literature will be found in the article "Kapuzinerorden" in Wetzer und Welte, *Kirchenlexicon* (2nd ed.), which is the best general sketch on the subject. Shorter sketches, with the needful references, are given in Max Heimbucher, *Orden und Kongregationen* (1896), i. § 44, and in Herzog-Hauck, *Realencyklopädie* (3rd ed.), art. "Kapuziner." Helyot's *Hist. des ordres religieux* (1792), vii. c. 24 and c. 27, gives an account of the Capuchins up to the end of the 17th century. (E. C. B.)

CAPUS, ALFRED (1858–), French author, was born at Aix, in Provence, on the 25th of November 1858. In 1878 he published, in collaboration with L. Vonoven, a volume of short stories, and in the next year the two produced a one-act piece, *Le Mari malgré lui*, at the Théâtre Cluny. He had been educated as an engineer, but became a journalist, and joined the staff of the *Figaro* in 1894. His novels, *Qui perd gagne* (1890), *Faux Départ* (1891), *Années d'aventures* (1895), which belong to this period, describe the struggles of three young men at the beginning of their career. From the first of these he took his first comedy, *Brignol et sa fille* (Vaudeville, 23rd November 1894). Among his later plays are *Innocent* (1896), written with Alphonse Allais; *Petites folles* (1897); *Rosine* (1897); *Mariage bourgeois* (1898); *Les Maris de Léontine* (1900); *La Bourse ou la vie* (1900); *La Veine* (1901); *La Petite Fonctionnaire* (1901); *Les Deux Écoles* (1902); *La Châtelaine* (1902); *L'Adversaire* (1903), with Emmanuel Arène, which was produced in London by Mr George Alexander as *The Man of the Moment*, and *Notre Jeunesse* (1904), the first of his plays to be represented at the Théâtre Français; *Monsieur Piégois* (1905); and, in collaboration with Lucien Descaves, *L' Attentat* (1906).

See Édouard Quet, *Alfred Capus* (1904), with appreciations by various authors, in the series of *Célébrités d'aujourd'hui*.

CAPYBARA, or CARPINCHO (*Hydrochaerus capybara*), the largest living rodent mammal, characterized by its moderately long limbs, partially-webbed toes, of which there are four in front and three behind, hoof-like nails, sparse hair, short ears, cleft upper lip and the absence of a tail. The dentition is peculiar on account of the great size and complexity of the last upper molar, which is composed of about twelve plates, and exceeds in length the three teeth in front. The front surface of the incisors has a broad, shallow groove. Capybaras are aquatic rodents, frequenting the banks of lakes and rivers, and

being sometimes found where the water is brackish. They generally associate in herds, and spend most of the day in covert on the banks, feeding in the evening and morning. When disturbed they make for the water, in which they swim and dive with expertness, often remaining below the surface for several minutes. Their usual food consists of water-plants and bark, but in cultivated districts they do much harm to crops. Their cry is a low, abrupt grunt. From five to eight is the usual number in a litter, of which there appears to be only one in the year; and the young are carried on their parent's back when in the water. Extinct species of capybara occur in the tertiary deposits of Argentina, some of which were considerably larger than the living form. Capybaras belong to the family *Caviidae*, the leading characteristics of which are given in RODENTIA. When full-grown the entire length of the animal is about 4 ft., and the girth 3 ft. Their geographical range extends from Guiana to the river Plate. Capybaras can be easily tamed; numbers are killed on land by jaguars and in the water by caimans—the alligators of South America.

CAR (Late Lat. *carra*), a term originally applied to a small two-wheeled vehicle for transport (see CARRIAGE), but also to almost anything in the nature of a carriage, chariot, &c., and to the carrying-part of a balloon. With some specific qualification (tram-car, street-car, railway-car, sleeping-car, motor-car, &c.) it is combined to serve as a general word instead of carriage or vehicle. From Ireland comes the "jaunting-car," which is in general use, both in the towns, where it is the commonest public carriage for hire, and in the country districts, where it is employed to carry the mails and for the use of tourists. The gentry and more well-to-do farmers also use it as a private carriage in all parts of Ireland. The genuine Irish jaunting-car is a two-wheeled vehicle constructed to carry four persons besides the driver. In the centre, at right angles to the axle, is a "well" about 18 in. deep, used for carrying parcels or small luggage, and covered with a lid which is usually furnished with a cushion. The "well" provides a low back to each of the two seats, which are in the form of wings placed over each wheel, with foot boards hanging outside the wheel on hinges, so that when not in use they can be turned up over the seats, thus reducing the width of the car (sometimes very necessary in the narrow country roads) and protecting the seats from the weather. The passengers on each side sit with their backs to each other, with the "well" between them. The driver sits on a movable box-seat, or "dicky," a few inches high, placed across the head of the "well," with a footboard to which there is usually no splash-board attached. A more modern form of jaunting-car, known as a "long car," chiefly used for tourists, is a four-wheeled vehicle constructed on the same plan, which accommodates as many as eight or ten passengers on each side, and two in addition on a high box-seat beside the driver. In the city of Cork a carriage known as an "inside car" is in common use. It is a two-wheeled covered carriage in which the passengers sit face to face as in a wagonette. In remote country districts the poorer peasants still sometimes use a primitive form of vehicle, called a "low-backed car," a simple square shallow box or shelf of wood fastened to an axle without springs. The two wheels are solid wooden disks of the rudest construction, generally without the protection of metal tires, and so small in diameter that the body of the car is raised only a few inches from the ground.

CARABINIERS, originally mounted troops of the French army, armed with the carabine (carbine). In 1690 one company of carabiniers was maintained in each regiment of cavalry. Their duties were analogous to those of grenadiers in infantry regiments—scouting, detached work, and, in general, all duties requiring special activity and address. They fought mounted and dismounted alike, and even took part in siege warfare in the trenches. At the battle of Neerwinden in 1693 all the carabinier companies present were united in one body, and after the action Louis XIV. consolidated them into a permanent regiment with the name Royal Carabiniers. This was one of the old regiments which survived the French Revolution, at which time the title was changed to "horse grenadiers"; it is represented in the French army of to-day by the 11th Cuirassiers. The carabiniers (6th Dragoon Guards) of the British army date from 1685, and received the title from being armed with the carabine in 1692. Regimentally therefore they were one year senior to the French regiment of Royal Carabiniers, and as a matter of fact they took part as a regiment in the battle of Neerwinden. Up to 1745 their title was "The King's Carabiniers"; from 1745 to 1788 they were called the 3rd Irish Horse, and from 1788 they have borne their present title. In the German army, one carabinier regiment alone (2nd Saxon Reiter regiment) remains of the cavalry corps which formerly in various states bore the title. In Italy the gendarmerie are called *carabinieri*.

CARABOBO, the smallest of the thirteen states of Venezuela, bounded N. by the Caribbean Sea, E. by the state of Aragua, S. by Zamora and W. by Lara. Its area is 2985 sq. m., and its population, according to an official estimate of 1905, is 221,891. The greater part of its surface is mountainous with moderately elevated valleys of great fertility and productiveness, but south of the Cordillera there are extensive grassy plains conterminous with those of Guárico and Zamora, on which large herds of cattle are pastured. The principal products of the state are cattle, hides and cheese from the southern plains, coffee and cereals from the higher valleys, sugar and aguardiente from the lower valleys about Lake Valencia, and cacao, coco-nuts and coco-nut fibre from the coast. Various minerals are also found in its south-west districts, about Nirgua. The capital is Valencia, and its principal towns are Puerto Cabello, Montalbán (estimated pop. in 1904 7500), 30 m. W.S.W. of Valencia; Nirgua (pop. in 1891 8394), an important commercial and mining town 36½ m. S.W. of Valencia, 2500 ft. above sea level; and Ocumare (pop. in 1891 7493), near the coast 18½ m. E. of Puerto Cabello, celebrated for the fine quality of its cacao. Carabobo is best known for the battle fought on the 24th of June 1821 on a plain at the southern exit from the passes through the Cordillera in this state, between the revolutionists under Bolívar and the Spanish forces under La Torre. It was one of the four decisive battles of the war, though the forces engaged were only a part of the two armies and numbered 2400 revolutionists (composed of 1500 mounted *llaneros* known as the "Apure legion," and 900 British), and 3000 Spaniards. The day was won by the British, who drove the Spaniards from the field at the point of the bayonet, although at a terrible loss of life. The British legion was afterwards acclaimed by Bolívar as "Salvadores de mi Patria." The Spanish forces continued the war until near the end of 1823, but their operations were restricted to the districts on the coast.

CARACAL, the capital of the department of Romanatzi, Rumania; situated in the plains between the lower reaches of the Jiu and Olt rivers, and on the railway from Corabia, beside the Danube, to Hermannstadt in Transylvania. Pop. (1900) 12,055. Caracal has little trade, except in grain. Its chief buildings are the prefecture, school of arts and crafts and several churches. There are some ruins of a tower, built in A.D. 217 by the Roman emperor Caracalla, after whom the place is named. In 1596 Michael the Brave of Walachia defeated the Turks near Caracal.

CARACAL (*Lynx caracal*), sometimes called Persian lynx, an animal widely distributed throughout south-western Asia, and over a large portion of Africa. It is somewhat larger than a fox, of a uniform reddish brown colour above, and whitish beneath, with two white spots above each of the eyes, and a tuft of long black hair at the tip of the ears; to these it owes its name, which is derived from Turkish words signifying "black-ear." There is little information as to the habits of this animal in a wild state. Dr W. T. Blanford considers that it dwells among grass and bushes rather than in forests. Its prey is said to consist largely of gazelles, small deer, hares and peafowl and other birds. The caracal is easily tamed, and in some parts of India is trained to capture the smaller antelopes and deer and such birds as the crane and pelican. According to Blyth, it is a favourite amusement among the natives to let loose a couple of tame caracals

among a flock of pigeons feeding on the ground, when each will strike down a number of birds before the flock can escape. Frequent reference is made in Greek and Roman literature to the lynx, and from such descriptions as are given of it there is little doubt that the caracal, and not the European lynx, was referred to. In South Africa, where the caracal abounds, its hide is made by the Zulus into skin-cloaks, known as karosses. According to W. L. Sclater, these when used as blankets are said to be beneficial in cases of rheumatism; an ointment prepared from the fat of the animal being employed for the same purpose. The North African caracal has been separated as *Lynx*, or *Caracal, berberorum*, but it is best regarded as a local race.

CARACALLA (or CARACALLUS), **MARCUS AURELIUS ANTONINUS** (186–217), Roman emperor, eldest son of the emperor Septimius Severus, was born at Lugdunum (Lyons) on the 4th of April 186. His original name was Bassianus; his nickname Caracalla was derived from the long Gallic tunic which he wore and introduced into the army. He further received the imperial title of Marcus Aurelius Antoninus at the time when his father declared himself the adopted son of M. Aurelius. After the death of Severus (211) at Eboracum (York) in Britain, Caracalla and his brother Geta, who had accompanied their father, returned to Rome as colleagues in the supreme power. In order to secure the sole authority, Caracalla barbarously murdered his brother in his mother's arms, and at the same time put to death some 20,000 persons, who were suspected of favouring him, amongst them the jurist Papinianus. An important act of his reign (212) was the bestowal of the rights of Roman citizenship upon all free inhabitants of the empire, although the main object of Caracalla was doubtless to increase the amount of revenue derived from the tax on inheritances or legacies to which only Roman citizens were liable. His own extravagances and the demands of the soldiery were a perpetual drain upon his resources, to meet which he resorted to taxes and extortion of every description. He spent the remainder of his reign wandering from place to place, a mode of life to which he was said to have been driven by the pangs of remorse. Handing over the reins of government to his mother, he set out in 213 for Raetia, where he carried on war against the Alamanni; in 214 he attacked the Goths in Dacia, whence he proceeded by way of Thrace to Asia Minor, and in 215 crossed to Alexandria. Here he took vengeance for the bitter sarcasms of the inhabitants against himself and his mother by ordering a general massacre of the youths capable of bearing arms. In 216 he ravaged Mesopotamia because Artabanus, the Parthian king, refused to give him his daughter in marriage. He spent the winter at Edessa, and in 217, when he recommenced his campaign, he was murdered between Edessa and Carrhae on the 8th of April at the instigation of Opellius (Opilius) Macrinus, praefect of the praetorian guard, who succeeded him. Amongst the numerous buildings with which Caracalla adorned the city, the most famous are the *thermae*, and the triumphal arch of Septimius Severus in the forum.

AUTHORITIES.—Dio Cassius lxxvii., lxxviii.; Herodian iii. 10, iv. 14; lives of Caracalla, Severus and Geta, in *Scriptores Historiae Augustae*; Eutropius viii. 19-22; Aurelius Victor, *De Caesaribus*, 20-23; *Epit.* 20-23; Zosimus i. 9-10; H. Schiller, *Geschichte der römischen Kaiserzeit* (1883), 738 ff.; Pauly-Wissowa, *Realencyclopädie*, ii. 2434 ff. (von Rohden).

CARÁCAS, the principal city and the capital of the United States of Venezuela, situated at the western extremity of an elevated valley of the Venezuelan Coast Range known as the plain of Chacao, 6½ m. S.S.E. of La Guaira, its port on the Caribbean coast, in lat. 10° 30′ N., long. 67° 4′ W. The plain is about 11 m. long by 3 m. wide, and is separated from the coast by a part of the mountain chain which extends along almost the entire water front of the republic. It is covered with well-cultivated plantations. The Guaira river, a branch of the Tuy, traverses the plain from west to east, and flows past the city on the south. Among its many small tributaries are the Catuche, Caroata and Anauco, which flow down through the city from the north and give it a natural surface drainage. The city is built at the narrow end of the valley and at the foot of the Cerro de Avila, and stands from 2887 to 3442 ft. above sea level, the elevation of the Plaza de Bolívar, its topographical centre, being 3025 ft. Two miles north-east is the famous Silla de Carácas, whose twin summits, like a gigantic old-fashioned saddle (*silla*), rise to an elevation of 8622 ft.; and the Naigueté, still farther eastward, overlooks the valley from a height of 9186 ft. The climate of Carácas is often described as that of perpetual spring. It is subject, however, to extreme and rapid variations in temperature, to alternations of dry and humid winds (the latter, called *catias*, being irritating and oppressive), to chilling night mists brought up from the coast by the westerly winds, and to other influences productive of malaria, catarrh, fevers, bilious disorders and rheumatism. The maximum and minimum temperatures range from 84° to 48° F., the annual mean being about 66°, and the daily variation is often as much as 15°. The city is built with its streets running between the cardinal points of the compass and crossing each other at right angles. Two intersecting central streets also divide the city into four sections, in each of which the streets are methodically named and numbered, as North 3rd, 5th, 7th, &c., or West 2nd, 4th, 6th, &c., according to direction and location. This method of numeration dates from the time of Guzman Blanco, but the common people adhere to the names bestowed upon the city squares in earlier times. The streets are narrow, but are clean and well-paved, and are lighted by electricity and gas. There are several handsome squares and public gardens, adorned with statues, trees and shrubbery. The principal square is the Plaza de Bolívar, the conventional centre of the city, in which stands a bronze equestrian statue of Bolívar, and on which face the cathedral, archbishop's residence, Casa Amarilla, national library, general post office and other public offices. The Independencia Park, formerly called Calvario Park, which occupies a hill on the west side of the city, is the largest and most attractive of the public gardens. Among the public edifices are the capitol, which occupies a whole square, the university, of nearly equal size, the cathedral, pantheon, masonic temple (built by the state in the spendthrift days of Guzman Blanco), national library, opera-house, and a number of large churches. The city is generously provided with all the modern public services, including two street car lines, local and long distance telephone lines, electric power and light, and waterworks. The principal water supply is derived from the Macarao river, 15 m. distant. Railway connexion with the port of La Guaira was opened in 1883 by means of a line 23 m. long. Another line (the Gran Ferrocarril de Venezuela) passes through the mountains to Valencia, 111 m. distant, and two short lines run to neighbouring villages, one to Petare and Santa Lucia, and the other to El Valle. The archbishop of Venezuela resides in Carácas and has ecclesiastical jurisdiction over the dioceses of Ciudad Bolívar, Calabozo, Barquisimeto, Mérida and Maracaibo. There are no manufactures of note.

Carácas was founded in 1567 by Diego de Losada under the pious title of Santiago de León de Carácas, and has been successively capital of the province of Carácas, of the captaincy-general of Carácas and Venezuela, and of the republic of Venezuela. It is also one of the two chief cities, or capitals, of the Federal district. It was the birthplace of Simón Bolívar, and claims the distinction of being the first colony in South America to overthrow Spanish colonial authority. The city was almost totally destroyed by the great earthquake of 1812. In the war of independence it was repeatedly subjected to pillage and slaughter by both parties in the strife, and did not recover its losses for many years. In 1810 its population was estimated at 50,000; seventy-one years later the census of 1881 gave it only 55,638. In 1891 its urban population was computed to be 72,429, which in 1904 was estimated to have increased to about 90,000.

CARACCI, LODOVICO, AGOSTINO, and **ANNIBALE,** three celebrated Italian painters, were born at Bologna in 1555, 1557, and 1560 respectively. Lodovico, the eldest, son of a butcher, was uncle to the two younger, Agostino and Annibale, sons of a tailor, and had nearly finished his professional studies before the

others had begun their education. From being a reputed dunce, while studying under Tintoretto in Venice, he gradually rose, by an attentive observation of nature and a careful examination of the works of the great masters preserved at Bologna, Venice, Florence and Parma, to measure himself with the teachers of his day, and ultimately projected the opening of a rival school in his native place. Finding himself unable to accomplish his design without assistance, he sent for his two nephews, and induced them to abandon their handicrafts (Agostino being a goldsmith, and Annibale a tailor) for the profession of painting. Agostino he first placed under the care of Fontana, retaining Annibale in his own studio; but he afterwards sent both to Venice and Parma to copy the works of Titian, Tintoretto and Correggio, on which his own taste had been formed. On their return, the three relatives, assisted by an eminent anatomist, Anthony de la Tour, opened, in 1589, an academy of painting under the name of the Incamminati (or, as we might paraphrase it, the Right Road), provided with numerous casts, books and bassi-rilievi, which Lodovico had collected in his travels. From the affability and kindness of the Caracci, and their zeal for the scientific education of the students, their academy rose rapidly in popular estimation, and soon every other school of art in Bologna was deserted and closed. They continued together till, at the invitation of Cardinal Farnese, Annibale and Agostino went to Rome in 1600 to paint the gallery of the cardinal's palace. The superior praises awarded to Agostino inflamed the jealousy of Annibale, already kindled by the brilliant reception given by the pupils of the Incamminati to Agostino's still highly celebrated picture of the "Communion of St Jerome," and the latter was dismissed to Parma to paint the great saloon of the Casino. Here he died in 1602, when on the eve of finishing his renowned painting of "Celestial, Terrestrial and Venal Love." Annibale continued to work alone at the Farnese gallery till the designs were completed; but, disappointed at the miserable remuneration offered by the cardinal, he retired to Naples, where an unsuccessful contest for a great work in the church of the Jesuits threw him into a fever, of which he died in 1609. Lodovico always remained at his academy in Bologna (excepting for a short visit to his cousin at Rome), though invited to execute paintings in all parts of the country. He died in 1619, and was interred in the church of Santa Maria Maddalena. The works of Lodovico are numerous in the chapels of Bologna. The most famous are—The "Madonna standing on the moon, with St Francis and St Jerome beside her, attended by a retinue of angels"; "John the Baptist," "St Jerome," "St Benedict" and "St Cecilia"; and the "Limbo of the Fathers." He was by far the most amiable of the three painters, rising superior to all feelings of jealousy towards his rivals, and though he received large sums for his productions, yet, from his almost unparalleled liberality to the students of the academy, he died poor. With skill in painting Agostino combined the greatest proficiency in engraving (which he had studied under Cornelius de Cort) and high accomplishments as a scholar. He died not untroubled by remorse for the indecencies which, in accordance with the corruption of the time, he had introduced into some of his engravings. The works of Annibale are more diversified in style than those of the others, and comprise specimens of painting after the manner of Correggio, Titian, Paolo Veronese, Raphael and Michelangelo. The most distinguished are the "Dead Christ in the lap of the Madonna"; the "Infant and St John"; "St Catherine"; "St Roch distributing alms" (now in the Dresden gallery); and the "Saviour wailed over by the Maries," at present in possession of the earl of Carlisle. He frequently gave great importance to the landscape in his compositions. The reputation of Annibale is tarnished by his jealousy and vindictiveness towards his brother, and the licentiousness of his disposition, which contributed to bring him to a comparatively early grave.

The three Caracci were the founders of the so-called Eclectic school of painting,—the principle of which was to study in the works of the great masters the several excellences for which they had been respectively pre-eminent, and to combine these in the productions of the school itself; for instance, there was to be the design of Raphael, the power of Michelangelo, the colour of Titian, and so on.

See A. Venturi, *I Caracci e la loro scuola*, 1895. (W. M. R.)

CARACCIOLO, FRANCESCO, Prince (1732–1799), Neapolitan admiral and revolutionist, was born on the 18th of January 1732, of a noble Neapolitan family. He entered the navy and learned his seamanship under Rodney. He fought with distinction in the British service in the American War of Independence, against the Barbary pirates, and against the French at Toulon under Lord Hotham. The Bourbons placed the greatest confidence in his skill. When on the approach of the French to Naples King Ferdinand IV. and Queen Mary Caroline fled to Sicily on board Nelson's ship the "Vanguard" (December 1798), Caracciolo escorted them on the frigate "Sannita." He was the only prominent Neapolitan trusted by the king, but even the admiral's loyalty was shaken by Ferdinand's cowardly flight. On reaching Palermo Caracciolo asked permission to return to Naples to look after his own private affairs (January 1799). This was granted, but when he arrived at Naples he found all the aristocracy and educated middle classes infatuated with the French revolutionary ideas, and he himself was received with great enthusiasm. He seems at first to have intended to live a retired life; but, finding that he must either join the Republican party or escape to Procida, then in the hands of the English, in which case even his intimates would regard him as a traitor and his property would have been confiscated, he was induced to adhere to the new order of things and took command of the republic's naval forces. Once at sea, he fought actively against the British and Neapolitan squadrons and prevented the landing of some Royalist bands. A few days later all the French troops in Naples, except 500 men, were recalled to the north of Italy.

Caracciolo then attacked Admiral Thurn, who from the "Minerva" commanded the Royalist fleet, and did some damage to that vessel. But the British fleet on the one hand and Cardinal Fabrizio Ruffo's army on the other made resistance impossible. The Republicans and the 500 French had retired to the castles, and Caracciolo landed and tried to escape in disguise. But he was betrayed and arrested by a Royalist officer, who on the 29th of June brought him in chains on board Nelson's flagship the "Foudroyant." It is doubtful whether Caracciolo should have been included in the capitulation concluded with the Republicans in the castles, as that document promised life and liberty to those who surrendered before the blockade of the forts, whereas he was arrested afterwards, but as the whole capitulation was violated the point is immaterial. Moreover, the admiral's fate was decided even before his capture, because on the 27th of June the British minister, Sir W. Hamilton, had communicated to Nelson Queen Mary Caroline's wish that Caracciolo should be hanged. As soon as he was brought on board, Nelson ordered Thurn to summon a court martial composed of Caracciolo's former officers, Thurn himself being a personal enemy of the accused. The court was held on board the "Foudroyant," which was British territory—a most indefensible proceeding. Caracciolo was charged with high treason; he had asked to be judged by British officers, which was refused, nor was he allowed to summon witnesses in his defence. He was condemned to death by three votes to two, and as soon as the sentence was communicated to Nelson the latter ordered that he should be hanged at the yard-arm of the "Minerva" the next morning, and his body thrown into the sea at sundown. Even the customary twenty-four hours' respite for confession was denied him, and his request to be shot instead of hanged refused. The sentence was duly carried out on the 30th of June 1799.

Caracciolo was technically a traitor to the king whose uniform he had worn, but apart from the wave of revolutionary enthusiasm which had spread all over the educated classes of Italy, and the fact that treason to a government like that of the Neapolitan Bourbons could hardly be regarded as a crime, there was no necessity for Nelson to make himself the executor of the revenge of Ferdinand and Mary Caroline. His greatest offence, as Captain Mahan remarks (*Life of Nelson*, i. 440), was

committed against his own country by sacrificing his inalienable character as the representative of the king of Great Britain to his secondary and artificial character as delegate of the king of Naples. The only explanation of Nelson's conduct is to be found in his infatuation for Lady Hamilton, whose low ambition made her use her influence over him in the interest of Queen Mary Caroline's malignant spite.

AUTHORITIES.—Besides the general works on Nelson and Naples, such as P. Colletta's *Storia del Reame di Napoli* (Florence, 1848), there is a large amount of special literature on the subject. *Nelson and the Neapolitan Jacobins* (Navy Records Society, 1903) contains all the documents on the episode, including those incorrectly transcribed by A. Dumas in his *Borboni di Napoli* (Naples, 1862–1863), with an introduction defending Nelson by H. C. Gutteridge; the work contains a bibliography. The case against Nelson is set forth by Professor P. Villari in his article "Nelson, Caracciolo, e la Repubblica Napolitana" (*Nuova Antologia*, 16th February 1899); Captain A. T. Mahan has replied in "The Neapolitan Republic and Nelson's Accusers" (*English Historical Review*, July 1899), "Nelson at Naples" (*ibid.*, October 1900), and "Nelson at Naples" (*Athenaeum*, 8th July 1899); see also F. Lemmi, *Nelson e Caracciolo* (Florence, 1898); C. Giglioli, *Naples in 1799* (London, 1903); Freiherr von Helfert, *Fabrizio Ruffo* (Vienna, 1882); H. Hüffer, *Die neapolitanische Republik des Jahres 1799* (Leipzig, 1884). (L. V.*)

CARACOLE (a Fr. word, the origin of which is doubtful, meaning the wheeling about of a horse; in Spanish and Portuguese *caracol* means a snail with a spiral shell), a turn or wheeling in horsemanship to the left or right, or to both alternately, so that the movements of the horse describe a zig-zag course. The term has been used loosely and erroneously to describe any display of fancy riding. It is also used for a spiral staircase in a tower.

CARACTACUS, strictly CARATĀCUS, the Latin form of a Celtic name, which survives in Caradoc and other proper names. The most famous bearer of the name was the British chieftain who led the native resistance to the Roman invaders in A.D. 48–51, and was finally captured and sent to Rome (Tac. *Ann.* xii. 33, Dio. lx.). Two old camps on the Welsh border are now called Caer Caradoc, but the names seem to be the invention of antiquaries and not genuinely ancient memorials of the Celtic hero.

CARADOC SERIES, in geology, the name introduced by R. I. Murchison in 1839 for the sandstone series of Caer Caradoc in Shropshire, England. The limits of Murchison's Caradoc series have since been somewhat modified, and through the labours of C. Lapworth the several members of the series have been precisely defined by means of graptolitic zones. These zones are identical with those found in the rocks of the same age in North Wales, the Bala series (*q.v.*), and the terms Bala or Caradoc series are used indifferently by geologists when referring to the uppermost substage of the Ordovician System. The Ordovician rocks of the Caradoc district have been subdivided into the following beds, in descending order: the *Trinucleus* shales, Acton Scott beds, Longville flags, Chatwell and Soudley sandstones, Harnage shales and Hoar Edge grits and limestone. In the Corndon district in the same county the Caradoc series is represented by the Marrington group of ashes and shales and the Spy Wood group beneath them; these two groups of strata are sometimes spoken of as the Chirbury series. In the Breidden district are the barren Criggeon shales with ashes and flows of andesite.

In the Lake district the Coniston limestone series represents the Upper Caradocian, the lower portion being taken up by part of the great Borrowdale volcanic series of rocks. The Coniston limestone series contains the following subdivisions:—

Ashgill group (Ashgill shales and *Staurocephalus* limestone).
Kiesley limestone.
Sleddale group (Applethwaite beds = Upper Coniston limestone conglomerate; Yarlside rhyolite; stye end beds = Lower Coniston limestone.
Roman Fell group (Corona beds).

The Dufton shales and Drygill shales are equivalents of the Sleddale group.

Rocks of Caradoc age are well developed in southern Scotland; in the Girvan district they have been described as the Ardmillan series with the Drummock group and Barren Flagstone group in the upper portion, and the Whitehouse, Ardwell and Balclatchie groups in the lower part. Similarly, two divisions, known as the Upper and Lower Hartfell series, are recognized in the southern and central area, in Peeblesshire, Ayrshire and Dumfriesshire.

In Ireland the Caradoc or Bala series is represented by the limestones of Portraine near Dublin and of the Chair of Kildare; by the Ballymoney series of Wexford and Carnalea shales of Co. Down. In the Lough Mask district beds of this age are found, as in Wales, interstratified with volcanic lavas and tuffs. Other localities are known in counties Tyrone, Meath and Louth, also in Lambay Island.

See ORDOVICIAN SYSTEM; also C. Lapworth, *Ann. and Mag. Nat. Hist.*, 5th series, vol. vi., 1880; *Geol. Mag.*, 1889; C. Lapworth and W. W. Watts, *Proc. Geol. Assoc.*, xiii., 1894; J. E. Marr, *Geol. Mag.*, 1892; J. E. Marr and T. Roberts, *Q. J. G. S.*, 1885; B. N. Peach and J. Horne, "Silurian Rocks of Great Britain," vol. i., 1899 (*Mem. Geol. Survey*). (J. A. H.)

CARALES (Gr. Κάραλις, mod. *Cagliari*, *q.v.*), the most important ancient city of Sardinia, situated on the south coast of the island. Its foundation is generally attributed to the Carthaginians, and Punic tombs exist in considerable numbers near the present cemetery on the east and still more on the rocky plateau to the north-west of the town. It first appears in Roman history in the Second Punic War, and probably obtained full Roman civic rights from Julius Caesar. In imperial times it was the most important town in the island, mainly owing to its fine sheltered harbour, where a detachment of the *classis Misenas* was stationed. In the 4th and 5th centuries it was probably the seat of the *praeses Sardiniae*. It is mentioned as an important harbour in the Gothic and Gildonic wars. It was also the chief point of the road system of Sardinia. Roads ran hence to Olbia by the east coast, and through the centre of the island, to Othoca (Oristano) direct, and thence to Olbia (probably the most frequented route), through the mining district to Sulci and along the south and west coasts to Othoca. The hill occupied by the Pisan fortifications and the medieval town within them must have been the acropolis of the Carthaginian settlement; it is impossible to suppose that a citadel presenting such natural advantages was not occupied. The Romans, too, probably made use of it, though the lower quarters were mainly occupied in imperial times. A. Taramelli (*Notizie degli Scavi*, 1905, 41 seq.) rightly points out that the nucleus of the Roman *municipium* is probably represented by the present quarter of the Marina, in which the streets intersect at right angles and Roman remains are frequently found in the subsoil. An inscription found some way to the north towards the amphitheatre speaks of paving in the squares and streets, and of drains constructed under Domitian in A.D. 83 (F. Vivanet in *Notizie degli Scavi*, 1897, 279). The amphitheatre occupies a natural depression in the rock just below the acropolis, and open towards the sea with a fine view. Its axes are 95½ and 79 yds., and it is in the main cut in the rock, though some parts of it are built with concrete. Below it, to the south, are considerable remains of ancient reservoirs for rain-water, upon which the city entirely depended. This nucleus extended both to the east and to the west; in the former direction it ran some way inland, on the east of the castle hill. Here were the *ambulationes* or public promenades constructed by the pro-consul Q. Caecilius Metellus before A.D. 6 (*Corp. Inscrip. Lat.* x., Berlin, 1883, No. 7581). Here also, not far from the shore, the remains of Roman baths, with a fine coloured mosaic pavement, representing deities riding on marine monsters, were found in 1907. To the east was the necropolis of Bonaria, where both Punic and Roman tombs exist, and where, on the site of the present cemetery, Christian catacombs have been discovered (F. Vivanet in *Notizie degli Scavi*, 1892, 183 seq.; G. Pinza in *Nuovo Bullettino di Archeologia Cristiana*, 1901, 61 seq.). But the western quarter seems to have been far more important; it extended along the lagoon of S. Gilla (which lies to the north-west of the town, and which until the middle ages was an open bay) and on the lower slopes of the hill which rises above it. The chief discoveries which have been made are noted by Taramelli (*loc. cit.*) and include some important buildings, of which a large Roman house (or group of houses) is the only one now visible (G. Spano in *Notizie degli Scavi*, 1876, 148, 173; 1877, 285; 1880, 105, 405). Beyond this quarter begins an extensive Roman necropolis extending along the edge of the hill north-east of the high road leading to the north-west; the most

important tomb is the so-called Grotta delle Vipere, the rock-hewn tomb of Cassius Philippus and Atilia Pomptilla, the sides of which are covered with inscriptions (*Corpus Inscr. Lat.* x., Berlin, 1883, Nos. 7563-7578). Other tombs are also to be found on the high ground near the Punic tombs already mentioned. The latter are hewn perpendicularly in the rock, while the Roman tombs are chambers excavated horizontally. In the lagoon itself were found a large number of terra cottas, made of local clay, some being masks of both divinities and men (among them grotesques) others representing hands and feet, others various animals, and of *amphorae* of various sizes and other vases. Some of the *amphorae* contained animals' bones, possibly the remains of sacrifices. These objects are of the Punic period; they were all found in groups, and had apparently been arranged on a platform of piles in what was then a bay, in readiness for shipment (F. Vivanet in *Notizie degli Scavi*, 1893, 255). It is probable that the acropolis of Carales was occupied even in prehistoric times; but more abundant traces of prehistoric settlements (pottery and fragments of obsidian, also kitchen middens, containing bones of animals and shells of molluscs used for human food) have been found on the Capo S. Elia to the south-east of the modern town (see A. Taramelli in *Notizie degli Scavi*, 1904, 19 seq.). An inscription records the existence of a temple of Venus Erycina on this promontory in Roman times. The museum contains an interesting collection of objects from many of the sites mentioned, and also from other parts of the island; it is in fact the most important in Sardinia, and is especially strong in prehistoric bronzes (see SARDINIA).

For the Roman inscriptions see *C. I. L. cit.*, Nos. 7552-7807. (T.As.)

CARAN D'ACHE, the pseudonym (meaning "lead-pencil") of Emmanuel Poiré (1858–1909), French artist and illustrator, who was born and educated at Moscow, being the grandson of one of Napoleon's officers who had settled in Russia. He determined to be a military painter, and when he arrived in Paris from Russia he found an artistic adviser in Detaille. He served five years in the army, where the principal work allotted to him was the drawing of uniforms for the ministry of war. He embellished a short-lived journal, *La Vie militaire*, with a series of illustrations, among them being some good-tempered caricatures of the German army, which showed how accurately he was acquainted with military detail. His special gift lay in pictorial anecdote, the story being represented at its different stages with irresistible effect, in the artist's own mannered simplicity. Much of his work was contributed to *La Vie parisienne*, *Le Figaro illustré*, *La Caricature*, *Le Chat noir*, and he also issued various albums of sketches, the *Carnet de chèques*, illustrating the Panama scandals, *Album de croquis militaires et d'histoire sans légendes*, *Histoire de Marlborough*, &c., besides illustrating a good many books, notably the *Prince Kozakokoff* of Bemadaky. He died on the 26th of February 1909.

A collection of his work was exhibited at the Fine Art Society's rooms in London in 1898. The catalogue contained a prefatory note by M. H. Spielmann.

CARAPACE (a Fr. word, from the Span. *carapacho*, a shield or armour), the upper shell of a crustacean, tortoise or turtle. The covering of the armadillo is called a carapace, as is also the hard case in which certain of the Infusoria are enclosed.

CARAPEGUA, an interior town of Paraguay, 37 m. S.E. of Asunción on the old route between that city and the missions. Pop. (est.) 13,000 (probably the population of the large rural district about the town is included in this estimate). The town (founded in 1725) is situated in a fertile country producing cotton, tobacco, Indian corn, sugar-cane and mandioca. It has two schools, a church and modern public buildings.

CARAT (Arab. *Qīrāt*, weight of four grains; Gr. *κεράτιον*, little horn, the fruit of the carob or locust tree), a small weight (originally in the form of a seed) used for diamonds and precious stones, and a measure for determining the fineness of gold. The exact weight of the carat, in practice, now varies slightly in different places. In 1877 a syndicate of London, Paris and Amsterdam jewellers fixed the weight at 205 milligrammes (3·163 troy grains). The South African carat, according to Gardner Williams (general manager of the De Beers mines), is equal to 3·174 grains (*The Diamond Mines of South Africa*, 1902). The fineness of gold is measured by a ratio with 24 carats as a standard; thus 2 parts of alloy make it 22-carat gold, and so on.

CARAUSIUS, MARCUS AURELIUS, tyrant or usurper in Britain, A.D. 286–293, was a Menapian from Belgic Gaul, a man of humble origin, who in his early days had been a pilot. Having entered the Roman army, he rapidly obtained promotion, and was stationed by the emperor Maximian at Gessoriacum (Bononia, *Boulogne*) to protect the coasts and channel from Frankish and Saxon pirates. He at first acted energetically, but was subsequently accused of having entered into partnership with the barbarians and was sentenced to death by the emperor. Carausius thereupon crossed over to Britain and proclaimed himself an independent ruler. The legions at once joined him; numbers of Franks enlisted in his service; an increased and well-equipped fleet secured him the command of the neighbouring seas. In 289 Maximian attempted to recover the island, but his fleet was damaged by a storm and he was defeated. Maximian and Diocletian were compelled to acknowledge the rule of Carausius in Britain; numerous coins are extant with the heads of Carausius, Diocletian and Maximian, bearing the legend "Carausius et fratres sui." In 292 Constantius Chlorus besieged and captured Gessoriacum (hitherto in possession of Carausius), together with part of his fleet and naval stores. Constantius then made extensive preparations to ensure the reconquest of Britain, but before they were completed Carausius was murdered by Allectus, his praefect of the guards (Aurelius Victor, *Caesares*, 39; Eutropius ix. 21, 22; Eumenius, *Panegyrici* ii. 12, v. 12). A Roman mile-stone found near Carlisle (1895) bears the inscription IMP. C[aes] M. AUR[elius] MAUS. The meaning of MAUS is doubtful, but it may be an anticipation of ARAUS (see F. J. Haverfield in *Cumberland and Westmorland Antiquarian Soc. Transactions*, 1895, p. 437).

A copper coin found at Richborough, inscribed *Domino Carausio Ces.*, must be ascribed to a Carausius of later date, since the type of the reverse is not found until the middle of the 4th century at the earliest. Nothing is known of this Carausius (A. J. Evans in *Numismatic Chronicle*, 1887, "On a coin of a second Carausius Caesar in Britain in the Fifth Century").

See J. Watts de Peyster, *The History of Carausius, the Dutch Augustus* (1858); P. H. Webb, *The Reign and Coinage of Carausius* (1908).

CARAVACA, a town of south-eastern Spain, in the province of Murcia; near the left bank of the river Caravaca, a tributary of the Segura. Pop. (1900) 15,846. Caravaca is dominated by the medieval castle of Santa Cruz, and contains several convents and a fine parish church, with a miraculous cross celebrated for its healing power, in honour of which a yearly festival is held on the 3rd of May. The hills which extend to the north are rich in marble and iron. Despite the lack of railway communication, the town is a considerable industrial centre, with large iron-works, tanneries and manufactories of paper, chocolate and oil.

CARAVAGGIO, MICHELANGELO AMERIGHI (or MERIGI) **DA** (1569–1609), Italian painter, was born in the village of Caravaggio, in Lombardy, from which he received his name. He was originally a mason's labourer, but his powerful genius directed him to painting, at which he worked with immitigable energy and amazing force. He despised every sort of idealism whether noble or emasculate, became the head of the Naturalisti (unmodified imitators of ordinary nature) in painting, and adopted a style of potent contrasts of light and shadow, laid on with a sort of fury, indicative of that fierce temper which led the artist to commit a homicide in a gambling quarrel at Rome. To avoid the consequences of his crime he fled to Naples and to Malta, where he was imprisoned for another attempt to avenge a quarrel. Escaping to Sicily, he was attacked by a party sent in pursuit of him, and severely wounded. Being pardoned, he set out for Rome; but having been arrested by mistake before his arrival, and afterwards released, and left to shift for himself in excessive heat, and still suffering from wounds and hardships,

he died of fever on the beach at Pontercole in 1609. His best pictures are the "Entombment of Christ," now in the Vatican; "St Sebastian," in the Roman Capitol; a magnificent whole-length portrait of a grand-master of the Knights of Malta, Alof de Vignacourt, and his page, in the Louvre; and the Borghese "Supper at Emmaus."

CARAVAGGIO, POLIDORO CALDARA DA (1495 or 1492–1543), a celebrated painter of frieze and other decorations in the Vatican. His merits were such that, while a mere mortar-carrier to the artists engaged in that work, he attracted the admiration of Raphael, then employed on his great pictures in the Loggie of the palace. Polidoro's works, as well as those of his master, Maturino of Florence, have mostly perished, but are well known by the fine etchings of P. S. Bartoli, C. Alberti, &c. On the sack of Rome by the army of the Constable de Bourbon in 1527, Polidoro fled to Naples. Thence he went to Messina, where he was much employed, and gained a considerable fortune, with which he was about to return to the mainland of Italy when he was robbed and murdered by an assistant, Tonno Calabrese, in 1543. Two of his principal paintings are a Crucifixion, painted in Messina, and "Christ bearing the Cross" in the Naples gallery.

CARAVAN (more correctly *Karwan*), a Persian word, adopted into the later Arabic vocabulary, and denoting, throughout Asiatic Turkey and Persia,[1] a body of traders travelling together for greater security against robbers (and in particular against Bedouins, Kurds, Tatars and the like, whose grazing-grounds the proposed route may traverse) and for mutual assistance in the matter of provisions, water and so forth. These precautions are due to the absence of settled government, inns and roads. These conditions having existed from time immemorial in the major part of western Asia, and still existing, caravans always have been the principal means for the transfer of merchandise. In these companies camels are generally employed for the transport of heavy goods, especially where the track, like that between Damascus and Bagdad, for example, lies across level, sandy and arid districts. The camels are harnessed in strings of fifty or more at a time, a hair-rope connecting the rear of one beast with the head of another; the leader is gaily decorated with parti-coloured trappings, tassels and bells; an unladen ass precedes the file, for luck, say some, for guidance, say others. Where the route is rocky and steep, as that between Damascus and Aleppo, mules, or even asses, are used for burdens. The wealthier members ride, where possible, on horseback. Every man carries arms; but these are in truth more for show than for use, and are commonly flung away in the presence of any serious robber attack. Should greater peril than ordinary be anticipated, the protection of a company of soldiers is habitually pre-engaged,—an expensive, and ordinarily a useless adjunct. A leader or director, called *Karawan-Bashi* (headman), or, out of compliment, *Karawan-Seraskier* (general), but most often simply designated *Raïs* (chief), is before starting appointed by common consent. His duties are those of general manager, spokesman, arbitrator and so forth; his remuneration is indefinite. But in the matter of sales or purchases, either on the way or at the destination, each member of the caravan acts for himself.

The number of camels or mules in a single caravan varies from forty or so up to six hundred and more; sometimes, as on the reopening of a long-closed route, it reaches a thousand. The ordinary caravan seasons are the months of spring, early summer and later autumn. Friday, in accordance with a recommendation made in the Koran itself, is the favourite day for setting out, the most auspicious hour being that immediately following noonday prayer. The first day's march never does more than just clear the starting-point. Subsequently each day's route is divided into two stages,—from 3 or 4 A.M. to about 10 in the forenoon, and from between 2 and 3 P.M. till 6 or even 8 in the evening. Thus the time passed daily on the road averages from ten to twelve hours, and, as the ordinary pace of a laden camel does not exceed 2 m. an hour, that of a mule being $2\frac{3}{4}$, a distance varying from 23 to 28 m. is gone over every marching day. But prolonged halts of two, three, four and even more days often occur. The hours of halt, start and movement, the precise lines of route, and the selection or avoidance of particular localities are determined by common consent. But if, as sometimes happens, the services of a professional guide, or those of a military officer have been engaged, his decisions are final. While the caravan is on its way, the five stated daily prayers are, within certain limits, anticipated, deferred or curtailed, so as the better to coincide with the regular and necessary halts,—a practice authorized by orthodox Mahommedan custom and tradition.

Two caravans are mentioned in Genesis xxxvii.; the route on which they were passing seems to have coincided with that nowadays travelled by Syrian caravans on their way to Egypt. Other allusions to caravans may be found in Job, in Isaiah and in the Psalms. Eastern literature is full of such references.

The yearly pilgrim-bands, bound from various quarters of the Mahommedan world to their common destination, Mecca, are sometimes, but inaccurately, styled by European writers caravans; their proper designation is *Hajj*, a collective word for pilgrimages and pilgrims. The two principal pilgrim-caravans start yearly, the one from Damascus, or, to speak more exactly, from Mozarib, a village station three days' journey to the south of the Syrian capital, the other from Cairo in Egypt.[2] This latter was formerly joined on its route, near Akaba of the Red Sea, by the North African Hajj, which, however, now goes from Egypt by sea from Suez; the former gathers up bands from Anatolia, Kurdistan, Mesopotamia and Syria. Besides these a third, but smaller Hajj of Persians, chiefly sets out from Suk-esh-Sheiukh, in the neighbourhood of Meshed Ali, on the lower Euphrates; a fourth of negroes, Nubians, etc., unites at Yambu on the Hejaz coast, whither they have crossed from Kosseir in Upper Egypt; a fifth of Indians and Malays, centres at Jidda; a sixth and seventh, of southern or eastern Arabs arrive, the former from Yemen, the latter from Nejd.

The Syrian Hajj is headed by the pasha of Damascus, either in person or by a vicarious official of high rank, and is further accompanied by the *Sorrah Amir* or "Guardian of the Purse," a Turkish officer from Constantinople. The Egyptian company is commanded by an amir or ruler, appointed by the Cairene government, and is accompanied by the famous "Maḥmal," or sacred pavilion. The other bands above mentioned have each their own amir, besides their *mekowwams* or agents, whose business it is to see after provisions, water and the like, and are not seldom encumbered with a numerous retinue of servants and other attendants. Lastly, a considerable force of soldiery accompanies both the Syrian and the Egyptian Hajj.

No guides properly so-called attend these pilgrim-caravans, the routes followed being invariably the same, and well known. But Bedouin bands generally offer themselves by way of escort, and not seldom designedly lead their clients into the dangers from which they bargain to keep them safe. This they are the readier to do because, in addition to the personal luxuries with which many of the pilgrims provide themselves for the journey, a large amount of wealth, both in merchandise and coins, is habitually to be found among the travellers, who, in accordance with Mahommedan tradition, consider it not merely lawful but praiseworthy to unite mercantile speculation with religious duty. Nor has any one, the pasha himself or the amir and the military, when present, excepted, any acknowledged authority or general control in the pilgrim-caravans; nor is there any orderly subdivision of management or service. The pilgrims do, indeed, often coalesce in companies among themselves for mutual help, but necessity, circumstance or caprice governs all details, and thus it happens that numbers, sometimes as many as a third of the entire Hajj, yearly perish by their own negligence or by misfortune,—dying, some of thirst, others of fatigue and sickness, others at the hand of robbers on the way. In fact the principal

[1] In Arabia proper it is rarely employed in speech and never in writing, strictly Arabic words such as *Rikb* ("assembled riders") or *Qāfila* ("wayfaring band") being in ordinary use.

[2] The Syrian and Egyptian hajj have been able, since 1908, to travel by the railway from Damascus to the Hejaz.

routes are in many places lined for miles together with the bones of camels and men.

The numbers which compose these pilgrim caravans are much exaggerated by popular rumour; yet it is certain that the Syrian and Egyptian sometimes amount to 5000 each, with 25,000 or 30,000 camels in train. Large supplies of food and water have to be carried, the more so at times that the pilgrim season, following as it does the Mahommedan calendar, which is lunar, falls for years together in the very hottest season. Hence, too, the journey is usually accomplished by night marches, the hours being from 3 to 4 P.M. to 6 or 7 A.M. of the following day. Torches are lighted on the road, the pace is slower than that of an ordinary caravan, and does not exceed 2 m. an hour.

See MECCA and MAHOMMEDAN RELIGION.

CARAVANSERAI, a public building, for the shelter of a caravan (*q.v.*) and of wayfarers generally in Asiatic Turkey. It is commonly constructed in the neighbourhood, but not within the walls, of a town or village. It is quadrangular in form, with a dead wall outside; this wall has small windows high up, but in the lower parts merely a few narrow air-holes. Inside a cloister-like arcade, surrounded by cellular store-rooms, forms the ground floor, and a somewhat lighter arcade, giving access to little dwelling-rooms, runs round it above. Broad open flights of stone steps connect the storeys. The central court is open to the sky, and generally has in its centre a well with a fountain-basin beside it. A spacious gateway, high and wide enough to admit the passage of a loaded camel, forms the sole entrance, which is furnished with heavy doors, and is further guarded within by massive iron chains, drawn across at night. The entry is paved with flagstones, and there are stone seats on each side. The court itself is generally paved, and large enough to admit of three or four hundred crouching camels or tethered mules; the bales of merchandise are piled away under the lower arcade, or stored up in the cellars behind it. The upstairs apartments are for human lodging; cooking is usually carried on in one or more corners of the quadrangle below. Should the caravanserai be a small one, the merchants and their goods alone find place within, the beasts of burden being left outside. A porter, appointed by the municipal authority of the place, is always present, lodged just within the gate, and sometimes one or more assistants. These form a guard of the building and of the goods and persons in it, and have the right to maintain order and, within certain limits, decorum; but they have no further control over the temporary occupants of the place, which is always kept open for all arrivals from prayer-time at early dawn till late in the evening. A small gratuity is expected by the porter, but he has no legal claim for payment, his maintenance being provided for out of the funds of the institution. Neither food nor provender is supplied.

Many caravanserais in Syria, Mesopotamia and Anatolia have considerable architectural merit; their style of construction is in general that known as Saracenic; their massive walls are of hewn stone; their proportions apt and grand. The portals especially are often decorated with intricate carving; so also is the prayer-niche within. These buildings, with their belongings, are works of charity, and are supported, repaired and so forth out of funds derived from pious legacies, most often of land or rentals. Sometimes a municipality takes on itself to construct and maintain a caravanserai; but in any case the institution is tax-free, and its revenues are inalienable. When, as sometimes happens, those revenues have been dissipated by peculation, neglect or change of times, the caravanserai passes through downward stages of dilapidation to total ruin (of which only too many examples may be seen) unless some new charity intervene to repair and renew it.

Khans, i.e. places analogous to inns and hotels, where not lodging only, but often food and other necessaries or comforts may be had for payment, are sometimes by inaccurate writers confounded with caravanserais. They are generally to be found within the town or village precincts, and are of much smaller dimensions than caravanserais. The khan of Asad Pasha at Damascus is a model of constructive skill and architectural beauty.

CARAVEL, or CARVEL (from the Gr. *κάραβος*, a light ship, through the Ital. *carabella* and the Span. *carabas*), a name applied at different times and in different countries to ships of very varying appearance and build, as in Turkey to a ship of war, and in France to a small boat used in the herring fishery. In the 15th and 16th centuries, caravels were much used by the Portuguese and Spanish for long voyages. They were roundish ships, with a double tower at the stern, and a single one in the bows, and were galley rigged. Two out of the three vessels in which Columbus sailed on his voyage of discovery to America were "caravels." Carvel, the older English form, is now used only in the term "carvel-built," for a boat in which the planking is flush with the edges laid side to side, in distinction from "clinker-built," where the edges overlap.

CARAVELLAS, a small seaport of southern Bahia, Brazil, on the Caravellas river a few miles above its mouth, which is dangerously obstructed by sandbars. Pop. (1890) of the municipality 5482, about one-half of whom lived in the town. Caravellas was once the centre of a flourishing whale fishery, but has since fallen into decay. It is the port of the Bahia & Minas railway, whose traffic is comparatively unimportant.

CARAWAY, the fruit, or so-called seed, of *Carum Carui*, an umbelliferous plant growing throughout the northern and central parts of Europe and Asia, and naturalized in waste places in England. The plant has finely-cut leaves and compound umbels of small white flowers. The fruits are laterally compressed and ovate, the mericarps (the two portions into which the ripe fruit splits) being subcylindrical, slightly arched, and marked with five distinct pale ridges. Caraways evolve a pleasant aromatic odour when bruised, and they have an agreeable spicy taste. They yield from 3 to 6 % of a volatile oil, the chief constituent of which is cymene aldehyde. Cymene itself is present, having the formula $CH_3C_6H_4CH(CH_3)_2$; also carvone $C_{10}H_{14}O$, and limonene, a terpene. The dose of the oil is ½-3 minims. The plant is cultivated in north and central Europe, and Morocco, as well as in the south of England, the produce of more northerly latitudes being richer in essential oil than that grown in southern regions. The essential oil is largely obtained by distillation for use in medicine as an aromatic stimulant and carminative, and as a flavouring material in cookery and in liqueurs for drinking. Caraways are, however, more extensively consumed entire in certain kinds of cheese, cakes and bread, and they form the basis of a popular article of confectionery known as caraway comfits.

CARBALLO, a town of north-western Spain, in the province of Corunna; on the right bank of the river Allones, 20 m. S.W. of the city of Corunna. Pop. (1900) 13,032. Carballo is the central market of a thriving agricultural district. At San Juan de Carballo, on the opposite bank of the Allones, there are hot sulphurous springs.

CARBAZOL, $C_{12}H_9N$, a chemical constituent of coal-tar and crude anthracene. From the latter it may be obtained by fusion with caustic potash when it is converted into carbazol-potassium, which can be easily separated by distilling off the anthracene. It may be prepared synthetically by passing the vapours of diphenylamine or aniline through a red-hot tube; by heating diorthodiaminodiphenyl with 25 % sulphuric acid to 200° C. for 15 hours; by heating orthoaminodiphenyl with lime; or by heating thiodiphenylamine with copper powder. It is also obtained as a decomposition product of brucine or strychnine, when these alkaloids are distilled with zinc dust. It is easily soluble in the common organic solvents, and crystallizes in plates or tables melting at 238° C. It is a very stable compound, possessing feebly basic properties and characterized by its ready sublimation. It distils unchanged, even when the operation is carried out in the presence of zinc dust. On being heated with caustic potash in a current of carbonic acid, it gives carbazol carbonic acid $C_{12}H_8N{\cdot}COOH$; melted with oxalic acid it gives carbazol blue. It dissolves in concentrated sulphuric acid to a clear yellow solution. The potassium salt reacts with the alkyl iodides to give N-substituted alkyl derivatives. It gives the pine-shaving reaction, in this respect resembling pyrrol (*q.v.*).

CARBIDE, in chemistry, a compound of carbon with another element. The introduction of the electric furnace into practical chemistry was followed by the preparation of many metallic carbides previously unknown, some of which, especially calcium carbide, are now of great commercial importance. Carbides of the following general formulae have been obtained by H. Moissan (M denotes an atom of metal and C of carbon):—

M_3C = manganese, iron; M_2C = molybdenum; M_3C_2 = chromium; MC = zirconium; M_4C_3 = beryllium, aluminium; M_2C_3 = uranium; MC_2 = barium, calcium, strontium, lithium, thorium, &c.; MC_4 = chromium.

The principal methods for the preparation of carbides may be classified as follows:—(1) direct union at a high temperature, *e.g.* lithium, iron, chromium, tungsten, &c.; (2) by the reduction of oxides with carbon at high temperatures, *e.g.* calcium, barium, strontium, manganese, chromium, &c.; (3) by the reduction of carbonates with magnesium in the presence of carbon, *e.g.* calcium, lithium; (4) by the action of metals on acetylene or metallic derivatives of acetylene, *e.g.*, sodium, potassium. The metallic carbides are crystalline solids, the greater number being decomposed by water into a metallic hydrate and a hydrocarbon; sometimes hydrogen is also evolved. Calcium carbide owes its industrial importance to its decomposition into acetylene; lithium carbide behaves similarly. Methane is yielded by aluminium and beryllium carbides, and, mixed with hydrogen, by manganese carbide. The important carbides are mentioned in the separate articles on the various metals. The commercial aspect of calcium carbide is treated in the article ACETYLENE.

CARBINE (Fr. *carabine*, Ger. *Karabiner*), a word which came into use towards the end of the 16th century to denote a form of small fire-arm, shorter than the musket and chiefly used by mounted men. It has retained this significance, through all subsequent modifications of small-arm design, to the present day, and is now as a rule a shortened and otherwise slightly modified form of the ordinary rifle (*q.v.*).

CARBO, the name of a Roman plebeian family of the gens Papiria. The following are the most important members in Roman history:—

1. GAIUS PAPIRIUS CARBO, statesman and orator. He was associated with C. Gracchus in carrying out the provisions of the agrarian law of Tiberius Gracchus (see GRACCHUS). When tribune of the people (131 B.C.) he carried a law extending voting by ballot to the enactment and repeal of laws; another proposal, that the tribunes should be allowed to become candidates for the same office in the year immediately following, was defeated by the younger Scipio Africanus. Carbo was suspected of having been concerned in the sudden death of Scipio (129), if not his actual murderer. He subsequently went over to the optimates, and (when consul in 120) successfully defended Lucius Opimius, the murderer of Gaius Gracchus, when he was impeached for the murder of citizens without a trial, and even went so far as to say that Gracchus had been justly slain. But the optimates did not trust Carbo. He was impeached by Licinius Crassus on a similar charge, and, feeling that he had nothing to hope for from the optimates and that his condemnation was certain, he committed suicide.

See Livy, *Epit.* 59; Appian, *Bell. Civ.* i. 18; Vell. Pat. ii. 4; Val. Max. iii. 7. 6; A. H. J. Greenidge, *History of Rome* (1904).

2. His son, GAIUS PAPIRIUS CARBO, surnamed Arvina, was a staunch supporter of the aristocracy, and was put to death by the Marian party in 82. He is known chiefly for the law (Plautia Papiria) carried by him and M. Plautius Silvanus when tribunes of the people in 90 (or 89), whereby the Roman franchise was offered to every Italian ally domiciled in Italy at the time when the law was enacted, provided he made application personally within sixty days to the praetor at Rome (see ROME: *History*, II. "The Republic," Period C.). The object of the law was to conciliate the states at war with Rome and to secure the loyalty of the federate states. Like his father, Carbo was an orator of distinction.

See Cicero, *Pro Archia*, 4; Vell. Pat. ii. 26; Appian, *Bell. Civ.* i. 88.

3. GNAEUS PAPIRIUS CARBO (*c.* 130–82 B.C.), nephew of (1). He was a strong supporter of the Marian party, and took part in the blockade of Rome (87). In 85 he was chosen by Cinna as his colleague in the consulship, and extensive preparations were made for carrying on war in Greece against Sulla, who had announced his intention of returning to Italy. Cinna and Carbo declared themselves consuls for the following year, and large bodies of troops were transported across the Adriatic; but when Cinna was murdered by his own soldiers, who refused to engage in civil war, Carbo was obliged to bring them back. In 82 Carbo, then consul for the third time with the younger Marius, fought an indecisive engagement with Sulla near Clusium, but was defeated with great loss in an attack on the camp of Sulla's general, Q. Caecilius Metellus Pius [see under METELLUS (6)] near Faventia. Although he still had a large army and the Samnites remained faithful to him, Carbo was so disheartened by his failure to relieve Praeneste, where the younger Marius had taken refuge, that he decided to leave Italy. He first fled to Africa, thence to the island of Cossyra (Pentellaria), where he was arrested, taken in chains before Pompey at Lilybaeum and put to death.

See Appian, *Bell. Civ.* i. 67-98; Livy, *Epit.* 79, 84, 88, 89; Plutarch, *Pompey*, 5, 6, 10, and *Sulla*, 28; Cicero, *ad Fam.* ix. 21; Eutropius, v. 8, 9; Orosius, v. 20; Valerius Maximus, v. 3. 5, ix. 13. 2; art. SULLA, L. CORNELIUS.

CARBOHYDRATE, in chemistry, the generic name for compounds empirically represented by the formula $C_x(H_2O)_y$. They are essentially vegetable products, and include the sugars, starches, gums and celluloses (*q.v.*).

CARBOLIC ACID or PHENOL (hydroxy-benzene), C_6H_5OH, an acid found in the urine of the herbivorae, and in small quantity in *castoreum* (F. Wöhler, *Ann.*, 1848, 67, p. 360). Its principal commercial source is the fraction of coal-tar which distils between 150 and 200° C., in which it was discovered in 1834 by F. Runge. In order to obtain the phenol from this distillate, it is treated with caustic soda, which dissolves the phenol and its homologues together with a certain quantity of naphthalene and other hydrocarbons. The solution is diluted with water, and the hydrocarbons are thereby precipitated and separated. The solution is then acidified, and the phenols are liberated and form an oily layer on the surface of the acid. This layer is separated, and the phenol recovered by a process of fractional distillation. It may be synthetically prepared by fusing potassium benzene sulphonate with caustic alkalis (A. Kekulé, A. Wurtz); by the action of nitrous acid on aniline; by passing oxygen into boiling benzene containing aluminium chloride (C. Friedel and J. M. Crafts, *Ann. Chim. Phys.*, 1888 (6) 14, p. 435); by heating phenol carboxylic acids with baryta; and, in small quantities by the oxidation of benzene with hydrogen peroxide or nascent ozone (A. R. Leeds, *Ber.*, 1881, 14, p. 976).

It crystallizes in rhombic needles, which melt at 42·5-43° C., and boil at 182-183° C.; its specific gravity is 1·0906 (0° C.). It has a characteristic smell, and a biting taste; it is poisonous, and acts as a powerful antiseptic. It dissolves in water, 15 parts of water dissolving about one part of phenol at 16-17° C., but it is miscible in all proportions at about 70° C.; it is volatile in steam, and is readily soluble in alcohol, ether, benzene, carbon bisulphide, chloroform and glacial acetic acid. It is also readily soluble in solutions of the caustic alkalis, slightly soluble in aqueous ammonia solution, and almost insoluble in sodium carbonate solution. When exposed in the moist condition to the air it gradually acquires a red colour. With ferric chloride it gives a violet coloration, and with bromine water a white precipitate of tribromphenol.

When phenol is passed through a red-hot tube a complex decomposition takes place, resulting in the formation of benzene, toluene, naphthalene, &c. (J. G. Kramers, *Ann.*, 1877, 189, p. 129). Chromium oxychloride reacts violently on phenol, producing hydroquinone ether, $O(C_6H_4OH)_2$; chromic acid gives phenoquinone, and potassium permanganate gives paradiphenol, oxalic acid, and some salicylic acid (R. Henriques, *Ber.*, 1888, 21, p. 1620). In alkaline solution, potassium permanganate oxidizes it to inactive tartaric acid and carbon dioxide (O. Doebner, *Ber.*, 1891, 24, p. 1755). When distilled over lead oxide, it forms diphenylene oxide, $(C_6H_4)_2O$; and

when heated with oxalic acid and concentrated sulphuric acid, it forms aurin, $C_{19}H_{14}O_3$. It condenses with aceto-acetic ester, in the presence of sulphuric acid, to β-methyl coumarin (H. v. Pechmann and J. B. Cohen, *Ber.*, 1884, 17, p. 2188).

The hydrogen of the hydroxyl group in phenol can be replaced by metals, by alkyl groups and by acid radicals. The metallic derivatives (phenolates, phenates or carbolates) of the alkali metals are obtained by dissolving phenol in a solution of a caustic alkali, in the absence of air. Potassium phenolate, C_6H_5OK, crystallizes in fine needles, is very hygroscopic and oxidizes rapidly on exposure. Other phenolates may be obtained from potassium phenolate by precipitation. The alkyl derivatives may be obtained by heating phenol with one molecular proportion of a caustic alkali and of an alkyl iodide. They are compounds which greatly resemble the mixed ethers of the aliphatic series. They are not decomposed by boiling alkalis, but on heating with hydriodic acid they split into their components. *Anisol*, phenyl methyl ether, $C_6H_5{\cdot}O{\cdot}CH_3$, is prepared either by the above method or by the action of diazomethane on phenol, $C_6H_5OH+CH_3N_2=N_2+C_6H_5{\cdot}O{\cdot}CH_3$ (H. v. Pechmann, *Ber.*, 1895, 28, p. 857); by distilling anisic acid (para-methoxy benzoic acid) with baryta or by boiling phenyl diazonium chloride with methyl alcohol. It is a colourless pleasant-smelling liquid which boils at 154·3° C. *Phenetol*, phenyl ethyl ether, $C_6H_5{\cdot}O{\cdot}C_2H_5$, a liquid boiling at 172° C., may be obtained by similar methods. A. Hantzsch (*Ber.*, 1901, 34, p. 3337) has shown that in the action of alcohols on diazonium salts an increase in the molecular weight of the alcohol and an accumulation of negative groups in the aromatic nucleus lead to a diminution in the yield of the ether produced and to the production of a secondary reaction, resulting in the formation of a certain amount of an aromatic hydrocarbon.

The acid esters of phenol are best obtained by the action of acid chlorides or anhydrides on phenol or its sodium or potassium salt, or by digesting phenol with an acid in the presence of phosphorus oxychloride (F. Rasinski, *Jour. f. prak. Chem.*, 1882 [2], 26, p. 62). Phenyl acetate, $C_6H_5{\cdot}O{\cdot}COCH_3$, a colourless liquid of boiling point 193° C., may be prepared by heating phenol with acetamide. When heated with aniline it yields phenol and acetanilide. Phenyl benzoate, $C_6H_5{\cdot}O{\cdot}COC_6H_5$, prepared from phenol and benzoyl chloride, crystallizes in monoclinic prisms, which melt at 68-69° C. and boil at 314° C.

Phenol is characterized by the readiness with which it forms substitution products; chlorine and bromine, for example, react readily with phenol, forming ortho- and para- chlor- and -bromphenol, and, by further action, trichlor- and tribrom-phenol. Iodphenol is obtained by the action of iodine and iodic acid on phenol dissolved in a dilute solution of caustic potash. Nitro-phenols are readily obtained by the action of nitric acid on phenol. By the action of dilute nitric acid; ortho- and para-nitrophenols are obtained, the ortho-compound being separated from the para-compound by distillation in a current of steam. Ortho-nitrophenol, $C_6H_4{\cdot}OH{\cdot}NO_2(1{\cdot}2)$, crystallizes in yellow needles which melt at 45° C. and boil at 214°C. Para-nitrophenol, $C_6H_4{\cdot}OH{\cdot}NO_2(1{\cdot}4)$, crystallizes in long colourless needles which melt at 114°C. Meta-nitrophenol, $C_6H_4{\cdot}OH{\cdot}NO_2{\cdot}(1{\cdot}3)$, is prepared from meta-nitraniline by diazotizing the base and boiling the resulting diazonium salt with water. By nitrating phenol with concentrated nitric acid, no care being taken to keep the temperature of reaction down, trinitrophenol (picric acid) is obtained (see PICRIC ACID). By the reduction of nitro-phenols, the corresponding aminophenols are obtained, and of these, the meta- and para-derivatives are the most important. Para-aminophenol, $C_6H_4{\cdot}OH{\cdot}NH_2(1{\cdot}4)$ melts at 148° C., with decomposition. Its most important derivative is phenacetin. Meta-aminophenol, $C_6H_4{\cdot}OH{\cdot}NH_2(1{\cdot}3)$, and dimethyl meta-aminophenol, $C_6H_4{\cdot}OH{\cdot}N(CH_3)_2(1{\cdot}3)$, are extensively employed in the manufacture of the important dyestuffs known as the rhodamines. The aminophenols also find application as developers in photography, the more important of these developers being amidol, the hydrochloride of diaminophenol, ortol, the hydrochloride of para-methylaminophenol, $C_6H_4{\cdot}OH{\cdot}NHCH_3{\cdot}HCl(1{\cdot}4)$, rodinal, para-aminophenol, and metol, the sulphate of a methylaminophenol sulphonic acid. Meta-aminophenol is prepared by reducing meta-nitrophenol, or by heating resorcin with ammonium chloride and ammonia to 200° C. Dimethyl-meta-aminophenol is prepared by heating meta-aminophenol with methyl alcohol and hydrochloric acid in an autoclave; by sulphonation of dimethylaniline, the sulphonic acid formed being finally fused with potash; or by nitrating dimethylaniline, in the presence of sulphuric acid at 0° C. In the latter case a mixture of nitro-compounds is obtained which can be separated by the addition of sodium carbonate. The meta-nitro-compound, which is precipitated last, is then reduced, and the amino group so formed is replaced by the hydroxyl group by means of the Sandmeyer reaction. Dimethyl-meta-aminophenol crystallizes in small prisms which melt at 87° C. It condenses with phthalic anhydride to form rhodamine, and with succinic anhydride to rhodamine S.

Phenol dissolves readily in concentrated sulphuric acid, a mixture of phenol-ortho- and -para-sulphonic acids being formed. These acids may be separated by conversion into their potassium salts, which are then fractionally crystallized, the potassium salt of the para-acid separating first. The ortho-acid, in the form of its aqueous solution, is sometimes used as an antiseptic, under the name of aseptol. A *thiophenol*, C_6H_5SH, is known, and is prepared by the action of phosphorus pentasulphide on phenol, or by distilling a mixture of sodium benzene sulphonate and potassium sulphydrate. It is a colourless liquid, which possesses a very disagreeable smell, and boils at 168° C.

Various methods have been devised for the quantitative determination of phenol. J. Messinger and G. Vortmann (*Ber.*, 1890, 23, p. 2753) dissolve phenol in caustic alkali, make the solution up to known volume, take an aliquot part, warm it to 60° C., and add decinormal iodine solution until the liquid is of a deep yellow colour. The mixture is then cooled, acidified by means of sulphuric acid, and titrated with decinormal sodium thiosulphate solution. S. B. Schryver (*Jour. of Soc. Chem. Industry*, 1899, 18, p. 553) adds excess of sodamide to a solution of the phenol in a suitable solvent, absorbs the liberated ammonia in an excess of acid, and titrates the excess of acid. See also C. E. Smith, *Amer. Jour. Pharm.*, 1898, 369.

Pharmacology and Therapeutics.—Carbolic acid is an efficient parasiticide, and is largely used in destroying the fungus of ringworm and of the skin disease known as *pityriasis versicolor*. When a solution of the strength of about 1 in 20 is applied to the skin it produces a local anaesthesia which lasts for many hours. If concentrated, however, it acts as a caustic. It never produces vesication. The drug is absorbed through the unbroken skin—a very valuable property in the treatment of such conditions as an incipient whitlow. A piece of cotton wool soaked in strong carbolic acid will relieve the pain of dental caries, but is useless in other forms of toothache. Taken internally, in doses of from one to three grains, carbolic acid will often relieve obstinate cases of vomiting and has some value as a gastric antiseptic.

Toxicology.—Carbolic acid is distinguished from all other acids so-called—except oxalic acid and hydrocyanic acid—in that it is a neurotic poison, having a marked action directly upon the nervous system. In all cases of carbolic acid poisoning the nervous influence is seen. If it be absorbed from a surgical dressing there are no irritant symptoms, but when the acid is swallowed in concentrated form, symptoms of gastro-intestinal irritation occur. The patient becomes collapsed, and the skin is cold and clammy. The breathing becomes shallow, the drug killing, like nearly all neurotic poisons (alcohol, morphia, prussic acid, &c.), by paralysis of the respiratory centre, and the patient dying in a state of coma. The condition of the urine is of the utmost importance, as it is often a clue to the diagnosis, and in surgical cases may be the first warning that absorption is occurring to an undue degree. The urine becomes dark green in colour owing to the formation of various oxidation products such as pyrocatechin. Fifteen grains constitute an exceedingly dangerous dose for an adult male of average weight. Other symptoms of undue absorption are vertigo, deafness, sounds in the ears, stupefaction, a subnormal temperature, nausea, vomiting and a weak pulse (Sir Thomas Fraser).

The antidote in cases of carbolic acid poisoning is any soluble sulphate. Carbolic acid and sulphates combine in the blood to form sulpho-carbolates, which are innocuous. The symptoms of nerve-poisoning are due to the carbolic acid (or its salts) which circulate in the blood after all the sulphates in the blood have been used up in the formation of sulpho-carbolates (hence, during administration of carbolic acid, the urine should frequently be tested for the presence of free sulphates; as long as these occur in the urine, they are present in the blood and there is no danger). The treatment is therefore to administer an ounce of sodium sulphate in water by the mouth, or to inject a similar quantity of the salt in solution directly into a vein or into the subcutaneous tissues. Magnesium sulphate may be given by the mouth, but is poisonous if injected intravenously. If the acid has been swallowed, wash out the stomach and give chalk, the carbolate of calcium being insoluble. Alkalis which form soluble carbolates are useless. Give ether and brandy subcutaneously and apply hot water-bottles and blankets if there are signs of collapse.

CARBON (symbol C, atomic weight 12), one of the chemical non-metallic elements. It is found native as the diamond (*q.v.*), graphite (*q.v.*), as a constituent of all animal and vegetable tissues and of coal and petroleum. It also enters (as carbonates) into the composition of many minerals, such as chalk, dolomite,

calcite, witherite, calamine and spathic iron ore. In combination with oxygen (as carbon dioxide) it is also found to a small extent in the atmosphere. It is a solid substance which occurs in several modifications, differing very much in their physical properties. *Amorphous carbon* is obtained by the destructive distillation of many carbon compounds, the various kinds differing very greatly as regards physical characters and purity, according to the substance used for their preparation. The most common varieties met with are lampblack, gas carbon, wood charcoal, animal charcoal and coke. *Lampblack* is prepared by burning tar, resin, turpentine and other substances rich in carbon, with a limited supply of air; the products of combustion being conducted into condensing chambers in which cloths are suspended, on which the carbon collects. It is further purified by heating in closed vessels, but even then it still contains a certain amount of mineral matter and more or less hydrocarbons. It is used in the manufacture of printer's ink, in the preparation of black paint and in calico printing. *Gas carbon* is produced by the destructive distillation of coal in the manufacture of illuminating gas (see GAS: *Manufacture*), being probably formed by the decomposition of gaseous hydrocarbons. It is a very dense form of carbon, and is a good conductor of heat and electricity. It is used in the manufacture of carbon rods for arc lights, and for the negative element in the Bunsen battery.

Charcoal is a porous form of carbon; several varieties exist. *Sugar charcoal* is obtained by the carbonization of sugar. It is purified by boiling with acids, to remove any mineral matter, and is then ignited for a long time in a current of chlorine in order to remove the last traces of hydrogen. *Animal charcoal* (bone black) is prepared by charring bones in iron retorts. It is a very impure form of carbon, containing on the average about 80% of calcium phosphate. It possesses a much greater decolorizing and absorbing power than wood charcoal. A variety of animal charcoal is sometimes prepared by calcining fresh blood with potassium carbonate in large cylinders, the mass being purified by boiling out with dilute hydrochloric acid and subsequent reheating. *Wood charcoal* is a hard and brittle black substance, which retains the external structure of the wood from which it is made. It is prepared (where wood is plentiful) by stacking the wood in heaps, which are covered with earth or with brushwood and turf, and then burning the heap slowly in a limited supply of air. The combustion of the wood is conducted from the top downwards, and from the exterior towards the centre; great care has to be taken that the process is carried out slowly. The disadvantage in this process is that the by-products, such as pyroligneous acid, acetone, wood spirit, &c., are lost; as an alternative method, wood is frequently carbonized in ovens or retorts and the volatile products are condensed and utilized.

Charcoal varies considerably in its properties, depending upon the particular variety of wood from which it is prepared, and also upon the process used in its manufacture. It can be made at a temperature as low as 300° C., and is then a soft, very friable material possessing a low ignition point. When made at higher temperatures it is much more dense, and its ignition point is considerably higher. Charcoal burns when heated in air, usually without the formation of flame, although a flame is apparent if the temperature be raised. It is characterized by its power of absorbing gases; thus, according to J. Hunter [*Phil. Mag.*, 1863 (4), 25, p. 363], one volume of charcoal absorbs (at 0° C. and 760 mm. pressure) 171·7 ccs. of ammonia, 86·3 ccs. of nitrous oxide, 67·7 ccs. of carbon monoxide, 21·2 ccs. of carbon dioxide, 17·9 ccs. of oxygen, 15·2 ccs. of nitrogen, and 4·4 ccs. of hydrogen [see also J. Dewar, *Ann. Chim. Phys.*, 1904 (8), 3, p. 5]. It also has the power of absorbing colouring matters from solution. Charcoal is used as a fuel and as a reducing agent in metallurgical processes.

The element carbon unites directly with hydrogen to form acetylene when an electric arc is passed between carbon poles in an atmosphere of hydrogen (M. Berthelot); it also unites directly with fluorine, producing, chiefly, carbon tetrafluoride CF_4. It burns when heated in an atmosphere of oxygen, forming carbon dioxide, and when heated in sulphur vapour it forms carbon bisulphide (*q.v.*). When heated with nitrogenous substances, in the presence of carbonated or caustic alkali, it forms cyanides. It combines directly with silicon, at the temperature of the electric furnace, yielding *carborundum*, SiC; and H. Moissan has also shown that it will combine with many metals at the temperature of the electric furnace, to form carbides (*q.v.*).

The specific heat of carbon varies with the temperature, the following values having been obtained by H. F. Weber (*Jahresberichte*, 1874, p. 63):—

Diamond.		Graphite.		Porous wood carbon.	
t°.	Sp. Ht.	t°.	Sp. Ht.	t°.	Sp. Ht.
−50·5	0·0635	−50·3	0·1138	0−23	0·1653
−10·6	0·0955	−10·7	0·1437	0−99	0·1935
+10·7	0·1128	+10·8	0·1604	0−223	0·2385
85·5	0·1765	61·3	0·1990		
206·1	0·2733	201·6	0·2966		
606·7	0·4408	641·9	0·4454		
985·0	0·4589	977·0	0·4670		

The atomic weight of carbon has been determined by J. B. A. Dumas and by J. S. Stas [*Ann. Chim. Phys.*, 1841 (3), 1, p. 1; *Jahresb.*, 1849, 223] by estimating the amount of carbon dioxide formed on burning graphite or diamond in a current of oxygen, the value obtained being 12·0 (O = 16). Confirmatory evidence has also been obtained by O. L. Erdmann and R. F. Marchand (*Jour. Prak. Chem.*, 1841, 23, p. 159; see also F. W. Clarke, *Jahresb.*, 1881, p. 7).

Compounds.—Three oxides of carbon are known, namely, carbon suboxide, C_3O_2, carbon monoxide, CO, and carbon dioxide, CO_2. *Carbon suboxide*, C_3O_2, is formed by the action of phosphorus pentoxide on ethyl malonate (O. Diels and B. Wolf, *Ber.*, 1906, 39, p. 689), $CH_2(COOC_2H_5)_2 = 2C_2H_4 + 2H_2O + C_3O_2$. At ordinary temperatures it is a colourless gas, possessing a penetrating and suffocating smell. It liquefies at 7° C. It is an exceedingly reactive compound, combining with water to form malonic acid, with hydrogen chloride to form malonyl chloride, and with ammonia to form malonamide. When kept for some time in sealed tubes it changes to a yellowish liquid, from which a yellow flocculent substance gradually separates, and finally it suddenly solidifies to a dark red mass, which appears to be a polymeric form. Its vapour density agrees with the molecular formula C_3O_2, and this formula is also confirmed by exploding the gas with oxygen and measuring the amount of carbon dioxide produced (see KETENES).

Carbon monoxide, CO, is found to some extent in volcanic gases. It was first prepared in 1776 by J. M. F. Lassone (*Mem. Acad. Paris*) by heating zinc oxide with carbon, and was for some time considered to be identical with hydrogen. Cruikshank concluded that it was an oxide of carbon, a fact which was confirmed by Clement and J. B. Désormes (*Ann. Chim. Phys.*, 1801, 38, p. 285). It may be prepared by passing carbon dioxide over red-hot carbon, or red-hot iron; by heating carbonates (magnesite, chalk, &c.) with zinc dust or iron; or by heating many metallic oxides with carbon. It may also be prepared by heating formic and oxalic acids (or their salts) with concentrated sulphuric acid (in the case of oxalic acid, an equal volume of carbon dioxide is produced); and by heating potassium ferrocyanide with a large excess of concentrated sulphuric acid, $K_4Fe(CN)_6 + 6H_2SO_4 + 6H_2O = 2K_2SO_4 + FeSO_4 + 3(NH_4)_2SO_4 + 6CO$. It is a colourless, odourless gas of specific gravity 0·967 (air = 1). It is one of the most difficultly liquefiable gases, its critical temperature being −139·5° C., and its critical pressure 35·5 atmos. The liquid boils at −190° C., and solidifies at −211° C. (L. P. Cailletet, *Comptes rendus*, 1884, 99, p. 706). It is only very slightly soluble in water. It burns with a characteristic pale blue flame to form carbon dioxide. It is very poisonous, uniting with the haemoglobin of the blood to form carbonyl-haemoglobin. It is a powerful reducing agent, especially at high temperatures. It is rapidly absorbed by an ammoniacal or acid (hydrochloric acid) solution of cuprous chloride. It unites directly with chlorine, forming carbonyl chloride or phosgene (see below), and with nickel and iron to form nickel and iron carbonyls (see NICKEL and IRON). It also combines directly with potassium hydride to form potassium formate (see FORMIC ACID). The volume composition of carbon monoxide is established by exploding a mixture of the gas with oxygen, two volumes of the gas combining with one volume of oxygen to form two volumes of carbon dioxide. This fact, coupled with the determination of the vapour density of the gas, establishes the molecular formula CO.

Carbon dioxide, CO_2, is a gas first distinguished from air by van Helmont (1577–1644), who observed that it was formed in fermentation processes and during combustion, and gave to it the name *gas sylvestre*. J. Black (*Edin. Phys. and Lit. Essays*, 1755) showed that it was a constituent of the carbonated alkalis and called it "fixed air." T. O. Bergman, in 1774, pointed out its acid character, and A. L. Lavoisier (1781–1788) first proved it to be an oxide of carbon by burning carbon in the oxygen obtained from the decomposition of mercuric oxide. It is a regular constituent of the atmosphere, and is found in many spring waters and in volcanic gases; it also occurs in the uncombined condition at the Grotto del Cane (Naples) and in the Poison Valley (Java). It is a constituent of the minerals cerussite, malachite, azurite, spathic iron ore, calamine, strontianite, witherite, calcite aragonite, limestone, &c. It may be prepared by burning carbon in excess of air or oxygen, by the direct decomposition of many carbonates by heat, and by the decomposition of carbonates

with mineral acids, $M_2CO_3+2HCl=2MCl+H_2O+CO_2$. It is also formed in ordinary fermentation processes, in the combustion of all carbon compounds (oil, gas, candles, coal, &c.), and in the process of respiration.

It is a colourless gas, possessing a faint pungent smell and a slightly acid taste. It does not burn, and does not support ordinary combustion, but the alkali metals and magnesium, if strongly heated, will continue to burn in the gas with formation of oxides and liberation of carbon. Its specific gravity is 1·529 (air = 1). It is readily condensed, passing into the liquid condition at 0° C. under a pressure of 35 atmospheres. Its critical temperature is 31·35° C., and its critical pressure is 72·9 atmos. The liquid boils at −78·2° C. (1 atmo.), and by rapid evaporation can be made to solidify to a snow-white solid which melts at −65° C. (see LIQUID GASES). Carbon dioxide is moderately soluble in water, its coefficient of solubility at 0° C. being 1·7977 (R. Bunsen). It is still more soluble in alcohol. The solution of the gas in water shows a faintly acid reaction and is supposed to contain *carbonic acid*, H_2CO_3. The gas is rapidly absorbed by solutions of the caustic alkalis, with the production of alkaline carbonates (*q.v.*), and it combines readily with potassium hydride to form potassium formate. It unites directly with ammonia gas to form ammonium carbamate, NH_2COONH_4. It may be readily recognized by the white precipitate which it forms when passed through lime or baryta water. Carbon dioxide dissociates, when strongly heated, into carbon monoxide and oxygen, the reaction being a balanced action; the extent of dissociation for varying temperatures and pressures has been calculated by H. Le Chatelier (*Zeit. Phys. Chem.*, 1888, 2, p. 782; see H. Sainte-Claire Deville, *Comptes rendus*, 1863, 56, p. 195 et seq.). The volume composition of carbon dioxide is determined by burning carbon in oxygen, when it is found that the volume of carbon dioxide formed is the same as that of the oxygen required for its production, hence carbon dioxide contains its own volume of oxygen. Carbon dioxide finds industrial application in the preparation of soda by the Solvay process, in the sugar industry, in the manufacture of mineral waters, and in the artificial production of ice.

Carbonyl chloride (phosgene), $COCl_2$, was first obtained by John Davy (*Phil. Trans.*, 1812, 40, p. 220). It may be prepared by the direct union of carbon monoxide and chlorine in sunlight (Th. Wilm and G. Wischin, *Ann.*, 1868, 14, p. 150); by the action of phosphorus pentoxide on carbon tetrachloride at 200–210° C. (G. Gustavson, *Ber.*, 1872, 5, p. 30), $4CCl_4+P_4O_{10}=2CO_2+4POCl_3+2COCl_2$; by the oxidation of chloroform with chromic acid mixture (A. Emmerling and B. Lengyel, *Ber.*, 1869, 2, p. 54), $4CHCl_3+3O_2=4COCl_2+2H_2O+2Cl_2$; or most conveniently by heating carbon tetrachloride with fuming sulphuric acid (H. Erdmann, *Ber.*, 1893, 26, p. 1993), $2SO_3+CCl_4=S_2O_5Cl_2+COCl_2$.

It is a colourless gas, possessing an unpleasant pungent smell. Its vapour density is 3·46 (air = 1). It may be condensed to a liquid, which boils at 8° C. It is readily soluble in benzene, glacial acetic acid, and in many hydrocarbons. Water decomposes it violently, with formation of carbon dioxide and hydrochloric acid. It reacts with alcohol to form chlorcarbonic ester and ultimately diethyl carbonate (see CARBONATES), and with ammonia it yields urea (*q.v.*). It is employed commercially in the production of colouring matters (see BENZOPHENONE), and for various synthetic processes.

Carbon oxysulphide, COS, was first prepared by C. Than in 1867 (*Ann. Suppl.*, 5, p. 236) by passing carbon monoxide and sulphur vapour through a tube at a moderate heat. It is also formed by the action of sulphuretted hydrogen on the isocyanic esters, $2CONC_2H_5+H_2S=COS+CO(NHC_2H_5)_2$, by the action of concentrated sulphuric acid on the isothiocyanic esters, $RNCS+H_2O=COS+RNH_2$, or of dilute sulphuric acid on the thiocyanates. In the latter reaction various other compounds, such as carbon dioxide, carbon bisulphide and hydrocyanic acid, are produced. They are removed by passing the vapours in succession through concentrated solutions of the caustic alkalis, concentrated sulphuric acid, and triethyl phosphine; the residual gas is then purified by liquefaction (W. Hempel, *Zeit. angew. Chemie*, 1901, 14, p. 865). It is also formed when sulphur trioxide reacts with carbon bisulphide at 100° C., $CS_2+3SO_3=COS+4SO_2$, and by the decomposition of ethyl potassium thiocarbonate with hydrochloric acid, $CO(OC_2H_5)SK+HCl=COS+KCl+C_2H_5OH$. It is a colourless, odourless gas, which burns with a blue flame and is decomposed by heat. Its vapour density is 2·1046 (air = 1). The liquefied gas boils at −47° C. under atmospheric pressure. It is soluble in water; the aqueous solution gradually decomposes on standing, forming carbon dioxide and sulphuretted hydrogen. It is easily soluble in solutions of the caustic alkalis, provided they are not too concentrated, forming solutions of alkaline carbonates and sulphides, $COS+4KHO=K_2CO_3+K_2S+2H_2O$.

CARBONADO, a name given in Brazil to a dark massive form of impure diamond, known also as "carbonate" and in trade simply as carbon. It is sometimes called black diamond. Generally it is found in small masses of irregular polyhedral form, black, brown or dark-grey in colour, with a dull resinoid lustre; and breaking with a granular fracture, paler in colour, and in some cases much resembling that of fine-grained steel. Being slightly cellular, its specific gravity is rather less than that of crystallized diamond. It is found almost exclusively in the state of Bahia in Brazil, where it occurs in the *cascalho* or diamond-bearing gravel. Borneo also yields it in small quantity. Formerly of little or no value, it came into use on the introduction of Leschot's diamond-drills, and is now extremely valuable for mounting in the steel crowns used for diamond-boring. Having no cleavage, the carbon is less liable to fracture on the rotation of the drill than is crystallized diamond. The largest piece of carbonado ever recorded was found in Bahia in 1895, and weighed 3150 carats. Pieces of large size are, however, relatively less valuable than those of moderate dimensions, since they require the expenditure of much labour in reducing them to fragments of a suitable size for mounting in the drill-heads. Ilmenite has sometimes been mistaken in the South African mines for carbonado. (F. W. R.*)

CARBONARI (an Italian word meaning "charcoal-burners"), the name of certain secret societies of a revolutionary tendency which played an active part in the history of Italy and France early in the 19th century. Societies of a similar nature had existed in other countries and epochs, but the stories of the derivation of the Carbonari from mysterious brotherhoods of the middle ages are purely fantastic. The Carbonari were probably an offshoot of the Freemasons, from whom they differed in important particulars, and first began to assume importance in southern Italy during the Napoleonic wars. In the reign (1808–1815) of Joachim Murat a number of secret societies arose in various parts of the country with the object of freeing it from foreign rule and obtaining constitutional liberties; they were ready to support the Neapolitan Bourbons or Murat, if either had fulfilled these aspirations. Their watch-words were freedom and independence, but they were not agreed as to any particular form of government to be afterwards established. Murat's minister of police was a certain Malghella (a Genoese), who favoured the Carbonari movement, and was indeed the instigator of all that was Italian in the king's policy. Murat himself had at first protected the sectarians, especially when he was quarrelling with Napoleon, but later, Lord William Bentinck entered into negotiations with them from Sicily, where he represented Great Britain, through their leader Vincenzo Federici (known as Capobianco), holding out promises of a constitution for Naples similar to that which had been established in Sicily under British auspices in 1812. Some Carbonarist disorders having broken out in Calabria, Murat sent General Manhès against the rebels; the movement was ruthlessly quelled and Capobianco hanged in September 1813 (see Greco, *Intorno al tentativo dei Carbonari di Citeriore Calabria nel 1813*). But Malghella continued secretly to protect the Carbonari and even to organize them, so that on the return of the Bourbons in 1815 King Ferdinand IV. found his kingdom swarming with them. The society comprised nobles, officers of the army, small landlords, government officials, peasants and even priests. Its organization was both curious and mysterious, and had a fantastic ritual full of symbols taken from the Christian religion, as well as from the trade of charcoal-burning, which was extensively practised in the mountains of the Abruzzi and Calabria. A lodge was called a *vendita* (sale), members saluted each other as *buoni cugini* (good cousins), God was the "Grand Master of the Universe," Christ the "Honorary Grand Master," also known as "the Lamb," and every Carbonaro was pledged to deliver the Lamb from the Wolf, *i.e.* tyranny. Its red, blue and black flag was the standard of revolution in Italy until substituted by the red, white and green in 1831.

When King Ferdinand felt himself securely re-established at Naples he determined to exterminate the Carbonari, and to this end his minister of police, the prince of Canosa, set up another secret society called the *Calderai del Contrappeso* (braziers of the counterpoise), recruited from the brigands and the dregs of the people, who committed hideous excesses against supposed Liberals, but failed to exterminate the movement. On the

contrary, Carbonarism flourished and spread to other parts of Italy, and countless lodges sprang up, their adherents comprising persons in all ranks of society, including, it is said, some of royal blood, who had patriotic sentiments and desired to see Italy free from foreigners. In Romagna the movement was taken up with enthusiasm, but it also led to a certain number of murders owing to the fiery character of the Romagnols, although its criminal record is on the whole a very small one. Among the foreigners who joined it for love of Italy was Lord Byron. The first rising actively promoted by the Carbonari was the Neapolitan revolution of 1820. Several regiments were composed entirely of persons affiliated to the society, and on the 1st of July a military mutiny broke out at Monteforte, led by two officers named Morelli and Silvati, to the cry of " God, the King and the Constitution." The troops sent against them, under General Pepe, himself a Carbonaro, sympathized with the mutineers, and the king, being powerless to resist, granted the constitution (13th of July), which he swore on the altar to observe. But the Carbonari were unable to carry on the government, and after the separatist revolt of Sicily had broken out the king went to the congress of Laibach, and obtained from the emperor of Austria the loan of an army with which to restore the autocracy. He returned to Naples early in 1821 with 50,000 Austrians, defeated the constitutionalists under Pepe, dismissed parliament, and set to work to persecute all who had been in any way connected with the movement.

A similar movement broke out in Piedmont in March 1821. Here as in Naples the Carbonari comprised many men of rank, such as Santorre di Santarosa, Count San Marzano, Giacinto di Collegno, and Count Moffa di Lisio, all officers in the army, and they were more or less encouraged by Charles Albert, the heir-presumptive to the throne. The rising was crushed, and a number of the leaders were condemned to death or long terms of imprisonment, but most of them escaped. At Milan there was only the vaguest attempt at conspiracy; but Silvio Pellico, Maroncelli and Count Confalonieri were implicated as having invited the Piedmontese to invade Lombardy, and were condemned to pass many years in the dungeons of the Spielberg.

The French revolution of 1830 had its echo in Italy, and Carbonarism raised its head in Parma, Modena and Romagna the following year. In the papal states a society called the Sanfedisti or Bande della Santa Fede had been formed to checkmate the Carbonari, and their behaviour and character resembled those of the Calderai of Naples. In 1831 Romagna and the Marches rose in rebellion and shook off the papal yoke with astonishing ease. At Parma the duchess, having rejected the demand for a constitution, left the city and returned under Austrian protection. At Modena, Duke Francis IV., the worst of all Italian tyrants, was expelled by a Carbonarist rising, and a dictatorship was established under Biagio Nardi on the 5th of February. Francis returned with an Austrian force and hanged the conspirators, including Ciro Menotti. The Austrians occupied Romagna and restored the province to the pope, but though many arrests of Carbonari were made there were no executions. Among those implicated in the Carbonarist movement was Louis Napoleon, who even in after years, when he was ruling France as Napoleon III., never quite forgot that he had once been a conspirator, a fact which influenced his Italian policy. The Austrians retired from Romagna and the Marches in July 1831, but Carbonarism and anarchy having broken out again, they returned, while the French occupied Ancona. The Carbonari after these events ceased to have much importance, their place being taken by the more energetic Giovane Italia Society presided over by Mazzini.

In France, Carbonarism began to take root about 1820, and was more thoroughly organized than in Italy. The example of the Spanish and Italian revolutions incited the French Carbonari, and risings occurred at Belfort, Thouars, La Rochelle and other towns in 1821, which though easily quelled revealed the nature and organization of the movement. The Carbonarist lodges proved active centres of discontent until 1830, when, after contributing to the July revolution of that year, most of their members adhered to Louis Philippe's government.

The Carbonarist movement undoubtedly played an important part in the Italian Risorgimento, and if it did not actively contribute to the wars and revolutions of 1848–49, 1859–60 and 1866, it prepared the way for those events. One of its chief merits was that it brought Italians of different classes and provinces together, and taught them to work in harmony for the overthrow of tyranny and foreign rule.

BIBLIOGRAPHY.—Much information on the Carbonari will be found in R. M. Johnston's *Napoleonic Empire in Southern Italy* (2 vols., London, 1904), which contains a full bibliography; D. Spadoni's *Sette, cospirazioni, e cospiratori* (Turin, 1904) is an excellent monograph; *Memoirs of the Secret Societies of Southern Italy*, said to be by one Bertoldi or Bartholdy (London, 1821, Ital. transl. by A. M. Cavallotti, Rome, 1904); Saint-Edme, *Constitution et organisation des Carbonari*; P. Colletta, *Storia del Reame di Napoli* (Florence, 1848); B. King, *A History of Italian Unity* (London, 1899), with bibliography. (L. V.*)

CARBONATES. (1) The metallic carbonates are the salts of carbonic acid, H_2CO_3. Many are found as minerals, the more important of such naturally occurring carbonates being cerussite (lead carbonate, $PbCO_3$), malachite and azurite (both basic copper carbonates), calamine (zinc carbonate, $ZnCO_3$), witherite (barium carbonate, $BaCO_3$), strontianite (strontium carbonate, $SrCO_3$), calcite (calcium carbonate, $CaCO_3$), dolomite (calcium magnesium carbonate, $CaCO_3 \cdot MgCO_3$), and sodium carbonate, Na_2CO_3. Most metals form carbonates (aluminium and chromium are exceptions), the alkali metals yielding both acid and normal carbonates of the types $MHCO_3$ and M_2CO_3 (M = one atom of a monovalent metal); whilst bismuth, copper and magnesium appear only to form basic carbonates. The acid carbonates of the alkali metals can be prepared by saturating an aqueous solution of the alkaline hydroxide with carbon dioxide, $M \cdot OH + CO_2 = MHCO_3$, and from these acid salts the normal salts may be obtained by gentle heating, carbon dioxide and water being produced at the same time, $2MHCO_3 = M_2CO_3 + HO_2 + CO_2$. Most other carbonates are formed by precipitation of salts of the metals by means of alkaline carbonates. All carbonates, except those of the alkali metals and of thallium, are insoluble in water; and the majority decompose when heated strongly, carbon dioxide being liberated and a residue of an oxide of the metal left. The alkaline carbonates undergo only a very slight decomposition, even at a very bright red heat. The carbonates are decomposed by mineral acids, with formation of the corresponding salt of the acid, and liberation of carbon dioxide. Many carbonates which are insoluble in water dissolve in water containing carbon dioxide. The individual carbonates are described under the various metals.

(2) The organic carbonates are the esters of carbonic acid, H_2CO_3, and of the unknown ortho-carbonic acid, $C(OH)_4$. The acid esters of carbonic acid of the type $HO \cdot CO \cdot OR$ are not known in the free state, but J. B. Dumas obtained barium methyl carbonate by the action of carbon dioxide on baryta dissolved in methyl alcohol (*Ann.*, 1840, 35, p. 283).

Potassium ethyl carbonate, $KO \cdot CO \cdot OC_2H_5$, is obtained in the form of pearly scales when carbon dioxide is passed into an alcoholic solution of potassium ethylate, $CO_2 + KOC_2H_5 = KO \cdot CO \cdot OC_2H_5$. It is not very stable, water decomposing it into alcohol and the alkaline carbonate. The normal esters may be prepared by the action of silver carbonate on the alkyl iodides, or by the action of alcohols on the chlorcarbonic esters. These normal esters are colourless, pleasant-smelling liquids, which are readily soluble in water. They show all the reactions of esters, being readily hydrolysed by caustic alkalis, and reacting with ammonia to produce carbamic esters and urea. By heating with phosphorus pentachloride an alkyl group is eliminated and a chlorcarbonic ester formed. Dimethylcarbonate, $CO(OCH_3)_2$, is a colourless liquid, which boils at 90·6° C., and is prepared by heating the methyl ester of chlorcarbonic acid with lead oxide. Diethylcarbonate, $CO(OC_2H_5)_2$, is a colourless liquid, which boils at 125·8° C.; its specific gravity is 0·978 (20°) [H. Kopp]. When it is heated to 120° C. with sodium ethylate it decomposes into ethyl ether and sodium ethyl carbonate (A. Geuther, *Zeit. f. Chemie*, 1868).

Ortho-carbonic ester, $C(OC_2H_5)_4$, is formed by the action of sodium ethylate on chlorpicrin (H. Bassett, *Ann.*, 1864, 132, p. 54), $CCl_3NO_2 + 4C_2H_5ONa = C(OC_2H_5)_4 + NaNO_2 + 3NaCl$. It is a thereal-smelling liquid, which boils at 158-159° C., and has a specific

gravity of 0·925. When heated with ammonia it yields guanidine, and on boiling with alcoholic potash it yields potassium carbonate.

Chlorcarbonic ester, $Cl{\cdot}CO{\cdot}OC_2H_5$, is formed by the addition of well-cooled absolute alcohol to phosgene (carbonyl chloride). It is a pungent-smelling liquid, which fumes strongly on exposure to air. It boils at 93·1° C., and has a specific gravity of 1·144 (15° C.). When heated with ammonia it yields urethane. Sodium amalgam converts it into formic acid; whilst with alcohol it yields the normal carbonic ester. It is easily broken down by many substances (aluminium chloride, zinc chloride, &c.) into ethyl chloride and carbon dioxide.

Percarbonates.—Barium percarbonate, $BaCO_4$, is obtained by passing an excess of carbon dioxide into water containing barium peroxide in suspension; it is fairly stable, and yields hydrogen peroxide when treated with acids (E. Merck, *Abs. J.C.S.*, 1907, ii. p. 859). Sodium percarbonates of the formulae Na_2CO_4, $Na_2C_2O_6$, Na_3CO_4, $NaHCO_4$ (two isomers) are obtained by the action of gaseous or solid carbon dioxide on the peroxides Na_2O_2, Na_2O_2, $NaHO_2$ (two isomers) in the presence of water at a low temperature (R. Wolffenstein and E. Peltner, *Ber.*, 1908, 41, pp. 275, 280). Potassium percarbonate, $K_2C_2O_6$, is obtained in the electrolysis of potassium carbonate at −10 to −15°.

CARBON BISULPHIDE, CS_2, a chemical product first discovered in 1796 by W. A. Lampadius, who obtained it by heating a mixture of charcoal and pyrites. It may be more conveniently prepared by passing the vapour of sulphur over red hot charcoal, the uncondensed gases so produced being led into a tower containing plates over which a vegetable oil is allowed to flow in order to absorb any carbon bisulphide vapour, and then into a second tower containing lime, which absorbs any sulphuretted hydrogen. The crude product is very impure and possesses an offensive smell; it may be purified by forcing a fine spray of lime water through the liquid until the escaping water is quite clear, the washed bisulphide being then mixed with a little colourless oil and distilled at a low temperature. For further methods of purification see J. Singer (*Journ. of Soc. Chem. Ind.*, 1889, p. 93), Th. Sidot (*Jahresb.*, 1869, p. 243), E. Allary (*Bull. de la Soc. Chim.*, 1881, 35, p. 491), E. Obach (*Jour. prak. Chem.*, 1882 (2), 26, p. 282).

When perfectly pure, carbon bisulphide is a colourless, somewhat pleasant smelling, highly refractive liquid, of specific gravity 1·2661 (18°/4°) (J. W. Brühl) or 1·29215 (0°/4°) (T. E. Thorpe). It boils at 46·04° C. (T. E. Thorpe, *Journ. Chem. Soc.*, 1880, 37, p. 364). Its critical temperature is 277·7° C., and its critical pressure is 78·1 atmos. (J. Dewar, *Chem. News*, 1885, 51, p. 27). It solidifies at about −116° C., and liquefies again at about −110° C. (K. Olszewski, *Jahresb.*, 1883, p. 75). It is a monomolecular liquid (W. Ramsay and J. Shields, *Jour. Chem. Soc.*, 1893, 63, p. 1089). It is very volatile, the vapour being heavy and very inflammable. It burns with a pale blue flame to form carbon dioxide and sulphur dioxide. It is almost insoluble in water, but mixes in all proportions with absolute alcohol, ether, benzene and various oils. It is a good solvent for sulphur, phosphorus, wax, iodine, &c. It dissociates when heated to a sufficiently high temperature. A mixture of carbon bisulphide vapour and nitric oxide burns with a very intense blue-coloured flame, which is very rich in the violet or actinic rays. When heated with water in a sealed tube to 150° C. it yields carbon dioxide and sulphuretted hydrogen. Zinc and hydrochloric acid reduce it to tri-thioformaldehyde $(CH_2S)_3$ (A. Girard, *Comptes rendus*, 1856, 43, p. 396). When passed through a red-hot tube with chlorine it yields carbon tetrachloride and sulphur chloride (H. Kolbe). Potassium, when heated, burns in the vapour of carbon bisulphide, forming potassium sulphide and liberating carbon. In contact with chlorine monoxide it forms carbonyl chloride and thionyl chloride (P. Schützenberger, *Ber.*, 1869, 2, p. 219). When passed with carbon dioxide through a red-hot tube it yields carbon oxysulphide, COS (C. Winkler), and when passed over sodamide it yields ammonium thiocyanate. A mixture of carbon bisulphide vapour and sulphuretted hydrogen, when passed over heated copper, gives, amongst other products, some methane.

Carbon bisulphide slowly oxidizes on exposure to air, but by the action of potassium permanganate or chromic acid it is readily oxidized to carbon dioxide and sulphuric acid. By the action of aqueous alkalis, carbon bisulphide is converted into a mixture of an alkaline carbonate and an alkaline thiocarbonate (J. Berzelius, *Pogg. Ann.*, 1825, 6, p. 444), $6KHO+3CS_2=K_2CO_3+2K_2CS_3+3H_2O$; on the other hand, an alcoholic solution of a caustic alkali converts it into a xanthate (A. Vogel, *Jahresb.*, 1853, p. 643),

$$CS_2+KHO+R{\cdot}OH=H_2O+RO{\cdot}CS{\cdot}SK.$$

Aqueous and alcoholic solutions of ammonia convert carbon bisulphide into ammonium dithiocarbamate, which readily breaks down into ammonium thiocyanate and sulphuretted hydrogen (A. W. Hofmann),

$$CS_2+2NH_3\rightarrow NH_2{\cdot}CSS{\cdot}NH_4\rightarrow H_2S+NH_4CNS.$$

Carbon bisulphide combines with primary amines to form alkyl dithiocarbamates, which when heated lose sulphuretted hydrogen and leave a residue of a dialkyl thio-urea,

$$CS_2+2R{\cdot}NH_2\rightarrow R{\cdot}NH{\cdot}CSS{\cdot}NH_3R\rightarrow CS(NHR)_2+H_2S;$$

or if the aqueous solution of the dithiocarbamate be boiled with mercuric chloride or silver nitrate solution, a mustard oil (*q.v.*) is formed,

$$R{\cdot}NH{\cdot}CSS{\cdot}NH_3R+HgCl_2\rightarrow Hg(R{\cdot}NH{\cdot}CSS)_2\rightarrow 2RNCS+HgS+H_2S.$$

Carbon bisulphide is used as a solvent for caoutchouc, for extracting essential oils, as a germicide, and as an insecticide.

Carbon monosulphide, CS, is formed when a silent electric discharge is passed through a mixture of carbon bisulphide vapour and hydrogen or carbon monoxide (S. M. Losanitsch and M. Z. Jovitschitsch, *Ber.*, 1897, 30, p. 135).

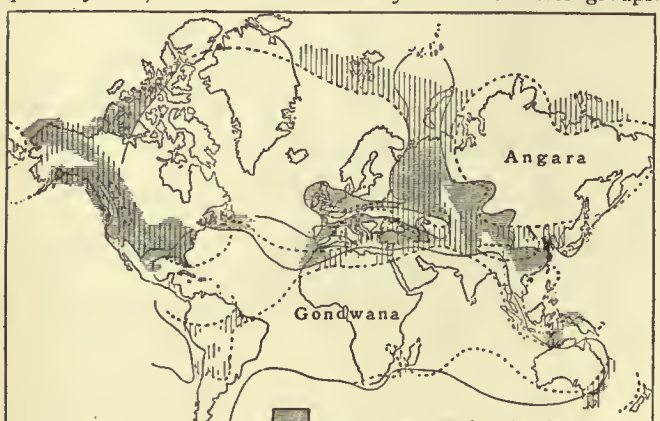
CARBONDALE, a city of Lackawanna county, Pennsylvania, U.S.A., on the Lackawanna river, 16 m. N.E. of Scranton. Pop. (1890) 10,833; (1900) 13,536, of whom 2553 were foreign-born; (1906, estimate) 14,976. Carbondale is served by the Erie, the Delaware & Hudson (which has machine shops here), and the New York, Ontario & Western railways. The city lies near the upper end of the Lackawanna valley, and the scenery of the surrounding mountains makes it a summer resort of some importance. It has a public library, a small park, an emergency hospital and the Carbondale city private hospital. Carbondale is situated in one of the richest anthracite coal regions of the state, and its principal interest is in coal. Among its manufactures are foundry and machine shop products, sheet-iron, silk, glass, thermometers and hydrometers, bobbins and refrigerating machines. The value of the city's factory products increased from $1,146,181 in 1900 to $2,315,695 in 1905, or 102%. The settlement of the place began in 1824 with the opening of the coal mines, and Carbondale was chartered as a city in 1851.

CARBONIC ACID, in chemistry, properly H_2CO_3, the acid assumed to be formed when carbon dioxide is dissolved in water; its salts are termed carbonates. The name is also given to the neutral carbon dioxide from its power of forming salts with oxides, and on account of the acid nature of its solution; and, although not systematic, this use is very common.

CARBONIFEROUS SYSTEM, in geology, the whole of the great series of stratified rocks and associated volcanic rocks which occur above the Devonian or Old Red Sandstone and below the Permian or Triassic systems, belonging to the Carboniferous period. The name was first applied by W. D. Conybeare in 1821 to the coal-bearing strata of England and Wales, including the related grits and limestones immediately beneath them. The term is a relic of that early period in the history of stratigraphy when each group of strata was supposed to be distinguished by some peculiar lithological character. In this case the carbonaceous beds—coal-seams—naturally appealed most strongly to the imagination, and the name is a good one, notwithstanding the fact that coal-seams occupy but a small fraction of the total thickness of the Carboniferous system; and although subsequent investigations have demonstrated the existence of coal in other geological formations, in none of these does it play so prominent a part. The stratified rocks of this system include marine limestones, shales and sandstones; estuarine, lagoonal and fresh-water shales, sandstones and marls with beds of coal, oil-bearing rocks, gypsum and salt.

In many parts of the world there is no sharp line of demarcation between the Devonian and the Carboniferous rocks; neither can the fossil faunas and floras be clearly separated at any well-defined line; this is true in Britain, Belgium, Russia, Westphalia and parts of North America. Again, at the summit of the Carboniferous series, both the rocks and their fossil contents merge gradually into those of the succeeding Permian

system, as in Russia, Bohemia, the Saar region and Texas. This has led certain geologists to classify the Devonian, Carboniferous and Permian into one grand system; E. Renevier in 1874 proposed to include these three into a single "Carbonique" system, later he retained only the two latter groups.



Distribution of Carboniferous Rocks.

There seems to be sufficient reason, however, to maintain each of these groups as a separate system and limit the term Carboniferous (*carbonifèrien*) in the manner indicated above. At the same time it must be remembered that there is in India, South Africa, the Urals, in Australasia and parts of North America an important series of rocks, with a "Permo-Carboniferous" fauna, which constitutes a passage formation between the Carboniferous, *sensu stricto*, and Jurassic rocks.

Stratigraphy.—No assemblage of stratified rocks has received such careful and detailed examination as the Carboniferous system; consequently our knowledge of the stratigraphical sequence in isolated local areas, where the coals have been exploited, is very full.

In Europe, the system is very completely developed in the British Isles, where was made the first successful attempt at a classification of its various members, although at a somewhat earlier date Omalius d'Halloy had recognized a *terrain bituminifère* or coal-bearing series in the Belgian region.

The area within which the Carboniferous rocks of Britain occur is sufficiently extensive to contain more than one type of the system, and thus to cast much light on the varied geographical conditions under which these rocks were accumulated. In prosecuting the study of this part of British geology it is soon discovered, and it is essential to bear in mind, that, during the Carboniferous period, the land whence the chief supplies of sediment were derived rose mainly to the north and north-west, as it seems to have done from very early geological time. While therefore the centre and south of England lay under clear water of moderate depth, the north of the country and the south of Scotland were covered by shallow water, which was continually receiving sand and mud from the adjacent northern land. Hence vertical sections of the Carboniferous formations of Britain differ greatly according to the districts in which they are taken.

The Coal-Measures and Millstone Grit are usually grouped together in the *Upper Carboniferous*, the Carboniferous Limestone series constituting the *Lower Carboniferous*.

In addition to the above broad subdivisions, Murchison and Sedgwick, when working upon the rocks of Devonshire and Cornwall, recognized, with the assistance of W. Lonsdale, another phase of sedimentation. This comprised dark shales, with grits and thin limestones and thin, impure coals, locally called "culm" (*q.v.*). These geologists appropriated the term "culm" for the whole of this facies in the west of England, and subsequently traced the same type on the European continent, where it is widely developed in the western centre.

Besides the considerable exposed area of Carboniferous rocks in Great Britain, there is as much or more that is covered by younger formations; this is true particularly of the eastern side of England and the south-eastern counties, where the coal-measures have already been found at Dover.

From England, Carboniferous rocks can be followed across northern and central France, into Germany, Bohemia, the Alps, Italy and Spain. In Russia this system occupies some 30,000 sq. m., and it extends northward at least as far as Spitzbergen. Carboniferous rocks are present in North and South Africa, and in India and Australasia; in China they cover thousands of square miles, and in the United States and British North America they occupy no less than 200,000 sq. m.; they are known also in South America.

The subjoined table expresses the typical subdivisions which can be recognized, with modifications, in the United Kingdom.

Coal Measures.	Upper: Red and grey sandstones, marls and clays with occasional breccias, thin coals and limestones with *Spirorbis*, workable coals in the South Wales, Bristol, Somerset and Forest of Dean coalfields. Middle: Sandstones, marls, shales and the most important of the British coals. Lower: Flaggy hard sandstones (ganister), shales and thin coal seams.
Millstone Grit.	Grits (coarse and fine), shales, thin coal seams and occasional thin limestones. The fossil plants connect this group with the coal-measures; the marine fossils have, to some extent, a Carboniferous limestone aspect.
Carboniferous Limestone Series.	*Upper black shales* with thin limestones (Pendleside group) connecting this series with the Millstone grit above. *The thick, main or scaur limestone* (mountain limestone) of the centre and south of England, Wales and Ireland, which splits up in the Yorkshire dales (Yoredale group) into a succession of stout limestone beds between beds of sandstone and shale, and becomes increasingly detrital in character as it is traced northwards. *Lower limestone shales* of the south and centre of England with marine fossils, and the Calciferous Sandstone group of Scotland with marine, estuarine and terrestrial fossils.

(See BERNICIAN, TUEDIAN and AVONIAN.)

At an early period, owing to the immense commercial importance of the coal seams, it became the practice to distinguish a "productive" (*flotzführend, terrain houiller*) and an "unproductive," barren (*flotzleerer*) Lower Carboniferous; these two groups correspond in North America to the "Carboniferous" and "Sub-Carboniferous" respectively, or, as they are now sometimes styled, the "Pennsylvanian" and "Mississippian." But it was soon discovered that the "productive" beds were not regularly restricted to the upper or younger division, and, as E. Kayser points out, the real state of the matter is more accurately represented by the subjoined tabular scheme.

	Continental Type of Deposit.	Marine Type of Formation.	
Upper Carboniferous	Upper *Productive* Carboniferous	Younger Carboniferous limestone and the *Fusulina* limestone of Russia and Western North America	
Lower Carboniferous	Lower *Productive* Carboniferous	Culm (in part)	Lower Carboniferous limestone series

While the continental type of deposit, with its coal beds, was the earliest to be formed in certain areas, and the marine series came on later, in other regions this order was reversed. It should be observed, however, that the repeated intercalation of marine deposits within the continental series and the frequent occurrence of thin coaly layers in the marine series makes any hard and fast distinction of this kind impossible.

The so-called "unproductive" or barren strata, that is, those without workable coals, are not always limestones; quite as often they are shales, red sandstones and red marls.

In subdividing the strata of the Carboniferous system and correlating the major divisions in different areas, just as in other great systems, use has to be made of the fossil contents of the rocks; stratigraphical units, based on lithology, are useless for this purpose. The groups of organisms utilized for zoning and correlation by different workers include brachiopods, pelecypods, cephalopods, corals, fishes and plants; and the results of the comparison of the faunas and floras of different areas where Carboniferous rocks occur are generalized in the table below.

The relative value of any group of animals or plants for the correlation of distant areas must vary greatly with the varying conditions of sedimentation and with the precise definition of the zonal species and with many other factors. It is found that the subdivisions in this system demanded by palaeobotanists do not always coincide with those acknowledged by palaeozoologists; nevertheless there is general agreement as to the main divisional lines.

Breaks in the Stratigraphic Sequence.—The sequence of Carboniferous strata is not everywhere one of unbroken continuity. From central France eastward towards the Carpathians only later portions of the system are found. These generally rest upon crystalline rocks, but in places they contain evidence of the denuded surfaces of Lower Carboniferous, as in the basin of Charleroi, where the equivalent of

the Millstone Grit contains fragments of chert which can only have come from the waste of the earlier limestones. This unconformity is generally found about the same horizon in the continental Culm areas, and it occurs again in the western part of the English Culm.

In the eastern border of the Rhenish Schiefergebirge the Permian rests unconformably upon Lower Carboniferous rocks. In the United States, in Missouri, Pennsylvania, West Virginia, Kentucky, Ohio and elsewhere, there is an unconformable junction between the Lower and Upper Carboniferous, representing an interval of time during which the lower member was strongly eroded; it has even been proposed to regard the Mississippian (Lower Carboniferous) as a distinct geological period, mainly on account of this break in the succession.

Tabular Statement of the Principal Subdivisions of the Carboniferous System.

		European Development.	America.	Predominant Plant Types.
Upper Carboniferous.	Coal Measures = Terrain Houiller.	Ouralien and Stephanien (marine type) // (continental type) \\	Pennsylvanian	Ferns and Annularias
		Moscovien and Westphalien (marine type) // (continental type) \\		Sigillarias and Calamites
Lower Carboniferous.	Carboniferous Limestone Series.	Dinantien (marine pelagic, including continental deposits in some areas) and Culm (marine littoral)	Mississippian	Lycopods

Thickness of Carboniferous Rocks.—The great variety of conditions under which the sediments and limestones were formed naturally produced corresponding inequalities in the thickness. In the Eurasian land area the greatest thickness of Carboniferous rocks is in the west; in North America it is in the east. In Britain the Carboniferous limestone series is 2000-3500 ft. thick; in the Ural mountains it is over 4500 ft.; the Culm in Moravia is credited with the enormous thickness of over 42,000 ft. The Upper Carboniferous in Lancashire is from 12,000 to 13,000 ft.; elsewhere in Britain it is thinner. In western Germany this portion attains a thickness of 10,000 ft. In Pennsylvania the sandstone and shale, at its maximum, reaches 4400 ft., but even within the limits of the state this formation has thinned out to no more than 300 ft. in places. In Colorado the Lower Carboniferous is only 400-500 ft. thick; while the limestones of the Mississippi basin amount to 1500 ft. and in Virginia are 2000 ft. thick.

Life of the Carboniferous Period.—We have seen that in the Carboniferous rocks there are two phases of sedimentation, the one marine, the other continental; corresponding with these there are two distinct faunal facies.

(1) *Fauna of the Marine Strata.*—Numerically, the most important inhabitants of the clear Carboniferous seas were the crinoids, corals, Foraminifera and brachiopods. Each of these groups contributed at one place or another towards the upbuilding of great masses of limestone. For the first time in the earth's history we find Foraminifera taking a prominent part in the marine faunas; the genus *Fusulina* was abundant in what is now Russia, China, Japan, North America; *Valvulina* had a wide range, as also had *Endothyra* and *Archaediscus*; *Saccammina* is a form well known in Britain and Belgium, and many others have been described; some Carboniferous genera are still extant. Radiolaria are found in cherts in the Culm of Devonshire and Cornwall, in Russia, Germany and elsewhere. Sponges are represented by spicules and anchor ropes. Corals, both reef-builders and others, flourished in the clearer waters; rugose forms are represented by Amplexoid, Zaphrentid and Cyathophyllid types, and by *Lithostrotion* and *Phillipsastraea*; common tabulate forms are *Chaetetes*, *Chladochonus*, *Michelinia*, &c. Amongst the echinoderms crinoids were the most numerous individually, dense submarine thickets of the long-stemmed kinds appear to have flourished in many places where their remains consolidated into thick beds of rock; prominent genera are *Cyathocrinus*, *Woodocrinus*, *Actinocrinus*; sea-urchins, *Archaeocidaris*, *Palaeechinus*, &c., were present; while the curious extinct Blastoids, which included the groups of *Pentremitidae* and *Codasteridae*, attained their maximum development.

Annelids (*Spirorbis*, *Serpulites*, &c.) are common fossils on certain horizons. The Bryozoa were also abundant in some regions (*Polypora*, *Fenestella*), including the remarkable form known as *Archimedes*.

Brachiopods occupied an important place; most typical were the Productids, some of which reached a great size and had very thick shells. Other common genera are *Spirifer*, *Chonetes*, *Athyris*, Rhynchonellids and Terebratulids, *Discina* and *Crania*. Some species had an almost world-wide range with only minor variations; such are *Productus semireticulatus*, *P. cora*, *P. pustulosus*; *Orthotetes* (*Streptorhynchus*) *crenistria*, *Dielasma hastata*, and many others.

Pelecypods among the true mollusca were increasing in numbers and importance (*Aviculopecten*, *Posidonomya*); *Nucula*, *Carbonicola*, *Edmondia*, *Conocardium*, *Modiola*, Gasteropods also were numerous (*Murchisonia*, *Euomphalus*, *Naticopsis*). The Pteropods were well represented by *Conularia* and *Bellerophon*. Amongst the Cephalopods, the most striking feature is the rise and development of the Goniatites (*Glyphioceras*, *Gastrioceras*, &c.); straight-shelled forms still lived on in some variety (*Orthoceras*, *Actinoceras*), along with numerous nautiloids.

Trilobites during this period sank to a very subordinate position, but Ostracods (*Cythere*, *Kirkbya*, *Beyrichia*) were abundant.

Many fish inhabited the Carboniferous seas and most of these were Elasmobranchs, sharks with crushing pavement teeth (*Psammodus*), adapted for grinding the shells of brachiopods, crustaceans, &c. Other sharks had piercing teeth (*Cladoselache* and *Cladodus*); some, the petalodonts, had peculiar cycloid cutting teeth. The Arthrodirans, so prominent during the Devonian period, disappeared before the close of the Carboniferous. Most of the sharks lived in the sea continuously, but the ganoids frequenting the coastal waters appear to have migrated inland. About 700 species of Carboniferous fish have been described largely from teeth, spines and dermal ossicles.

(2) *Flora and Fauna of the Lagoonal or Continental Facies.*—The strata deposited during this period are the earliest in which the remains of plants take a prominent place. The fossil plants which are found in the upper beds of the preceding Devonian system are so closely related to those in the Lower Carboniferous, that from a palaeobotanical standpoint the two form one indivisible period.

In the Lower Carboniferous the flora was composed of six great groups of plants, viz. the Equisetales (Horse-tails), the Lycopodiales (Club mosses), the Filicales (Ferns) and Cycadofilices, the Sphenophyllales and Cordaitales. These six groups were the dominant types throughout the period, but during Upper Carboniferous time three other groups arose, the Coniferales, the Cycadophyta, and the Ginkgoales (of which *Ginkgo biloba* is the only modern representative). Algae and fungi also were present, but there were no flowering plants. The true ferns, including tree ferns with a height of upwards of 60 ft., were associated with many plants possessing a fern-like habit (Cycadofilices) and others whose affinities have not yet been definitely determined. The fronds of some of these Carboniferous ferns are almost identical with those of living species. Probably many of the ferns were epiphytic. *Pecopteris*, *Cyclopteris*, *Neuropteris*, *Alethopteris*, *Sphenopteris* are common genera; *Megaphyton* and *Caulopteris* were tree ferns. Our modern diminutive "horse-tails" with scaly leaves were represented in the Carboniferous period by gigantic calamites, often with a diameter of 1 to 2 ft. and a height of 50 to 90 ft. The Carboniferous forerunners of the tiny club-moss were then great trees with dichotomously branching stems and crowded linear leaves, such as *Lepidodendron* (with its fruit cone called *Lepidostrobus*), *Halonia*, *Lepidophloios* and *Sigillaria*, the largest plants of the period, with trunks sometimes 5 ft. in diameter and 100 ft. high. The roots of several of these forms are known as *Stigmaria*. *Sphenophyllum* was a slender climbing plant with whorls of leaves, which was probably related both to the calamites and the lycopods. *Cordaites*, a tall plant (20-30 ft.) with yucca-like leaves, was related to the cycads and conifers; the catkin-like inflorescence, which bore yew-like berries, is called *Cardiocarpus*. Many large trees which have been looked upon as conifers on account of their wood structure may perhaps belong more properly to the Cordaitales. True coniferous trees (*Walchia*) do appear at the top of the coal measures.

The animals preserved in the continental type of Carboniferous deposit naturally differ markedly from the fossil remains of the purely marine portions of the system. The inhabitants of the waters of this geographical phase include mollusca, which are supposed to have lived in brackish or fresh water, such as *Anthracomya*, *Naiadites*, *Carbonicola*, and many forms of Crustacea, *e.g.* (*Bairdia Carbonia*), phyllopods (*Estheria*), phyllocarids (*Acanthocaris*, *Dithyrocaris*), schizopods (*Anthrapalaemon*), Eurypterids (*Eurypterus*, *Glyptoscorpius*). Fishes were abundant, many of the smaller ganoids are beautifully preserved in an entire condition, other larger forms are represented by fin spines, teeth and bones; *Clenodus*, *Uronemus*, *Acanthodes*, *Cheirodus*, *Gyracanthus* are characteristic genera.

Frequently a temporary return of marine conditions permitted the entombment of such salt water genera as *Lingula*, *Orbiculoides*, *Productus* in the thin beds known as "marine bands."

Remains of air-breathing insects, myriapods and arachnids show that these forms of life were both well developed and individually numerous. Among the insects we find the Orthoptera, Neuroptera, Hemiptera and Coleoptera represented; cockroaches were particularly abundant; crickets, beetles, locusts, walking-stick insects, mayflies and bugs are found, but there were neither flies, moths, butterflies nor bees, which is no more than we should expect from

the conditions of plant life. Many insects, &c., have been obtained from the coalfields of Saarbrück and Commentry, and from the hollow trunks of fossil trees in Nova Scotia. Certain British coalfields have yielded good specimens: *Archaeoptilus*, from the Derbyshire coalfield, had a spread of wing extending to more than 14 in.; some specimens (*Brodia*) still exhibit traces of brilliant wing colours. In the Nova Scotian tree trunks land snails (*Archaeozonites*, *Dendropupa*) have been found.

In the later Carboniferous rocks the earliest amphibians make their appearance in considerable numbers; they were all Stegocephalians (Labyrinthodonts) with long bodies, a head covered with bony plates and weak or undeveloped limbs. The largest were about 7 or 8 ft. long, the smallest only a few inches. Some were probably fluviatile in habit (*Loxomma*, *Anthracosaurus*, *Ophiderpeton*); others may have been terrestrial (*Dendrerpeton*, *Hylerpeton*). Certain footprints in the coal measures of Kansas have been supposed to belong to lacertilian or dinosaurian forms.

The Physical Conditions during the Period.—In western Europe the advent of the Carboniferous period was accompanied by the production of a series of synclines which permitted the formation of organic limestones, free from the sediments which generally characterized the concluding phases of the preceding Devonian deposition. The old land area still existed to the north, but doubtless much reduced in height; against this land, detrital deposits still continued to be formed, as in Scotland; while over central Ireland and central and northern England the clearer waters of the sea furnished a suitable home for countless corals, brachiopods and foraminifera and great beds of sea lilies; sponges flourished in many parts of the sea, and their remains contributed largely to the formation of the beds of chert. This clearer water extended from Ireland across north-central England and through South Wales and Somerset into Belgium and Westphalia; but a narrow ridge of elevated older rocks ran across the centre of England towards Belgium at this time.

Traced eastward into north Germany, Thuringia and Silesia, the limestones pass into the detrital culm formations, which owe their existence to a southern uplifted massif, the complement of the synclines already mentioned. Sediments approaching to the culm type, with similar flora and fauna, were deposited in synclinal hollows in parts of France and Spain.

Thus western Europe in early Carboniferous time was occupied by a series of constricted, gulf-like seas; and on account of the steady progress of intermittent warping movements of the crust, we find that the areas of clearer water, in which the limestone-building organisms could exist, were repeatedly able to spread, thus forming those thin limestones found interbedded with shale and sandstone which occur typically in the Yoredale district of Yorkshire and in the region to the north, and also in the culm deposits of central Europe. The spread of these limestones was repeatedly checked by the steady influx of detritus from the land during the pauses in movements of depression. Looking eastward, towards central and northern Russia, we find a wider and much more open sea; but the continental type of deposit prevailed in the northern portion, and here, as in Scotland, we find coal-beds amongst the sediments (Moscow basin). Farther south in the Donetz basin the coals only appear at the close of the Lower Carboniferous.

In North America, the crustal movements at the beginning of the period are less evident than in Europe, but a marked parallelism exists; for in the east, in the Appalachian tract, we find detrital sediments prevailing, while the open sea, with great deposits of limestone, lay out towards the west in the direction of that similar open sea which lay towards the east of Europe and extended through Asia.

The close of the early Carboniferous period was marked by an augmentation of the orogenic movements. The gentler synclines and anticlines of the earlier part of the period became accentuated, giving rise to pronounced mountain ridges, right across Europe.

This movement commenced in the central and western part of the continent and continued throughout the whole Carboniferous period. The mountains then formed have been called the "Palaeozoic Alps" by E. Kayser, the "Hercynian Mountains" by M. Bertrand. The most western range extended from Ireland through Wales and the south of England to the central plateau of France; this was the "Armorican range" of E. Suess. The eastern part of the chain passed from South France through the Vosges, the Black Forest, Thuringia, Harz, the Fichtelgebirge, Bohemia, the Sudetes, and possibly farther east; this constitutes the "Varischen Alps" of Suess.

The sea had gained somewhat at the beginning of the Carboniferous period in western Europe, but the effect of these movements, combined with the rapid formation of detrital deposits from the rising land areas, was to drive the sea steadily from the north towards the south, until the open sea (with limestones) was relegated to what is now the Mediterranean and to Russia and thence eastward. Similar events were meanwhile happening in North America, for the seas were steadily filled with sediments which drove them from the north-east towards the south-west, and doubtless those movements which at the close of this period uplifted the Appalachian mountains were already operative in the same direction.

The folding of the Ural mountains began in the earlier part of this period and was continued, after its close, into the Permian; and there are traces of uplifts in central Asia and Armenia.

None of these movements appears to have affected the southern hemisphere.

The net result of the orogenic movements was, that at the close of the period there existed a great northern continental mass, embracing Europe, North Asia and North America; and a great southern continental mass, including South America, Africa, Australia and India. Between these land masses lay a great Mediterranean sea—the "Tethys" of Suess.

The conditions under which the beds of coal were formed will be found described under that head; it will be sufficient to notice here that some coal seams were undoubtedly formed by jungle or swamp-like growths on the site of the deposit, and it is equally true that others were formed by the transport and deposition of vegetable detritus. The main point to observe in this connexion is that large tracts of land in many parts of the world were at a critical level as regards the sea, a condition highly favourable to frequent extensive incursions of marine waters over the low-lying areas in a period of extreme crustal instability.

Vulcanicity.—In intimate relationship with the mountain-building orogenic crustal movements was the prevalence of volcanic activity during the earlier part of this period. In the Lower Carboniferous rocks of Scotland intercalated volcanic rocks are strikingly abundant, and now form an important feature in the geology of the southern portion of that country. Of these rocks Sir Archibald Geikie says: "Two great phases or types of volcanic action during Carboniferous time may be recognized—(1) Plateaus, where the volcanic materials discharged copiously from many scattered openings now form broad tablelands or ranges of hills, sometimes many hundreds of square miles in extent and 1500 ft. or more in thickness; (2) Puys, where the ejections were often confined to the discharge of a small amount of fragmentary materials from a single independent vent." The plateau type was most extensively developed during the formation of the Calciferous Sandstone; the puy type was of somewhat later date. Basic lavas, with andesites, trachytes, tuffs and agglomerates are the most common Scottish rocks of this period. Similar eruptions, but on a much smaller scale, took place in other parts of Great Britain.

Granites, porphyries and porphyrites belonging to this period occur in the Saxon Erzgebirge, the Harz, Thüringerwald, Vosges, Brittany, Cornwall and Christiania. Porphyrites and tuffs are known in the French Carboniferous. In China, at the close of the period, there were enormous eruptions of melaphyre, porphyrite and quartz-porphyry. In North America, the principal region of volcanic activity lay in the west; great thicknesses of igneous rocks occur in the Lower Carboniferous rocks of British Columbia, and from the middle of the period until near its close volcanoes were active from Alaska to California. Igneous rocks of this period are found also in Australasia.

Climate.—That the vegetation during this period was unusually exuberant there can be no doubt, and that a general uniformity of climatic conditions prevailed is shown not only by the wide distribution of coal measures, but by the uniformity of plant types over the whole earth. It is well, however, to guard against an over-estimation of this exuberance; it must be borne in mind that the physiographic conditions were peculiarly favourable to the preservation of plant remains, conditions that do not appear to have obtained so completely in any other period. The climate, we may assume from the distribution of land and water, was generally moist, and it was probably mild if not warm; conditions favourable to the growth of certain types of plants. But there is no good evidence for an excess of carbon dioxide in the atmosphere—an assumption founded on the luxuriance of the vegetation, coupled with the fact that vulcanicity was active and wide-ranging. Carbon dioxide may have been present in the air in greater abundance in earlier periods than it is at present, but there is no reason to suppose that the percentage was appreciably higher in the Carboniferous period than it is now.

The occurrence of *red deposits* in western Australia, Scotland, the Ural mountains, in Michigan, Montana and Nova Scotia, &c., associated in some instances with the formation of gypsum and salt, clearly points to the existence of areas of excessive evaporation, such as are found in land-locked waters in regions where something like desert conditions prevail. The xerophytic structures found in some of the plants might seem to corroborate this view; but similar structures are assumed by many plants when dwelling in brackish marshes and morasses.

The abundance of corals in some of the Carboniferous seas and possibly also the large size of some of the Productids and foraminifera may be taken as evidence of warm or temperate waters.

In spite of the bulk of the evidence being in favour of geniality of climate, it is necessary to observe that certain deposits have been recognized as glacial; in the culm of the Frankenwald, in the coal basins of central France, and in central England, certain conglomeratic beds have been assigned, somewhat doubtfully, to this origin. They have also been regarded as the result of torrential action. Glacial deposits certainly do exist in the Permo-carboniferous formations, which are described under that head, but in the true Carboniferous system glaciation may be taken as not proven. The foreign boulders of granite, gneiss, &c., found in the coal-measures of some districts, are quite as likely to have been dropped by rafts of vegetation as to have been carried by floating icebergs.

Economic Products.—Foremost among the useful products of the Carboniferous rocks is the coal (*q.v.*) itself; but associated with the coal seams in Great Britain, North America and elsewhere, are very important beds of ironstone, fire-clay, terra-cotta clay, and occasionally oil shale and alum shale. Oil and gas are of importance in the Lower Carboniferous Pocono sandstone of West Virginia and in the Berea grit of Ohio, where brine also occurs.

In the Carboniferous Limestone series, the purer kinds of limestone are used for the manufacture of lime, bleaching powder and similar products, also as a flux in the smelting of iron; some of the less pure varieties are used in making cement. The beds of chert are utilized in the pottery industry, and some of the harder and more crystalline limestones are beautiful marbles, capable of taking a high polish.

The sandstones are used for building, and for millstones and grindstones. Within the Carboniferous rocks, but due to the action of various agencies long after their deposition, are important ore formations; such are the Rio Tinto ores of Spain, the lead and zinc ores and some haematite of the Pennine and Mendip hills and other British localities, and many ore regions in the United States.

REFERENCES.—For a good general account of the Carboniferous system, see A. Geikie, *Text Book of Geology*, vol. ii. (4th ed., 1903); and for the American development see T. C. Chamberlin and R. D. Salisbury, *Geology*, vol. ii. (1906). These two works give abundant references to the literature of the subject. See also, *Recent Additions to Geological Literature*, published annually by the Geological Society of London since 1893; and *Neues Jahrbuch für Mineralogie* (Stuttgart). (J. A. H.)

CARBORUNDUM, a silicide of carbon formed by the action of carbon on sand (silica) at high temperatures, which on account of its great hardness is an important abrasive, and also has possible applications in the metallurgy of iron and steel. Its name was derived from *carbon* and *corundum* (a form of alumina), from a mistaken view as to its composition. It was first obtained accidentally in 1891 by Acheson in America, when he was experimenting with the electric furnace in the hope of producing artificial diamonds. The experiments were followed up in an incandescence furnace, which on a larger scale is now employed for the industrial manufacture of the product. A full description of the process has been given in the *Journ. Soc. Chem. Industry*, 1897, vol. xvi. p. 863. The furnace is rectangular, about 16 ft. long and 5 ft. wide by 5 ft. high, with massive brick end walls 2 ft. thick, through which are built the carbon poles, consisting of bundles of 60 parallel 3-in. carbon rods, each 3 ft. in length, with a copper rod let into the outer end to connect it with a copper cap, which in turn is connected with one of the terminals of the generating dynamo. The spaces between the carbons of the electrode are packed tightly with graphite. In preparing the furnace for use, transverse iron screens are placed temporarily across each end, the space between these and the end walls being rammed with fine coke, and that in the interior is filled to the level of the centre of the carbon poles with the charge, consisting of 34 parts of coke, with 54 of sand, 10 of sawdust and 2 of salt. A longitudinal trench is then formed in the middle, and in this is arranged a cylindrical pile of fragments of coke about ½ in. or more in diameter, so that they form a core, about 21 in. in diameter, connecting the carbon poles in the end walls. Temporary side walls are then built up, the iron screens are removed, and a further quantity of charge is heaped up about 3 ft. above the top of the furnace. An alternating current of about 1700 amperes at 190 volts is now switched on; as the mass becomes heated by the passage of the current the resistance diminishes, and the current is regulated until after about 2 hours or less from starting it is maintained constant at about 6000 amperes and 125 volts. Carbon monoxide is given off and burns freely around the sides and top of the furnace, tinged yellow after a time by the sodium in the salt mixed with the charge. Meanwhile a shrinkage takes place, which is made good by the addition of a further quantity of charge until the operation is complete, usually in about 36 hours from the commencement. The current is then switched off, and the side walls, after cooling for a day, are taken down, the comparatively unaltered charge from the top is removed, and the products are carefully extracted. These consist of the inner carbon core, which at the temperature of the furnace will have been for the most part converted into graphite, then a thin black crust of graphite mixed with carborundum, next a layer of nearly pure crystallized carborundum about a foot in thickness, then grey amorphous carbide of silicon mixed with increasing proportions of unaltered charge, and lastly, on the outside, the portion of the charge which had never reached the temperature necessary for reaction, and which is altered only by the intrusion of salt from the inner part of the furnace. Special precautions are taken in making and breaking the intense current here used (amounting at the end to about 750 kilowatts, or 1000 E.H.P.), a water-regulator consisting of removable iron plates dipped in salt water being used for the purpose. In such a furnace as that above described the charge weighs about 14 tons, the yield of carborundum is about 3 tons, and the expenditure of energy about 3·9 kilowatt-hours (5·2 H.P.-hours) per pound of finished product. The carborundum thus produced is crystalline, greenish, bluish or brownish in colour, sometimes opaque, but often translucent, resisting the action of even the strongest acids, and the action of air or of sulphur at high temperatures. The crude product can therefore be treated with hot sulphuric acid to purify it. In hardness it nearly equals the diamond, and it is used for tool-grinding in the form of vitrified wheels (mixed with powdered porcelain and iron, pressed into shape and fired in a kiln). Carborundum paper, made like emery paper, is now largely used in place of garnet paper in American shoe factories, and finds a market in other directions. The amorphous carbide, which was at first a waste product, has been tried, it is reported, with success as a lining for steel furnaces, as it is said not to be affected by iron or iron oxide at a white heat. (W. G. M.)

CARBOY (from the Pers. *qarābah*, a flagon), a large globular glass vessel or bottle, encased in wicker or iron-work for protection, used chiefly for holding vitriol, nitric acid and other corrosive liquids.

CARBUNCLE (Lat. *carbunculus*, diminutive of *carbo*, a glowing coal), in mineralogy, a garnet (*q.v.*) cut with a convex surface. In medicine the name given to an acute local inflammation of the deeper layers of the skin, followed by sloughing. It is accompanied by great local tension and by constitutional disturbance, and in the early stages the pain is often extremely acute. A hard flattened swelling of a deep-red colour is noticed on the back, face or extremities. This gradually extends until in some instances it may become as large as a dinner-plate. Towards the centre of the mass numerous small openings form on the surface, from which blood and matter escape. Through these openings a yellow slough or "core" of leathery consistence can be seen. Carbuncle is an intense local inflammation caused by septic germs which have in some manner found their way to the part. It is particularly apt to occur in persons whose health is depressed by mental worries, or by such troubles as chronic disease of the kidneys or blood-vessels, or by diabetes. The attack ends in mortification of the affected tissue, and, after much suffering, the core or mortified part slowly comes away. The modern treatment consists in cutting into the inflamed area, scraping out the germ-laden core at the earliest possible moment, and applying germicides. This method relieves the pain at once, materially diminishes the risk of blood-poisoning, and hastens convalescence. (E. O.*)

CARCAGÉNTE, or CARCAJÉNTE, a town of eastern Spain, in the province of Valencia; near the right bank of the river Júcar, at the junction between the Valencia-Murcia and Carcagénte-Denia railways. Pop. (1900) 12,262. Carcagénte is a picturesque town, of considerable antiquity. Various Roman remains have been found in its neighbourhood. It is surrounded by groves of orange, palm and mulberry trees, and contains many Moorish houses, whose old-fashioned blue-tiled cupolas contrast with the chimneys of the silk mills and linen factories opened in modern times. An important local industry is the cultivation of rice, for which the moist and warm climate of the low-lying Júcar valley is well suited.

CÁRCAR, a town of the province of Cebú, island of Cebú, Philippine Islands, on the Cárcar river near its mouth at the head of Cárcar Bay, 23 m. S.W. of Cebú, the capital. It is connected with Cebú by a railway, and a branch of this railway extending across the island to Barili and Dumanjug was projected in 1908. Cárcar has some coast trade. The surrounding country

is rugged, and produces Indian corn and sugar in considerable quantity. The language is Cebú-Visayan. Cárcar was founded in 1624.

CARCASS, the dead body of an animal. As a butcher's term, the word means the body of an animal without the head, extremities and offal. It is also used of a hollow iron case filled with combustibles, and fired from a howitzer to set fire to buildings, ships, &c., the flames issuing through holes pierced in the sides. The word is common in various forms to Romanic languages, but the ultimate origin is obscure. Possible derivations are from the Lat. *caro*, flesh, and Ital. *casso* or *cassa*, chest, or from a Med. Gr. *ταρκάσιον*, a quiver, for which the Fr. is *carquois*, and Port. *carcaz*.

CARCASSONNE, a city of south-western France, capital of the department of Aude, 57 m. S.E. of Toulouse, on the Southern railway between that city and Narbonne. Pop. (1906) 25,346. Carcassonne is divided by the river Aude into two distinct towns, the Ville Basse and the Cité, which are connected by two bridges, one modern, the other dating from the 13th century. The Cité occupies the summit of an abrupt and isolated hill on the right bank of the river. Its dirty and irregular streets are inhabited by a scanty population of workpeople, and its interest lies mainly in its ancient fortifications (see FORTIFICATION AND SIEGECRAFT) which, for completeness and strength, are unique in France and probably in Europe. They consist of a double line of ramparts, of which the outer measures more than 1600 yds. in circumference. These are protected at frequent intervals by towers, and can be entered only by two gates, one to the east, the other to the west, both of which are themselves elaborately fortified (see GATE). In the interior, and to the north of the western gate, a citadel adjoins the fortifications. A portion of the inner line is attributed to the Visigoths of the 6th century; the rest, including the castle, seems to belong to the 11th or 12th century, while the outer circuit has been referred mainly to the end of the 13th. The old cathedral of St Nazaire dates from the 11th to the 14th centuries. The nave was begun in 1096 and is Romanesque in style; the transept and choir, which contain magnificent stained glass of the Renaissance period, are of Gothic architecture. Both the fortifications and the church were restored by Viollet-le-Duc between 1850 and 1880. On the left bank of the Aude, between it and the Canal du Midi, lies the new town, clean, well-built and flourishing, with streets intersecting each other at right angles. It is surrounded by boulevards occupying the site of its ramparts, and is well provided with fountains, public squares and gardens planted with fine plane-trees. The most interesting buildings are the cathedral of St Michel, dating from the 13th century but restored in modern times, and St Vincent, a church of the 14th century, remarkable for the width of its nave.

Carcassonne is the seat of a bishop, a prefect and a court of assizes, and has tribunals of first instance and of commerce, a chamber of commerce and a branch of the Bank of France. It also has a lycée for boys, training-colleges, theological seminaries, a library and a museum rich in paintings. The old cloth industry is almost extinct. The town is, however, an important wine-market, and the vineyards of the vicinity are the chief source of its prosperity, which is enhanced by its port on the Canal du Midi. Tanning and leather-dressing, distilling, the manufacture of agricultural implements, furniture and corks, cooperage and the preparation of preserved fruits, are prominent industries.

Carcassonne occupies the site of *Carcaso*, an ancient city of Gallia Narbonensis, which belonged to the Volcae Tectosages. It was a place of some importance at the time of Caesar's invasion, but makes almost no appearance in Roman history. On the disintegration of the empire, it fell into the hands of the Visigoths, who, in spite of the attacks of the Franks, especially in 585, retained possession till 724, when they were expelled by the Arabs, destined in turn to yield before long to Pippin the Short. From about 819 to 1082 Carcassonne formed a separate countship, and from the latter date till 1247 a viscountship. Towards the end of the 11th century the viscounts of Carcassonne assumed the style of viscounts of Béziers, which town and its lords they had dominated since the fall of the Carolingian empire. The viscounty of Carcassonne, together with that of Béziers, was confiscated to the crown in 1247, as a result of the part played by the viscount Raymond Roger against Simon de Montfort in the Albigensian crusade, during which in 1209 the city was taken by the Crusaders (see ALBIGENSES). A revolt of the city against the royal authority was severely punished in 1262 by the expulsion of its principal inhabitants, who were, however, permitted to take up their quarters on the other side of the river. This was the origin of the new town, which was fortified in 1347. During the religious wars, Carcassonne several times changed hands, and it did not recognize Henry IV. till 1596.

See E. E. Viollet-le-Duc, *La Cité de Carcassonne* (Paris, 1858); L. Fédié, *Histoire de Carcassonne* (Carcassonne, 1887).

CARDAMOM, the fruit of several plants of the genera *Elettaria* and *Amomum*, belonging to the natural order Zingiberaceae, the principal of which is *Elettaria Cardamomum*, from which the true officinal or Malabar cardamom is derived. The Malabar cardamom plant is a large perennial herb with a thick fleshy root-stock, which sends up flowering stems, 6 to 12 ft. high. The large leaves are arranged in two rows, have very long sheaths enveloping the stem and a lanceolate spreading blade 1 to 2½ ft. long. The fruit is an ovate-triangular, three-celled, three-valved capsule (about ⅓ in. long, of a dirty yellow colour) enclosing numerous angular seeds, which form the valuable part of the plant. It is a native of the mountainous parts of the Malabar coast of India, and the fruits are procured either from wild plants or by cultivation throughout Travancore, western Mysore, and along the western Ghauts. A cardamom of much larger size found growing in Ceylon was formerly regarded as belonging to a distinct species, and described as such under the name of *Elettaria major*; but it is now known to be only a variety of the Malabar cardamom. In commerce, several varieties are distinguished according to their size and flavour. The most esteemed are known as "shorts," a name given to such capsules as are from a quarter to half an inch long and about a quarter broad. Following these come "short-longs" and "long-longs," also distinguished by their size, the largest reaching to about an inch in length. The Ceylon cardamom attains a length of an inch and a half and is about a third of an inch broad, with a brownish pericarp and a distinct aromatic odour. Among the other plants, the fruits of which pass in commerce as cardamoms, are the round or cluster cardamom, *Amomum Cardamomum*, a native of Siam and Java; the bastard cardamom of Siam, *A. xanthioides*—the Bengal cardamom, which is the fruit of *A. subulatum*, a native of Nepal; the Java cardamom, produced by *A. maximum*; and the Korarima cardamom of Somaliland, the last-named is the product of a plant which is unknown botanically. Cardamoms generally are possessed of a pleasant aromatic odour, and an agreeable, spicy taste. On account of their flavour they are much used with other medicines, and they form a principal ingredient in curries and compounded spices. In the north of Europe they are much used as a spice and flavouring material for cakes and liqueurs; and they are very extensively employed in the East for chewing with betel, &c.

CARDAN [Ital. CARDANO], **GIROLAMO** [GERONYMO or HIERONIMO] (1501–1576), Italian mathematician, physician and astrologer, born at Pavia on the 24th of September 1501, was the illegitimate son of Facio Cardano (1444–1524), a learned jurist of Milan, himself distinguished by a taste for mathematics. He was educated at the university of Pavia, and subsequently at that of Padua, where he graduated in medicine. He was, however, excluded from the College of Physicians at Milan on account of his illegitimate birth, and it is not surprising that his first book should have been an exposure of the fallacies of the faculty. A fortunate cure of the child of the Milanese senator Sfondrato now brought him into notice, and the interest of his patron procured him admission into the medical body. About this time (1539) he obtained additional celebrity by the publication of his *Practica arithmeticae generalis*, a work of great merit

for the time, and he became engaged in a correspondence with Niccolo Tartaglia, who had discovered a solution of cubic equations. This discovery Tartaglia had kept to himself, but he was ultimately induced to communicate it to Cardan under a solemn promise that it should never be divulged. Cardan, however, published it in his comprehensive treatise on algebra (*Artis magnae sive de regulis Algebrae liber unus*) which appeared at Nuremberg in 1545 (see ALGEBRA: *History*). Two years previously he had published a work even more highly regarded by his contemporaries, his celebrated treatise on astrology. As a believer in astrology Cardan was on a level with the best minds of his age; the distinction consisted in the comparatively cautious spirit of his inquiries and his disposition to confirm his assertions by an appeal to facts, or what he believed to be such. A very considerable part of his treatise is based upon observations carefully collected by himself, and seemingly well calculated to support his theories so far as they extend. Numerous instances of his belief in dreams and omens may be collected from his writings, and he especially valued himself on being one of the five or six celebrated men to whom, as to Socrates, had been vouchsafed the assistance of a guardian daemon.

In 1547 he was appointed professor of medicine at Pavia. The publication of his works on algebra and astrology at this juncture had gained for him a European renown, and procured him flattering offers from Pope Paul III. and the king of Denmark, both of which he declined. In 1551 his reputation was crowned by the publication of his great work, *De Subtilitate Rerum*, which embodied the soundest physical learning of his time and simultaneously represented its most advanced spirit of speculation. It was followed some years later by a similar treatise, *De Varietate Rerum* (1557), the two making in effect but one book. A great portion of this is occupied by endeavours, commonly futile, to explain ordinary natural phenomena, but its chief interest for us consists in the hints and glimpses it affords of principles beyond the full comprehension of the writer himself, and which the world was then by no means ready to entertain. The inorganic realm of Nature he asserts to be animated no less than the organic; all creation is progressive development; all animals were originally worms; the inferior metals must be regarded as *conatus naturae* towards the production of gold. The indefinite variability of species is implied in the remark that Nature is seldom content with a single variation from a customary type. The oviparous habits of birds are explained by their tendency to favour the perpetuation of the species, precisely in the manner of modern naturalists. Animals were not created for the use of man, but exist for their own sakes. The origin of life depends upon cosmic laws, which Cardan naturally connects with his favourite study of astrology. The physical divergencies of mankind arise from the effects of climate and the variety of human circumstances in general. Cardan's views on the dissimilarity of languages are much more philosophical than usual at his time; and his treatise altogether, though weak in particular details, is strong in its pervading sense of the unity and omnipotence of natural law, which renders it in some degree an adumbration of the course of science since the author's day. It was attacked by J. C. Scaliger, whom Cardan refuted without difficulty.

The celebrity which Cardan had acquired led in the same year (1551) to his journey to Scotland as the medical adviser of Archbishop Hamilton of St Andrews. The archbishop was supposed to be suffering from consumption, a complaint which Cardan, under a false impression, as he frankly admits, had represented himself as competent to cure. He was of great service to the archbishop, whose complaint proved to be asthmatical; but the principal interest attaching to his expedition is derived from his account of the disputes of the medical faculty at Paris, and of the court of Edward VI. of England. The Parisian doctors were disturbed by the heresies of Vesalius, who was beginning to introduce anatomical study from the human subject. Cardan's liberality of temper led him to sympathize with the innovator. His account of Edward VI.'s disposition and understanding is extremely favourable, and is entitled to credit as that of a competent observer without bias towards either side of the religious question. He cast the king's nativity, and indulged in a number of predictions which were effectually confuted by the royal youth's death in the following year.

Cardan had now attained the summit of his prosperity, and the rest of his life was little but a series of disasters. His principal misfortunes arose from the crimes and calamities of his sons, one of whom was an utter reprobate, while the tragic fate of the other overwhelmed the father with anguish. This son, Giovanni Battista, also a physician, had contracted an imprudent marriage with a girl of indifferent character, Brandonia Seroni, who subsequently proved unfaithful to him. The injured husband revenged himself with poison; the deed was detected, and the exceptional severity of the punishment seems to justify Cardan in attributing it to the rancour of his medical rivals, with whom he had never at any time been on good terms. The blow all but crushed him; his reputation and his practice waned; he addicted himself to gaming, a vice to which he had always been prone; his mind became unhinged and filled with distempered imaginations. He was ultimately banished from Milan on some accusation not specified, and although the decree was ultimately rescinded, he found it advisable to accept a professorship at Bologna (1562). While residing there in moderate comfort, and mainly occupied with the composition of supplements to his former works, he was suddenly arrested on a charge not stated, but in all probability heresy. Though he had always been careful to keep on terms with the Church, the bent of his mind had been palpably towards free thought, and the circumstance had probably attracted the attention of Pius V., who then ruled the Church in the spirit, as he had formerly exercised the functions, of an inquisitor. Through the intercession, as would appear, of some influential cardinals, Cardan was released, but was deprived of his professorship, prohibited from teaching and publishing any further, and removed to Rome, where he spent his remaining years in receipt of a pension from the pope. It seems to have been urged in his favour that his intellect had been disturbed by grief for the loss of his son—an assertion to which his frequent hallucinations lent some countenance, though the existence of any serious derangement is disproved by the lucidity and coherence of his last writings. He occupied his time at Rome in the composition of his commentaries, *De Vita Propria*, which, along with a companion treatise, *De Libris Propriis*, is our principal authority for his biography. Though he had burned much, he left behind him more than a hundred MSS., not twenty of which have been printed. He died at Rome on the 21st of September 1576.

Alike intellectually and morally, Cardan is one of the most interesting personages connected with the revival of science in Europe. He had no especial bent towards any scientific pursuit, but appears as the man of versatile ability, delighting in research for its own sake. He possessed the true scientific spirit in perfection; nothing, he tells us, among the king of France's treasures appeared to him so worthy of admiration as a certain natural curiosity which he took for the horn of a unicorn. It has been injurious to his fame to have been compelled to labour, partly in fields of research where no important discovery was then attainable, partly in those where his discoveries could only serve as the stepping-stones to others, by which they were inevitably eclipsed. His medical career serves as an illustration of the former case, and his mathematical of the latter. His medical knowledge was wholly empirical; restrained by the authority of Galen, and debarred from the practice of anatomy, nothing more could be expected than that he should stumble on some fortunate nostrums. As a mathematician, on the other hand, he effected important advances in science, but such as merely paved the way for discoveries which have obscured his own. From his astrology no results could be expected; but even here the scientific character of his mind is displayed in his common-sense treatment of what usually passed for a mystical and occult study. His prognostications are as strictly empirical as his prescriptions, and rest quite as much upon the observations which he supposed himself to have made in his practice. As frequently is the case with men incapable of rightly ordering

their own lives, he is full of wisdom and sound advice for others; his ethical precepts and practical rules are frequently excellent. To complete the catalogue of his accomplishments, he is no contemptible poet.

The work of Cardan's, however, which retains most interest for this generation is his autobiography, *De Vita Propria*. In its clearness and frankness of self-revelation this book stands almost alone among records of its class. It may be compared with the autobiography of another celebrated Italian of the age, Benvenuto Cellini, but is much more free from vanity and self-consciousness, unless the extreme candour with which Cardan reveals his own errors is to be regarded as vanity in a more subtle form. The general impression is highly favourable to the writer, whose impetuosity and fits of reckless dissipation appear as mere exaggerations of the warmth of heart which imparted such strength to his domestic affections, and in the region of science imparted that passionate devotion to research which could alone have enabled him to persevere so resolutely and effect such marked advances in such multifarious fields of inquiry.

Cardan's autobiography has been most ably condensed, and at the same time supplemented by information from the general body of his writings and other sources, by Henry Morley (*Jerome Cardan*, 1854, 2 vols). His capital treatises, *De Subtilitate* and *De Varietate Rerum*, are combined and fully analysed in vol. ii. of Rixner and Siber's *Leben und Lehrmeinungen berühmter Physiker am Ende des xvi. und am Anfange des xvii. Jahrhunderts* (Sulzbach, 1820). Cardan's works were edited in ten volumes by Sponius (Lyons, 1663). A biography was prefixed by Gabriel Naudé, whose unreasonable depreciation has unduly lowered Cardan's character with posterity. (R. G.)

CÁRDENAS (*San Juan de Dios de Cárdenas*), a maritime town of Cuba, in Matanzas province, about 75 m. E. of Havana, on the level and somewhat marshy shore of a spacious bay of the northern coast of the island, sheltered by a long promontory. Pop. (1907) 24,280. It has railway communication with the trunk railway of the island, and communicates by regular steamers with all the coast towns. The city lies between the sea and hills. There are broad streets, various squares (including the Plaza de Colón, with a bronze statue of Columbus given to the city by Queen Isabel II. and erected in 1862) and substantial business buildings. Cárdenas is one of the principal sugar-exporting towns of Cuba. The shallowness of the harbour necessitates lighterage and repeated loading of cargoes. The surrounding region is famed for its fertility. A large quantity of asphalt has been taken from the bed of the harbour. A flow of fresh water from the bed of the harbour is another peculiar feature; it comes presumably from the outlets of subterranean rivers. There is a large United States business element, which has been, indeed, prominent in the city ever since its foundation. At El Varadero, on a peninsula at the mouth of the bay, there is fine sea-bathing on a long beach, and El Varadero is a winter resort. Cárdenas was founded in 1828, and in 1861 already had 12,910 inhabitants. In 1850 General Narciso Lopez landed here on a filibustering expedition, and held the town for a few hours, abandoning it when he saw that the people would not rise to support him in his efforts to secure Cuban independence. On the 11th of May 1898 an American torpedo-boat and revenue cutter here attacked three Spanish gun-boats, and Ensign Worth Bagley (1874–1898) was killed—the first American naval officer to lose his life in the Spanish-American War.

CARDIFF, a city, municipal, county and parliamentary borough, seaport and market-town, and the county town of Glamorganshire, South Wales, situated on the Taff, 1 m. above its outflow, 145¼ m. from London by the Great Western railway via Badminton, 40½ m. W. of Bristol and 45½ m. E.S.E. of Swansea. Cardiff is also the terminus of both the Taff Vale and the Rhymney railways, the latter affording the London & North-Western railway access to the town. The Barry line from Barry dock joins the Great Western and Taff Vale railways at Cardiff, and the Cardiff Railway Company (which owns all the docks) has a line from Pontypridd via Llanishen to the docks. The Glamorganshire canal, opened in 1794, runs from Cardiff to Merthyr Tydfil, with a branch to Aberdare. The increase of the population of Cardiff during the 19th century was phenomenal; from 1870 inhabitants in 1801, and 6187 in 1831 it grew to 32,954 in 1861. The borough, which originally comprised only the parishes of St John's and St Mary's, was in 1875 and 1895 extended so as to include Roath and a large part of Llandaff, known as Canton, on the right of the Taff. The whole area was united as one civil parish in 1903, and the population in 1901 was 164,333, of whom only about 8% spoke Welsh.

Probably no town in the kingdom has a nobler group of public buildings than those in Cathays Park, which also commands a view of the castle ramparts and the old keep. On opposite sides of a fine avenue are the assize courts and new town hall (with municipal offices), which are both in the Renaissance style. The Glamorgan county council has also a site of one acre in the park for offices.

The University College of South Wales and Monmouthshire, founded in 1883, under the principalship of J. Viriamu Jones, for some time carried on its work in temporary buildings, pending the erection of the commodious and imposing building from the plans of Mr W. D. Caröe, in Cathays Park, where the registry of the university of Wales (of which the college is a constituent) is also situated. The Drapers' Company has given £15,500 towards building a library, in addition to previous donations to the engineering department and the scholarship fund of the college. The college has departments for arts, pure and applied science and technology, medicine, public health, music, and for the training of men and women teachers for elementary and secondary schools. Its library includes the Salesbury collection of books relating to Wales. Aberdare Hall is a hostel for the women students. The Baptist theological college of Pontypool was removed to Cardiff in 1895.

The public library and museum were founded in 1863, but in 1882 were removed to a new building which was enlarged in 1896. The library is especially rich in books and MSS. relating to Wales and in Celtic literature generally. These comprise the Welsh portion of the MSS. which belonged to Sir Thomas Phillipps of Middlehill (including the Book of Aneurin—one of the "Four ancient books of Wales"), purchased for £3500. A catalogue of the printed books in the Welsh department, which soon became a standard work of reference, was published in 1898, while a calendar of the Welsh MSS. was issued by the Historical MSS. Commission in 1903. There are six branch libraries, while a scheme of school libraries has been in operation since 1899. The chief features of the museum are collections of the fossils, birds and flora of Wales and of obsolete Welsh domestic appliances, casts of the pre-Norman monuments of Wales, and reproductions of metal and ivory work illustrating various periods of art and civilization. There is also a unique collection of Swansea and Nantgarw china. The fine arts department contains twenty-seven oil paintings by modern English and continental artists bequeathed by William Menelaus of Dowlais in 1883, the Pyke-Thompson collection of about 100 water-colour paintings presented in 1899, and some 3000 prints and drawings relating to Wales. In 1905 Cardiff was selected by a privy council committee to be the site of a state-aided national museum for Wales, the whole contents of the museum and art gallery, together with a site in Cathays Park, having been offered by the corporation for the purpose. A charter providing for its government was granted on the 19th of March 1907. In Cathays Park there is also a "gorsedd" or bardic circle of huge monoliths erected in connexion with the eisteddfod of 1899.

The other public buildings of the town include the infirmary founded in 1837, the present buildings being erected in 1883, and subsequently enlarged; the sanatorium, the seamen's hospital, the South Wales Institute of Mining Engineers (which has a library) built in 1894, the exchange, an institute for the blind, a school for the deaf and dumb, and one of the two prisons for the county (the other being at Swansea). There are a technical school, an intermediate school for boys and another for girls, a "higher-grade" and a pupil teachers' school. A musical festival is held triennially.

In the business part the buildings are also for the most part imposing and the thoroughfares spacious, while the chief

suburban streets are planted with trees. The Taff is spanned by two bridges, one a four-arched bridge rebuilt in 1858–1859 leading to Llandaff, and the other a cantilever with a central swinging span of 190 ft. 8 in.

In virtue of its being the shire-town, Cardiff acquired in 1535 the right to send one representative to parliament, which it did until 1832, from which date Cowbridge and Llantrisant have been joined with it as contributory boroughs returning one member. The great sessions for the county were during their whole existence from 1542 to 1830 held at Cardiff, but the assizes (which replaced them) have since then been held at Swansea and Cardiff alternately, as also are the quarter sessions for Glamorgan. The borough has a separate commission of the peace, having a stipendiary magistrate since 1858. It was granted a separate court of quarter sessions in 1890, it was constituted a county borough in 1888, and, by letters patent dated the 28th of October 1905, it was created a city and the dignity of lord mayor conferred on its chief magistrate. The corporation consists of ten aldermen and thirty councillors, and the area of the municipal borough is 8408 acres.

Under powers secured in 1884, the town obtains its chief water supply from a gathering ground near the sources of the Taff on the old red sandstone beyond the northern out-crop of the mineral basin and on the southern slopes of the Brecknock Beacons. Here two reservoirs of a combined capacity of 668 million gallons have been constructed, and a conduit some 36 m. long laid to Cardiff at a total cost of about £1,250,000. A third reservoir is authorized. A gas company, first incorporated in 1837, supplies the city as well as Llandaff and Penarth with gas, but the corporation also supplies electric power both for lighting and working the tramways, which were purchased from a private company in 1898. The city owned in 1905 about 290 acres of parks and "open spaces," the chief being Roath Park of 100 acres (including a botanical garden of 15 acres), Llandaff fields of 70 acres, and Cathays Park of 60 acres, which was acquired in 1900 mainly with the view of placing in it the chief public buildings of the town.

Commerce and Industries.—Edward II.'s charter of 1324 indicates that Cardiff had become even then a trading and shipping centre of some importance. It enjoyed a brief existence as a staple town from 1327 to 1332. During the reigns of Elizabeth and James I. it was notorious as a resort of pirates, while some of the ironfounders of the district were suspected of secretly supplying Spain with ordnance. It was for centuries a "head port," its limits extending from Chepstow to Llanelly; in the 18th century it sank to the position of "a creek" of the port of Bristol, but about 1840 it was made independent, its limits for customs' purposes being defined as from the Rumney estuary to Nash Point, so that technically the "port of Cardiff" includes Barry and Penarth as well as Cardiff proper. Down to the end of the 18th century there was only a primitive quay on the river side for shipping purposes. Coal was brought down from the hills on the backs of mules, and iron carried in two-ton wagons. In 1798 the first dock (12 acres in extent) was constructed at the terminus of the Glamorgan canal from Merthyr. The commercial greatness of Cardiff is due to the vast coal and iron deposits of the country drained by the Taff and Rhymney, between whose outlets the town is situated. But a great impetus to its development was given by the 2nd marquess of Bute, who has often been described as the second founder of Cardiff. In 1830 he obtained the first act for the construction of a dock, which (now known as the West Bute dock) was opened in 1839 and measures (with its basin) 19½ acres. The opening of the Taff Vale railway in 1840 and of the South Wales railway to Cardiff in 1850 necessitated further accommodation, and the trustees of the marquess (who died in 1848) began in 1851 and opened in 1855 the East Bute dock and basin measuring 46¼ acres. The Rhymney railway to Cardiff was completed in 1858 and the trade of the port so vastly increased that the shipment of coal and coke went up from 4562 tons in 1839 to 1,796,000 tons in 1860. In 1864 the Bute trustees unsuccessfully sought powers for constructing three additional docks to cost two millions sterling, but under the more limited powers granted in 1866, the Roath basin (12 acres) was opened in 1874, and (under a substituted act of 1882) the Roath dock (33 acres) was opened in 1887. All these docks were constructed by the Bute family at a cost approaching three millions sterling. Still they fell far short of the requirements of the district for in 1865 the Taff Vale Railway Company opened a dock of 26 acres under the headland at Penarth, while in 1884 a group of colliery owners, dissatisfied with their treatment at Cardiff, obtained powers to construct docks at Barry which are now 114 acres in extent. The Bute trustees in 1885 acquired the Glamorgan canal and its dock, and in the following year obtained an act for vesting their various docks and the canal in a company now known as the Cardiff Railway Company. The South Bute dock of 50½ acres, authorized in 1894 and capable of accommodating the largest vessels afloat, was opened in 1907, bringing the whole dock area of Cardiff (including timber ponds) to about 210 acres. There are also ten private graving and floating docks and one public graving dock. There is ample equipment of fixed and movable staiths and cranes of various sizes up to 70 tons, the Lewis-Hunter patent cranes being largely used for shipping coal owing to their minimizing the breakage of coal and securing its even distribution. The landing of foreign cattle is permitted by the Board of Trade, and there are cattle lairs and abattoirs near the Cardiff wharf. The total exports of the Cardiff docks in 1906 amounted to 8,767,502 tons, of which 8,433,629 tons were coal, coke and patent fuel, 151,912 were iron and steel and their manufactures, and 181,076 tons of general merchandise. What Cardiff lacks is a corresponding import trade, for its imports in 1906 amounted to only 2,108,133 tons, of which the chief items were iron ore (895,610 tons), pit-wood (303,407), grain and flour (298,197). Taking "the port of Cardiff" in its technical sense as including Barry and Penarth, it is the first port in the kingdom for shipping cleared to foreign countries and British possessions, second in the kingdom for its timber imports, and first in the world for shipment of coal.

The east moors, stretching towards the outlet of the Rhymney river, have become an important metallurgical quarter. Copper works were established here in 1866, followed long after by tin-stamping and enamel works. In 1888 the Dowlais Iron Company (now Messrs Guest, Keen & Nettlefold, Ltd.) acquired here some ninety acres on which were built four blast furnaces and six Siemens' smelting furnaces. There are also in the city several large grain mills and breweries, a biscuit factory, wire and hemp roperies, fuel works, general foundries and engineering works. At Ely, 3½ m. out of Cardiff, there are also breweries, a small tin works and large paper works. The newspapers of Cardiff include two weeklies, the *Cardiff Times* and *Weekly Mail*, founded in 1857 and 1870 respectively, two morning dailies, the *South Wales Daily News* and *Western Mail*, established in 1872 and 1869 respectively, and two evening dailies.

History and Historic Buildings.—In documents of the first half of the 12th century the name is variously spelt as *Kairdif*, *Cairti* and *Kardid*. The Welsh form of the name, Caerdydd (pronounced Caerdeeth, with the accent on the second syllable) suggests that the name means "the fort of (Aulus?) Didius," rather than Caer Dâf ("the fortress on the Taff"), which is nowhere found (except in Leland), though Caer Dyv once existed as a variant. No traces have been found of any pre-Roman settlement at Cardiff. Excavations carried out by the marquess of Bute from 1889 onward furnished for the first time conclusive proof that Cardiff had been a Roman station, and also revealed the sequence of changes which it had subsequently undergone. There was first, on the site occupied by the present castle, a camp of about ten acres, probably constructed after the conquest of the Silures A.D. 75–77, so as to command the passage of the Taff, which was here crossed by the Via Maritima running from Gloucester to St David's. In later Roman times there were added a series of polygonal bastions, of the type found at Caerwent. To this period also belongs the massive rampart, over 10 ft. thick, and the north gateway, one of the most perfect Roman gateways in Great Britain. After the departure of the Romans the walls became ruinous or were partly pulled down,

perhaps by sea rovers from the north. In this period of anarchy the native princes of Glamorgan had their principal demesne, not at the camp but a mile to the north at Llystalyhont, now merely a thatched farmhouse, while some Saxon invaders threw up within the camp a large moated mound on which the Normans about the beginning of the 12th century built the great shell-keep which is practically all that remains of their original castle. Its builder was probably Robert, earl of Gloucester, who also built Bristol castle. Then or possibly even earlier the old rampart was for two-thirds of its circuit buried under enormous earthworks, the remainder being rebuilt. It was in the keep, and not, as tradition says, in the much later "Black Tower" (also called "Duke Robert's Tower"), that Robert, duke of Normandy, was imprisoned by order of his brother Henry I. from 1108 until his death in 1134. Considerable additions of later date, in the Decorated and Perpendicular styles, are due to the Despensers and to Beauchamp, earl of Warwick, while the present residential part is of various dates ranging from the 15th century down to the last half of the 19th, when a thorough restoration, including the addition of a superbly ornamented clock-tower, was carried out. The original ditch, about 20 yds. wide, still exists on three sides, but it is now converted into a "feeder" for the docks and canal. Geoffrey of Monmouth was at one time chaplain of the castle, where he probably wrote some of his works. The scene of the "sparrow-hawk" tournament, described in *Geraint and Enid*, one of the Arthurian romances, is laid at Cardiff.

On the conquest of the district by the Normans under Fitz Hamon, Cardiff became the caput of the seigniory of Glamorgan, and the castle the residence of its lords. The castle and lordship descended by heirship, male and female, through the families of De Clare, Despenser, Beauchamp and Neville to Richard III., on whose fall they escheated to the Crown, and were granted later, first to Jasper Tudor, and finally by Edward VI. in 1550 to Sir William Herbert, afterwards created Baron Herbert of Cardiff and earl of Pembroke. Through the daughter and granddaughter of the 7th earl the castle and estates became the property of the 1st marquess of Bute (who was created Baron Cardiff in 1776), to whose direct descendant they now belong.

The town received its earliest known grant of municipal privileges sometime before 1147 from Fitz Hamon's successor and son-in-law Robert, earl of Gloucester. In 1284 the inhabitants petitioned the burgesses of Hereford for a certified copy of the customs of the latter town, and these furnished a model for the later demands of the growing community at Cardiff from its lords, while Cardiff in turn furnished the model for the Glamorgan towns such as Neath and Kenfig. In 1324 Edward II. granted a number of exemptions to Cardiff and other towns in South Wales, and this grant was confirmed by Edward III. in 1359, Henry IV. in 1400, Henry VI. in 1452, and Edward IV. in 1465.

Its most important early charter was that granted in 1340 by Hugh le Despenser, whereby the burgesses acquired the right to nominate persons from whom the constable of the castle should select a bailiff and other officers, two ancient fairs, held on the 29th of June and 19th of September, were confirmed, and extensive trading privileges were granted, including the right to form a merchant gild. A charter granted in 1421 by Richard de Beauchamp provided that the town should be governed by twelve elected aldermen, but that the constable of the castle should be mayor. In 1581 Queen Elizabeth granted a confirmatory charter to the mayor and bailiffs direct without reference to the lord of the castle. The town was treated as a borough by prescription until 1608, when James I. confirmed its status by express incorporation, adding also to its rights of self-government, and granting it a third fair (on the 30th of November). In 1687 the town surrendered this charter to James II., who in a substituted one, which, however, was never acted upon, reserved to the Crown the right of removing any member of the corporation from office. The first step towards the modern improvement of the town was taken in 1774, when a special act was obtained for the purpose. Nineteen private acts and provisional orders were obtained during the 19th century.

Among the many early English kings who visited or passed through Cardiff was Henry II., on whom in 1171, outside St Piran's chapel (which has long since disappeared), was urged the duty of Sunday observance. About 1153, Ivor Bâch (or the Little), a neighbouring Welsh chieftain, seized the castle and for a time held William, earl of Gloucester, and the countess prisoners in the hills. In 1404 Owen Glendower burnt the town, except the quarters of the Friars Minors. In 1645, after the battle of Naseby, Charles I. visited the town, which until then had been mainly Royalist, but about a month later was taken by the Parliamentarians. In 1648, a week after the Royalists had been decisively defeated by Colonel Horton at St Fagan's, 4 m. west of Cardiff, Cromwell passed through the town on his way to Pembroke.

Outside the north-west angle of the castle, Richard de Clare in 1256 founded a Dominican priory, which was burnt by Glendower in 1404. Though rebuilt, the building fell into decay after the Dissolution. The site was excavated in 1887. Outside the north-east angle a Franciscan friary was founded in 1280 by Gilbert de Clare, which at the Dissolution became the residence of a branch of the Herbert family. Its site was explored in 1896. The only other building of historic interest is the church of St John the Baptist, which is in the Perpendicular style, its fine tower having been built about 1443 by Hart, who also built the towers of Wrexham and St Stephen's, Bristol. In the Herbert chapel is a fine altar tomb of two brothers of the family. A sculptured stone reredos by W. Goscombe John was erected in 1896. The original church of St Mary's, at the mouth of the river, was swept away by a tidal wave in 1607: Wordsworth took this as a subject for a sonnet.

In 1555 Rawlins White, a fisherman, was burnt at Cardiff for his Protestantism, and in 1679 two Catholic priests were executed for recusancy. Cardiff was the birthplace of Christopher Love (b. 1618), Puritan author, and of William Erbury, sometime vicar of St Mary's in the town, who, with his curate, Walter Cradock, were among the founders of Welsh nonconformity.

As to Roman Cardiff see articles by J. Ward in the *Archaeologia* for 1901 (vol. lvii.), and in *Archaeologia Cambrensis* for 1908. As to the castle and the Black and Gray Friars see *Archaeologia Cambrensis*, 3rd series, viii. 251 (reprinted in Clark's *Medieval Military Architecture*), 5th series, vi. 97; vii. 283; xvii. 55; 6th series, i. 69. The charters of Cardiff and "Materials for a History of the County Borough from the Earliest Times" were published by order of the corporation in *Cardiff Records* (5 vols., 1898, sqq.). See also a *Handbook of Cardiff and District*, prepared for the use of the British Association, 1891; *Cardiff, an Illustrated Handbook*, 1896; the *Annual Report* of the Cardiff Chamber of Commerce; the *Calendar* of the University College. (D. Ll. T.)

CARDIGAN, JAMES THOMAS BRUDENELL, 7TH EARL OF (1797–1868), English lieutenant-general, son of the 6th earl of Cardigan (the title dating from 1661), was born at Hambleden, Bucks, on the 16th of October 1797. He studied for several terms at Christ Church, Oxford; and in 1818 entered parliament. He entered the army in 1824 as cornet in the 8th Hussars, and was promoted within eight years, by purchase, to be lieutenant-colonel in the 15th Hussars. With this regiment he made himself one of the most unpopular of commanding officers. He gave the reins to his natural overbearing and quarrelsome temper, treating his men with excessive rigour and indulging in unscrupulous licentiousness. Within two years he held 105 courts-martial, and made more than 700 arrests, although the actual strength of his regiment was only 350 men. In consequence of one of his numerous personal quarrels, he left the regiment in 1834; but two years later, at the urgent entreaty of his father, he was appointed to the command of the 11th Hussars. He played the same part as before, and was censured for it; but he was allowed to retain his post, and the discipline and equipment of his regiment, in which he took great pride, and on which he spent large sums of money, received high commendation from the duke of Wellington. He succeeded to the peerage on the death of his father in August 1837. In September 1840 Lord Cardigan fought a duel, on Wimbledon common, with one of his own

officers. The latter was wounded, and Lord Cardigan was tried before the House of Lords on a charge of feloniously shooting his adversary. But the trial was a mere sham, and on a trivial technical ground he was acquitted. In 1854, at the outbreak of the Crimean War, he was appointed to the command of the light cavalry brigade, with the rank of major-general, and he spent a very large sum in the purchase of horses and on the equipment of his regiment. He took a prominent part in the early actions of the campaign, and displayed throughout the greatest personal courage and the greatest recklessness in exposing his men. In the charge of the light brigade at Balaklava (*q.v.*) he was the first man to reach the line of the Russian guns; and Cardigan and his men alike have been credited by the bitterest critics of the charge with splendid daring and unquestioning obedience to orders. At the close of the war he was created K.C.B., and was appointed inspector-general of cavalry, and this post he held till 1860. In 1863 he engaged without success in legal proceedings against an officer who had published an account of Balaklava which the earl held to contain a reflection on his military character. He attained the rank of lieutenant-general in 1861. He was twice married, in 1826 and 1858, but had no children. On his death, which took place on the 28th of March 1868, the family titles (including the English barony of Brudenell, cr. 1628) passed to his relative, the second marquess of Ailesbury.

CARDIGAN (*Aberteifi*), a seaport, market-town and municipal borough, and the county town of Cardiganshire, Wales, picturesquely situated on the right bank of the Teifi about 3 m. above its mouth. Pop. (1901) 3511. It is connected by an ancient stone bridge with the suburb of Bridgend on the southern or Pembroke bank of the river. It is the terminal station of the Whitland-Cardigan branch of the Great Western railway. Owing to the bar at the estuary of the Teifi, the shipping trade is inconsiderable, but there are brick-works and foundries in the town; and as the centre of a large agricultural district, Cardigan market is well attended. There is a curious local custom of mixing "culm," a compound of clay and small coal, in the streets. The town has for the most part a modern and prosperous appearance. Two bastions with some of the curtain wall of the ancient castle remain, whilst the dwelling-house known as Castle Green contains part of a drum tower, and some vaulted chambers of the 13th century. The chancel of the Priory church of St Mary is an interesting specimen of early Perpendicular work, and the elaborate tracery of its fine east window contains some fragments of ancient stained glass. It is the only existing portion of a Benedictine house which was originally founded by Prince Rhys ap Griffith in the 12th century.

Although a Celtic settlement doubtless existed near the mouth of the Teifi from an early period, it was not until Norman times that Cardigan became a place of importance. Its castle was first erected by Roger de Montgomery about the year 1091, and throughout the 12th and 13th centuries this stronghold of Cardigan played no small part in the constant warfare between Welsh and English, either side from time to time gaining possession of the castle and the small town dependent on it. In 1136 the English army under Randolf, earl of Chester, was severely defeated by the Welsh at Crûg Mawr, now called Bank-y-Warren, a rounded hill 2 m. north-east of the town. During the latter part of the 12th century the castle became the residence of Rhys ap Griffith, prince and justiciar of South Wales (d. 1196), who kept considerable state within its walls, and entertained here in 1188 Archbishop Baldwin and Giraldus Cambrensis during their preaching of the Third Crusade. In 1284 Edward I. spent a month in the castle, settling the affairs of South Wales. This famous pile was finally taken and destroyed by the Parliamentarian Major-General Laugharne in 1645. The lordship, castle and town of Cardigan formed part of the dower bestowed on Queen Catherine of Aragon by King Henry VII. Henry VIII.'s charter of 1542 confirmed earlier privileges granted by Edward I. and other monarchs, and provided for the government of the town by a duly elected mayor, two bailiffs and a coroner. In 1887 the assizes and quarter sessions were removed hence to Lampeter, which has a more central position in the county. Cardigan was declared a parliamentary borough in 1536, but in 1885 its representation was merged in that of the county.

CARDIGANSHIRE (*Ceredigion, Str Aberteifi*), a county of South Wales, bounded N. by Merioneth, E. by Montgomery, Radnor and Brecon, S. by Carmarthen and Pembroke, and W. by Cardigan Bay of the Irish Sea. It has an area of 688 sq. m., so that it ranks fifth in size of the Welsh countries. The whole of Cardiganshire is hilly or undulating, with the exception of the great bogs of Borth and Tregaron, but the mountains generally have little grandeur in their character; Plinlimmon itself, on the boundary of the county with Montgomeryshire, in spite of its elevation of 2463 ft., being singularly deficient in boldness of outline. Of other hills, only Tregaron Mountain (1778 ft.) exceeds 1500 ft. in height. Of the rivers by far the most important is the Teifi, or Tivy, which rises above Tregaron in Llyn Teifi, one of a group of tiny lakes which are usually termed the Teifi Pools, and flows southward through the county as far as Lampeter, forming from this point onwards its southern boundary. A succession of deep pools and rushing shallows, the Teifi has from the earliest times been celebrated for the quantity and quality of its salmon, which are netted in great numbers on Cardigan Bar. Trout and sewin (a local species of sea-trout) are also plentiful, so that the Teifi is much frequented by anglers. This river is also believed to have been the last British haunt of the beaver (*afange, lost-llydan*), for the slaying of which a very heavy penalty was exacted by the old royal laws of Wales. Giraldus Cambrensis, Michael Drayton, and other writers allude to this circumstance, though at what date the beaver became extinct in these waters is quite uncertain. On the Teifi may frequently be observed fishermen in coracles. Other rivers worthy of mention are the Dovey (Dyfi), separating Cardigan from Merioneth in the extreme north; the Rheidol and the Ystwyth, which rise in Plinlimmon; and the Aeron, which has its source in Llyn Eiddwen, a pool in the hilly district known as Mynydd Bach. All these streams flow westward into Cardigan Bay.

The valley of the Teifi presents many points of great beauty and interest between Llandyssul and the sea. The rapids of Henllan, the falls of Cenarth and the wooded cliffs of Coedmore constitute some of the finest scenery in South Wales. The valley of the Aeron is well wooded and fertile, while the Rheidol contains amidst striking surroundings the famous cascade spanned by the Devil's Bridge, which is known to the Welsh as Pont-ar-Fynach (the Monks' Bridge).

Geology.—The rocks of Cardiganshire consist of shales, slates and grits which have been folded and uptilted so that nowhere do they retain their original horizontality. They belong entirely to the Ordovician and Silurian periods; they have yielded few fossils, and much work remains to be done upon them before the stratigraphical subdivisions can be clearly defined. Many metalliferous lodes occur in the rocks, and the lead mines have long been famous; it was from the profits of his mining speculations, carried on chiefly in this county, that the celebrated Sir Hugh Myddleton was enabled to carry out his gigantic project for supplying London with water by means of the New River. Copper and zinc ores have also been obtained. Tregaron is the centre of the mining district, and the Lisburne, Goginan and Cwm Ystwyth mines are among the most important.

The slates have been worked at Devil's Bridge, Corris, Strata Florida, Goginan, &c. Glacial drift occupies some of the lower ground, and peaty bogs are common on the mountains. A small tract of blown sand lies at the mouth of the river Dovey.

Industries.—The climate on the coast is mild and salubrious, but that of the hill country is cold, bleak and rainy. The cultivated crops consist of oats, wheat, barley, turnips and potatoes; and in the lower districts on the coast, especially in the neighbourhood of Cardigan, Aberaeron and Llanrhystyd, good crops are raised. The uplands are mostly covered by wild heathy pastures, which afford good grazing for Welsh mountain sheep and ponies. The country has long been celebrated for its breed of "Cardiganshire cobs," for which high prices are often obtained from English dealers, who frequent the local horse fairs, especially Dalis Fair at Lampeter. Cattle, sheep, pigs, butter, oats, wool, flannel and coarse slates form the principal

articles of export. Hand-looms are by no means uncommon in the remote parts of the country, and clog-making of alder wood meets a local demand. The North Cardiganshire lead-mines, of which the Lisburne, Goginan and Cwm Ystwyth mines are the most noted, have been famous, and are said to have been worked by the Romans. Some of the lead raised is very rich in silver, and in the 17th century so great was the amount of silver obtained that a mint for coining it was erected by virtue of letters patent at Aberystwyth.

Communications.—The railways within the county are the Cambrian, by means of which access is given to Aberystwyth from all parts of the kingdom; and the former Manchester & Milford line, which runs south from Aberystwyth by Lampeter to Pencader, and has been acquired by the Great Western railway. The lower valley of the Teifi, or Tivyside, is reached by means of two branch lines of the Great Western railway—one from Whitland to Cardigan, and the other from Pencader to Llandyssul and Newcastle-Emlyn.

Population and Administration.—The area of the administrative county is 443,071 acres, with a population in 1891 of 63,467, and in 1901 of 60,237. The municipal boroughs are Aberystwyth (pop. 8013), Cardigan (3511) and Lampeter (1722). Aberaeron and New Quay are urban districts. Other towns are Tregaron (1509), an ancient but decayed market-town in a wild boggy district; Aberaeron (1331), a small seaport, and Llandyssul (2801,) a rising place on the Teifi with woollen factories. In modern times several small watering-places have sprung up on the coast, notably at Borth, New Quay, Tresaith, Aberporth and Gwbert. Quarter sessions are held at Lampeter, and here also are held the assizes for the county, which lies in the South Wales circuit. The county returns one member of parliament, and has no parliamentary borough. Ecclesiastically it lies wholly in the diocese of St David's, and contains sixty-six parishes.

History.—In spite of its poverty and sparse population, Cardiganshire has never ceased to play a prominent part in all Welsh political, literary and educational movements. The early history of the district is obscure, but at the time of the Roman invasion it was tenanted by the Dimetae, a Celtic tribe, within whose limits was comprised the greater portion of the south-west of Wales. After the departure of the Romans, the whole basin of the Teifi eventually fell into the power of Ceredig, son of Cunedda Wledig of North Wales; and the district, peopled with his subjects and nearly co-extensive with the existing shire, obtained the name of Ceredigion, later corrupted into Cardigan. During the 5th and 6th centuries Ceredigion was largely civilized by Celtic missionaries, notably by St David and St Padarn, the latter of whom founded a bishopric at Llanbadarn Fawr, which in the 8th century became merged in the see of St David's. Two important local traditions, evidently based on fact, are associated with this remote era:—the inundation of the Cantref-y-Gwaelod and the synod of Llanddewi Brefi. The Cantref-y-Gwaelod (the lowland Hundred), a large tract of flat pasture-land containing sixteen townships, and protected from the inroad of the sea by sluices, was suddenly submerged at an uncertain date about the year 500. The legend of its destruction declares that Seithenyn, the drunken keeper of the sluices, carelessly let in the waters of the bay, with the result that the land was lost for ever, and Prince Gwyddno and his son Elphin, with all their subjects, were forced to migrate to the wild region of Snowdon. This tale has ever been a favourite theme with Welsh bards, so that "the sigh of Gwyddno when the wave turned over his land" remains a familiar figure of speech throughout Wales. In support of this story it may be mentioned that there are indications of submerged dwellings and roads (*e.g.* the Sarn Cynfelin and Sarn Badrig) between the mouth of the Dovey and Cardigan Head. The famous synod of Brefi, an historical fact clouded by miraculous details, probably took place early in the 6th century, when at a largely attended meeting of the Welsh clergy held at Brefi, near the source of the Teifi, St David's eloquence for ever silenced the champions of the Pelagian heresy. In the 10th and 11th centuries the coast of Ceredigion suffered much from the inroads of the Danes, and in later times of the Normans and Flemings; but on the whole the native inhabitants seem to have maintained a successful resistance. By the close of the 11th century most of Ceredigion had been reduced by the Normans, and during the 12th and 13th centuries it formed a favourite battle ground between the Welsh princes and the English forces. By the Statutes of Rhuddlan (1284) Edward I. constituted Ceredigion out of the former principality of Wales a shire on the English model, dividing the new county into six hundreds and fixing the assizes at Carmarthen. By the act of Union in the reign of Henry VIII., the boundaries of the county were subsequently enlarged to their present size by the addition of certain outlying portions of the Marches round Tregaron and Cardigan, and the assizes were assigned to the county town. During the rebellion of Owen Glendower in the opening years of the 15th century, the county was again disturbed, and Owen for a short time actually held a court in Aberystwyth Castle. In the year 1485, according to local tradition, Henry of Richmond marched through South Cardiganshire on his way to Bosworth Field, and he is stated to have raised recruits round Llanarth, where the old mansion of Wern, still standing, is pointed out as his halting-place on this occasion. Under Henry VIII. Cardiganshire was for the first time empowered to send a representative member to parliament, and under Mary the same privilege was extended to the boroughs. During the Great Rebellion the county—which possessed at least three leading Parliamentarians in the persons of Sir John Vaughan, of Crosswood, afterwards chief justice of the common pleas; Sir Richard Pryse, of Gogerddan; and James Philipps, of Cardigan Priory—seems to have been less Royalist in its sympathies than other parts of Wales. At this time the castles of Cardigan and Aberystwyth, both held in the name of King Charles, were reduced to ruins by the Cromwellian army. In the 18th century the Methodist movement found great support in the county; in fact, Daniel Rowland (1713–1790), curate of Llangeitho, was one of the chief leaders of this important revival. The 19th century witnessed the foundation of two important educational centres in the county:—St David's College at Lampeter (1827), and one of the three colleges of the university of Wales at Aberystwyth (1872). In the years 1842–1843 the county was much disturbed by the Rebecca Riots, during which a large number of turnpike gates were destroyed by local mobs. Forty-five years later it was affected by the Welsh agrarian agitation against payment of tithe, which produced some scenes of violence against the distraining police, especially in the district round Llangranog.

Chief amongst the county families of Cardigan is that of Lloyd, descendants of the powerful Cadifor ap Dinawal, lord of Castle Howell, in the 12th century. Certain branches of this family, such as the Lloyds of Millfield (Maes-y-felin), the Lloyds of Llanlyr and the Lloyds of Peterwell, are extinct, but others are still flourishing. The family of Vaughan of Crosswood, or Trawscoed (now represented by the earl of Lisburne), has held its family estates in the male line for many centuries. A representative in the female line of the ancient house of Pryse, long prominent in the annals of the county, still possesses the old family seat of Gogerddan. Other families worthy of mention are Lloyd of Bronwydd, Powell of Nanteos and Johnes of Hafod and Llanfair-Clydogau.

Antiquities.—Scattered over all parts of the county are numerous British or early medieval tumuli and camps. Traces of the ancient Roman road, the *Via Occidentalis*—called by the Welsh *Sarn Helen*, a corruption of *Sarn Lleon*, Road of the Legion—are to be found in the eastern districts of the county; and at Llanio are to be seen what are perhaps the remains of the Roman military station of Loventium. There are also various inscribed and incised stones, of which good examples exist in the churchyards of Llanbadarn Fawr and Llanddewi Brefi. In buildings of interest Cardiganshire is singularly deficient. Besides the ruins of Aberystwyth and Cardigan Castles, and of Strata Florida Abbey, there is a large cruciform church of the 12th century at Llanbadarn Fawr; whilst the massive parish church of Llanddewi Brefi once formed part of the minster of a prebendal college founded by Bishop Beck of

St David's towards the close of the 13th century. Tregaron, Llanwenog, Llandyssul and Llanarth own parish churches with western towers of early date, but for the most part the ecclesiastical structures of Cardiganshire are small in size and mean in appearance, and many of them were entirely rebuilt during the latter half of the 19th century. The little church of Eglwys Newydd, near the Devil's Bridge, contains one of Sir Francis Chantrey's masterpieces, a white marble group in memory of Mariamne Johnes (1818), the daughter of Thomas Johnes, of Hafod (1748–1816), the translator of Froissart.

Customs, etc.—The old Welsh costume, customs and superstitions are fast disappearing, although they linger in remote districts such as the neighbourhood of Llangeitho. The steeple-crowned beaver hat has practically vanished, although it was in general use within living memory; but the short petticoat and overskirt (*pais-a-gŵn-bâch*), the frilled mob-cap, little check shawl and buckled shoes are still worn by many of the older women. Of peculiarly Welsh customs, the bidding (*gwahoddiad*) is not quite extinct in the county. The bidding was a formal invitation sent by a betrothed pair through a bidder (*gwahoddwr*) to request the presence and gifts of all their neighbours at the forthcoming marriage. All presents sent were duly registered in a book with a view to repayment, when a similar occasion should arise in the case of the donors. When printing became cheap and common, the services of the professional bidder were often dispensed with, and instead printed leaflets were circulated. The curious horse wedding (*priodas ceffylau*) at which the man and his friends pursued the future bride to the church porch on horseback, and then returned home at full gallop, became obsolete before the end of the 19th century. Of the practices connected with death, the wake, or watching of the corpse, alone remains; but the habit of attending funerals, even those of strangers, is still popular with both sexes, so that a funeral procession in Cardiganshire is often a very imposing sight. Nearly all the old superstitions, once so prevalent, concerning the fairies (*tylwyth teg*) and fairy rings, goblins (*bwbachod*), and the teulu, or phantom funeral, are rapidly dying out; but in the corpse candle (*canwll corph*), a mysterious light which acts as a death-portent and is traditionally connected with St David, are still found many believers.

AUTHORITIES.—Sir S. R. Meyrick, *History and Antiquities of Cardiganshire* (London, 1806); Rev. G. Eyre Evans, *Cardiganshire and its Antiquities* (Aberystwyth, 1903); E. R. Horsfall-Turner, *Walks and Wanderings in County Cardigan* (Bingley).

CARDINAL (Lat. *cardinalis*), in the Roman Church, the title of the highest dignitaries next to the pope. The cardinals constitute the council or senate of the sovereign pontiff, his auxiliaries in the general government of the Church; it is they who act as administrators of the Church during a vacancy of the Holy See and elect the new pope. Together they constitute a spiritual body called the Sacred College. The dignity of cardinal is not an essential part of the legal constitution of the Church; it is a reflection of and participation in the sovereign dignity of the Head of the Church, by the chief clergy of the Church of Rome. The present position is the result of a long process of evolution, of which there are several interesting survivals.

The name is derived from *cardo*, hinge; like many other words (the word *pope* in particular) it was originally of a more general application, before it was reserved exclusively to the members of the Sacred College, and the word is still used adjectivally in the sense of pre-eminent or that on which everything else "hinges." As early as the 6th century we find mentioned, in the letters of St Gregory, cardinal bishops and priests. This expression signifies clergy who are attached to their particular church in a stable relation, as a door is attached to a building by its hinges (see Thomassin, *Vetus et nova discipl.* vol. 1, lib. ii. cap. 113-115). Moreover, this sense is still preserved in the present day in the expressions *incardinatio*, *excardinatio*, which signify the act by which a bishop permanently attaches a foreign cleric to his diocese, or allows one of his own clergy to leave his diocese in order to belong to another. For a long time, too, the superior clergy, and especially the canons of cathedrals or the heads of important churches, were *cardinales* (see examples in Du Cange, *Glossarium*, s.v.). Gradually, however, this title was confined by usage to the Roman cardinals, until Pius V., by his constitution of the 15th of February 1568, reserved it to them exclusively.

The Sacred College.

The grouping of the cardinals into a body called the Sacred College, the College of Cardinals, is connected, in the case at least of cardinal priests, with the ancient *presbyterium*, which existed in each church from the earliest times. The Sacred College as such was not, however, definitively constituted until the uniting of the three orders of cardinals into a single body, the body which was to elect the pope; and this only took place in the 12th century. Up till that time the elements remained distinct, and there were separate classes: the "Roman" bishops, *i.e.* bishops of sees near Rome, presbyters of the "titles" (*tituli*) of Rome, and deacons of the Roman Church. Nowadays, the Sacred College is still composed of three orders or categories: cardinal bishops, cardinal priests, and cardinal deacons. But the process of evolution has not been the same in the case of all these orders.

Cardinal bishops.

Cardinal bishops are the bishops of suburbicarian churches, situated in the immediate neighbourhood of Rome. Very early we find them assisting the pope in his ritual functions and in dealing with important business; they formed a kind of permanent synod (cf. the σύνοδος ἐνδημοῦσα of Constantinople); and they also took the place of the pope in the ceremonies of the liturgy, excepting the most important ones, and especially in the service of the cathedral at Rome, the Lateran. A passage from the life of Stephen II. (A.D. 769), in the *Liber Pontificalis* (ed. Duchesne, i. p. 478), shows clearly that they were seven in number and served for a week in turn: *Hic constituit ut omni dominico die a septem Episcopis cardinalibus hebdomadariis, qui in ecclesia Salvatoris* (the Lateran) *observant, missarum solemnia super altare Beati Petri celebrarentur.* They were called "cardinal bishops of the Lateran church," as recorded by St Peter Damian in 1058 (Ep. 1, lib. ii.). Their sees are the same to-day as they were then: Ostia, Porto, Santa Rufina (Sylva Candida), Albano, Sabina, Tusculum (Frascati) and Palestrina. From time immemorial the bishop of Ostia has had the privilege of sacring the pope, and on this ground he enjoys the right of wearing the "pallium"; he is *ex officio* dean of the suburbicarian bishops, and consequently dean of the Sacred College. His episcopal see having been in ruins for a long time, that of Velletri has been joined to it. The second rank belongs to the bishop of Porto, who is *ex officio* vice-dean of the Sacred College; his episcopal see being also in ruins Calixtus II. added to it that of Santa Rufina, thus reducing the number of suburbicarian bishoprics and cardinal bishops to six; this number was adhered to by Sixtus V., and has not varied since.

Cardinal priests.

The second order of cardinals is that of the cardinal priests. It represents and is a continuation of the ancient *presbyterium*; but in Rome the process of evolution was different from that in the other episcopal towns. In the latter, the division into parishes was but slowly accomplished; there is no authority for their existence before the year 1000; the bishop with the higher clergy, now developed into the chapter, were in residence at the cathedral, which formed, as it were, the one parish in the town. At Rome, on the contrary (and doubtless at Alexandria), certain churches, to which were attached certain districts, were at an early date entrusted to one or more priests. These churches, in which the liturgy was celebrated, or certain sacraments administered, were called *tituli* (titles). According to the *Liber Pontificalis* (ed. Duchesne, i. pp. 122, 126, 164), the titles of Rome, numbering twenty-five, were already established as early as the 1st century; this seems hardly probable, but it was certainly the case in the 5th century. The priest serving one of these churches was the priest of that title, and, similarly, the church which he served was that priest's title. When several priests were attached to the same church, only the first, or principal one, had the title; he alone was the *presbyter cardinalis*. This practice explains how it is that the Roman presbyterium did not give rise to a cathedral chapter, but to cardinal priests, each attached to his title. As the higher

clergy of Rome gradually acquired a more important status, the relations between the cardinal priest and the church of which he bore the title became more and more nominal; but they have never entirely ceased. Even to-day every cardinal priest has his title, a church in Rome of which he is the spiritual head, and the name of which appears in his official signature, *e.g.* "Herbertus tituli sanctorum Andreae et Gregorii sanctae romanae ecclesiae presbyter cardinalis Vaughan." When the attachment of the cardinal priest to his title had become no more than a tradition, the number of cardinal titles, which in the 11th century had reached twenty-eight, was increased according to need, and it was held an honour for a church to be made titulary. The last general rearrangement of the titular churches was begun by Clement VIII. and completed by Paul V.; Leo XIII. made a title of the church of San Vitale. To-day, according to the *Gerarchia Pontificia* the cardinal titles number fifty-three; since the highest possible number of cardinal priests is fifty, and this number is never reached, it follows that there are always a certain number of vacant titles. The first title is that of San Lorenzo in Lucina, and the cardinal priest of the oldest standing takes the name of "first priest," *protopresbyter*.

Cardinal deacons.

The third order of cardinals is that of the cardinal deacons. For a long time the Roman Church, faithful to the example of the primitive church at Jerusalem (Acts vi.), had only seven deacons. Their special function was the administration of her temporal property, and particularly works of charity. Between them were divided at an early date the fourteen districts (*regiones*) of Rome, grouped two by two so as to constitute the seven ecclesiastical districts. Now the charitable works were carried on in establishments called *diaconiae*, adjoining churches which were specially appropriated to each *diaconia*. The connexion between the names (*diaconus*) and (*diaconia*) and the presence of a church in connexion with each diaconia gradually established for the deacons a position analogous to that of priests. In the 8th century Pope Adrian found sixteen diaconiae and founded two others (*Lib. Pont.* ed. Duchesne, i. p. 509); in the 12th century the cardinal deacons, who then numbered eighteen, were no longer distinguished by an ecclesiastical district, as they had formerly been, but by the name of the church connected with some diaconia (*loc. cit.* p. 364). By the time of Sixtus V. the connexion between a cardinal deacon and his diaconia was merely nominal. Sixtus reduced the number of cardinal deacons to fourteen; and this is still the number to-day. Except that his church is called a diaconia, and not a title, the cardinal deacon is in this respect assimilated to the cardinal priest; but he does not mention his diaconia in his official signature: *e.g.* "Joannes Henricus diaconus cardinalis Newman." There are at present sixteen diaconiae, the chief being that of Santa Maria in Via lata; the cardinal deacon of longest standing takes the name of "first deacon," *protodiaconus*.

Cardinals can pass from one order, title or see to another, by a process of "option." When a suburbicarian see falls vacant, the cardinals resident at Rome have the right of "opting" for it in order of rank,—that is to say, of claiming it in consistory and receiving their promotion to it. In the same way cardinal deacons can pass after ten years to the order of priests, while retaining after their passage the rank in the Sacred College given them by the date of their promotion.

With the exception of the classes resulting from the order to which they belong, there are no distinctions between the rights of the various cardinals. As to the ordination obligatory upon them, it is that indicated in their title; cardinal bishops must naturally be bishops; for cardinal priests it is enough to have received the priesthood, though many of them are actually bishops; similarly, it is enough for cardinal deacons to have received the diaconate, though most of them are priests; cases have occurred, however, even in quite recent times, of cardinals who have only received the diaconate, *e.g.* Cardinal Mertel.

There is one cardinal chosen by the pope from among the Sacred College to whom is entrusted the administration of the common property; this is the cardinal camerlengo or chamberlain (*camerarius*). His office is an important one, for during the vacancy of the Holy See it is he who exercises all external authority, especially that connected with the Conclave.

Number and distribution.

The number of the cardinals reaches a total of 70: six cardinal bishops, fifty cardinal priests and fourteen cardinal deacons. This number was definitively fixed by Sixtus V. (constit. *Postquam*, 5th December 1586); but the Sacred College never reaches its full number, and there are always ten or so "vacant hats," as the saying goes. Though the rule laid down by Sixtus V. has not been modified since, before him the number of cardinals was far from being constant. For a long time it varied in the neighbourhood of twenty; in 1331 John XXII. said that there were twenty cardinals; in 1378 they were reckoned at 23. Their number increased during the Great Schism because there were several rival obediences. The councils of Constance and Basel reduced the number of cardinals to 24; but it did not rest at that for long, and in the 16th century was more than doubled. In 1517 Leo X., in order to introduce strong supporters of himself into the Sacred College, created 31 cardinals at the same time. The highest number was reached under Pius IV., when the cardinals numbered as many as 76.

The composition of the Sacred College is subject to no definite law; but the necessity for giving a first representation to different interests, especially in view of the election of the popes, has for a long time past thrown open the Sacred College to representatives of the episcopate of the Catholic nations. From the 11th century onwards are to be found cases in which the pope summoned to its ranks persons who did not belong to the Roman Church, particularly abbots, who were not even required to give up the direction of their monasteries. In the following century occur a few cases of bishops being created cardinals without having to leave their see, and of cardinals upon whom were conferred foreign bishoprics (cf. Thomassin, *loc. cit.* cap. 114, n. 9). Of the cardinals created by the popes of Avignon the majority were French, and in 1331 John XXII. remarks that 17 cardinals were French out of the 20 who then existed. The councils of Constance and Basel forbade that more than a third of the cardinals should belong to the same country. After the return of the popes to Rome and after the Great Schism, the ancient customs were soon resumed; the cardinals were for the most part Italians, the entire number of cardinals' hats conferred on the other Catholic nations only amounting to a minority. The non-Italian cardinals, with rare exceptions, are not resident in Rome; together with the rank of cardinal they receive a dispensation from residing *in curia*; they are none the less, as cardinals, priests or deacons of the Roman Church.

Qualifications.

The reform of the College of Cardinals inaugurated by the councils of Constance and Basel, though without much immediate success, was not only concerned with the number and nationality of the cardinals; it also dealt with conditions of age, learning and other qualifications: men of the most honourable character, aged not less than thirty, were to be chosen; at least a third were to be chosen from among the graduates of the universities; persons of royal blood and princes were not to be admitted in too great numbers, and lastly, relatives of the pope were to be set aside. Moreover, in order to secure the effectiveness of these reforms, selection of the new cardinals was to be made by the votes of the members of the Sacred College given in writing. This mode of control was perhaps excessive, and the reform consequently remained ineffective. Up to the middle of the 16th century there were still instances of unfortunate and even scandalous appointments to the cardinalate of very young men, of relatives or favourites of the popes and of men whose qualifications were by no means ecclesiastical. In the Sacred College as elsewhere nepotism and an exaggerated estimate of temporal interests were rife. At last a real reform was effected. The council of Trent (sess. xxiv. cap. i. *de reform.*) requires for cardinals all the qualifications prescribed by law for bishops. Sixtus V. defined these still more clearly, and his regulations are still in force: a cardinal must, in the year of his promotion, be of the canonical age required for his reception into the order demanded by his rank: *i.e.* 22 for the diaconate, 23 for the priesthood and 30 for the episcopate, and if not already ordained he must take orders in the year of his appointment. Men of illegitimate birth are

excluded, as well as near relatives of the pope (with one exception) and of the cardinals; the personal qualities to be most sought for are learning, holiness and an honourable life. All these recommendations have been, on the whole, well observed, and are so better than ever in the present day. We may add that the religious orders have had a certain number of representatives, four, at least, in the Sacred College, since Sixtus V., several of whom, as we know, became popes. As to the cardinals' hats granted at the request of the heads of Catholic states, they are subject to negotiations analogous to those concerning nominations to the episcopate, though entailing no concordatory agreement, strictly speaking, on the part of the popes.

Creation.

The *creation* of cardinals (to use the official term) is in fact nowadays the function of the pope alone. It is accomplished by the publication of the persons chosen by the pope in secret consistory (*q.v.*). No other formality is essential; and the provision of Eugenius IV., which required the reception of the insignia of the cardinalate for the promotion to be valid, was abrogated before long, and definitely annulled by the declaration of Pius V. of the 26th of January 1571. Similarly neither the consent nor the vote of the Sacred College is required. It is true that a Roman *Ceremoniale* of 1338 (Thomassin, *loc. cit.* cap. 114, n. 12) still enjoins upon the pope to consult the Sacred College, on the Wednesdays during Ember days, as to whether it is necessary to nominate new cardinals, and if so, how many; but this is only a survival of the ritual of the ancient form of ordination. The injunctions of the councils of Constance and Basel as to the written vote of the cardinals became before very long a dead letter, but there still remains a relic of them. In the consistory, when the pope has nominated those whom he desires to raise to the purple, he puts to the cardinals present the question: "Quid vobis videtur?" The cardinals bend the head as a sign of their consent, and the pope then continues: "Itaque, auctoritate omnipotentis Dei, sanctorum Apostolorum Petri et Pauli, et Nostra, creamus et publicamus sanctae romanae Ecclesiae cardinales N. et N., etc."

The new dignitary, who has been warned of his nomination several weeks in advance by "biglietto" (note) from the office of the secretary of state, is then officially informed of it by a *ceremoniarius* of the pope; he at once waits upon the pope, to whom he is presented by one of the cardinals. The pope first invests him with the rochet and red biretta, but there is no formal ceremony. The conferring of the cardinal's red hat takes place a few days later in a public consistory; while placing the hat on his head the pope pronounces the following words: "Ad laudem omnipotentis Dei et Sanctae Sedis ornamentum, accipe galerum rubrum, insigne singularis dignitatis cardinalatus, per quod designatur quod usque ad mortem et sanguinis effusionem inclusive pro exaltatione sanctae fidei, pace et quiete populi christiani, augmento et statu sacrosanctae romanae Ecclesiae, te intrepidum exhibere debeas, in nomine Patris et Filii et Spiritus Sancti." While pronouncing the last words the pope makes the sign of the cross three times over the new cardinal. The public consistory is immediately followed by a secret consistory, to accomplish the last ceremonies. The pope begins by closing the mouth of the new cardinal, who is led before him, as a symbol of the discretion he should observe; after this he bestows on him the cardinal's ring, assigns him a title or diaconia; and finally, after going through the formality of consulting the Sacred College, finishes with the symbolic ceremony of the opening of the mouth, signifying the right and duty of the new cardinal to express his opinion and vote in the matters which it will fall to him to consider.

When the cardinals are resident abroad and appointed at the request of the heads of their state, a member of the Noble Guard is sent on the same day that the consistory is held to take the new dignitary the cardinal's "calotte"; after a few days the red biretta is brought to him by a Roman prelate, with the powers of an *ablegatus*; the biretta is conferred on him with great pomp by the head of the state. But the conferring of the red hat always takes place at the hands of the pope in a public consistory.

Cardinals "in petto."

Sometimes, after nominating the cardinals, the pope adds that he also appoints a certain number of others, whose names he does not divulge, but reserves the right of publishing at a later date. These cardinals, whose names he conceals "in his breast," are for that reason called cardinals *in pectore* (Ital. *in petto*). This practice seems to go back to Martin V., who may have had recourse to this expedient in order to avoid the necessity of soliciting the votes of the cardinals; but for a long time past the popes have only resorted to it for quite other reasons. If the pope dies before making known the cardinals *in petto*, the promotion is not valid; if he publishes them, the cardinals take rank from the day on which they were reserved *in pectore*, the promotion acting restrospectively, even in the matter of emoluments. This method has sometimes been used by the popes to ensure to certain prelates who had merit, but were poor, the means of paying the expenses of their promotion. In March 1875 Pius IX. announced the nomination of several cardinals *in petto*, whose names would be given in his will. It was pointed out to the pope that this posthumous publication would not be a pontifical act, and ran the risk of being contested, or even declared invalid; Pius IX. gave way before this reasoning, and published the names in a subsequent consistory (Sept. 17).

Dignity.

The dignity of the cardinals is a participation in that of the sovereign pontiff, and as such places them above all the other ecclesiastical dignitaries and prelates. This rank, however, has not always been assigned to them; but was attributed to the cardinal bishops before it was to the rest. Their common prerogative was definitively established when they became the sole electors of the pope, at a period when the papacy, under pontiffs like Innocent III., shone with its most brilliant lustre. For example, at the council of Lyons in 1245 all the cardinals took precedence of the archbishops and bishops. It was in 1245, or perhaps the year before, that Innocent IV. granted the cardinals the privilege of wearing the red hat; as to the scarlet robe which still forms their costume of ceremony, it was already worn by cardinals performing the functions of legate; and the use was soon extended to all. As to their civil relations, cardinals were assimilated by the Catholic kings to the rank of princes of the blood royal, cardinals being the highest in the Church, after the pope, just as princes of the blood royal are the first in the kingdom after the king. Of the many ecclesiastical privileges enjoyed by the cardinals, we will mention only two: the real, though nowadays restricted, jurisdiction which they exercise over the churches forming their title or diaconia; and the official style of address conferred on them by Urban VIII. (10th of June 1630), of Eminence, *Eminentissimo signore*.

Functions.

The most lofty function of the cardinals is the election of the pope (see CONCLAVE). But this function is necessarily intermittent, and they have many others to fulfil *sede plena*. On those rare occasions on which the pope officiates in person, they carry out, according to their respective orders, their former functions in the ritual. But they are, above all, the assistants of the pope in the administration of the Church; they fill certain permanent offices, such as those of chancellor, penitentiary, &c.; or again, temporary missions, such as that of legate *a latere*; they have seats in the councils and tribunals which deal with the affairs of the Church, and the Roman congregations of cardinals (see CURIA ROMANA).

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CARDINAL VIRTUES (Lat. *cardo*, a hinge; the fixed point on which anything turns), a phrase used for the principal virtues on which conduct in general depends. Socrates and Plato (see *Republic*, iv. 427) take these to be Prudence, Courage (or Fortitude), Temperance and Justice. It is noticeable that the virtue of Benevolence, which has played so important a part in Christian ethics and in modern altruistic and sociological theories, is omitted by the ancients. Further, against the Platonic list it may be urged (1) that it is arbitrary, and (2) that the several virtues are not specifically distinct, that the basis of the division is unsound, and that there is overlapping. It is said that St Ambrose was the first to adapt the Platonic classification to Christian theology. By the Roman Catholic Church these virtues are regarded as *natural* as opposed to the *theological* virtues, Faith, Hope and Charity. Some authors, combining the two lists, have spoken of the Seven Cardinal Virtues. In English literature the phrase is found as far back as the *Cursor Mundi* (1300) and the *Ayenbite of Inwit* (1340).

See B. Jowett, *Republic of Ploto* (Eng. trans., Oxford, 1887, Introd. p. lxiii); Plato, *Protagoras* (329-330); Aristotle, *Nicomachean Ethics*, vi. 13. 6; Th. Ziegler, *Gesch. d. chr. Eth.* (2nd ed.); H. Sidgwick, *History of Ethics* (5th ed.), pp. 44, 133, 143; and *Methods of Ethics*, p. 375.

CARDING, the process of using the "card" (Lat. *carduus*, a thistle or teasel) for combing textile fibrous materials. The practice of carding is of such great antiquity that its origin cannot be traced. It consists in combing or brushing fibres until they are straight and placed in parallel lines; in doing this, imperfect fibres are separated from perfect ones, all impurities are removed, and the sound fibres are in condition for further treatment. The teasels once used have long given place to hand cards, and these in turn to what, in the rudest form, were known as "stock cards," namely, two wire brushes, each 4 in. broad by 12 in. long, and having teeth bent at a uniform angle. One was nailed upon a bench with the teeth sloping from the operator, the other was similarly secured upon a two-handled bar with the teeth sloping towards the operator. The material to be treated was thinly spread upon the fixed card, and the movable one drawn by hand to and fro over it. When sufficiently carded, a rod furnished with parallel projecting needles, called a "needle stick," was pushed amongst the card teeth to strip the fibres from the comb. The strip thus procured was rolled into a sliver and spun. James Hargreaves, the inventor of the spinning jenny, suspended the movable comb by passing two cords over pulleys fixed in the ceiling and attached balance weights to opposite ends of the cords. This enabled him to lengthen the cards, to apply two or three to the same stock and to manipulate the top one with less labour, as well as to produce more and better work. In May of 1748, Daniel Bourn, of Leominster, patented a machine in which four parallel rollers were covered with cards, and set close together. Fibres were fed to the first rotating roller, each in turn drew them from the preceding one, and a grid was employed to remove the carded material from the last roller. This introduced the principle of carding with revolving cylinders whose surfaces were clothed with cards working point to point. In December of the same year Lewis Paul, of Birmingham, the inventor of drawing rollers, patented two types of carding engines. In one, parallel rows of spaced cards were nailed upon a cylinder which was revolved by a winch handle. Beneath the cylinder a concave trough had a card fixed on the inside, so that as the fibres passed between the two series of teeth they were combed. This was the origin of "flat-carding," namely, nailing strips of stationary cards upon transverse pieces of wood and adjusting the strips or flats by screws to the cylinder. In 1762, the father of Sir Robert Peel, with the assistance of Hargreaves, erected and used a cylinder carding engine which differed in some important particulars from Bourn's invention. But although roller-carding and flat-carding are the only principles in use at the present time, to Sir Richard Arkwright belongs the merit of introducing an automatic carding engine, for between the years 1773 and 1775 he combined the various improvements of his predecessors, entirely remodelled the machine, and added parts which made the operation continuous. So successful were these cards that some of them were in use at the beginning of the present century. Notwithstanding the numerous and important changes that have been made since Arkwright's time, carding remains essentially the same as established by him. (See COTTON-SPINNING MACHINERY.) (T. W. F.)

CARDIOID, a curve so named by G. F. M. M. Castillon (1708–1791), on account of its heart-like form (Gr. *καρδία*, heart). It was mathematically treated by Louis Carré in 1705 and Koersma in 1741. It is a particular form of the limaçon (*q.v.*) and is generated in the same way. It may be regarded as an epicycloid in which the rolling and fixed circles are equal in diameter, as the inverse of a parabola for its focus, or as the caustic produced by the reflection at a spherical surface of rays emanating from a point on the circumference. The polar equation to the cardioid is $r=a(1+\cos\theta)$. There is symmetry about the initial line and a cusp at the origin. The area is $\frac{3}{2}\pi a^2$, *i.e.* $1\frac{1}{2}$ times the area of the generating circle; the length of the curve is $8a$. (For a figure see LIMAÇON.)

CARDONA (perhaps the anc. *Udura*), a town of north-eastern Spain, in the province of Barcelona; about 55 m. N.W. of Barcelona, on a hill almost surrounded by the river Cardoner, a branch of the Llobregat. Pop. (1900) 3855. Cardona is a picturesque and old-fashioned town, with Moorish walls and citadel, and a 14th-century church. It is celebrated for the extensive deposit of rock salt in its vicinity. The salt forms a mountain mass about 300 ft. high and 3 m. in circumference, covered by a thick bed of a reddish-brown clay, and apparently resting on a yellowish-grey sandstone. It is generally more or less translucent, and large masses of it are quite transparent. The hill is worked like a mine; pieces cut from it are carved by artists in Cardona into images, crucifixes and many articles of an ornamental kind.

CARDOON, *Cynara cardunculus* (natural order Compositae), a perennial plant from the south of Europe and Barbary, a near relation of the artichoke. The edible part, called the *chard*, is composed of the blanched and crisp stalks of the inner leaves. Cardoons are found to prosper on light deep soils. The seed is sown annually about the middle of May, in shallow trenches, like those for celery, and the plants are thinned out to 10 or 12 in. from each other in the lines. In Scotland it is preferable to sow the seed singly in small plots, placing them in a mild temperature, and transplanting them into the trenches after they have attained a height of 8 or 10 in. Water must be copiously supplied in dry weather, both to prevent the formation of flower-stalks and to increase the succulence of the leaves. In autumn the leaf-stalks are applied close to each other, and wrapped round with bands of hay or straw, only the points being left free. Earth is then drawn up around them to the height of 15 or 18 in. Sometimes cardoons are blanched by a more thorough earthing up, in the manner of celery, but in this case the operation must be carried on from the end of summer. During severe frost the tops of the leaves should be defended with straw or litter. Besides the common and Spanish cardoons, there are the prickly-leaved Tours cardoon, the red-stemmed cardoon and the Paris cardoon, all of superior quality, the Paris being the largest and most tender. The common artichoke is also used for the production of chard.

CARDS, PLAYING. As is the case with all very ancient pastimes, the origin of playing-cards is obscure, many nations having been credited with the invention, but the generally accepted view is that they come from Asia. In the Chinese dictionary, *Ching-tsze-tung* (1678), it is said that cards were invented in the reign of Sèun-ho, 1120 A.D., for the amusement of his concubines. There is a tradition that cards have existed in India from time immemorial—very ancient ones, round in form, are preserved in museums—and that they were invented by the Brahmans. Their invention has also been assigned to the Egyptians, with whom they were said to have had a religious meaning, and to the Arabs. A very ingenious theory, founded on numerous singular resemblances to the ancient game of chess

(*chaturanga*, the four *angas* or members of an army), has been advanced that they were suggested by chess (see "Essay on the Indian Game of Chess," by Sir William Jones, in his *Asiatic Researches*, vol. ii.).

The time and manner of the introduction of cards into Europe are matters of dispute. The 38th canon of the council of Worcester (1240) is often quoted as evidence of cards having been known in England in the middle of the 13th century; but the games *de rege et regina* there mentioned are now thought to have been a kind of mumming exhibition (Strutt says chess). No queen is found in the earliest European cards. In the wardrobe accounts of Edward I. (1278), Walter Stourton is paid 8s. 5d. *ad opus regis ad ludendum ad quatuor reges*, a passage which has been thought to refer to cards, but it is now supposed to mean chess, which may have been called the "game of four kings," as was the case in India (*chaturaji*). If cards were generally known in Europe as early as 1278, it is very remarkable that Petrarch, in his dialogue that treats of gaming, never once mentions them; and that, though Boccaccio, Chaucer and other writers of that time notice various games, there is not a single passage in them that can be fairly construed to refer to cards. Passages have been quoted from various works, of or relative to this period, but modern research leads to the supposition that the word rendered *cards* has often been mistranslated or interpolated. An early mention of a distinct series of playing cards is the entry of Charles or Charbot Poupart, treasurer of the household of Charles VI. of France, in his book of accounts for 1392 or 1393, which runs thus: *Donné à Jacquemin Gringonneur, peintre, pour trois jeux de cartes, à or et à diverses couleurs, ornés de plusieurs devises, pour porter devers le Seigneur Roi, pour son ébatement, cinquante-six sols parisis.* This, of course, refers only to the painting of a set or pack of cards, which were evidently already well known. But, according to various conjectural interpretations of documents, the earliest date of the mention of cards has been pushed farther back by different authorities. For instance, in the account-books of Johanna, duchess of Brabant, and her husband, Wenceslaus of Luxemburg, there is an entry, under date of the 14th of May 1379, as follows: "Given to Monsieur and Madame four peters, two florins, value eight and a half moutons, wherewith to buy a pack of cards" (*Quartspel met te copen*). This proves their introduction into the Netherlands at least as early as 1379. In a British Museum MS. (Egerton, 2, 419) mention is made of a game of cards (*qui ludus cartarum appellatur*) in Germany in 1377. The safe conclusion with regard to their introduction is that, though they may possibly have been known to a few persons in Europe about the middle of the 14th century, they did not come into general use until about a half-century later. Whence they came is another question that has not yet been answered satisfactorily. If we may believe the evidence of Covelluzzo of Viterbo (15th century) cards were introduced into Italy from Arabia. On the authority of a chronicle of one of his ancestors he writes: "In the year 1379 was brought into Viterbo the game of cards, which comes from the country of the Saracens, and is with them called *naib*." The Crusaders, who were inveterate gamblers, may have been the instruments of their introduction (see *Istoria della città di Viterbo*, by F. Bussi, Rome, 1743). According to other authorities, cards came first to Spain from Africa with the Moors, and it is significant that, to this day, playing cards are called in Spain *naipes* (probably a corruption of the Arabic *Nabi*, prophet). Taken in connexion with the statement of Covelluzzo, this fact would seem to prove the wide popularity of the game of *naib*, or cards, among the Arab tribes. The meaning of the word (prophet) has been suggested to refer to the fortune-telling function of cards, and the theory has been advanced that they were used by the Moorish gypsies for that purpose. Gypsies are, however, not known to have appeared in Spain before the 15th century, at a time when cards were already well known. In regard to the word *naib*, the Italian language still preserves the name *naibi*, playing cards.

Towards the end of the 14th century cards seem to have become common, for in an edict of the provost of Paris, 1397, working-people are forbidden to play at tennis, bowls, dice, cards or nine-pins on working days. From an omission of any mention of cards in an ordonnance of Charles V. in 1369, forbidding certain other games, it may be reasonably concluded that cards became popular in France between that date and the end of the century. In Italy it is possible that they were generally known at a somewhat earlier date. In the 15th century they were often the object of the attacks of the clergy. In 1423 St Bernardino of Siena preached a celebrated sermon against them at Bologna, in which, like the English Puritans after him, he attributed their invention to the devil. Cards in Germany are referred to in a manuscript of Nuremberg about 1384, which illustrates the rapid spread of the new game throughout Europe. In form the earliest cards were generally rectangular or square, though sometimes circular.

Not long after their introduction, cards began to be used for other purposes than gaming. In 1509 a Franciscan friar, Thomas Murner, published an exposition of logic in the form of a pack of cards, and a pack invented in 1651 by Baptist Pendleton purported to convey a knowledge of grammar. These were soon followed by packs teaching geography and heraldry, the whole class being called "scientiall cards." Politics followed, and in England satirical and historical sets appeared, one of them designed to reveal the plots of the Popish agitators. The first mention of cards in the New World is found in the letters of Herrera, a companion of Cortes, who describes the interest manifested by the Aztecs in the card games of the Spanish soldiers.

Early in the 15th century the making of cards had become a regular trade in Germany, whence they were sent to other countries. Cards were also manufactured in Italy at least as early as 1425, and in England before 1463; for by an act of parliament of 3 Edw. IV. the importation of playing cards is forbidden, in consequence, it is said, of the complaints of manufacturers that importation obstructed their business. No cards of undoubted English manufacture of so early a date have been discovered; and there is reason to believe, notwithstanding the act of Edward IV., that the chief supplies came from France or the Netherlands. In the reign of Elizabeth the importation of cards was a monopoly; but from the time of James I. most of the cards used in this country were of home manufacture. A duty was first levied on cards in the reign of James I.; since when they have always been taxed.

It has been much disputed whether the earliest cards were printed from wood-blocks. If so, it would appear that the art of wood-engraving, which led to that of printing, may have been developed through the demand for the multiplication of implements of play. The belief that the early card-makers or card-painters of Ulm, Nuremberg and Augsburg, from about 1418–1450, were also wood-engravers, is founded on the assumption that the cards of that period were printed from wood-blocks. It is, however, clear that the earliest cards were executed by hand, like those designed for Charles VI. Many of the earliest wood-cuts were coloured by means of a stencil, so it would seem that at the time wood-engraving was first introduced, the art of depicting and colouring figures by means of stencil plates was well known. There are no playing cards engraved on wood to which so early a date as 1423 (that of the earliest dated wood-engraving generally accepted) can be fairly assigned; and as at this period there were professional card-makers established in Germany, it is probable that wood-engraving was employed to produce cuts for sacred subjects before it was applied to cards, and that there were hand-painted and stencilled cards before there were wood-engravings of saints. The German *Briefmaler* or card-painter probably progressed into the wood-engraver; but there is no proof that the earliest wood-engravers were the card-makers.

It is undecided whether the earliest cards were of the kind now common, called *numeral* cards, or whether they were *tarocchi* or *tarots*, which are still used in some parts of France, Germany and Italy, but the probability is that the tarots were the earlier. A pack of tarots consists of seventy-eight cards, four suits of

numeral cards and twenty-two emblematic cards, called *atutti* or *atouts* (=trumps). Each suit consists of fourteen cards, ten of which are the pip cards, and four court (or more properly *coat* cards), viz. king, queen, chevalier and valet. The *atouts* are numbered from 1 to 21; the unnumbered card, called the *fou*, has no positive value, but augments that of the other *atouts* (see *Académie des jeux*, Corbet, Paris, 1814, for an account of the mode of playing tarocchino or tarots).

The marks of the suits on the earliest cards (German) are hearts, bells, leaves and acorns. No ace corresponding to the earliest known pack has been discovered; but other packs of about the same date have aces, and it seems unlikely that the suits commenced with the deuces.

Next in antiquity to the marks mentioned are swords, batons, cups and money. These are the most common on Italian cards of the late 15th century, and are used both in Italy and in Spain. French cards of the 16th century bear the marks now generally used in France and England, viz. *cœur* (hearts), *trèfle* (clubs), *pique* (spades) and *carreau* (diamonds).

The French *trèfle*, though so named from its resemblance to the trefoil leaf, was in all probability copied from the acorn; and the *pique* similarly from the leaf (*grün*) of the German suits, while its name is derived from the sword of the Italian suits. It is not derived from its resemblance to a pike head, as commonly supposed. In England the French marks are used, and are named—hearts, clubs (corresponding to *trèfle*, the French symbol being joined to the Italian name, *bastoni*), spades (corresponding to the French *pique*, but having the Italian name—*spade*, swords) and diamonds. This confusion of names and symbols is accounted for by Chatto thus—"If cards were actually known in Italy and Spain in the latter part of the 14th century, it is not unlikely that the game was introduced into this country by some of the English soldiers who had served, under Hawkwood and other free captains, in the wars of Italy and Spain. However this may be, it seems certain that the earliest cards commonly used in this country were of the same kind, with respect to the marks of the suits, as those used in Italy and Spain."

About the last quarter of the 15th century, packs with animals, flowers and human figures, for marks of the suits, were engraved upon copper; and later, numerous variations appeared, dictated by the caprice of individual card-makers; but they never came into general use.

The court cards of the early packs were king, chevalier and knave. The Italians were probably the first to substitute a queen for the chevalier, who in French cards is altogether superseded by the queen. The court cards of French packs received fanciful names, which varied from time to time.

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CARDUCCI, BARTOLOMMEO (1560–1610), Italian painter, better known as CARDUCHO, the Spanish corruption of his Italian patronymic, was born in Florence, where he studied architecture and sculpture under Ammanati, and painting under Zuccaero. The latter master he accompanied to Madrid, where he painted the ceiling of the Escorial library, assisting also in the production of the frescos that adorn the cloisters of that famous palace. He was a great favourite with Philip III., and lived and died in Spain, where most of his works are to be found. The most celebrated of them is a Descent from the Cross, in the church of San Felipe el Real, in Madrid.

His younger brother VINCENZO (1568–1638), was born in Florence, and was trained as a painter by Bartolommeo, whom he followed to Madrid. He worked a great deal for Philip III. and Philip IV., and his best pictures are those he executed for the former monarch as decorations in the Prado. Examples of his work are preserved at Toledo, at Valladolid, at Segovia, and at several other Spanish cities. For many years he laboured in Madrid as a teacher of his art, and among his pupils were Giovanni Ricci, Pedro Obregon, Vela, Francisco Collantes, and other distinguished representatives of the Spanish school during the 17th century. He was also author of a treatise or dialogue, *De las Excelencias de la Pintura*, which was published in 1633.

CARDUCCI, GIOSUE (1836–1907), Italian poet, was born at Val-di-Castello, in Tuscany, on the 27th of July 1836, his father being Michele Carducci, a physician, of an old Florentine family, who in his youth had suffered imprisonment for his share in the revolution of 1831. Carducci received a good education. He began life as a public teacher, but soon took to giving private lessons at Florence, where he became connected with a set of young men, enthusiastic patriots in politics, and in literature bent on overthrowing the reigning romantic taste by a return to classical models. These aspirations always constituted the mainsprings of Carducci's poetry. In 1860 he became professor at Bologna, where, after in 1865 astonishing the public by a defiant *Hymn to Satan*, he published in 1868 *Levia Gravia*, a volume of lyrics which not only gave him an indisputable position at the head of contemporary Italian poets, but made him the head of a school of which the best Italian men of letters have been disciples, and which has influenced all. Several other volumes succeeded, the most important of which were the *Decennalia* (1871), the *Nuove Poesie* (1872), and the three series of the *Odi Barbare* (1877–1889).

Carducci had been brought into more fraternal contact with the aims of the younger generation by the efforts of Angelo Sommaruga who became, about 1880, the publisher of a group of young unknown writers all destined to some, and a few to great, accomplishment. The period of his prosperity was a strange one for Italy. The first ten years of the newly constituted kingdom had passed more in stupor than activity; original contributions to literature had been scarce, and publishers had preferred bringing out inferior translations of not always admirable French authors to encouraging the original work of Italians—work which it must be confessed was generally mediocre and entirely lifeless. Sommaruga's creation, a literary review called *La Cronaca Bizantina*, gathered together such beginners as Giovanni Marradi, Matilde Serao, Edoardo Scarfoglio, Guido Magnoni and Gabriele d'Annunzio. In order to obtain the sanction of what he considered an enduring name, the founder turned to Giosuè Carducci, then living in retirement at Bologna, discontented with his fate, and still not generally known by the public of his own country. The activity of Sommaruga exercised a great influence on Giosuè Carducci. Within the next few years he published the three admirable volumes of his *Confessioni e Battaglie*, the *Ça Ira* sonnets, the *Nuove Odi Barbare*, and a considerable number of articles, pamphlets and essays, which in their collected edition form the most living part of his work. His lyrical production, too, seemed to reach its perfection in those five years of tense, unrelenting work; for the *Canzone di Legnano*, the Odes to Rome and to Monte Mario, the Elegy on the urn of Percy Bysshe Shelley, the ringing rhymes of the *Intermezzo*, in which he happily blended the satire of Heine with the lyrical form of his native poetry—all belong to this period, together with the essays on Leopardi and on Parini, the admirable discussions in defence of his *Ça Ira*, and the pamphlet called *Eterno Femminino regale*, a kind of self-defence, undertaken to explain the origin of the Alcaic metre to the queen of Italy, which marks the beginning of the last evolution in Carducci's work (1881). The revolutionary spirits of the day, who had always

looked upon Giosuè Carducci as their bard and champion, fell away from him after this poem written in honour of a queen, and the poet, wounded by the attitude of his party, wrote what he intended to be his defence and his programme for the future in pages that will remain amongst the noblest and most powerful of contemporary literature. From that time Carducci appears in a new form, evolved afterwards in his last Odes, *Il Piemonte*, *Li Bicocca di San Giacomo*, the Ode to the daughter of Francesco Crispi on her marriage, and the one to the church where Dante once prayed, *Alla Chiesetta dei Polenta*, which is like the withdrawing into itself of a warlike soul weary of its battle.

For a few months in 1876 Carducci had a seat in the Italian Chamber. In 1881 he was appointed a member of the higher council of education. In 1890 he was made a senator. And in 1906 he was awarded the Nobel prize for literature. He died at Bologna on the 16th of February 1907. By his marriage in 1859 he had two daughters, who survived him, and one son, who died in infancy.

The same qualities which placed Carducci among the classics of Italy in his earlier days remained consistently with him in later life. His thought flows limpid, serene, sure of itself above an undercurrent of sane and vigorous if pagan philosophy. Patriotism, the grandeur of work, the soul-satisfying power of justice, are the poet's dominant ideals. For many years the national struggle for liberty had forced the best there was in heart and brain into the atmosphere of political intrigue and from one battlefield to another; Carducci therefore found a poetry emasculated by the deviation into other channels of the intellectual virility of his country. On this mass of patriotic doggerel, of sickly, languishing sentimentality as insincere as it was inane, he grafted a poetry not often tender, but always violently felt and thrown into a mould of majestic form; not always quite expected or appreciated by his contemporaries, but never commonplace in structure; always high in tone and free in spirit. The adaptation of various kinds of Latin metres to the somewhat sinewless language he found at his disposal, whilst it might have been an effort of mere pedantry in another, was a life-giving and strengthening inspiration in his case. Another of his characteristics, which made him peculiarly precious to his countrymen, is the fact that his poems form a kind of lyric record of the Italian struggle for independence. The tumultuous vicissitudes of all other nations, however, and the pageantry of the history of all times, have in turns touched his particular order of imagination. The more important part of his critical work which belongs to this later period consists of his *Conversazioni critiche*, his *Storia filosofica della letteratura Italiana*, and a masterly edition of Petrarch. That he should have had the faults of his qualities is not remarkable. Being almost a pioneer in the world of criticism, his essays on the authors of other countries, though appearing in the light of discoveries to his own country, absorbed as it had hitherto been in its own vicissitudes, have little of value to the general student beyond the attraction of robust style. And in his unbounded admiration for the sculptural lines of antique Latin poetry he sometimes relapsed into that fascination by mere sound which is the snare of his language, and against which his own work in its great moments is a reaction.

CARDWELL, EDWARD (1787–1861), English theologian, was born at Blackburn in Lancashire in 1787. He was educated at Brasenose College, Oxford (B.A. 1809; M.A. 1812; B.D. 1819; D.D. 1831), and after being for several years tutor and lecturer, was appointed, in 1814, one of the examiners to the university. In 1825 he was chosen Camden professor of ancient history; and during his five years' professorship he published an edition of the *Ethics* of Aristotle, and a course of his lectures on *The Coinage of the Greeks and Romans*. In 1831 he succeeded Archbishop Whately as principal of St Alban's Hall. He published in 1837 a student's edition of the Greek Testament, and an edition of the Greek and Latin texts of the *History of the Jewish War*, by Josephus, with illustrative notes. But his most important labours were in the field of English church history. He projected an extensive work, which was to embrace the entire synodical history of the church in England, and was to be founded on David Wilkins's *Concilia Magnae Britanniae et Hiberniae*. Of this work he executed some portions only. The first published was *Documentary Annals of the Reformed Church of England from 1546 to 1716*, which appeared in 1839. It was followed by a *History of Conferences, &c., connected with the Revision of the Book of Common Prayer* (1840). On 1842 appeared *Synodalia, a Collection of Articles of Religion, Canons, and Proceedings of Convocation from 1547 to 1717*, completing the series for that period. Closely connected with these works is the *Reformatio Legum Ecclesiasticarum* (1850), which treats of the efforts for reform during the reigns of Henry VIII., Edward VI., and Elizabeth. Cardwell also published in 1854 a new edition of Bishop Gibson's *Synodus Anglicana*. He was one of the best men of business in the university, and held various important posts, among which were those of delegate of the press, curator of the university galleries, manager of the Bible department of the press, and private secretary to successive chancellors of the university. He established the Wolvercot paper mill. He died at Oxford on the 23rd of May 1861.

CARDWELL, EDWARD CARDWELL, Viscount (1813–1886), English statesman, was the son of a merchant of Liverpool, where he was born on the 24th of July 1813. After a brilliant career at Oxford, where he gained a double first-class, he entered parliament as member for Clitheroe in 1842, and in 1845 was made secretary to the treasury. He supported Sir Robert Peel's free-trade policy, and went out of office with him. In 1847 he was elected for Liverpool, but lost his seat in 1852 for having supported the repeal of the navigation laws. He soon found another constituency at Oxford, and upon the formation of Lord Aberdeen's coalition ministry became president of the Board of Trade, although debarred by the jealousy of his Whig colleagues from a seat in the cabinet. In 1854 he carried, almost without opposition, a most important and complicated act consolidating all existing shipping laws, but in 1855 resigned, with his Peelite colleagues, upon the appointment of Mr Roebuck's Sevastopol inquiry committee, declining the offer of the chancellorship of the Exchequer pressed upon him by Lord Palmerston. In 1858 he moved the famous resolution condemnatory of Lord Ellenborough's despatch to Lord Canning on the affairs of Oude, which for a time seemed certain to overthrow the Derby government, but which ultimately dissolved into nothing. He obtained a seat in Lord Palmerston's cabinet of 1859, and after filling the uncongenial posts of secretary for Ireland and chancellor of the duchy of Lancaster (1861), became secretary for the colonies in 1864. Here he reformed the system of colonial defence, refusing to keep troops in the colonies during time of peace unless their expense was defrayed by the colonists; he also laid the foundation of federation in Canada and, rightly or wrongly, censured Sir George Grey's conduct in New Zealand. Resigning with his friends in 1866, he again took office in 1868 as secretary for war. In this post he performed the most memorable actions of his life by the abolition of purchase and the institution of the short service system and the reserve in the army, measures which excited more opposition than any of the numerous reforms effected by the Gladstone government of that period, but which were entirely justified by their successful working afterwards. On the resignation of the Gladstone ministry in 1874 he was raised to the peerage as Viscount Cardwell of Ellerbeck, but took no further prominent part in politics. His mental faculties, indeed, were considerably impaired during the last few years of his life, and he died at Torquay on the 15th of February 1886. He was not a showy, hardly even a prominent politician, but effected far more than many more conspicuous men. The great administrator and the bold innovator were united in him in an exceptional degree, and he allowed neither character to preponderate unduly.

CARDWELL, a town of Cardwell county, Queensland, Australia, on Rockingham Bay, about 800 m. direct N.W. by N. of Brisbane. Pop. of town and district (1901) 3435. It has one of the best harbours in the state, easy of access in all weathers, with a depth ranging from 4 to 10 fathoms. Various minerals, including gold and tin, exist in the district; and there are preserve and sauce

factories, and works for meat extract and tinning. The dugong fishery is carried on, and the oil is extracted. There are large timber forests in the district, and much cedar is exported.

CAREW, GEORGE (d. about 1613), English diplomatist and historian, second son of Sir Wymond Carew of Antony, was educated at Oxford, entered the Inns of Court, and passed some years in continental travel. At the recommendation of Queen Elizabeth, who conferred on him the honour of knighthood, he was appointed secretary to Sir Christopher Hatton, and afterwards, having been promoted to a mastership in chancery, was sent as ambassador to the king of Poland. In the reign of James he was employed in negotiating the treaty of union with Scotland, and for several years was ambassador to the court of France. On his return he wrote a *Relation of the State of France*, with sketches of the leading persons at the court of Henry IV. It is written in the classical style of the Elizabethan age, and was appended by Dr Birch to his *Historical View of the Negotiations between the Courts of England, France and Brussels, from 1592 to 1617*. Much of the information regarding Poland contained in De Thou's *History of His Own Times* was furnished by Carew.

CAREW, RICHARD (1555–1620), English poet and antiquary, was born on the 17th of July 1555, at Antony House, East Antony, Cornwall. At the age of eleven, he entered Christ Church, Oxford, and when only fourteen was chosen to carry on an extempore debate with Sir Philip Sidney, in presence of the earls of Leicester and Warwick and other noblemen. From Oxford he removed to the Middle Temple, where he spent three years, and then went abroad. By his marriage with Juliana Arundel in 1577 he added Coswarth to the estates he had already inherited from his father. In 1586 he was appointed high-sheriff of Cornwall; he entered parliament in 1584; and he served under Sir Walter Raleigh, then lord lieutenant of Cornwall, as treasurer. He became a member of the Society of Antiquaries in 1589, and was a friend of William Camden and Sir Henry Spelman. His great work is the *Survey of Cornwall*, published in 1602, and reprinted in 1769 and 1811. It still possesses interest, apart from its antiquarian value, for the picture it gives of the life and interests of a country gentleman of the days of Elizabeth. Carew's other works are:—a translation of the first five Cantos of Tasso's *Gerusalemme* (1594), printed in the first instance without the author's knowledge, and entitled *Godfrey of Balloigne, or the Recouerie of Hierusalam*; *The Examination of Men's Wits* (1594), a translation of an Italian version of John Huarte's *Examen de Ingenios*; and *An Epistle concerning the Excellences of the English Tongue* (1605). Carew died on the 6th of November 1620.

His son, Sir Richard Carew (d. 1643?), was the author of a *True and Readie Way to learn the Latine Tongue*, by writers of three nations, published by Samuel Hartlib in 1654.

CAREW, THOMAS (1595–1645?), English poet, was the son of Sir Matthew Carew, master in chancery, and his wife, Alice Ingpenny, widow of Sir John Rivers, lord mayor of London. The poet was probably the third of the eleven children of his parents, and was born at West Wickham in Kent, in the early part of 1595, for he was thirteen years of age in June 1608, when he matriculated at Merton College, Oxford. He took his degree of B.A. early in 1611, and proceeded to study at the Middle Temple. Two years later his father complained to Sir Dudley Carleton that he was doing little at the law. He was in consequence sent to Italy, as a member of Sir Dudley's household, and when the ambassador returned from Venice, he seems to have kept Thomas Carew with him, for he is found in the capacity of secretary to Sir Dudley Carleton, at the Hague, early in 1616. From this office he was dismissed in the autumn of that year for levity and slander; he had great difficulty in finding another situation. In August 1618 his father died, and Carew entered the service of Lord Herbert of Cherbury, in whose train he started for France in March 1619, and it is believed that he travelled in Herbert's company until that nobleman returned to England, at the close of his diplomatic missions, in April 1624. Carew "followed the court before he was of it," not receiving the definite appointment of gentleman of the privy chamber until 1628. While Carew held this office, he displayed his tact and presence of mind by stumbling and extinguishing the candle he was holding to light Charles I. into the queen's chamber, because he saw that Lord St Albans had his arm round her majesty's neck. The king suspected nothing, and the queen heaped favours on the poet. Probably in 1630, Carew was made "server" or taster-in-ordinary to the king. To this period may be attributed his close friendship with Sir John Suckling, Ben Jonson and Clarendon; the latter says that Carew was "a person of pleasant and facetious wit." Donne, whose celebrity as a court-preacher lasted until his death in 1631, exercised a powerful if not entirely healthful influence over the genius of Carew. In February 1633 a masque by the latter, entitled *Coelum Britanicum*, was acted in the banqueting-house at Whitehall, and was printed in 1634. The close of Carew's life is absolutely obscure. It was long supposed that he died in 1639, and this has been thought to be confirmed by the fact that the first edition of his *Poems*, published in 1640, seems to have a posthumous character. But Clarendon tells us that "after fifty years of life spent with less severity and exactness than it ought to have been, he died with the greatest remorse for that licence." If Carew was more than fifty years of age, he must have died in or after 1645, and in fact there were final additions made to his *Poems* in the third edition of 1651. Walton tells us that Carew in his last illness, being afflicted with the horrors, sent in great haste to "the ever-memorable" John Hales (1584–1656); Hales "told him he should have his prayers, but would by no means give him then either the sacrament or absolution."

Carew's poems, at their best, are brilliant lyrics of the purely sensuous order. They open to us, in his own phrase, "a mine of rich and pregnant fancy." His metrical style was influenced by Jonson and his imagery still more clearly by Donne, for whom he had an almost servile admiration. His intellectual power was not comparable with Donne's, but Carew had a lucidity and directness of lyrical utterance unknown to Donne. It is perhaps his greatest distinction that he is the earliest of the Cavalier song-writers by profession, of whom Rochester is the latest, poets who turned the disreputable incidents of an idle court-life into poetry which was often of the rarest delicacy and the purest melody and colour. The longest and best of Carew's poems, "A Rapture," would be more widely appreciated if the rich flow of its imagination were restrained by greater reticence of taste.

The best edition of Carew's *Poems* is that prepared by Arthur Vincent in 1899. (E. G.)

CAREY, HENRY (d. 1743), English poet and musician, reputed to be an illegitimate son of George Savile, marquess of Halifax, was born towards the end of the 17th century. His mother is supposed to have been a schoolmistress, and Carey himself taught music at various schools. He owed his knowledge of music to Olaus Linnert, and later he studied with Roseingrave and Geminiani. He wrote the words and the music of *The Contrivances; or More Ways than One*, a farce produced at Drury Lane in 1715. His *Hanging and Marriage; or The Dead Man's Wedding* was acted at Lincoln's Inn Fields in 1722. *Chrononhotonthologos* (1734), described as "The most Tragical Tragedy that ever was tragedized by any Company of Tragedians," was a successful burlesque of the bombast of the contemporary stage. The best of his other pieces were *A Wonder; or the Honest Yorkshireman* (1735), a ballad opera, and the *Dragon of Wantley* (1737), a burlesque opera, the music of which was by J. F. Lampe. He was the author of *Namby-Pamby*, a once famous parody of Ambrose Philips's verses to the infant daughter of the earl of Carteret. Carey is best remembered by his songs. "Sally in our Alley" (printed in his *Musical Century*) was a sketch drawn after following a shoemaker's 'prentice and his sweetheart on a holiday. The present tune set to these words, however, is not the one written by Carey, but is borrowed from an earlier song, "The Country Lasse," which is printed in *The Merry Musician* (vol. iii., *c.* 1716). It has been claimed for him that he was the author of "God save the King" (see National Anthems). He died in London on the 4th of

October 1743, and it was asserted, without justification, that he had committed suicide. Edmund Kean, the tragedian, was one of his great-grandchildren.

The completest edition of his poems is *Poems on Several Occasions* (1729). His dramatic works were published by subscription in 1743.

CAREY, HENRY CHARLES (1793–1879), American economist, was born in Philadelphia on the 15th of December 1793. At the age of twenty-eight he succeeded his father, Mathew Carey (1760–1839)—an influential economist, political reformer, editor, and publisher, of Irish birth, but for many years a resident of Philadelphia—as a member of the publishing firm of Carey & Lea, which was long the most conspicuous in America. He died in Philadelphia on the 13th of October 1879.

Among Mathew Carey's many writings had been a collection (1822) of *Essays on Political Economy*, one of the earliest of American treatises favouring protection, and Henry C. Carey's life-work was devoted to the propagation of the same theory. He retired from business in 1838, almost simultaneously with the appearance (1837–1840) of his *Principles of Political Economy*. This treatise, which was translated into Italian and Swedish, soon became the standard representative in the United States of the school of economic thought which, with some interruptions, has since dominated the tariff system of that country. Carey's first large work on political economy was preceded and followed by many smaller volumes on wages, the credit system, interest, slavery, copyright, &c.; and in 1858–1859 he gathered the fruits of his lifelong labours into *The Principles of Social Science*, in three volumes. This work is a most comprehensive as well as mature exposition of his views. In it Carey sought to show that there exists, independently of human wills, a natural system of economic laws, which is essentially beneficent, and of which the increasing prosperity of the whole community, and especially of the working classes, is the spontaneous result—capable of being defeated only by the ignorance or perversity of man resisting or impeding its action. He rejected the Malthusian doctrine of population, maintaining that numbers regulate themselves sufficiently in every well-governed society, and that their pressure on subsistence characterizes the lower, not the more advanced, stages of civilization. He denied the universal truth, for all stages of cultivation, of the law of diminishing returns from land.

His fundamental theoretic position relates to the antithesis of wealth and value. Carey held that land, as we are concerned with it in industrial life, is really an instrument of production which has been formed as such by man, and that its value is due to the labour expended on it in the past—though measured, not by the sum of that labour, but by the labour necessary under existing conditions to bring new land to the same stage of productiveness. He studied the occupation and reclamation of land with peculiar advantage as an American, for whom the traditions of first settlement were living and fresh, and before whose eyes the process was indeed still going on. The difficulties of adapting a primitive soil to the work of yielding organic products for man's use can be lightly estimated only by an inhabitant of a country long under cultivation. It is, in Carey's view, the overcoming of these difficulties by arduous and continued effort that entitles the first occupier of land to his property in the soil. Its present value forms a very small proportion of the cost expended on it, because it represents only what would be required, with the science and appliances of our time, to bring the land from its primitive into its present state. Property in land is therefore only a form of invested capital—a quantity of labour or the fruits of labour permanently incorporated with the soil; for which, like any other capitalist, the owner is compensated by a share of the produce. He is not rewarded for what is done by the powers of nature, and society is in no sense defrauded by his sole possession. The so-called Ricardian theory of rent is a speculative fancy, contradicted by all experience. Cultivation does not in fact, as that theory supposes, begin with the best, and move downwards to the poorer soils in the order of their inferiority. The light and dry higher lands are first cultivated; and only when population has become dense and capital has accumulated, are the low-lying lands, with their greater fertility, but also with their morasses, inundations, and miasmas, attacked and brought into occupation. Rent, regarded as a proportion of the produce, sinks, like all interest on capital, in process of time, but, as an absolute amount, increases. The share of the labourer increases, both as a proportion and an absolute amount. And thus the interests of these different social classes are in harmony. But, Carey proceeded to say, in order that this harmonious progress may be realized, what is taken from the land must be given back to it. All the articles derived from it are really separated parts of it, which must be restored on pain of its exhaustion. Hence the producer and the consumer must be close to each other; the products must not be exported to a foreign country in exchange for its manufactures, and thus go to enrich as manure a foreign soil. In immediate exchange value the landowner may gain by such exportation, but the productive powers of the land will suffer.

Carey, who had set out as an earnest advocate of free trade, accordingly arrived at the doctrine of protection: the "co-ordinating power" in society must intervene to prevent private advantage from working public mischief. He attributed his conversion on this question to his observation of the effects of liberal and protective tariffs respectively on American prosperity. This observation, he says, threw him back on theory, and led him to see that the intervention referred to might be necessary to remove (as he phrases it) the obstacles to the progress of younger communities created by the action of older and wealthier nations. But it seems probable that the influence of List's writings, added to his own deep-rooted and hereditary jealousy and dislike of English predominance, had something to do with his change of attitude (see PROTECTION).

CAREY, WILLIAM (1761–1834), English Oriental scholar, and the pioneer of modern missionary enterprise, was born at Paulerspury, Northamptonshire, on the 17th of August 1761. When a youth he worked as a shoemaker; but having joined the Baptists when he was about twenty-one, he devoted much of his time to village preaching. In 1787 he became pastor of a Baptist church in Leicester, and began those energetic movements among his fellow religionists which resulted in the formation of the Baptist Missionary Society, Carey himself being one of the first to go abroad. On reaching Bengal in 1793, he and his companions lost all their property in the Hugli; but having received the charge of an indigo factory at Malda, he was soon able to prosecute the work of translating the Bible into Bengali. In 1799 he quitted Malda for Serampore, where he established a church, a school, and a printing-press for the publication of the Scriptures and philological works. In 1801 Carey was appointed professor of Oriental languages in a college founded at Fort William by the marquess of Wellesley. From this time to his death he devoted himself to the preparation of numerous philological works, consisting of grammars and dictionaries in the Mahratta, Sanskrit, Punjabi, Telinga, Bengali and Bhotanta dialects. The Sanskrit dictionary was unfortunately destroyed by a fire which broke out in the printing establishment. From the Serampore press there issued in his lifetime over 200,000 Bibles and portions in nearly forty different languages and dialects, Carey himself undertaking most of the literary work. He died on the 9th of June 1834.

See *Lives* by J. Culross (1881) and G. Smith (1884).

CARGILL, DONALD (1610–1681), Scottish Covenanter, was born in 1610. He was educated at St Andrews, and afterwards attached himself to the Protesters. After his appointment to one of the churches in Glasgow, he openly resisted the measures of the government. Compelled to remain at a distance from his charge, he ventured back to celebrate the Communion, and was arrested, but was liberated at the instance of some of his private friends. He was afterwards wounded at the battle of Bothwell Bridge, and fled to Holland, where he remained a few months. On his return he joined Richard Cameron in publishing the Sanquhar declaration, and boldly excommunicated the king and his officials. He was soon afterwards apprehended, and brought to Edinburgh, where he was beheaded on the 27th of July 1681.

CARGO (Span. for "loading," from Lat. *carrus*, car), a ship-load, or the goods (or even, less technically, persons) carried on board a ship; and so, by analogy, a term used for any large amount. The maritime law affecting the cargo of a ship is dealt with in the articles AVERAGE, AFFREIGHTMENT, INSURANCE, SALVAGE, BOTTOMRY, LIEN; and the specialities of cargo-ships under SHIP.

CARIA, an ancient district of Asia Minor, bounded on the N. by Ionia and Lydia, on the W. and S. by the Aegean Sea, and on the E. by Lycia and a small part of Phrygia. The coast-line consists of a succession of great promontories alternating with deep inlets. The most important inlet, the Ceramic Gulf, or Gulf of Cos, extends inland for 70 m., between the great mountain promontory terminating at Myndus on the north, and that which extends to Cnidus and the remarkable headland of Cape Krio on the south. North of this is the deep bay called in ancient times the Gulf of Iasus (now known as the Gulf of Mendeliyah), and beyond this again was the deeper inlet which formerly extended inland between Miletus and Priene, but of which the outer part has been entirely filled up by the alluvial deposits of the Maeander, while the innermost arm, the ancient Latmic Gulf, is now a lake. South of Cape Krio again is the gulf known as the Gulf of Doris, with several subordinate inlets, bounded on the south by the rugged promontory of Cynossema (mod. Cape Alupo). Between this headland and the frontier of Lycia is the sheltered bay of Marmarice, noted in modern times as one of the finest harbours of the Mediterranean.

Almost the whole of Caria is mountainous. The two great masses of Cadmus (Baba-dagh) and Salbacum (Boz-dagh), which are in fact portions of the great chain of Taurus (see ASIA MINOR), form the nucleus to which the whole physical framework of the country is attached.. From these lofty ranges there extends a broad tableland (in many parts more than 3000 ft. high), while it sends down offshoots on the north towards the Maeander, and on the west towards the Aegean. Of these ranges the summit of Mt Latmus alone reaches 4500 ft.

The coast is fringed by numerous islands, in some instances separated only by narrow straits from the mainland. Of these the most celebrated are Rhodes and Cos. Besides these are Syme, Telos, Nisyros, Calymnos, Leros and Patmos, all of which have been inhabited, both in ancient and modern times, and some of which contain excellent harbours. Of these Nisyros alone is of volcanic origin; the others belong to the same limestone formation with the rocky headlands of the coast. The country known as Caria was shared between the Carians proper and the Caunians, who were a wilder people, inhabiting the district between Caria and Lycia. They were not considered to be of the same blood as the Carians, and were, therefore, excluded from the temple of the Carian Zeus at Mylasa, which was common to the Carians, Lydians and Mysians, though their language was the same as that of the Carians proper. Herodotus (i. 172) believed the Caunians to have been aborigines, the Carians having been originally called Leleges, who had been driven from the Aegean islands by the invading Greeks. This seems to have been a prevalent view among the Greek writers, for Thucydides (i. 8) states that when Delos was "purified" more than half the bodies found buried in it were those of "Carians." Modern archaeological discovery, however, is against this belief; and the fact that Mysus, Lydus and Car were regarded as brothers indicates that the three populations who worshipped together in the temple of Mylasa all belonged to the same stock. Homer (*Il.* x. 428-429) distinguishes the Leleges (*q.v.*) from the Carians, to whom is ascribed the invention of helmet-crests, coats of arms, and shield handles.

A considerable number of short Carian inscriptions has been found, most of them in Egypt. They were first noticed by Lepsius at Abu-Simbel, where he correctly inferred that they were the work of the Carian mercenaries of Psammetichus. The language, so far as it has been deciphered, is "Asianic" and not Indo-European.

The excavations of W.R. Paton at Assarlik (*Journ. Hell. Studies*, 1887) and of F. Winter at Idrias have resulted in the discovery of Late-Mycenaean and Geometric pottery. Caria, however, figured but little in history. It was absorbed into the kingdom of Lydia, where Carian troops formed the bodyguard of the king. Cnidus and Halicarnassus on the coast were colonized by Dorians. At Halicarnassus (*q.v.*) the Mausoleum, the monument erected by Artemisia to her husband Mausolus, about 360 B.C., was excavated by Sir C. T. Newton in 1857–1858. Cnidus (*q.v.*) was excavated at the same time, when the "Cnidian Lion," now in the British Museum, was found crowning a tomb near the site of the old city (C. T. Newton, *History of Discoveries at Cnidus, Halicarnassus and Branchidae*). On the border-land between Caria and Lydia lay other Greek cities, Miletus, Priene, and Magnesia (see articles *s.v.*), colonized in early times by the Ionians. Inland was Tralles (mod. Aidin), which also had an Ionic population, though it never belonged to the Ionic confederacy (see TRALLES). The excavations of the English in 1868–1869, of the French under O. Rayet and A. Thomas in 1873, and more recently of the Germans under Th. Wiegand and Schrader in 1895–1898 have laid bare the site of the Greek Priene, and the same has been done for the remains of Magnesia ad Maeandrum by French excavators in 1842–1843 and the German expedition under K. Humann in 1891–1893. A German expedition under Th. Wiegand carried on excavations at Miletus (see articles on these towns).

In the Persian epoch, native dynasts established themselves in Caria and even extended their rule over the Greek cities. The last of them seems to have been Pixodarus, after whose death the crown was seized by a Persian, Orontobates, who offered a vigorous resistance to Alexander the Great. But his capital, Halicarnassus, was taken after a siege, and the principality of Caria conferred by Alexander on Ada, a princess of the native dynasty. Soon afterwards the country was incorporated into the Syrian empire and then into the kingdom of Pergamum.

See W. M. Ramsay, "Historical Geography of Asia Minor" (*R.G.S.* iv., 1890); W. Ruge and E. Friedrich, *Archäologische Karte von Kleinasien* (1899); Perrot and Chipiez, *History of Art in Phrygia, Lydia, Caria and Lycia* (Eng. trans., 1892); A. H. Sayce, "The Karian Language and Inscriptions" (*T.S.B.A.* ix. 1, 1887); P. Kretschmer, *Einleitung in die Geschichte der griechischen Sprache*, pp. 376-384 (1896). For the coinage see NUMISMATICS. (A. H. S.)

CARIACO, or SAN FELIPE DE AUSTRIA, a town on the north coast of Venezuela, 40 m. east of the city of Cumaná at the head of the gulf bearing the same name. Pop. (1908, estimate) 7000. It stands a short distance up the Cariaco river and its port immediately on the coast is known as Puerto Sucre. The surrounding district produces cotton, tobacco, cacáo, cattle and fruit, and there is considerable trade through Puerto Sucre, although that port has no regular connexion with foreign ports.

CARIBBEE ISLANDS, a name chiefly of historical importance, sometimes applied to the whole of the West Indies, but strictly comprehending only the chain of islands stretching from Porto Rico to the coast of South America. These are also known as the Lesser Antilles, and the bulk of them are divided into the two groups of the Leeward and Windward Islands.

CARIBS, the name, used first by Columbus (from *Cariba*, said to mean "a valiant man"), of a South American people, who, at the arrival of the Spanish, occupied parts of Guiana and the lower Orinoco and the Windward and other islands in what is still known as the Caribbean Sea. They were believed to have had their original home in North America, spreading thence through the Antilles southward to Venezuela, the Guianas, and north-east Brazil. This view has been abandoned, as Carib tribes, the Bakairi and Nahuquas, using an archaic type of Carib speech and primitive in habits, have been met by German explorers in the very heart of Brazil. It may thus be assumed that the cradle of the race was the centre of South America; their first migrating movements being to Guiana and the Antilles. A cruel, ferocious and warlike people, they made a stout resistance to the Spaniards. They were cannibals, and it is to them that we owe that word, Columbus's *Caribal* being transformed into *Cannibal* in apparent reference to the *canine* voracity of the Caribs. They are physically by no means a powerful race, being distinguished by slight figures with limbs well formed but

lacking muscle, and with a tendency to be pot-bellied, due apparently to their habit of drinking *paiwari* (liquor prepared from the cassava plant) in great quantities. Their colour is a red cinnamon, but varies with different tribes. Their hair is thick, long, very black, and generally cut to an even edge, at right angles to the neck, round the head. The features are strikingly Mongoloid. Among the true Caribs a 2-in. broad belt of cotton is knitted round each ankle, and just below each knee of the young female children. All body-hair in both sexes is pulled out, even to the eye-brows. Among the women the lower lips are often pierced, pins of wood being passed through and forming a sort of *chevaux de frise* round the mouth. Sometimes a bell-shaped ornament is hung by men to a piece of string passed through the lower lip. The Carib government was patriarchal. Though the women did most of the hard work, they were kindly treated. Polygamy prevailed. Very little ceremony attended death. The Caribs of the West Indies, known as "Red" and "Black," the first pure, the second mixed with negro blood, after a protracted war with the British were transported in 1796 to the number of 5000 from Dominica and St Vincent to the island of Ruatan near the coast of Honduras. A few were subsequently allowed back to St Vincent, but the majority are settled in Honduras and Nicaragua.

CARICATURE (Ital. *caricatura, i.e. "ritratto ridicolo,"* from *caricare*, to load, to charge; Fr. *charge*), a general term for the art of applying the grotesque to the purposes of satire, and for pictorial and plastic ridicule and burlesque. The word "caricatura" was first used as English by Sir Thomas Browne (1605–1682), in his *Christian Morals*, a posthumous work; it is next found, still in its Italian form, in No. 537 of the *Spectator*; it was adopted by Johnson in his dictionary (1757), but does not appear in Bailey's dictionary, for example, as late as 1773; and it only assumed its modern guise towards the end of the 18th century, when its use and comprehension became general.

Little that is not conjectural can be written concerning caricature among the ancients. Few traces of the comic are discoverable in Egyptian art—such papyri of a satirical tendency as are known to exist appearing to belong rather to the class of ithyphallic drolleries than to that of the ironical grotesque. Among the Greeks, though but few and dubious data are extant, it seems possible that caricature may not have been altogether unknown. Their taste for pictorial parody, indeed, has been sufficiently proved by plentiful discoveries of pottery painted with burlesque subjects. Aristotle, moreover, who disapproved of grotesque art, condemns in strong terms the pictures of a certain Pauson, who, alluded to by Aristophanes, and the subject of one of Lucian's anecdotes, is hailed by Champfleury as the *doyen* of caricaturists. That the grotesque in graphic art conceived in the true spirit of intentional caricature was practised by the Romans is evident from the curious frescoes uncovered at Pompeii and Herculaneum; from the mention in Pliny of certain painters celebrated for burlesque pictures; from the curious fantasies graven in gems and called Grylli; and from the number of ithyphallic caprices that have descended to modern times. But in spite of these evidences of Greek and Roman humour, in spite of the famous comic statuette of Caracalla, and of the more famous *graffito* of the Crucifixion, the caricaturists of the old world must be sought for, not among its painters and sculptors, but among its poets and dramatists. The comedies of Aristophanes and the epigrams of Martial were, to the Athens of Pericles and the Rome of Domitian, what the etchings of Gillray and the lithographs of Daumier were to the London of George III. and the Paris of the Citizen King.

During the middle ages a vast mass of grotesque material was accumulated, but selection becomes even more difficult than with the scarce relics of antiquity. With the building of the cathedrals originated a new style of art; a strange mixture of memories of paganism and Christian imaginings was called into being for the adornment of those great strongholds of urban Catholicism, and in this the coarse and brutal materialism of the popular humour found its largest and freest expression. On missal-marge and sign-board, on stall and entablature, in gargoyle and initial, the grotesque displayed itself in an infinite variety of forms. The import of this inextricable tangle of imagery, often obscene and horrible, often quaint and fantastic, is difficult, if not impossible, to determine. We recognize the prevalence of three great popular types or figures, each of which may be credited with a satirical intention—of Reynard the Fox, the hero of the famous medieval romance; of the Devil, that peculiarly medieval antithesis of God; and of Death, the sarcastic and irreverent skeleton. The popularity of the last is evidenced by the fact that no fewer than forty-three towns in England, France and Germany are enumerated as possessing sets of the Dance of Death, that grandiose all-levelling series of caprices in the contemplation of which the middle ages found so much consolation. It was reserved for Holbein (1498–1554), seizing the idea and resuming all that his contemporaries thought and felt on the subject, to produce, in his fifty-three magnificent designs of the Danse Macabre, the first and perhaps the greatest set of satirical moralities known to the modern world.

It is in the tumult of the Renaissance, indeed, that caricature in its modern sense may be said to have been born. The great popular movements required some such vehicle of comment or censure; the perfection to which the arts of design were attaining supplied the means; the invention of printing ensured its dissemination. The earliest genuine piece of graphic irony that has been discovered is a caricature (1499) relating to Louis XII. and his Italian war. But it was the Reformation that produced the first full crop of satirical ephemerae, and the heads of Luther and Alexander VI. are therefore the direct ancestors of the masks that smirk and frown from the "cartoons" of *Punch* and the *Charivari*. Fairly started by Lucas Cranach, a friend of Luther, in his *Passionale of Christ and Antichrist* (1521), caricature was naturalized in France under the League, but only to pass into the hands of the Dutch, who supplied the rest of Europe with satirical prints during the whole of the next century. A curious reaction is visible in the work of Pieter Breughel (1510–1570) towards the grotesque *diablerie* and macaberesque morality of medieval art, the last original and striking note of which is caught in the compositions of Jacques Callot (1593–1635), and, in a less degree, in those of his followers, Stefano della Bella (1610–1664) and Salvator Rosa (1615–1673). On the other hand, however, Callot, one of the greatest masters of the grotesque that ever lived, in certain of his *Caprices*, and in his two famous sets of prints, the *Misères de la guerre*, may be said to anticipate certain productions of Hogarth and Goya, and so to have founded the modern school of ironic *genre*.

In England one of the earliest caricatures extant is that in the margin of the Forest Roll of Essex, 5, ed. 1, now at the Record Office; it is a grotesque portrait of "Aaron fil Diabole" (Aaron, son of the devil), probably representing Cok, son of Aaron. It is dated 1277. Another caricature, undated, appears on a Roll containing an account of the tallages and fines paid by Jews, 17. Henry III., belonging to 1233 (Exch. of Receipt, Jews' Roll, No. 8). It is an elaborate satirical design of Jews and devils, arranged in a pediment. During the 16th century, caricature can hardly be said to have existed at all,—a grotesque of Mary Stuart as a mermaid, a pen and ink sketch of which is yet to be seen in the Rolls Office, being the only example of it known. The Great Rebellion, however, acted as the Reformation had done in Germany, and Cavaliers and Roundheads caricatured each other freely. At this period satirical pictures usually did duty as the title-pages of scurrilous pamphlets; but one instance is known of the employment during the war of a grotesque allegory as a banner, while the end of the Commonwealth produced a satirical pack of playing cards, probably of Dutch origin. The Dutch, indeed, as already has been stated, were the great purveyors of pictorial satire at this time and during the early part of the next century. In England the wit of the victorious party was rather vocal than pictorial; in France the spirit of caricature was sternly repressed; and it was from Holland, bold in its republican freedom, and rich in painters and etchers, that issued the flood of prints and medals which illustrate, through cumbrous allegories and elaborate

symbolization, the principal political passages of both the former countries, from the Restoration (1660) to the South Sea Bubble (1720). The most distinguished of the Dutch artists was Romain de Hooghe (1638–1720), a follower of Callot, who, without any of the weird power of his master, possessed a certain skill in grouping and faculty of grotesque suggestiveness that made his point a most useful weapon to William of Orange during the long struggle with Louis XIV.

The 18th century, however, may be called emphatically the age of caricature. The spirit is evident in letters as in art; in the fierce grotesques of Swift, in the coarser *charges* of Smollett, in the keen ironies of Henry Fielding, in the Aristophanic tendency of Foote's farces, no less than in the masterly moralities of Hogarth and the truculent satires of Gillray. The first event that called forth caricatures in any number was the prosecution (1710) of Dr Sacheverell; most of these, however, were importations from Holland, and only in the excitement attendant on the South Sea Bubble, some ten years later, can the English school be said to have begun. Starting into active being with the ministry of Walpole (1721), it flourished under that statesman for some twenty years,—the "hieroglyphics," as its prints were named, graphically enough, often circulating on fans. It continued to increase in importance and audacity till the reign of Pitt (1757–1761), when its activity was somewhat abated. It rose, however, to a greater height than ever during the rule of Bute (1761–1763), and since that time its influence has extended without a check. The artists whose combinations amused the public during this earlier period are, with few exceptions, but little known and not greatly esteemed. Among them were two amateurs, Dorothy, wife of Richard Boyle, 3rd earl of Burlington, and General George Townshend (afterwards 1st Marquess Townshend); Goupy, Boitard and Liotard were Frenchmen; Vandergucht and Vanderbank were Dutchmen. This period witnessed also the rise of William Hogarth (1697–1764). As a political caricaturist Hogarth was not successful, save in a few isolated examples, as in the portraits of Wilkes and Churchill; but as a moralist and social satirist he has not yet been equalled. The publication, in 1732, of his *Modern Midnight Conversation* may be said to mark an epoch in the history of caricature. Mention must also be made of Paul Sandby (1725–1809), who was not a professional caricaturist, though he joined in the pictorial hue-and-cry against Hogarth and Lord Bute, and who is best remembered as the founder of the English school of water-colour; and of John Collet (1723–1788), said to have been a pupil of Hogarth, a kindly and industrious humorist, rarely venturing into the arena of politics. During the latter half of the century, however, political caricature began to be somewhat more skilfully handled than of old by James Sayer, a satirist in the pay of the younger Pitt, while social grotesques were pleasantly treated by Henry William Bunbury (1750–1811) and George Moutard Woodward. These personalities, however, interesting as they are, are dwarfed into insignificance by the great figure of James Gillray (1757–1815), in whose hands political caricature became almost epic for grandeur of conception and far-reaching suggestiveness. It is to the works of this man of genius, indeed, and (in a less degree) to those of his contemporary, Thomas Rowlandson (1756–1827), an artist of great and varied powers, that historians must turn for the popular reflection of all the political notabilia of the end of the 18th and the beginning of the 19th centuries. England may be said to have been the chosen home of caricature during this period. In France, timid and futile under the Monarchy, it had assumed an immense importance under the Revolution, and a cloud of hideous pictorial libels was the result; but even the Revolution left no such notes through its own artists, though Fragonard (1732–1806) himself was of the number, as came from the gravers of Gillray and Rowlandson. In Germany caricature did not exist. Only in Spain was there to be found an artist capable of entering into competition with the masters of the satirical grotesque of whom England could boast. The works of Francesco Goya y Lucientes (1746–1828) are described by Théophile Gautier as "a mixture of those of Rembrandt, Watteau, and the comical dreams of Rabelais," and Champfleury discovers analogies between him and Honoré Daumier, the greatest caricaturist of modern France.

The satirical grotesque of the 18th century had been characterized by a sort of grandiose brutality, by a certain vigorous obscenity, by a violence of expression and intention, that appear monstrous in these days of reserve and restraint, but that doubtless sorted well enough with the strong party feelings and fierce political passions of the age. After the downfall of Napoleon (1815), however, when strife was over and men were weary and satisfied, a change in matter and manner came over the caricature of the period. In connection with this change, the name of George Cruikshank (1792–1878), an artist who stretches hands on the one side towards Hogarth and Gillray, and on the other towards Leech and Tenniel, deserves honourable mention. Those of Cruikshank's political caricatures which were designed for the squibs of William Hone (1779–1842) are, comparatively speaking, uninteresting; his ambition was that of Hogarth—the production of "moral comedies." Much of his work, therefore, may be said to form a link in the chain of development through which has passed that ironical *genre* to which reference has already been made. In 1829, however, began to appear the famous series of lithographs, signed H. B., the work of John Doyle (1798–1868). These jocularities are interesting otherwise than politically; thin and weakly as they are, they inaugurated the style of later political caricature. In France, meanwhile, with the farcical designs of Edme Jean Pigal (b. 1794) and the realistic sketches of Henri Monnier (1805–1872), the admirable portrait-busts of Jean Pierre Dantan the younger (1800–1869) and the fine military and low-life drolleries of Nicolas Toussaint Charlet (1792–1845) were appearing. Up to this date, though journalism and caricature had sometimes joined hands (as in the case of the *Craftsman* and the *Anti-Jacobin*, and particularly in *Les Révolutions de France et de Brabant* and *Les Actes des Apôtres*), the alliance had been but brief; it was reserved for Charles Philipon (1802–1862), who may be called the father of comic journalism, to make it lasting. The foundation of *La Caricature*, by Philipon in 1831, suppressed in 1835 after a brief but glorious career, was followed by *Le Charivari* (December 1832), which is perhaps the most renowned of the innumerable enterprises of this extraordinary man. Among the artists he assembled round him, the highest place is held by Honoré Daumier (1808–1879), a draughtsman of great skill, and a caricaturist of immense vigour and audacity. Another of Philipon's band was Sulpice Paul Chevalier (1801–1866), better known as Gavarni, in whose hands modern social caricature, advanced by Cruikshank and Charlet, assumed its present guise and became elegant. Mention must also be made of Grandville (J. I. I. Gérard) (1803–1847), the illustrator of La Fontaine, and a modern patron of the medieval skeleton; of Charles Joseph Traviès de Villers, the father of the famous hunchback "Mayeux"; and of Amedée de Noé, or "Cham," the wittiest and most ephemeral of pictorial satirists. In 1840 the pleasantries of "H. B." having come to an end, there was founded, in imitation of this enterprise of Philipon, the comic journal which, under the title of *Punch, or the London Charivari*, has since become famous all over the world. Among its early illustrators were John Leech (1817–1864) and Richard Doyle (1824–1883), whose drawings were full of the richest grotesque humour.

In 1862 Carlo Pellegrini, in *Vanity Fair*, began a series of portraits of public men, which may be considered the most remarkable instances of personal caricature in England.

For the later developments of caricature, it is convenient to take them by countries in the following sections:—

Great Britain.—During the later 19th century the term caricature, somewhat loosely used at all times, came gradually to cover almost every form of humorous art, from the pictorial wit and wisdom of Sir John Tenniel to the weird grotesques of Mr S. H. Sime, from the gay pleasantries of Randolph Caldecott to the graceful but sedate fancies of Mr Walter Crane. It is made to embrace alike the social studies, satirical and sympathetic, of Du Maurier and Keene, the political cartoons of Mr Harry Furniss and Sir F. C. Gould, the unextenuating likenesses of "Ape," and "Spy," and "Max," the

subtle conceits of Mr Linley Sambourne, the whimsicalities of Mr E. T. Reed, the exuberant burlesques of Mr J. F. Sullivan, the frank buffooneries of W. G. Baxter. Of these diverse forms of graphic humour, some have no other object than to amuse, and therefore do not call for serious notice. The work of Mr Max Beerbohm ("Max") has the note of originality and extravagance too; while that of "Spy" (Mr Leslie Ward) in *Vanity Fair*, if it does not rival the occasional brilliancy of his predecessor "Ape" (Carlo Pellegrini, 1839–1889), maintains a higher average of merit. The pupil, too, is much more genial than the master, and he is content if his pencil evokes the comment, "How ridiculously like!" Caricature of this kind is merely an entertainment. Here we are concerned rather with those branches of caricature which, merrily or mordantly, reflect and comment upon the actual life we live. In treating of recent caricature of this kind, we must give the first place to *Punch*. Mr Punch's outlook upon life has not changed much since the 'seventies of the last century. His influence upon the tone of caricature made itself felt most appreciably in the days of John Leech and Richard Doyle. Their successors but follow in their steps. In their work, says a clever German critic, is to be found no vestige of the "sour bilious temper of John Bull" that pervaded the pictures of Hogarth and Rowlandson. Charles Keene (1823–1891) and Du Maurier (1834–1896), he declares, are not caricaturists or satirists, but amiable and tenderly grave observers of life, friendly optimists. The characterization is truer of Keene, perhaps, than of Du Maurier. Charles Keene's sketches are almost always cheerful; almost without exception they make you smile or laugh. In many of Du Maurier's, on the other hand, there is an underlying seriousness. While Keene looks on at life with easy tolerance, an amused spectator, Du Maurier shows himself sensitive, emotional, sympathetic, taking infinite delight in what is pretty and gay and charming, but hurt and offended by the sordid and the ugly. Thus while Keene takes things dispassionately as they come, seeing only the humorous side of them, we find Du Maurier ever and anon attacking some new phase of snobbishness or philistinism or cant. For all his kindliness in depicting congenial scenes, he is at times as unrelenting a satirist as Rowlandson. The other *Punch* artists, whose work is in the same field, resemble Keene in this respect rather than Du Maurier. Mr Leonard Raven-Hill recalls Charles Keene not merely in temperament but in technique; like Keene, too, he finds his subjects principally in *bourgeois* life. Mr J. Bernard Partridge, though, like Du Maurier, he has an eye for physical beauty, is a spectator rather than a critic of life, yet he has made his mark as a "cartoonist." Phil May (d. 1903), a modern Touchstone, is less easily classified. Though he wears the cap and bells, he is alive to the pity of things; he sees the pathos no less than the humour of his street-boys and "gutter-snipes." He is, however, a jester primarily: an artist, too, of high achievement. Two others stand out as masters of the art of social caricature—Frederick Barnard and Mr J. F. Sullivan. Barnard's illustrations to Dickens, like his original sketches, have a lively humour—the humour of irrepressible high spirits—and endless invention. High spirits and invention are characteristics also of Mr Sullivan. It is at the British artisan and petty tradesman—at the grocer given to adulteration and the plumber who outstays his welcome—that he aims his most boisterous fun. He rebels, too, delightfully, against red tape and all the petty tyrannies of officialdom. In political caricature Sir John Tenniel (*q.v.*) remained the leading artist of his day. The death of Abraham Lincoln, Bismarck's fall from power, the tragedy of Khartum—to subjects such as these, worthy of a great painter, Tenniel has brought a classic simplicity and a sense of dignity unknown previously to caricature. It is hard to say in which field Tenniel most excels—whether in those ingenious parables in which the British Lion and the Russian Bear, John Chinaman, Jacques Bonhomme and Uncle Sam play their part—or in the ever-changing scenes of the great parliamentary Comedy—or in sombre dramas of Anarchy, Famine or Crime—or in those London extravaganzas in which the symbolic personalities of Gog and Magog, Father Thames and the Fog Fiend, the duke of Mudford and Mr Punch himself, have become familiar. Subjects similar to these have been treated also for many years by Mr Linley Sambourne in his fanciful and often beautiful designs. In the field of humorous portraiture also, as in cartoon-designing, Mr Sambourne has made his mark, and he may be said almost to have originated, in a small way, that practice of illustrating the doings of parliament with comic sketches in which Mr Furniss, Mr E. T. Reed and Sir F. C. Gould were his most notable successors. Mr Furniss satirized the Royal Academy as effectively as the Houses of Parliament, but he has been above all the illustrator of parliament—the creator of Mr Gladstone's collars, the thief of Lord Randolph Churchill's inches, the immortalizer of so many otherwise obscure politicians who has worked the House of Commons and its doings into so many hundreds of eccentric designs. But Mr Furniss was never, like Sir F. C. Gould (of the *Westminster Gazette*), a politician first and a caricaturist afterwards. Gould is an avowed partisan, and his caricatures became the most formidable weapons of the Radical party. Caustic, witty and telling, not specially well drawn, but drawn well enough—the likenesses unfailingly caught and recognizable at a glance—his "Picture Politics" won him a place unique in the ranks of caricaturists. There is no evidence of such strenuousness in the work of Mr E. T. Reed (of *Punch*). In his parliamentary sketches, as in his "Animal Land" and "Prehistoric Peeps," Mr Reed is a wholly irresponsible humorist and parodist. One finds keen satire, however, in those "Ready-made Coats of Arms," in which he turned at once his heraldic lore and his insight into character to excellent account. In his more serious picture in which he has drawn a parallel between the *tricoteuses* awaiting with grim enjoyment the fall of the guillotine and those modern English gentlewomen who flock to the Old Bailey as to the play, we have the true Hogarthian touch. Mr Gunning King, Mr F. H. Townshend, Mr C. E. Brock, Mr Tom Browne, are among the younger humorists who have advanced to the front rank. Though there have been some notable competitors with *Punch*, there has never been a really "good second." In Matt Morgan the *Tomahawk* (1865–1867) could boast an original cartoonist after Tenniel's style, but without Tenniel's power and humour. Morgan's *Tomahawk* cartoons gained in effect from an ingenious method of printing in two colours. In Fred Barnard, W. G. Baxter, and Mr J. F. Sullivan, *Judy* (founded in 1867) possessed a trio of pictorial humorists of the first rank, and in W. Bowcher a political cartoonist thoroughly to the taste of those hot and strong Conservatives to whom *Punch's* faint Whiggery was but Radicalism in disguise. His successor, Mr William Parkinson, was not less loyal to Tory ideas, though more urbane in his methods. *Fun* has had cartoonists of high merit in Mr Gordon Thomson and in Mr John Proctor, who worked also for *Moonshine* (founded in 1879, now extinct). *Moonshine* afterwards enlisted the services of Alfred Bryan, to whose clever pencil the Christmas number of the *World* was indebted for many years. *Ally Sloper*, founded in 1884, is notable only as the widely circulated medium for W. G. Baxter's wild humours, kept up in the same spirit by Mr W. F. Thomas, his successor. *Pick-me-up* could once count a staff which rivalled at least the social side of *Punch*; Mr Raven-Hill, Phil May, Mr Maurice Greiffenhagen and Mr Dudley Hardy all contributed in their time to its sprightly pages, while Mr S. H. Sime made it the vehicle for his "squint-brained" imaginings. The *Will o' the Wisp*, the *Butterfly* and the *Unicorn*, kindred ventures, though on different lines, all met with an early death. *Lika Joko*, founded in 1894 by Mr Harry Furniss, who in that year abandoned *Punch*, and afterwards *Fair Game*, were also short-lived. To this brief list of purely comic or satirical journals should be added the names of several daily and weekly publications—and among monthlies the *Idler*, with its caricatures by Mr Scott Rankin, Mr Sime and Mr Beerbohm—which have made a special feature of humorous art. Among these are the *Graphic*, whose Christmas numbers were first brightened by Randolph Caldecott; the *Daily Graphic*, enlivened sometimes by Phil May and Mr A. S. Boyd; *Vanity Fair*, with its grotesque portraits; *Truth*, to whose Christmas numbers Sir F. C. Gould contributed some of his best and most ambitious work, printed in colours; the *Sketch*, with Phil May and others; *Black and White*, with Mr Henry Meyer; the *Pall Mall Gazette*, first with Sir F. C. Gould, and later with Mr G. R. Halkett. The *St Stephen's Review*, whose crudely powerful cartoons, the work of Tom Merry, were so popular, ceased publication in 1892. A tribute should be paid in conclusion to the coloured cartoons of the *Weekly Freeman* and other Irish papers, often remarkable for their humour and talent. (See also CARTOON and ILLUSTRATION.)

France.—In that peculiar branch of art which is based on irony, fun, oddity and wit, and in which Honoré Daumier (1808–1879), next to "Gavarni" (1804–1866), remains the undisputed master, France—as has already been shown—can produce an unbroken series of draughtsmen of strong individuality. Though "Cham" died in 1879, Eugène Giraud in 1881, "Randon" in 1884, "André Gill" in 1885, "Marcelin" in 1887, Edouard de Beaumont in 1888, Lami in 1891, Alfred Grévin in 1892, and "Stop" in 1899, a new group arose under the leadership of "Nadar" (b. 1820) and Etienne Carjat (b. 1828). Mirthful or satirical, and less philosophical than of yore, neglecting history for incident, and humanity for the puppets of the day, their drawings, which illustrate daily events, will perpetuate the manner and anecdotes of the time, though the illustrations to newspapers, or prints which need a paragraph of explanation, show nothing to compare with the *Propos de Thomas Virelocque* by "Gavarni." Quantity perhaps makes up for quality, and some of these artists deserve special mention. "Draner" (b. 1833) and "Henriot" (b. 1857) are journalists, carrying on the method first introduced by "Cham" in the *Univers Illustré*: realistic sketches, with no purpose beyond the droll illustration of facts, amusing at the time, but of no value to the print-collector. M. J. L. Forain, born at Reims in 1852, studied at the École des Beaux Arts under Jean Léon Gérôme and J. B. Carpeaux. He first worked for the *Courrier Français* in 1887, and afterwards for *Figaro*; he was then drawn into the polemical work of politics. Though he has created some great types of flunkeydom, the explanatory story is more to him than the picture, which is often too sketchy, though masterly. Reduced reproductions of his work have been issued in volumes, a common form of popularity never attempted with Daumier's fine lithographs. M. A. L. Willette, born at Châlons-sur-Marne in 1857, a son of Colonel Willette, the aide-de-camp to Marshal Bazaine, worked for four years in Alexandre Cabanel's studio, and so gained an artistic training which alone would have distinguished him from his fellows, even without the delightful poetical fancy and Watteau-like grace which are somewhat unexpected amid the ugliness of

modern life. His work has the value, no doubt, of deep and various meaning, but it has also intrinsic artistic worth. M. Willette is, in fact, the ideal delineator of the more voluptuous and highly spiced aspects of contemporary life. "Caran d'Ache," a native of Moscow, born in 1858, borrowed from the German caricaturists—mainly from W. Busch—his methods of illustrating "a story without words." He makes fun even of animals, and is a master of canine physiognomy. His simple and unerring outline is a method peculiarly his own; now and again his wit rises to grandiloquence, as in his *Bellona*, rushing on an automobile through massacre and conflagrations, and in his *Épopée* (Epic) of shadows thrown on a sheet. Among his followers may be included A. Guillaume and Gerbault. M. C. L. Léandre, born at Champsecret (Orne), in 1862, is, like "André Gill," a draughtsman of monstrosities; he can get a perfect likeness of a face while exaggerating some particular feature, gives his figure a hump-back, as Dantan did in his statuettes, and has a facial dexterity which sometimes does scant justice to his very original wit. At the same time he has a true sense of beauty. M. Théophile A. Steinlen, born at Lausanne in 1859, went to Paris in 1881. He should be studied in his illustrations to *Bruant*. He knows the inmost core of the Butte-Montmartre, and depicts it with realistic and brutal relish. M. Albert Robida, born at Compiègne in 1848, collaborated with Decaux in 1871 to found *La Caricature*; he is a paradoxical seer of the possible future and a curiosity-hunter of the past. Old Paris has no secrets from him; he knows all the old stones and costumes of the middle ages, and has illustrated Rabelais; and for fertility of fancy he reminds us of Gustave Doré, but with a sense of movement so vibrant as to be almost distressing. "Bac," born at Vienna in 1859, has infused a strain of the Austrian woman into the Parisienne; representing her merely as a pleasure- and love-seeking creature, as the toy of an evening, he has recorded her peccadilloes, her witcheries and her vices. Others who have shot folly as it flies are M. Albert Guillaume, who illustrated the Exhibition of 1900 in a series of remarkable silhouettes; "Mars"; "Henri Somm"; Gerbault; and Grün. M. Huard depicts to perfection the country townsfolk in their elementary psychology. M. Hermann Paul, M. Forain's not unworthy successor on the *Figaro*, is a cruel satirist, who in a single face can epitomize a whole class of society, and could catalogue the actors of the *comédie humaine* in a series of drawings. M. Jean Veber loves fantastic subjects, the gnomes of fairy-tales and myths; but he has a biting irony for contemporary history, as in the *Butcher's Shop*, where Bismarck is the blood-stained butcher. M. Abel Faivre, a refined and charming painter, is a whimiscal humorist with the pencil. He shows us monstrous women, fabulously hideous, drawing them with a sort of realism which is droll by sheer ugliness. Henri de Toulouse-Lautrec startles us by extraordinary dislocations, scrawled limbs and inexplicable anatomy; he has left an inimitable series of sketches of Mme Yvette Guilbert when she was at her thinnest. M. Felix Vallotton reproduces crows in blots of black with a Japanese use of the brush. M. G. Jeanniot, a notable illustrator, sometimes amuses himself by contributing to *Le Rire*, *Le Sourire*, *Le Pompon*, *L'Assiette au Beurre*, &c., drawing the two types he most affects: the fashionable world and soldiers. M. Ibels, Capiello and many more might be enumerated, but it is impossible to chronicle all the clever humorous artists of the illustrated papers.

It is the frequent habit of French caricaturists to employ a *nom-de-guerre*. We therefore give here a list of the genuine names represented by the pseudonyms used above, together with others familiar to the public:—

"André Gill"	=L. A. Gosset de Guine (1840–1885).
"Bac" ("Cab" and "Saro")	=Ferdinand Bach (b. 1859).
"Caran d'Ache"	=Emmanuel Poiré.
"Cham"	=Comte Amédée de Noé (b. 1818).
"Crafty"	=Victor Gérusez (b. 1840).
"Draner" (and "Paf")	=Jules Renard (b. 1833).
"Faustin"	=Faustin Betbeder (b. 1847).
"Gavarni"	=S. G. Chevalier (1804–1866).
"Gédéon"	=Gédéon Baril (b. 1832).
"Grandville"	=J. I. I. Gérard (1803–1847).
"Henriot" (and "Pif").	=Henri Maigrot (b. 1857).
"Henri Somm"	=Henri Sommier (b. 1844).
"Job"	=J. O. de Bréville (b. 1858).
"Marcelin"	=Émile Planat (1825–1887).
"Mars"	=Maurice Bonvoisin (b. 1849).
"Moloch"	=Colomb (b. 1849).
"Montbard"	=C. A. Loye (1841–1905).
"Nadar"	=Félix Tournachon (b. 1820).
"Pasquin"	=Georges Coutan (b. 1853).
"Pépin"	=Ed. Guillaume (b. 1842).
"Randon"	=Gilbert (1814–1845).
"Sahib"	=L. E. Lesage (b. 1847).
"Said"	=Alphonse Lévy (b. 1845).
"Sem"	=George Goursat.
"Stop"	=L. P. Morel-Retz (b. 1825).

Germany.—During the later 19th century German caricature flourished principally in the comic papers *Kladderadatsch* of Berlin and *Fliegende Blätter* of Munich; the former a political paper with little artistic value, in which the ideas alone are clever, whilst the illustrations are merely a more or less clumsy adjunct to the text, while the *Fliegende Blätter*, on the contrary, has artistic merit as well as wit. Wilhelm Busch (b. 1832), the most brilliant German draughtsman of the last generation, made his *début* with an illustrated poem "The Peasant and the Miller," and won a world-wide reputation with the following works: *Pater Filucius*, *Die Fromme Helene*, *Max und Moritz*, *Der heilige Antonius*, *Maler Kleksel*, *Balduin Bählamm*, *Die Erlebnisse Knopps des Junggesellen*. Busch stands alone among the caricaturists of his nation, inasmuch as he is both the author and the illustrator of these works, his witty doggerel supplying Germany with household words. The drawings that accompany the text are amazing for the skill and directness with which he hits the vital mark. A flourish or two and a few touches are enough to set before us figures of intensely comical aspect. This distinguishes Busch from Adolf Oberländer (1845), who became the chief draughtsman on *Fliegende Blätter*. Busch's drawings would have no meaning apart from the humorous words. Oberländer works with the pencil only. Men, animals, trees, objects, are endowed by him with a mysterious life of their own. Without the help of any verbal joke, he achieves the funniest results simply by seeing and accentuating the comical side of everything. His drawings are caricature in the strict sense of the word, its principle being the exaggeration of some natural characteristic. The new generation of contributors to *Fliegende Blätter* do not work on these lines. Busch and Oberländer were both offshoots of the romantic school; they made fun of modern novelties. Hermann Schlittgen, Meggendorfer, H. Vogel-Plauen, Réne Reinicke, Adolf Hengeler and Fritz Wahle are the sons of a self-satisfied time, triumphing in its own *chic*, elegance and grace; hence they do not parody what they see, but simply depict it. The wit lies exclusively in the text; the illustrations aim merely at a direct representation of street or drawing-room scenes. It is this which gives to *Fliegende Blätter* its value as a pictorial record of the history of German manners. Its pages are a permanent authority on the subject for those who desire to see the social aspects of Germany during the last quarter of the 19th century onwards. At the same time a falling-off in the brilliancy of this periodical was perceptible. Its fun became domestic and homely; it has faithfully adhered to the old technique of wood-engraving, and made no effort to keep pace with the modern methods of reproduction. German caricature, to live and flourish, was not keeping pace with the development of the art; it had to take into its service the gay effects of colour, and derive fresh inspiration from the sweeping lines of the ornamental draughtsman. This led to the appearance of three new weekly papers: *Jugend*, *Das Narrenschiff* and *Simplicissimus*. *Jugend*, started in 1896 by Georg Hirth in Munich, collected from the first a group of gifted young artists, more especially Thöny, Bernhard Pankok and Julius Diez, who based their style on old German wood-engraving; Fidus, who lavished the utmost beauty of line in unshaded pen-and-ink work; Rudolf Wilke, whose grotesques have much in common with Forain's clever drawings; Angelo Jank and R. M. Eichler, who work with a delightful *bonhomie*. Among the draughtsmen on the *Narrenschiff* (The Ship of Fools), Hans Baluschek is worthy of mention as having made the types of Berlin life all his own; and while this paper gives us for the most part inoffensive satire on society, *Simplicissimus*, first printed at Munich and then at Zurich, under the editorship of Albert Langen, shows a marked Socialist and indeed Anarchist tendency, subjecting to ridicule and mockery everything that has hitherto been held as unassailable by such weapons; it reminds us of the scathing satire of Honoré Daumier in *La Caricature* at the time of Louis Philippe. Thomas Theodor Heine (1867) is unsurpassed in this style for his power of expression and variety of technique. We must admire his delicate draughtsmanship, or again, his drawing of the figure with the heavy line of heraldic ornament, and his broad and monumental grasp of the grotesque. His laughter is often insolent, but he is more often the preacher, scourge in hand, who ruthlessly unveils all the dark side of life. Next to him come Paul, an incomparable limner of student life and the manners and customs of the Bavarian populace; E. Thöny, a wonderfully clever caricaturist of the airs and assumption of the Prussian *Junker* and the Prussian subaltern; J. C. Eugh and F. von Regnieck, who make fun of the townsman and political spouter in biting and searching satire. The standard of caricature is at the present time a high one in Germany; indeed, the modern adoption of the pen-line, which has arisen since the impressionists in oil-painting repudiated line, had its origin in the influence of caricature.

United States.—The proverbial irreverence of the American mind even towards its most cherished personages and ideals has made it particularly responsive to the appeal of caricature. At first an importation, it developed but slowly; then it burst into luxuriant growth, sometimes exceeding the limits of wise and careful cultivation. In the early period of American caricature, almost the only native is F. O. C. Darley (1822–1888), an illustrator of some importance; the other names include the engraver Paul Revere (chiefly famous for a picturesque exploit in the War of Independence); a Scotsman, William Charles; the Englishmen, Matt Morgan and E. P. Bellew; and the Germans, Thomas Nast and Joseph Keppler.

The name of Thomas Nast overshadows and sums up American political caricature. Nast, who was born in Bavaria in 1840, was

brought to America at the age of six; and his training and all his interests were strongly American. At fourteen he was an illustrator on *Leslie's Weekly*, and was sent at twenty to England to illustrate the famous Sayers-Heenan prize-fight. He then went as recorder of Garibaldi's campaign of 1860. He returned to America known only as an illustrator. The Civil War did not awaken his latent genius till 1864, when he published a cartoon of fierce irony against the political party which opposed Lincoln's re-election and advocated peace measures with the Southern confederacy. This cartoon not only made Nast famous, but may be said to contain the germ of American caricature; for all that had gone before was too crude in technique to pass muster even as good caricature.

The magnificent corruption of Tammany Hall under the leadership of William M. Tweed, the first of the great municipal "bosses," gave Nast a subject worth attacking. Siegfried, earnest but light-hearted, armed with the mightier sword of the pen of ridicule, assailed the monster ensconced in his treasure-cave, and after a long battle won a brilliant victory. Nast did not always rely on a mere picture to carry his thrust; often his cartoon consisted of only a minor figure or two looking at a large placard on which a long and poignantly-worded attack was delivered in cold type. At other times the most ingenious pictorial subtlety was displayed. This long series sounds almost the whole gamut of caricature, from downright ridicule to the most lofty denunciation. A very happy device was the representation of Tweed's face by a money-bag with only dollar marks for features, a device which, strangely enough, made a curiously faithful likeness of the "boodle"-loving despot. When, finally, Tweed took to flight, to escape imprisonment, he was recognized and caught, it is said, entirely through the wide familiarity given to his image in Nast's cartoons.

When Nast retired from *Harper's Weekly*, he was succeeded by Charles Green Bush (born 1842; died 1909). With even greater technical resources, he poured forth a series of cartoons of remarkable evenness of skill and interest; he soon left weekly for daily journalism. He never won, single-handed, such a battle as Nast's, but his drawings have a more general, perhaps a more lasting interest. When he left *Harper's Weekly* he was succeeded by W. A. Rogers, who composed many ingenious and telling cartoons.

The vogue which, through Nast, *Harper's Weekly* gave to caricature, prepared the way for the first purely comic weekly paper, *Puck*, founded by two Germans, and for long published in a German as well as an English edition—a journal which has cast its influence generally in favour of the Democratic party. It is worth noting that not only the founders but the spirit of American caricature have been rather German than English, the American comic papers more closely resembling *Fliegende Blätter*, for example, than *Punch*. One of the founders of *Puck* was Joseph Keppler, (1838-1894), long its chief caricaturist.

The Republican party soon found a champion in *Judge*, a weekly satirical paper which resembles *Puck* closely in its crudely coloured pages, though somewhat broader and less ambitious in the spirit and execution of its black-and-white illustrations. These two papers have kept rather strictly to permanent staffs, and have furnished the opening for many popular draughtsmen, such as Bernhard Gillam (d. 1896), and his brother, Victor; J. A. Wales (d. 1886); E. Zimmerman, whose extremely plebeian and broadly treated types often obscure the observation and Falstaffian humour displayed in them; Grant Hamilton; Frederick Opper, for many years devoted to the trials of suburban existence, and later concerned in combating the trusts; C. J. Taylor, a graceful technician; H. Smith; Frank A. Nankivell, whose pretty athletic girls are prone to attitudinizing; J. Mortimer Flagg; F. M. Howarth; Mrs Frances O'Neill Latham, whose personages are singularly well modelled and alive; and Miss Baker Baker, a skilful draughtswoman of animals.

A stimulus to genuine art in caricature was given by the establishment (1883) of the weekly *Life*, edited by J. A. Mitchell, a clever draughtsman as well as an original writer. It is to this paper that America owes the discovery and encouragement of its most remarkable artist humorist, Charles Dana Gibson, whose technique has developed through many interesting phases from exceeding delicacy to a sculpturesque boldness of line without losing its rich texture, and without becoming monotonous. Mr Gibson is chiefly beloved by his public for his almost idolatrous realizations of the beautiful American woman of various types, ages and environments. His works are, however, full of the most subtle character-observations, and American men of all walks of life, and foreigners of every type, impart as much importance and humour to his pages as his "Gibson girls" give radiance. His admitted devotion to Du Maurier, in reverence for the beautiful woman beautifully attired, has led some critics to set him down as a mere disciple, while his powerful individuality has led others to accuse him of monotony; but a serious examination of his work has seemed to reveal that he has gone beyond the genius of Du Maurier in sophistication, if not in variety, of subjects and treatment. As much as any other artist Mr Gibson has studiously tried new experiments in the new fields opened by modernized processes of photo-engraving, and has been an important influence in both English and American line-illustration.

Among other students of society, particular success has been achieved by C. S. Reinhart (1844–1896), Charles Howard Johnson (d. 1895), H. W. M'Vickar, S. W. van Schaick, A. E. Sterner, W. H. Hyde, W. T. Smedley and A. B. Wenzell, each of them strongly individual in manner and often full of *verve* and truth.

Life, and other comic papers, including for many years *Truth*, also brought forward caricaturists of distinct worth and a marked tendency to specialization. F. E. Atwood (d. 1900) was ingenious in cartoons lightly allegorical; Oliver Herford has shown a fascination elusive of analysis in his drawings as in his verse; T. S. Sullivant has made a quaintly intellectual application of the old-world devices of large heads, small bodies, and the like; Peter Newell has developed individuality both in treatment and in humour; E. W. Kemble is noteworthy among the exploiters of negro life; and H. B. Eddy, Augustus Dirk, Robert L. Wagner. A. Anderson, F. Sarka and T. Swinnerton have all displayed marked individuality.

In distinction from the earlier period, the modern school of American caricature is strongly national, not only in subject, but in origin, training and in mental attitude, exception being made of a few notable figures, such as Michael Angelo Woolf, born in England, and of a somewhat Cruikshankian technique. He came to America while young, and contributed a long series of what may be called slum-fantasies, instinct alike with laughter and sorrow, at times strangely combining extravagant melodrama with a most plausible and convincing impossibility. His drawings must always lie very close to the affections of the large audience that welcomed them. American also by adoption is Henry Mayer, a German by birth, who has contributed to many of the chief comic papers of France, England, Germany and America.

Entirely native in every way is the art of A. B. Frost (b. 1851), a prominent humorist who deals with the life of the common people. His caricature (he is also an illustrator of versatility and importance) is distinguished by its anatomical knowledge, or, rather, anatomical imagination. Violent as the action of his figures frequently is, it is always convincing. Such triumphs as the tragedy of the kind-hearted man and the ungrateful bull-calf; the spinster's cat that ate rat poison, and many others, force the most serious to laughter by their amazing velocity of action and their unctuousness of expression. Frost is to American caricature what "Artemus Ward" has been to American humour, and his field of publication has been chiefly the monthly magazine.

The influence of the weekly periodicals has been briefly traced. A later development was the entrance of the omnivorous daily newspaper into the field of both the magazine and the weekly. For many years almost every newspaper has printed its daily cartoon, generally of a political nature. Few of the cartoonists have been able to keep up the pace of a daily inspiration, but C. G. Bush has been unusually successful in the attempt. Yet an occasional success atones for many slips, and the cartoonists are known and eagerly watched. The most influential has doubtless been Homer C. Davenport, whose slender artistic resources have been eked out by a vigour and mercilessness of assault rare even in American annals. He has a Rabelaisian complacency and skill in making a portrait magnificiently repulsive, and his caricatures are a vivid example of the school of cartoonists who believe in slashing rather than merely prodding or tickling the object of attack. Charles Nelan (1859–1904) frequently scored, and in the wide extent of the United States one finds keen wits busily assailing the manifold evils of life. Noteworthy among them are: Thos. E. Powers, H. R. Heaton, Albert Levering, Clare Angell and R. C. Swayne.

Scandinavia.—Caricature flourishes also in the Scandinavian countries, but few names are known beyond their borders. Professor Hans Tegner of Denmark is an exception; his illustrations to Hans Andersen (English edition, 1900) have carried his name wherever that author is appreciated, yet his reputation was made in the Danish *Punch*, which was founded after the year 1870 but has long ceased to exist. Alfred Schmidt and Axel Thiess have contributed notable sketches to *Puk* and its successor *Klockhaus*, but in point of style they scarcely carry on the tradition of their predecessor, Fritz Jürgensen. Among humorous artists of Norway, Th. Kittelsen perhaps holds the leading place, and in Sweden, Bruno Liljefors, best known as a brilliant painter of bird life.

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pessimistic side of satiric art); *English Caricaturists and Graphic Humorists of the Nineteenth Century*, by Graham Everitt (*i.e.* William Rodgers Richardson), (4to, London, 1886), (a careful and interesting survey); *La Caricature en Angleterre*, by Augustin Filva (8vo, Paris, 1902), (an able criticism from the point of view of psycho-sociology); *The History of Punch*, by M. H. Spielmann (8vo, London, 1895), (dealing with caricature art of England during the half-century covered by the book); *Magazine of Art, passim*, for biographies of English caricaturists—"Our Graphic Humorists"; *Social Pictorial Satire*, by George du Maurier (12mo, London, 1898); *Les Mœurs et la caricature en France*, by J. Grand-Carteret (8vo, Paris, 1885); *La Caricature et l'humeur français au XIXe siècle*, by Raoul Deberdt (8vo, Paris); *Les Maîtres de la caricature française en XIXe siècle*, by Armand Dayot (Paris); *Nos humoristes*, by Ad. Brisson (4to, Paris, 1900); *Les Mœurs et la caricature en Allemagne*, &c., by J. Grand-Carteret (8vo, Paris, 1885). See also biographies of Charles Keene, H. Daumier, John Leech, &c., indicated under those names. (M. H. S.)

CARIGARA, a town of the province of Leyte, island of Leyte, Philippine Islands, on Carigara Bay, 22 m. W. of Tacloban, the capital. Pop. (1903) 19,488, including that of Capoocan (3106), annexed to Carigara in the same year. Carigara is open to coast trade, exports large quantities of hemp, raises much rice, and manufactures cotton and abaca fabrics. It also has important fisheries.

CARIGNANO, a town of Piedmont, Italy, in the province of Turin, 11 m. S. by steam tramway from the town of Turin. Pop. (1901) town, 4672, commune, 7104. It has a handsome church (S. Giovanni Battista) erected in 1756–1766 by the architect Benedetto Alfieri di Sostegno (1700–1767), uncle of the poet Alfieri. S. Maria delle Grazie contains the tomb of Bianca Palaeologus, wife of Duke Charles I. of Savoy, at whose court Bayard was brought up. The town passed into the hands of the counts of Savoy in 1418.

Carignano was erected by Charles Emmanuel I. of Savoy into a principality as an appanage for his third son, Thomas Francis (1596–1656), whose descendant, Charles Albert, prince of Carignano, became king of Sardinia on the extinction of the elder line of the house of Savoy with the death of Charles Felix in 1831. The house of Carignano developed two junior branches, those of Soissons and Villafranca. The first of these, which became extinct in 1734, was founded by Eugene Maurice, second son of Thomas, by his wife Marie de Condé, countess of Soissons, who received his mother's countship as his appanage. In 1662 the town of Yvois in the Ardennes was raised by Louis XIV. into a duchy in his favour, its name being changed at the same time to Carignan. The famous Prince Eugene was the second son of the first duke of Carignan. The branch of Villafranca started with Eugene Marie Louis (d. 1785), second son of Louis Victor of Carignano, whose grandson Eugene (1816–1888), afterwards an admiral in the Italian navy, was created prince of Savoy-Carignano, by King Charles Albert in 1834. He had contracted a morganatic marriage, and in 1888, on the occasion of his silver wedding, the title of countess of Villafranca was bestowed upon his wife, his eldest son, Filiberto, being at the same time created count of Villafranca, and his younger son, Vittorio, count of Soissons.

CARILLON, an arrangement for playing tunes upon a set of bells by mechanical means. The word is said to be a Fr. form of Late Lat. or Ital. *quadriglio*, a simple dance measure on four notes or for four persons (Lat. *qualluor*); and is used sometimes for the tune played, sometimes (and more commonly in England) for the set of bells used in playing it. The earliest mediæval attempts at bell music, as distinct from mere noise, seem to have consisted in striking a row of small bells by hand with a hammer, and illustrations in MSS. of the 12th and 13th centuries show this process on three, four or even eight bells. The introduction of mechanism in the form either of a barrel (see BARREL-ORGAN) set with pegs or studs and revolving in connexion with the machinery of a clock, or of a keyboard struck by hand (*carillon à clavier*), made it possible largely to increase the number of bells and the range of harmonies. In Belgium, the home of the *carillon* the art of the *carillonneur* was at one time brought to great perfection and held in high esteem (see BELL); but even there it is gradually giving way to mechanism. In England manual skill has never been much employed, though keyboards on the continental model have been introduced, *e.g.* at the Manchester town hall, at Eaton Hall, and elsewhere; carillon music being mainly confined to hymn tunes at regular intervals (generally three hours), or chimes at the hours and intervening quarters. The "Cambridge" and "Westminster" chimes are very familiar; and more recently chimes have been composed by Sir John Stainer for Freshwater in the Isle of Wight ("Tennyson" Chimes), and by Sir Charles Stanford for "Bow Bells" in London.

CARINI, a town in the province of Palermo, Sicily, 13 m. by rail W.N.W. of Palermo. Pop. (1901) 13,931. On the coast are some ruins of the ancient *Hyccara*, the only Sican settlement (probably a fishing village) on the coast. It was stormed and taken by the Athenians in 415 B.C., and the inhabitants, among them the famous courtesan Lais, sold as slaves. At La Grazia Christian catacombs have been found (*Not. degli Scavi*, 1899, 362).

CARINTHIA (Ger. *Kärnten*), a duchy and crownland of Austria, bounded E. by Styria, N. by Styria and Salzburg, W. by Tirol, and S. by Italy, Görz and Gradisca and Carniola. It has an area of 4005 sq. m. Carinthia is for the most part a mountainous region, divided by the Drave, which traverses it from west to east into two parts. To the north of the valley of the Drave the duchy is occupied by the Hohe Tauern and the primitive Alps of Carinthia and Styria, which belong to the central zone of the Eastern Alps. The Hohe Tauern contains the massifs of the Gross Glockner (12,455 ft.), the Hochnarr (10,670 ft.) and the Ankogel (11,006 ft.), and is traversed by the saddles of the Hochthor and the Malnitzer Tauern, which separates these groups from one another. To the east of the Hohe Tauern stretches the group of the primitive Alps of Carinthia and Styria, namely the Pöllaer Alps with the glacier-covered peak of the Hafner Eck (10,041 ft.); the Stang Alps with the highest peak the Eisenhut (8007 ft.); the Saualpe with the highest peak the Grosse Saualpe (6825 ft.); and finally the Koralpen chain or the Stainzer Alps (7023 ft.) separated from the preceding group by the Lavant valley. The country south of the Drave is occupied by several groups of the southern limestone zone, namely the Carnic Alps, the Julian Alps, the Karawankas and the Steiner Alps. The Carnic Alps are divided by the Gail valley into the South Carnic group and the northern Gailthal Alps. They are traversed by the Pontebba or Pontafel Pass, through which passes one of the principal Alpine roads from Italy to Austria. The road is covered by the fortress of Malborgeth, where Captain Hensel with a handful of men met with a heroic death defending the place against an overwhelming French force in the campaign of 1809. A similar fate overtook, on the same day, the 18th of May 1809, Captain Hermann von Hermannsdorf and his small garrison, who were defending the Predil fort. This fort covers the road which traverses the Predil Pass in the Julian Alps and is the principal road leading from Carinthia to the Coastland. Commemorative monuments have been erected in both places. The Gailthal Alps end with the Dobratsch or Villacher Alp (7107 ft.), situated to the south-west of Villach (*q.v.*), which is celebrated as one of the finest views in the whole eastern Alps. South of Hermagor, the principal place of the Gail valley, is the chain of mountains which is famous as being the only place where the beautiful *Wulfenia Carinthiaca* is found. The highest peaks in the Karawankas are the Grosse Mittagskogel (7033 ft.), the Och Obir (7023 ft.) and the Petzen (6934 ft.). The Ursula Berg (5563 ft.) ends the group of the Karawankas, which are continued by the Steiner Alps.

The principal river is the Drave, which flows from west to east through the length of the duchy, and receives in its course the waters of all the other streams, except the Fella, which reaches the Adriatic by its junction with the Tagliamento. Its principal tributaries are the Gail on the right, and the Möll, the Lieser, the Gurk with the Glan, and the Lavant on the left. Carinthia possesses a great number of Alpine lakes, which, unlike the other Alpine lakes, lie in the longitudinal valleys. The principal lakes are: the Millstätter-see (8½ sq. m. in extent, 908 ft. deep, at an altitude of 1902 ft.), the Wörther-see (17 sq. m. in extent, 212 ft. deep, at an altitude of 1438 ft.), the Ossiach-see (10½ sq. m.

in extent, 150 ft. deep, at an altitude of 1599 ft.), and the elongated Weissen-see (4½ m. long, 309 ft. deep, at an altitude of 3037 ft.).

The climate is severe in the north and north-west parts, but the south and south-east districts are milder, while the most favoured part is the Lavant valley. Of the total area only 13·71% is arable land, 10·50% is occupied by meadows and gardens, 5·18% by pastures, while 44·24% is covered by forests, almost exclusively pine-forests. Cattle-rearing is well developed, and the horses bred in Carinthia enjoy a good reputation. The mineral wealth of Carinthia is great, and consists in lead, iron, zinc and coal. Iron ore is extracted in the region of the Saualpe, and is worked in the foundries of St Leonhard, St Gertraud, Prävali, Hirt, Treibach and Eberstein. About two-thirds of the total production of lead in Austria is extracted in Carinthia, the principal places being Bleiberg and Raibl. The metallurgic industries are well developed, and consist in the production of iron, steel, machinery, small-arms, lead articles, wire-cables and rails. The principal manufacturing places are Prävali, Brückl, Klagenfurt, Lippitzbach, Wolfsberg, St Veit and Buchscheiden near Feldkirchen. The manufacture of small-arms is concentrated at Ferlach. Other trades are the manufacture of paper, leather, cement and the exploitation of forests.

The population of Carinthia in 1900 was 367,344, which corresponds to 91 inhabitants per sq. m. According to nationality, 71·54% were Germans, and 28·39% Slovenes, mostly settled in the districts adjoining the Slovene province of Carniola. Over 94% of the population were Roman Catholics. The local diet, of which the bishop of Gurk is a member *ex officio*, is composed of 37 members, and Carinthia sends 10 deputies to the Reichsrat at Vienna. For administrative purposes, the province is divided into seven districts, and an autonomous municipality, Klagenfurt (pop. 24,314), the capital. Other principal places are: Villach (9690), Wolfsberg (4852), St Veit (4667), an old town, the former capital of Carinthia up to 1518, Prävali (4047), Travis (3640), a favourite summer-resort and tourist place, Bleiberg (3435), Völkermarkt (2606) and Spittal (2564).

Carinthia is so called from the Carni, a Celtic people, and in the time of Augustus it formed part of Noricum. After the fall of the Roman empire, it was the nucleus of the kingdom of Carentania, which was founded by Samo, a Frankish adventurer, but soon fell to pieces after his death. Under Charlemagne it constituted a margravate, which in 843 passed into the hands of Louis the German, whose grandson Arnulf was the first to bear the title of duke of Carinthia. The duchy was held by various families during the 11th, 12th and 13th centuries, and at length in 1335 was bestowed by Louis the Bavarian on the dukes of Austria. It was divided into Upper or Western Carinthia and Lower or Eastern; of these the former fell to France in 1809, but was reconquered in 1813. It was created a separate crown-land in 1849.

See Aelschker, *Geschichte Kärntens* (Klagenfurt, 1885).

CARINUS, MARCUS AURELIUS, Roman emperor, A.D. 283–284, was the elder son of the emperor Carus, on whose accession he was appointed governor of the western portion of the empire. He fought with success against the German tribes, but soon left the defence of the Upper Rhine to his legates and returned to Rome, where he abandoned himself to all kinds of debauchery and excess. He also celebrated the *ludi Romani* on a scale of unexampled magnificence. After the death of Carus, the army in the East demanded to be led back to Europe, and Numerianus, the younger son of Carus, was forced to comply. During a halt at Chalcedon, Numerianus was murdered, and Diocletian, commander of the body-guards, was proclaimed emperor by the soldiers. Carinus at once left Rome and set out for the East to meet Diocletian. On his way through Pannonia he put down the usurper M. Aurelius Julianus, and encountered the army of Diocletian in Moesia. Carinus was successful in several engagements, and at the battle on the Margus (Morava), according to one account, the valour of his troops had gained the day, when he was assassinated by a tribune whose wife he had seduced. In another account, the battle is represented as having resulted in a complete victory for Diocletian. Carinus has the reputation of having been one of the worst of the emperors.

Vopiscus, *Carinus* (mainly the recital of his crimes); Aurelius Victor, *De Caesaribus*, 38, Epit. 38; Eutropius ix. 18-20; Zonaras xii. 30; Orosius vii. 25; Pauly-Wissowa, *Realencyclopädie*, ii. 24 ff. (Henze).

CARIPE, a small town of Venezuela in the state of Bermúdez, about 53 m. E.S.E. of Cumaná. It is the chief station of the Capuchin missions to the Chayma Indians, founded toward the close of the 17th century, and stands 2635 ft. above sea-level, in a fertile valley of the Sierra Bergantín, long celebrated for its cool, invigorating climate. The locality is also celebrated for the extensive system of caves in the limestone rocks found in its vicinity, which were described by Humboldt in his *Personal Narrative*. The principal cave, known as the Cueva del Guácharo, extends inward a distance of 2800 ft. with a height of 70-80 ft. These caves are frequented by a species of night-hawk, called *guacharo*, which nests in the recesses of the rocks. The young are killed in great numbers for their oil. Caripe itself has a population of only 580, but the valley and neighbouring stations have about ten times that number. Caripe should not be confounded with Rio Caribe, a town and port on the Caribbean coast a short distance east of Carúpano, which has a population of about 6000.

CARISBROOKE, a town in the Isle of Wight, England, 1 m. S. of Newport. Pop. (1901) 3993. The valley of the Lugley brook separates the village from the steep conical hill crowned by the castle, the existence of which has given Carisbrooke its chief fame. There are remains of a Roman villa in the valley, but no reliable mention of Carisbrooke occurs in Saxon times, though it has commonly been identified with the Saxon *Wihtgaraburh* captured by Cerdic in 530. Carisbrooke is not mentioned by name in the Domesday Survey, but Bowcombe, its principal manor, was a dependency of the royal manor of Amesbury, and was obtained from the king by William Fitz Osbern in exchange for three Wiltshire manors. The castle is mentioned in the Survey under Alvington, and was probably raised by William Fitz Osbern, who was made first lord of the Isle of Wight. From this date lordship of the Isle of Wight was always associated with ownership of the castle, which thus became the seat of government of the island. Henry I. bestowed it on Richard de Redvers, in whose family it continued until Isabella de Fortibus sold it to Edward I., after which the government was entrusted to wardens as representatives of the crown. The keep was added to the castle in the reign of Henry I., and in the reign of Elizabeth, when the Spanish Armada was expected, it was surrounded by an elaborate pentagonal fortification. The castle was garrisoned by Baldwin de Redvers for the empress Maud in 1136, but was captured by Stephen. In the reign of Richard II. it was unsuccessfully attacked by the French; Charles I. was imprisoned here for fourteen months before his execution. Afterwards his two youngest children were confined in the castle, and the Princess Elizabeth died there. In 1904 the chapel of St Nicholas in the castle was reopened and reconsecrated, having been rebuilt as a national memorial of Charles I. The remains of the castle are extensive and imposing, and the keeper's house and other parts are inhabited, but the king's apartments are in ruins. Within the walls is a well 200 ft. deep; and another in the centre of the keep is reputed to have been still deeper. The church of St Mary, Carisbrooke, has a beautiful Perpendicular tower, and contains transitional Norman portions. Only the site can be traced of the Cistercian priory to which it belonged. This was founded shortly after the Conquest and originated from the endowment which the monks of Lyre near Evreux held in Bowcombe, including the church, mill, houses, land and tithes of the manor. Richard II. bestowed it on the abbey of Mountgrace in Yorkshire. It was restored by Henry IV., but was dissolved by act of parliament in the reign of Henry V., who bestowed it on his newly-founded charter-house at Sheen. Carisbrooke formerly had a considerable market, several mills, and valuable fisheries, but it never acquired municipal or representative rights, and was important only as the site of the castle.

See *Victoria County History—Hampshire*; William Westall, *History of Carisbrooke Castle* (1850).

CARISSIMI, GIACOMO (*c.* 1604–1674), one of the most celebrated masters of the Italian, or, more accurately, the Roman school of music, was born about 1604 in Marino (near Rome). Of his life almost nothing is known. At the age of twenty he became chapel-master at Assisi, and in 1628 he obtained the same position at the church of St Apollinaris belonging to the Collegium Germanicum in Rome, which he held till his death on the 12th of January 1674, at Rome. He seems never to have left Italy. The two great achievements generally ascribed to him are the further development of the recitative, lately introduced by Monteverde, and of infinite importance in the history of dramatic music; and the invention of the chamber-cantata, by which Carissimi superseded the madrigals formerly in use. His position in the history of church music and vocal chamber music is somewhat similar to that of Cavalli in the history of opera. It is impossible to say who was really the inventor of the chamber-cantata; but Carissimi and Luigi Rossi were the composers who first made this form the vehicle for the most intellectual style of chamber-music, a function which it continued to perform until the death of Alessandro Scarlatti, Astorga and Marcello. Of his oratorios *Jephthah* has been published by Novello & Co., and is well known; this work and others are important as definitely establishing the form of oratorio unaccompanied by dramatic action, which has maintained its hold to the present day. He also may claim the merit of having given greater variety and interest to the instrumental accompaniments of vocal compositions. Dr Burney and Sir John Hawkins published specimens of his compositions in their works on the history of music; and Dr Aldrich collected an almost complete set of his compositions, at present in the library of Christ Church, Oxford. The British Museum also possesses numerous valuable works by this great Italian master. Most of his oratorios are in the Bibliothèque Nationale at Paris.

CARLETON, WILLIAM (1794–1869), Irish novelist, was born at Prillisk, Clogher, Co. Tyrone, on the 4th of March 1794. His father was a tenant farmer, who supported a family of fourteen children on as many acres, and young Carleton passed his early life among scenes precisely similar to those he afterwards delineated with so much power and truthfulness. His father was remarkable for his extraordinary memory, and had a thorough acquaintance with Irish folklore; the mother was noted throughout the district for the sweetness of her voice. The beautiful character of Honor, the miser's wife, in *Fardorougha*, is said to have been drawn from her.

The education received by Carleton was of a very humble description. As his father removed from one small farm to another, he attended at various places the hedge-schools, which used to be a notable feature of Irish life. The admirable little picture of one of these schools is given in the sketch called "The Hedge School" included in *Traits and Stories of Irish Peasantry*. Most of his learning was gained from a curate named Keenan, who taught a classical school at Donagh (Co. Monaghan), which Carleton attended from 1814 to 1816. Before this Carleton had resolved to prosecute his education as a poor scholar at Munster, with a view to entering the church; but in obedience to a warning dream, the story of which is told in the *Poor Scholar*, he returned home, where he received the unbounded veneration of the neighbouring peasantry for his supposed wonderful learning. An amusing account of this phase of his existence is given in the little sketch, "Denis O'Shaughnessy." About the age of nineteen he undertook one of the religious pilgrimages then common in Ireland. His experiences as a pilgrim, narrated in "The Lough Derg Pilgrim," made him resign for ever the thought of entering the church, and he eventually became a Protestant. His vacillating ideas as to a mode of life were determined in a definite direction by the reading of *Gil Blas*. He resolved to cast himself boldly upon the world, and try what fortune had in store for him. He went to Killanny, Co. Louth, and for six months acted as tutor in the family of a farmer named Piers Murphy, and after some other experiments he set out for Dublin, and arrived in the metropolis with 2s. 9d. in his pocket. He first sought occupation as a bird-stuffer, but a proposal to use potatoes and meal as stuffing failed to recommend him. He then determined to become a soldier, but the colonel of the regiment in which he desired to enlist persuaded him—Carleton had applied in Latin—to give up the idea. He obtained some teaching and a clerkship in a Sunday School office, began to contribute to the journals, and his paper "The Pilgrimage to Lough Derg," which was published in the *Christian Examiner*, excited great attention. In 1830 appeared the first series of *Traits and Stories of the Irish Peasantry* (2 vols.), which at once placed the author in the first rank of Irish novelists. A second series (3 vols.), containing, among other stories, "Tubber Derg, or the Red Well," appeared in 1833, and *Tales of Ireland* in 1834. From that time till within a few years of his death Carleton's literary activity was incessant. "Fardorougha the Miser, or the Convicts of Lisnamona" appeared in 1837–1838 in the *Dublin University Magazine*. Among his other famous novels are: *Valentine McClutchy, the Irish Agent, or Chronicles of the Castle Cumber Property* (3 vols., 1845); *The Black Prophet, a Tale of the Famine*, in the *Dublin University Magazine* (1846), printed separately in the next year; *The Emigrants of Ahadarra* (1847); *Willy Reilly and his dear Colleen Bawn* (in *The Independent*, London, 1850); and *The Tithe Proctor* (1849), the violence of which did his reputation harm among his own countrymen. Some of his later stories, *The Squanders of Castle Squander* (1852) for instance, are defaced by the mass of political matter with which they are overloaded. In spite of his very considerable literary production Carleton remained poor, but his necessities were relieved in 1848 by a pension of £200 a year granted by Lord John Russell in response to a memorial on Carleton's behalf signed by numbers of distinguished persons in Ireland. He died at Sandford, Co. Dublin, on the 30th of January 1869.

Carleton's best work is contained in the *Traits and Stories of the Irish Peasantry*. He wrote from intimate acquaintance with the scenes he described; and he drew with a sure hand a series of pictures of peasant life, unsurpassed for their appreciation of the passionate tenderness of Irish home life, of the buoyant humour and the domestic virtues which would, under better circumstances, bring prosperity and happiness. He alienated the sympathies of many Irishmen, however, by his unsparing criticism and occasional exaggeration of the darker side of Irish character. He was in his own words the "historian of their habits and manners, their feelings, their prejudices, their superstitions and their crimes." (Preface to *Tales of Ireland*.)

During the last months of his life Carleton began an autobiography which he brought down to the beginning of his literary career. This forms the first part of *The Life of William Carleton . . .* (2 vols., 1896), by D. J. O'Donoghue, which contains full information about his life, and a list of his scattered writings. A selection from his stories (1889), in the "Camelot Series," has an introduction by Mr W. B. Yeats. He must not be confused with Will Carleton (b. 1845), the American author of *Farm Ballads* (1873).

CARLETON PLACE, a town and port of entry of Lanark county, Ontario, Canada, 28 m. S.W. of Ottawa, on the Mississippi river, and at the junction of the main line and Brockville branch of the Canadian Pacific railway. It has abundant water-power privileges, and extensive railway-repair shops and woollen mills. Pop. (1901) 4059.

CARLILE, RICHARD (1790–1843), English freethinker, was born on the 8th of December 1790, at Ashburton, Devonshire, the son of a shoemaker. Educated in the village school, he was apprenticed to a tinman against whose harsh treatment he frequently rebelled. Having finished his apprenticeship, he obtained occupation in London as a journeyman tinman. Influenced by reading Paine's *Rights of Man*, he became an uncompromising radical, and in 1817 started pushing the sale of the *Black Dwarf*, a new weekly paper, edited by Jonathan Wooler, all over London, and in his zeal to secure the dissemination of its doctrines frequently walked 30 m. a day. In the same year he also printed and sold 25,000 copies of Southey's *Wat Tyler*, reprinted the suppressed *Parodies* of Hone, and wrote himself, in imitation of them, the *Political Litany*. This work cost him eighteen weeks imprisonment. In 1818 he published Paine's works, for which

and for other publications of a like character he was fined £1500, and sentenced to three years' imprisonment in Dorchester gaol. Here he published the first twelve volumes of his periodical the *Republican*. The publication was continued by his wife, who was accordingly sentenced to two years' imprisonment in 1821. A public subscription, headed by the duke of Wellington, was now raised to prosecute Carlile's assistants. At the same time Carlile's furniture and stock-in-trade in London were seized, three years were added to his imprisonment in lieu of payment of his fine, his sister was fined £500 and imprisoned for a year for publishing an address by him, and nine of his shopmen received terms of imprisonment varying from six months to three years. In 1825 the government decided to discontinue the prosecutions. After his release in that year Carlile edited the *Gorgon*, a weekly paper, and conducted free discussions in the London Rotunda. For refusing to give sureties for good behaviour after a prosecution arising out of a refusal to pay church rates, he was again imprisoned for three years, and a similar resistance cost him ten weeks' more imprisonment in 1834–1835. He died on the 10th of February 1843, after having spent in all nine years and four months in prison.

CARLINGFORD, CHICHESTER SAMUEL FORTESCUE, Baron (1823–1898), British statesman, son of Chichester Fortescue (d. 1826), M.P. for Louth in the Irish parliament, was born in January 1823. He came of an old family settled in Ireland since the days of Sir Faithful Fortescue (1581–1666), whose uncle, Lord Chichester, was lord deputy. The history of the family was written by his elder brother Thomas (1815–1887), who in 1852 was created Baron Clermont. The future Lord Carlingford, then Mr Chichester Fortescue, went to Christ Church, Oxford, where he took a first in classics (1844) and won the chancellor's English essay (1846); and in 1847 he was elected to parliament for Louth as a Liberal. He became a junior lord of the treasury in 1854, and subsequently held minor offices in the Liberal administrations till in 1865 he was made chief secretary for Ireland under Lord Russell, a post which he again occupied under Gladstone in 1868–1870; he then became president of the Board of Trade (1871–1874), and later lord privy seal (1881–1885) and president of the council (1883–1885). He was raised to the peerage in 1874. He parted from Gladstone on the question of Irish Home Rule, but in earlier years he was his active supporter on Irish questions. His influence in society was due largely to his wife, Frances (1821–1879), previously the wife of the 7th Earl Waldegrave, whom he married in 1863. In 1887 his brother, Lord Clermont, died, and Carlingford inherited his peerage; but on his own death without issue on the 30th of January 1898 both titles became extinct.

CARLINGFORD, a small market town and port of Co. Louth, Ireland, in the north parliamentary division. Pop. (1901) 606. It is beautifully situated on the western shore of Carlingford Lough, at the foot of Carlingford Mountain (1935 ft.), facing the fine heights of the Mourne Mountains across the lough in Co. Down. It has a station on the railway connecting Greenore and Newry, owned by the London & North-Western railway of England. It was formerly a place of great importance, as attested by numerous remains. King John's Castle (1210) commands the lough from an isolated rock. There are other remains of the castellated houses erected during the Elizabethan and previous wars. A Dominican monastery was founded in 1305, and combines ecclesiastical and military remains. The town received several charters between the reigns of Edward II. and James II., was represented in the Irish parliament until the Union, and possessed a mint from 1467. The lough is a typical rock-basin hollowed out by glacial action, about 4 fathoms deep at its entrance, but increasing to four times that depth within. The oyster-beds are valuable.

CARLI-RUBBI, GIOVANNI RINALDO, Count of (1720–1795), Italian economist and antiquarian, was born at Capo d' Istria, in 1720. At the age of twenty-four he was appointed by the senate of Venice to the newly established professorship of astronomy and navigation in the university of Padua, and entrusted with the superintendence of the Venetian marine. After filling these offices for seven years with great credit, he resigned them, in order to devote himself to the study of antiquities and political economy. His principal economic works are his *Delle monete, e della instituzione delle zecche d' Italia*; his *Ragionamento sopra i bilanci economici delle nazioni* (1759), in which he maintained that what is termed the balance of trade between two nations is no criterion of the prosperity of either, since both may be gainers by their reciprocal transactions; and his *Sul libero commercio dei grani* (1771), in which he argues that free trade in grain is not always advisable. Count Carli's merits were appreciated by Leopold of Tuscany, afterwards emperor, who in 1765 placed him at the head of the council of public economy and of the board of public instruction. In 1769 he became privy councillor, in 1771 president of the new council of finances. He died at Milan in February 1795. During his leisure he completed and published his *Antichità Italiche*, in which the literature and arts of his country are ably discussed. Besides the above, he published many works on antiquarian, economic and other subjects, including *L' Uomo libero*, in confutation of Rousseau's *Contrat Social*; an attack upon the abbé Tartarotti's assertion of the existence of magicians; *Observazioni sulla musica antica e moderna*; and several poems.

CARLISLE, EARLS OF. This English title has been held by two families, being created for James Hay in 1622, and being extinct in that line on the death of his son in 1660, and then being given in 1661 to Charles Howard, and descending to the present day in the Howard family.

James Hay, 1st earl of Carlisle (d. 1636), was the son of Sir James Hay of Kingask (a member of a younger branch of the Erroll family), and of Margaret Murray, cousin of George Hay, afterwards 1st earl of Kinnoull. He was knighted and taken into favour by James VI. of Scotland, brought into England in 1603, treated as a "prime favourite" and made a gentleman of the bedchamber. In 1604 he was sent on a mission to France and pleaded for the Huguenots, which annoyed Henry IV. and caused a substantial reduction of the present made to the English envoy. On the 21st of June 1606 he was created by patent a baron for life, with precedence next to the barons, but without a place or voice in parliament, no doubt to render his advancement less unpalatable to the English lords. The king bestowed on him numerous grants, paid his debts, and secured for him a rich bride in the person of Honora, only daughter and heir of Edward, Lord Denny, afterwards earl of Norwich. In 1610 he was made a knight of the Bath, and in 1613 master of the wardrobe, while in 1615 he was created Lord Hay of Sawley, and took his seat in the House of Lords. He was sent to France next year to negotiate the marriage of Princess Christina with Prince Charles, and on his return, being now a widower, married in 1617 Lady Lucy Percy (1599–1660), daughter of the 9th earl of Northumberland, and was made a privy councillor. In 1618 he resigned the mastership of the wardrobe for a large sum in compensation. He was created Viscount Doncaster, and in February 1619 was despatched on a mission to Germany, where he identified himself with the cause of the elector palatine and urged James to make war in his support. In 1621 and 1622 he was sent to France to obtain peace for the Huguenots from Louis XIII., in which he was unsuccessful, and in September 1622 was created earl of Carlisle. Next year he went to Paris on the occasion of Prince Charles's journey to Madrid, and again in 1624 to join Henry Rich, afterwards Lord Holland, in negotiating the prince's marriage with Henrietta Maria, when he advised James without success to resist Richelieu's demands on the subject of religious toleration. On the 2nd of July 1627 Lord Carlisle obtained from the king a grant of all the Caribbean Islands, including Barbados, this being a confirmation of a former concession given by James I. He was also a patentee and councillor of the plantation of New England, and showed great zeal and interest in the colonies. He became gentleman of the bedchamber to King Charles I. after his accession. In 1628, after the failure of the expedition to Rhé, he was sent to make a diversion against Richelieu in Lorraine and Piedmont; he counselled peace with Spain and the

vigorous prosecution of the war with France, but on his return home found his advice neglected. He took no further part in public life, and died in March 1636. Carlisle was a man of good sense and of accommodating temper, with some diplomatic ability. His extravagance and lavish expenditure, his "double suppers" and costly entertainments, were the theme of satirists and wonder of society, and his debts were said at his death to amount to more than £80,000. "He left behind him," says Clarendon, "a reputation of a very fine gentleman and a most accomplished courtier, and after having spent, in a very jovial life, above £400,000, which upon a strict computation he received from the crown, he left not a house or acre of land to be remembered by."

The charms and wit of his second wife, Lucy, countess of Carlisle, which were celebrated in verse by all the poets of the day, including Carew, Cartwright, Herrick and Suckling, and by Sir Toby Matthew in prose, made her a conspicuous figure at the court of Charles I. There appears no foundation for the scandal which made her the mistress successively of Strafford and of Pym. Strafford valued highly her sincerity and services, but after his death, possibly in consequence of a revulsion of feeling at his abandonment by the court, she devoted herself to Pym and to the interests of the parliamentary leaders, to whom she communicated the king's most secret plans and counsels. Her greatest achievement was the timely disclosure to Lord Essex of the king's intended arrest of the five members, which enabled them to escape. But she appears to have served both parties simultaneously, betraying communications on both sides, and doing considerable mischief in inflaming political animosities. In 1647 she attached herself to the interests of the moderate Presbyterian party, which assembled at her house, and in the second Civil War showed great zeal and activity in the royal cause, pawned her pearl necklace for £1500 to raise money for Lord Holland's troops, established communications with Prince Charles during his blockade of the Thames, and made herself the intermediary between the scattered bands of royalists and the queen. In consequence her arrest was ordered on the 21st of March 1649, and she was imprisoned in the Tower, whence she maintained a correspondence in cipher with the king through her brother, Lord Percy, till Charles went to Scotland. According to a royalist newsletter, while in the Tower she was threatened with the rack to extort information. She was released on bail on the 25th of September 1650, but appears never to have regained her former influence in the royalist counsels, and died soon after the Restoration, on the 5th of November 1660.

The first earl was succeeded by JAMES, his only surviving son by his first wife, at whose death in 1660 without issue, the peerage became extinct in the Hay family.

CHARLES HOWARD, 1st earl of Carlisle in the Howard line (1629–1685), was the son and heir of Sir William Howard, of Naworth in Cumberland, by Mary, daughter of William, Lord Eure, and great-grandson of Lord William Howard, "Belted Will" (1563–1640), and was born in 1629. In 1645 he became a Protestant and supported the government of the commonwealth, being appointed high sheriff of Cumberland in 1650. He bought Carlisle Castle and became governor of the town. He distinguished himself at the battle of Worcester on Cromwell's side, was made a member of the council of state in 1653, chosen captain of the protector's body-guard and selected to carry out various public duties. In 1655 he was given a regiment, was appointed a commissioner to try the northern rebels, and a deputy major-general of Cumberland, Westmorland and Northumberland. In the parliament of 1653 he sat for Westmorland, in those of 1654 and 1656 for Cumberland. In 1657 he was included in Cromwell's House of Lords and voted for the protector's assumption of the royal title the same year. In 1659 he urged Richard Cromwell to defend his government by force against the army leaders, but his advice being refused he used his influence in favour of a restoration of the monarchy, and after Richard's fall he was imprisoned. In April 1660 he sat again in parliament for Cumberland, and at the Restoration was made *custos rotulorum* of Essex and lord-lieutenant of Cumberland and Westmorland. On the 20th of April 1661 he was created Baron Dacre of Gillesland, Viscount Howard of Morpeth, and earl of Carlisle; the same year he was made vice-admiral of Northumberland, Cumberland and Durham, and in 1662 joint commissioner for the office of earl marshal. In 1663 he was appointed ambassador to Russia, Sweden and Denmark, and in 1668 he carried the Garter to Charles XI. of Sweden. In 1667 he was made lieutenant-general of the forces and joint commander-in-chief of the four northernmost counties. In 1672 he became lord-lieutenant of Durham, and in 1673 deputy earl marshal. In 1678 he was appointed governor of Jamaica, and reappointed governor of Carlisle. He died on the 24th of February 1685, and was buried in York Minster. He married Anne (d. 1696), daughter of Edward, 1st Lord Howard of Escrick; his eldest son EDWARD (*c.* 1646–1692) succeeded him as 2nd earl of Carlisle, the title descending to his son CHARLES (1674–1738) and grandson HENRY (1694–1758).

FREDERICK HOWARD, 5th earl (1748–1825), son of the 4th earl, was born in 1748. During his youth he was chiefly known as a man of pleasure and fashion; and after he had reached thirty years of age, his appointment on a commission sent out by Lord North to attempt a reconciliation with the American colonies was received with sneers by the opposition. The failure of the embassy was not due to any incapacity on the part of the earl, but to the unpopularity of the government from which it received its authority. He was, indeed, considered to have displayed so much ability that he was entrusted with the viceroyalty of Ireland in 1780. The time was one of the greatest difficulty; for while the calm of the country was disturbed by the American rebellion, it was drained of regular troops, and large bands of volunteers not under the control of the government had been formed. Nevertheless, the two years of Carlisle's rule passed in quietness and prosperity, and the institution of a national bank and other measures which he effected left permanently beneficial results upon the commerce of the island. In 1789, in the discussions as to the regency, Carlisle took a prominent part on the side of the prince of Wales. In 1791 he opposed Pitt's policy of resistance to the dismemberment of Turkey by Russia; but on the outbreak of the French Revolution he left the opposition and vigorously maintained the cause of war. In 1815 he opposed the enactment of the Corn Laws; but from this time till his death, in 1825, he took no important part in public life. Carlisle was the author of some political tracts, a number of poems, and two tragedies, *The Father's Revenge* and *The Stepmother*, which received high praise from his contemporaries. His mother was a daughter of the 4th Lord Byron, and in 1798 he was appointed guardian to Lord Byron, the poet, who lampooned him in *English Bards and Scotch Reviewers*.

GEORGE HOWARD, 6th earl (1773–1848), eldest son of the 5th earl, entered parliament as Lord Morpeth in 1795 as a Whig. He was appointed to the Indian board in 1806, when the "Ministry of all the Talents" took office, but resigned in 1807, though he remained prominent in the House of Commons. After his elevation to the House of Lords (1825), he held various cabinet offices under Canning and Grey. He made some minor contributions to literature and left the reputation of an amiable scholar.

GEORGE WILLIAM FREDERICK HOWARD, 7th earl (1802–1864), was born in London on the 18th of April 1802. He was the eldest son of the 6th earl by his wife Lady Georgiana Cavendish, eldest daughter of the duke of Devonshire. He was educated at Eton and Christ Church, Oxford, where (as Lord Morpeth) he earned a reputation as a scholar and writer of graceful verse, obtaining in 1821 both the chancellor's and the Newdigate prizes for a Latin and an English poem. In 1826 he accompanied his uncle, the duke of Devonshire, to Russia, to attend the coronation of the tsar Nicholas, and became a great favourite in society at St Petersburg. At the general election of the same year he was returned to parliament as member for the family borough of Morpeth. In one of his earliest speeches he undertook,

at the risk of forfeiting the good opinion of the Liberal party, the defence of the Russian emperor against severe attacks made on him in reference to the suppression of the Polish insurrection of 1830. In the agitation for parliamentary reform he took the side of Earl Grey; and after the dissolution of parliament, which took place about that time, he was elected member for Yorkshire. This seat he held till after the passing of the Reform Bill in 1832. He was then returned for the West Riding; and in 1835 he was appointed by Lord Melbourne chief secretary for Ireland, a position at that time of great difficulty, O'Connell being then at the height of his reputation. This post he held for about six years (being included in the cabinet in 1839), winning great popularity by his amiable manners and kindly disposition. Losing his seat at the election of 1841, he visited the United States, but in 1846 he was again returned for the West Riding, and was made chief commissioner of woods and forests in Lord John Russell's cabinet. Succeeding to the peerage in 1848, he became chancellor of the duchy of Lancaster in 1850. The great event of his life, however, was his appointment by Lord Palmerston to the lord-lieutenancy of Ireland in 1855. This office he continued to hold till February 1858, and again from June 1859 till within a few months of his death. His literary tastes and culture were displayed in various popular lectures and in several published works. Among these may be mentioned a lecture on *The Life and Writings of Pope* (1851); *The Last of the Greeks*, a tragedy (1828); a *Diary in Turkish and Greek Waters* (1854), the fruit of travels in the East in 1853 and 1854; and a volume of *Poems*, published after his death. In 1866 appeared his *Viceregal Speeches*, collected and edited by J. Gaskin. He took warm interest in the reformation of juvenile criminals, and established on his own estate one of the best conducted reformatories in the country. Lord Carlisle died at Castle Howard on the 5th of December 1864. He was never married, and was succeeded in the peerage by his brother, the Rev. William George Howard (d. 1889), as 8th earl.

George James Howard, 9th earl, born in 1843, was the son of Charles, fourth son of the 6th earl. He was educated at Eton and Trinity, Cambridge, and, then being only Mr Howard, married in 1864 Rosalind, daughter of the 2nd Lord Stanley of Alderley. He sat in parliament as a Liberal in 1879–1880, and again from 1881 to 1885; and succeeded his uncle in the peerage in 1889. His wife, a more active Liberal politician than himself, took a prominent part in the temperance movement and other advanced causes; and Lord Carlisle became best known as an art patron and an artist of considerable ability, whose landscape painting had considerable affinity to the work of Giovanni Costa. His position as a connoisseur was recognized by his being made one of the trustees of the National Gallery. His son, Viscount Morpeth (b. 1867), had a distinguished career at Oxford, and after various defeats in other constituencies was returned to parliament for South Birmingham as a Unionist supporter of Mr Chamberlain in 1904.

CARLISLE, a city, municipal and parliamentary borough, and the county town of Cumberland, England, 299 m. N.N.W. of London, and 8 m. S. of the Scottish border. Pop. (1901) 45,480. It lies on the south bank of the river Eden, a little below the point where it debouches upon the Solway Plain, 8 m. above its mouth in the Solway Firth, at the junction of two tributaries from the south, the Caldew and the Petteril. The city grew up originally on and about the two slight eminences of the peninsula enclosed between these three streams. To the north of the Eden lies the suburb of Stanwix, connected with the city by a handsome bridge (1812–1815). The rivers are not navigable, and a canal opened in 1823, connecting the city with Port Carlisle on the Solway Firth, was unsuccessful, and was converted into a railway. Silloth, on the Irish Sea, is the nearest port of importance (21 m.). Carlisle, however, is one of the principal railway centres in Great Britain. The London & North-Western and the Midland railways of England, and the Caledonian, North British and Glasgow & South-Western of Scotland, here make a junction for through traffic between England and Scotland; and the city is further served by the North Eastern (from Newcastle) and the Maryport & Carlisle railways.

Carlisle is the seat of a bishop. Bede, in his life of St Cuthbert, alludes to a monastery here, and the saint was also believed to have founded a convent and school. But all was swept away by the Northmen, and though William Rufus, who rehabilitated the town, doubtless made provision for an ecclesiastical foundation, it was left for Henry I., in 1133, to create a bishopric out of the house of Augustinian canons, founded in 1102. This was the sole episcopal chapter of regular canons of St Augustine in England. It was dissolved in 1540. Between 1156 and 1204 the bishop's throne was unoccupied, but thereafter there was a continuous succession. The diocese covers the whole of Westmorland, and practically of Cumberland, with Furness and the adjacent district in the north of Lancashire. The cathedral as it stands is a fine cruciform building with a central tower, but it is incomplete. Of the Norman nave, built by Æthelwold, the first prior and bishop, only two bays are standing, the remainder having been destroyed by the Parliamentarians in 1646. The south transept, and the lower part of the tower piers, are also of this period. Remarkable distortion is seen in the nave arches, owing to the sinking of the foundations. The thinness of the aisle walls, and the rude masonry of the foundations of the original apse which have been discovered, point to native, not Norman, workmanship. The choir is ornate and beautiful, and the huge Decorated east window, with its wonderful elaborate tracery, is perhaps the finest of its kind extant. The reconstruction of the Norman choir was begun in the middle of the 13th century, but the work was almost wholly destroyed by fire in 1292. The north transept and the tower also suffered. Building began again *c.* 1352, and the present tower, erected with some difficulty on the weak foundations of the Norman period, dates from 1400–1419. The conventual buildings are scanty, including little more than a Perpendicular gateway and refectory. A stone inscribed with runes, and a well, are among the objects of interest within the cathedral. Among the numerous memorials is one to Archdeacon Paley; and a stained-glass window commemorates the five children of Archibald Campbell Tait, dean of the cathedral, and afterwards archbishop of Canterbury. Of the two eminences within the three rivers, the cathedral occupies one, the castle the other. It was moated and very strong; but has been so far altered that only the keep is of special interest. A tower in which Mary, queen of Scots, was imprisoned was taken down in 1835. The castle serves as barracks. Fragments of the old city walls are seen on the western side over against the river Caldew. At Carlisle are the county gaol and the Cumberland infirmary, in connexion with which there is a seaside convalescent institution at Silloth. Other notable public buildings are the city hall, the court-houses, museum and art gallery. The grammar school, of very early foundation, received endowment from Henry VIII. Industries include the manufacture of cotton and woollen goods, and there are iron foundries, breweries, tanneries and large railway works. There is also a considerable agricultural trade. The parliamentary borough returns one member. The municipal borough is under a mayor, 10 aldermen and 30 councillors. Area, 2025 acres.

This was the Romano-British *Luguvallium*, probably rather a town than a fort, being one of the few towns as distinct from forts in the north of Britain. It lay a mile south of Hadrian's wall. There are no traces above ground *in situ*; but many inscriptions, potsherds, coins and other such-like relics have been discovered.

Carlisle (*Caer Luel*, *Karliol*) is first mentioned in 685, when under the name of Luel it was bestowed by Ecgfrith on St Cuthbert to form part of his see of Lindisfarne. It was then a thriving and populous city, and when St Cuthbert visited it in 686 he was shown with pride the ancient walls and a Roman fountain of marvellous construction. Nennius, writing in the 9th century, mentions it in a list of British cities under the name of Caer Luadiit, Caer Ligualid or Caer Lualid, but about this time it was either wholly or in part destroyed by the Danes, and vanishes completely from history until in 1092 it was re-established as the political centre of the district by William Rufus,

who built the castle and sent husbandmen to dwell there and till the land. During the centuries of border-strife which followed, the history of Carlisle centres round that of the castle, which formed the chief bulwark against the Scots on the western border, and played an important part in the history of the country down to the rebellion of the young Pretender in 1745. In 1292 a great fire destroyed nearly all the buildings and muniments of the city, so that no original charter is extant before that date. A charter from Edward I., dated 1293, however, exemplifies two earlier grants. The first, from Henry II., confirmed the liberties and customs which the city had theretofore enjoyed, granting in addition a free gild merchant, with other privileges. This grant is exemplified in the second charter, from Henry III., dated 1251. By a writ dated 5 Henry III. the citizens were allowed to hold the city direct from the king, paying a fee-farm rent of £60, instead of the former rent of £50, paid by the medium of the sheriff. A charter from Edward II., dated 1316, grants to the citizens the city, the king's mills in the city, and the fishery in the Eden, at a fee-farm rent of £80 a year. A charter from Edward III. in 1352 enumerates the privileges and liberties hitherto enjoyed by the citizens, including a market twice a week, on Wednesday and Saturday; a fair for sixteen days at the feast of the Assumption of the Virgin (15th of August); free election of a mayor, bailiffs and two coroners; and the right to hold their markets in the place called "Battailholm." It also mentions that the city was greatly impoverished by reason of the devastations of the Scots and by pestilence. Confirmations of former privileges were issued by Richard II., Henry IV. and Henry VI. A charter from Edward IV. in 1461, after reciting the damage sustained by the city through fire, reduced the fee-farm rent from £80 to £40, and granted to the citizens the fishery called the sheriff's net, free of rent. Further confirmations were granted by later sovereigns. Although the city had been under the jurisdiction of a mayor and bailiffs at least as early as 1290, the first charter of incorporation was granted by Elizabeth in 1566; it established a corporation under the style of "a mayor, eleven worshipful persons, and twenty-four able persons." A charter of James I. confirmed former liberties, and in 1638 Charles I. granted a charter under which the town continued to be governed until 1835. It declared Carlisle a city by itself, and established a corporation consisting of a mayor, 11 aldermen, 24 capital citizens, 2 bailiffs, 2 coroners and a recorder; the mayor, the recorder and 2 senior aldermen to be justices of the peace, and the mayor to be clerk of the market; other officers were a common clerk, a sword-bearer and three serjeants-at-mace. Two charters from Charles II. in 1664 and 1684 were never accepted. The latter granted a three days' fair or market on the first Wednesday in June. Much valuable information relating to the early history and customs of Carlisle is furnished both by the Dormont Book, which contains an elaborate set of bye-laws dated 1561, and by the records of the eight craft gilds—weavers, smiths, tailors, tanners, shoemakers, skinners, butchers and merchants. The defensive and offensive warfare in which the citizens were constantly engaged until the union of the crowns of England and Scotland left little time for the development of commercial pursuits, and Fuller, writing in the 17th century, says that the sole manufacture, that of fustian, though established shortly after the Restoration, had met with scant encouragement. In 1750 the manufacture of coarse linen cloth was established, and was followed in a few years by the introduction of calico stamperies. The commercial prosperity of Carlisle, however, began with the railway development of the 19th century. In 1283 the citizens of Carlisle were summoned to send two representatives to parliament, but no return is recorded. From 1295 Carlisle continued to return two members until the Redistribution Act of 1885. At the time of the Scottish wars Edward I. held two parliaments at Carlisle—in 1300 and in 1307.

See *Victoria County History, Cumberland*; R. S. Ferguson, *Some Municipal Records of the City of Carlisle* (Cumberl. and Westm. Antiq. and Archaeol. Soc., Carlisle and London, 1887), and *Royal Charters of Carlisle* (ditto, Carlisle, &c., 1894); Mandell Creighton, *Carlisle* in "Historic Towns" series (London, 1889).

CARLISLE, a borough and the county-seat of Cumberland county, Pennsylvania, U.S.A., 18 m. W. by S. of Harrisburg and 118 m. W. by N. of Philadelphia. Pop. (1890) 7620; (1900) 9626, of whom 1148 were negroes. It is served by the Cumberland Valley (controlled by the Pennsylvania railway) and the Gettysburg & Harrisburg railways. The borough is pleasantly situated in the central part of the fertile Cumberland Valley, which is here 12 m. wide. Mount Holly Springs and Boiling Springs are near, and are important summer attractions. In Carlisle is Dickinson College, founded in 1783 by Presbyterians, and named in honour of John Dickinson (*q.v.*), a benefactor of the college; it was reorganized in 1833 as a Methodist Episcopal College, and is now divided into the college, the school of law (founded in 1834) and Conway Hall, the preparatory department. President James Buchanan and Chief Justice R. B. Taney were graduates. Here are also Metzger College for young ladies, and a well-known United States Indian industrial school, established in 1879 through the efforts of Lieutenant (later Brigadier-General) Richard Henry Pratt (b. 1840), its superintendent until 1904; the school pays especial attention to industrial and agricultural training, and its athletic organizations are famous. A great effort is made to preserve and develop Indian arts and crafts; the instruction given by Mrs Angel Decora Dietz, a Winnebago, in colour work and design, decorating leather, making beadwork and weaving rugs, is particularly noteworthy. On the initiative of the pupils the Leupp Indian Art School was built on the campus in 1906–1907, all materials being purchased with the funds of the athletic association and all work being done by the students. The building is named in honour of Francis Ellington Leupp (b. 1849), U.S. commissioner of Indian affairs in 1905. Carlisle is prominent for the manufacture of boots and shoes, and has machine shops and manufactories of carriages, ribbons, railway frogs and switches, carpets and paper boxes. In 1905 the value of all the factory products was $1,985,743, of which $1,078,401 was the value of boots and shoes. The place was laid out as a town in 1751, was named from Carlisle, Cumberland, England, and was incorporated as a borough in 1872. In 1753 Benjamin Franklin, with two other commissioners, negotiated a treaty with the Ohio Indians here. During the War of Independence the Americans kept here for secure confinement a number of British prisoners, among them Major John André, and in 1794 Carlisle was the headquarters of George Washington during the Whisky Rebellion. On the night of the 1st of July 1863 Carlisle was bombarded by Confederate troops.

CARLOFORTE, a town of Sardinia, in the province of Cagliari, the capital of the small island (6 by 5 m.) of San Pietro (anc. *Accipitrum* or Ἱερακοννῆσος) off the west coast of Sardinia. Pop. (1901) 7693. It lies on the east coast of the island, 6 m. west by sea from Portoscuso, which is 47 m. west by rail from Cagliari. It was founded in 1737 by Charles Emmanuel III. of Savoy, who planted a colony of Genoese, whose dialect and costume still prevail. In 1798 it was attacked by the Tunisians and 933 inhabitants taken away as slaves. They were ransomed after five years and the place fortified. It is now a centre of the tunny fishery, and there are manganese mines also. The coral banks, which were once important, are now exhausted. Three m. to the south-east is the island of S. Antioco.

CARLOMAN (828–880), king of Bavaria and Italy, was the eldest son of Louis the German, king of the East Franks. In 856 he undertook the defence of the eastern frontier of Bavaria against the Bohemians and Moravians, and won considerable fame in various campaigns. He married a daughter of Ernest, count of the Bohemian mark, and in conjunction with his father-in-law resisted the authority of his father in 861. For some years he alternated between rebellion and submission to his father, but in 865 an arrangement was made by which he became possessed of Bavaria and Carinthia as his expectant share of the kingdom of Louis. During the troubles between Louis and his two younger sons Carloman remained faithful to his father, and carried on the war with the Moravians so successfully that in 870 their territory was completely under the power of the

Franks; and when peace was made at Forchheim in 874, they recognized the Frankish supremacy. In 875 the emperor Louis II. died, having named his cousin Carloman as his successor in Italy. Carloman crossed the Alps to claim his inheritance, but was cajoled into returning by the king of the West Franks, Charles the Bald. In 876, on his father's death, Carloman became actually king of Bavaria, and after a short campaign against the Moravians he went again to Italy in 877 and was crowned king of the Lombards at Pavia; but his negotiations with Pope John VIII. for the imperial crown were fruitless, and personal illness added to the outbreak of an epidemic in his army compelled him to return to Bavaria. Stricken with paralysis, Carloman was unable to prevent his brother Louis from seizing Bavaria; so making a virtue of necessity, he bequeathed the whole of his lands to Louis. He died on the 22nd of September 880 at Öttingen, where he was buried, leaving an illegitimate son, afterwards the emperor Arnulf.

See "Annales Fuldenses," "Annales Bertiniani," Regino von Prum, "Chronicon," all in the *Monumenta Germaniae historica. Scriptores*, Band i. (Hanover and Berlin, 1826–1892); E. Mühlbacher, *Die Regesten des Kaiserreichs unter den Karolingern* (Innsbruck, 1881); and E. Dümmler, *Geschichte des ostfränkischen Reiches* (Leipzig, 1887–1888).

CARLOMAN, the name of three Frankish princes.

CARLOMAN (d. 754), mayor of the palace under the Merovingian kings, was a son of Charles Martel, and, together with his brother, Pippin the Short, became mayor on his father's death in 741, administering the eastern part of the Frankish kingdom. He was successful in extending the power of the Franks in various wars with his troublesome neighbours, and was not less zealous in seeking to strengthen and reform the church in the lands under his rule. In 747 Carloman laid down his office and retired to a monastery which he founded on Monte Soracte, but troubled by the number of his visitors, he subsequently entered a monastery on Monte Casino. He died at Vienne on the 17th of August 754.

CARLOMAN (751–771), king of the Franks, was a son of King Pippin the Short, and consequently a brother of Charlemagne. The brothers became joint kings of the Franks on Pippin's death in 768, and some trouble which broke out between them over the conduct of the war in Aquitaine was followed by Carloman's death at Samoussy on the 4th of December 771. He married Gerberga, a daughter of Desiderius, king of the Lombards, who, together with her children, vanished from history soon after her husband's death.

CARLOMAN (d. 884), king of France, was the eldest son of King Louis II., the Stammerer, and became king, together with his brother Louis III., on his father's death in 879. Although some doubts were cast upon their legitimacy, the brothers obtained recognition and in 880 made a division of the kingdom, Carloman receiving Burgundy and the southern part of France. In 882 he became sole king owing to his brother's death, but the kingdom was in a very deplorable condition, and his power was very circumscribed. Carloman met his death while hunting on the 12th of December 884.

See E. Lavisse, *Histoire de France*, tome ii. (Paris, 1903).

CARLOS I. (1863–1908), king of Portugal, the third sovereign of Portugal of the line of Braganza-Coburg, son of King Louis I. and Maria Pia, daughter of King Victor Emmanuel of Italy, was born on the 28th of September 1863. When about twenty years of age he spent a considerable time in travelling, visiting England in 1883. On the 22nd of May 1886 he married Marie Amélie, daughter of Philippe, duc d'Orléans, comte de Paris, and on the death of his father (19th of October 1889) he succeeded to the throne of Portugal. In that year the British government found it necessary to make formal remonstrances against Portuguese encroachments in South Africa, and relations between the two countries were greatly strained for some time. The king's attitude during this critical period was one of conciliation, and his temperate, though firm, speech on opening the Cortes in January 1890 did much to strengthen the party of peace. In 1900–1901 also his friendly attitude towards Great Britain was shown by cordial toasts at a banquet to the officers of the British fleet at Lisbon. King Carlos distinguished himself as a patron of science and literature, and was himself an artist of some repute. In March 1894 he took a very active part in the celebration of the 500th anniversary of the birth of Prince Henry the Navigator, and a year later he decorated the Portuguese poet, João de Deus, with much honour at Lisbon. He took a great personal interest in deep-sea soundings and marine exploration, and published an account of some of his own investigations, the results themselves being shown at an oceanographic exhibition opened by him on the 12th of April 1897. In May 1907 the king suspended the constitution of Portugal and temporarily appointed Senhor Franco as dictator with a view to carrying out certain necessary reforms. Some discontent was aroused by this proceeding; this was increased by Franco's drastic measures, and on the 1st of February 1908 King Carlos and his elder son, Louis, duke of Braganza (1887–1908), were assassinated whilst driving through the streets of Lisbon. The king was succeeded by his only surviving son, Manuel, duke of Beja (b. 1889), who took the title of Manuel II.

See *S. M. El Rei D. Carlos I. e sua obra artistica e scientifica* (Lisbon, 1908).

CARLOS, DON (1545–1568), prince of Asturias, was the son of Philip II. king of Spain, by his first wife Maria, daughter of John III., king of Portugal, and was born at Valladolid on the 8th of July 1545. His mother died a few days after his birth, and the prince, who was very delicate, grew up proud, wilful and indolent, and soon began to show signs of insanity. In 1559 he was betrothed to Elizabeth, daughter of Henry II., king of France, a lady who a few months later became the third wife of his father; in 1560 he was recognized as the heir to the throne of Castile, and three years later to that of Aragon. Other brides were then suggested for the prince; Mary, queen of Scots, Margaret, another daughter of Henry II., and Anne, a daughter of the emperor Maximilian II.; but meanwhile his mental derangement had become much more acute, and his condition could no longer be kept secret. In 1562 he met with an accident which was followed by a serious illness, and after his recovery he showed more obvious signs of insanity, while his conduct both in public and in private was extremely vicious and disorderly. He took a marked dislike to the duke of Alva, possibly because he wished to proceed to the Netherlands instead of the duke, and he exhibited a morbid antipathy towards his father, whose murder he even contemplated. At length in January 1568, when he had made preparations for flight from Spain, he was placed in confinement by order of Philip, and on the 24th of July of the same year he died. This event is still enveloped in some mystery. Philip has been accused of murdering his son, and from what is known of the king's character this supposition is by no means improbable. It is known that the king appointed commissioners to try the prince, and he may have been put to death for treason in accordance with their verdict. It has also been suggested that his crime was heresy, and that his death was due to poison, and other solutions of the mystery have been put forward. On the other hand, it should be remembered that the health of Carlos was very poor, and that his outrageous behaviour in captivity would have undermined a much stronger constitution than his own. Consequently there is nothing strange or surprising in his death from natural causes, and while no decisive verdict upon this question can be given, Philip may perhaps be granted the benefit of the doubt. By some writers the sad fate and early death of Carlos have been connected with the story of his unlawful attachment to his promised bride, Elizabeth, who soon became his stepmother, and whose death followed so quickly upon his own. There is circumstantial evidence for this tale. The loss of an affianced bride, followed by hatred between supplanted and supplanter, who were father and son, then the increasing infirmity of the slighted prince, and finally the almost simultaneous deaths of the pair. But mature historical research dismisses this story as a fable. It has, however, served as the subject for romance. Schiller and Alfieri, J. G. de Campristron in *Andronic*, and Lord John Russell have made it the subject of dramas, and other dramas based upon the life of Don Carlos have been written by Thomas Otway, M. A. Chénier, J. P. de Montalvan, and D. X. de Enciso.

See C. V. de Saint Réal, *Don Carlos, nouvelle historique* (Paris, 1672). This gives the story of the attachment of Carlos and Elizabeth, which has been refuted by L. von Ranke, *Zur Geschichte des don Carlos* (Vienna, 1829); and J. A. Llorente, *Histoire critique de l'Inquisition* (French translation, Paris, 1817). See also L. P. Gachard, *Don Carlos et Philippe II* (Brussels, 1863); C. de Moüy, *Don Carlos et Philippe II* (Paris, 1863); M. Büdinger, *Don Carlos, Haft und Tod* (Vienna, 1891); L. A. Warnkönig, *Don Carlos, Leben, Verhaftung und Tod* (Stuttgart, 1864); W. Maurenbrecher, *Don Carlos* (Berlin, 1876); and W. H. Prescott, *History of the Reign of Philip II.* vol. ii. (London, 1855, 1859).

CARLOS, DON (1788–1855), the first of the Carlist claimants of the throne of Spain, was the second surviving son of King Charles IV. and his wife, Louisa Maria of Parma. He was born on the 29th of March 1788, and was christened Carlos Maria Isidro. From 1808 till 1814 he was a prisoner in France at Valençay with his brothers, who had been imprisoned by Napoleon when he seized the whole royal family of Spain at Bayonne. After his return he lived quietly as a prince at Madrid. In September 1816 he married Maria Francesca de Asis, daughter of King John VI. of Portugal, and sister of the second wife of his elder brother King Ferdinand VII. Though he took no part in the government of Spain, except to hold a few formal offices, Don Carlos was known for the rigid orthodoxy of his religious opinions, the piety of his life, and his firm belief in the divine right of kings to govern despotically. During the revolutionary troubles of 1820–1823 he was threatened by the extreme radicals, but no attack was made on him. When the revolutionary agitation was put down by French intervention in 1823, Don Carlos continued to behave as the affectionate brother and loyal subject of Ferdinand VII. The family affection between them was undoubtedly sincere, and was one of the very few amiable traits in the character of the elder brother. Towards the close of Ferdinand's reign Don Carlos was forced against his own will into the position of a party leader, or rather into the position of a prince whom a great party was forced to take as its leader. The extreme clericals among the Spaniards, who were the partisans of despotism because they rightly considered it as most favourable to the church, began to be discontented with King Ferdinand, who seemed wanting in energy. When the king showed his intention to alter the law of succession in order to secure the crown for his daughter Isabella, the clericals (in the Spanish phrase, "apostólicos") banded to protect the rights of Don Carlos. There can be no question that if he had been disposed to place himself at the head of an insurrection he would have been followed, and might have put Ferdinand under restraint. But Don Carlos held his principles honestly. He considered rebellion as a sin in a prince as much as in other men, and as wicked when made by "apostólicos" as by liberals. He would do no more than assert his rights, and those of his children, in words. His wife and her sister, the princess of Beira, widow of his first cousin the infante Pedro, were less scrupulous. They were actively engaged in intrigues with the "apostólicos." In March 1833 the princess of Beira was informed by the king that her brother Don Miguel, then regent in Portugal, desired her presence, and that she must pay him a visit. On the 16th of March Don Carlos left for Portugal with his wife, in company with the princess, after an interview with his brother the king which is said to have been friendly. In the following month he was called upon by the king to swear allegiance to the infanta Isabella, afterwards queen. Don Carlos refused, in respectful terms but with great firmness, to renounce his rights and those of his sons, in a public letter dated the 29th of April. The death of his brother on the 29th of September 1833 gave him an opportunity to vindicate his claims without offence to his principles, for in his own opinion and that of his partisans he was now king. But he was entangled in the civil war of Portugal and was shut off from Spain. He did, and perhaps could do, nothing to direct the Spaniards who rose on his behalf, and had proclaimed him king as Charles V. When the Miguelite party was beaten in Portugal, Don Carlos escaped to England on the 1st of June 1834 in H.M.S. "Donegal." His stay in England was short. On the 2nd of July he passed over to France, where he was actively aided by the legitimist party, and on the 11th he joined his partisans at Elizondo in the valley of Bastan, in the western Pyrenees. On the 27th of October of this year he was deprived of his rights as infante by a royal decree, confirmed by the Cortes on the 15th of January 1837. Don Carlos remained in Spain till the defeat of his party, and then escaped to France on the 14th of September 1839. During these years he accompanied his armies, without displaying any of the qualities of a general or even much personal courage. But he endured a good deal of hardship, and was often compelled to take to hiding in the hills. On these occasions he was often carried over difficult places on the back of a stout guide commonly known as the royal jackass (*burro real*). The semblance of a court which he maintained was torn by incessant personal intrigues, and by conflicts between his generals and the ecclesiastics who exercised unbounded influence over his mind. The defeat of his cause, which had many chances of success, was unquestionably due to a very large extent to his want of capacity, his apathy, and his increasing absorption in practices of puerile piety. His first wife having died in England, Don Carlos married her elder sister, the princess of Beira, in Biscay in October 1837. After his flight from Spain, Don Carlos led a life of increasing insignificance. He abdicated in May 1845, took a title of count of Molina, and died at Trieste on the 10th of March 1855.

By his first marriage, Don Carlos had three sons, Charles (1818–1861), John (1822–1887), and Ferdinand (1824–1861). Charles succeeded to the claims of his father, and was known to his partisans as Don Carlos VI., but was more commonly known as the count of Montemolin. In 1846, when the marriage of queen Isabella was being negotiated, the Austrian government endeavoured to arrange an alliance between her and the count of Montemolin. But as he insisted on the complete recognition of his rights, the Spanish government refused to hear of him as a candidate. The Carlists took up arms on his behalf between 1846 and 1848, but the count, who had been expelled from France by the police, did not join them in the field. In April 1860 he and his brother Ferdinand landed at San Carlos de la Rápita, at the mouth of the Ebro, in company with a feather-headed officer named Ortega, who held a command in the Balearic islands. They hoped to profit by the fact that the bulk of the Spanish army was absent in a war with Morocco. But no Carlist rising took place. The men who had been brought from the islands by Ortega deserted him. Montemolin and his brother, together with their devoted partisan General Elio, who had accompanied them from exile, lurked in hiding for a fortnight and were then captured. Ortega was shot, but the princes saved their lives, and that of Elio, by making an abject surrender of their claims. When he had been allowed to escape and had reached Cologne, the count of Montemolin publicly retracted his renunication on the 15th of June, on the ignominious ground that it had been extorted by fear. Montemolin and his brother Ferdinand died within a fortnight of one another in January 1861 without issue.

The third brother, John, who had advanced his own claims before his brother's retraction, now came forward as the representative of the legitimist and Carlist cause. As he had shown a disposition to accept liberalism, and to make concessions to the spirit of the age, he was unpopular with the party. On the 3rd of October 1868 he made a formal renunciation in favour of his son Charles (Don Carlos VII.), who is separately noticed below.

See Hermann Baumgarten, *Geschichte Spaniens* (Leipzig, 1861); H. Butler Clarke, *Modern Spain* (Cambridge, 1906), which contains a useful bibliography.

CARLOS, DON (CHARLES MARIA DE LOS DOLORES JUAN ISIDORE JOSEPH FRANCIS QUIRIN ANTONY MICHAEL GABRIEL RAPHAEL) (1848–1909), prince of Bourbon, claimant, as Don Carlos VII., to the throne of Spain, was born at Laibach on the 30th of March 1848, being the eldest surviving son of Don Juan (John) of Bourbon and of the archduchess Maria Beatrix, daughter of Francis IV., duke of Modena. Don Carlos was the grandson of the first pretender, noticed above. He married in February 1867, at Frohsdorf, Princess Marguerite, daughter of the duke of Parma and niece of the comte de Chambord, who was born on the 1st

of January 1847, and who bore him a son, Don Jaime, in 1870, and three daughters. Don Carlos boldly asserted his pretensions to the throne of Spain two years after the revolution of 1868 had driven Queen Isabella II. and the other branch of the Bourbons into exile. His manifesto, addressed to his brother Alphonso, namesake of his rival, Alphonso XII., found an echo in the fanatical priesthood and peasantry of many provinces of the Peninsula, but little support among the more enlightened middle classes, especially in the towns. The first rising was started in Catalonia by the brother of the pretender, who himself entered Spain by way of Vera, in the Basque provinces, on the 21st of May 1872. The troops of King Amadeus under General Moriones, a progressist officer, who was one of Spain's ablest and most popular commanders, surprised and very nearly captured the pretender at Oroquista, sending him a fugitive to France in headlong flight with a few followers. For more than a year he loitered about in the French Pyrenees, the guest of old noble houses who showed him much sympathy, while the French authorities winked at the fact that he was fomenting civil war in Spain, where his guerilla bands, many of them led by priests, committed atrocities, burning, pillaging, shooting prisoners of war, and not unfrequently ill-using even foreign residents and destroying their property. When the Federal Republic was proclaimed on the abdication of King Amadeus, the Carlists had overrun Spain to such an extent that they held all the interior of Navarre, the three Basque provinces, and a great part of Catalonia, Lower Aragon, and Valencia, and had made raids into the provinces of Old Castile and Estremadura. Don Carlos re-entered Spain on the 15th of July 1873, just before the Carlists took Estella, in Navarre, which became, with Tolosa and Durango in the Basque provinces, his favourite residence. He displayed very lax morals and an apathy which displeased his staff and partisans. Don Carlos was present at some fights around Estella, and was in the neighbourhood of Bilbao during its famous siege of three months in 1874 until its relief by Marshals Serrano and Concha on the 2nd of May. He was also present at the battle near Estella on the 27th of June 1874, in which Marshal Concha was killed and the liberals were repulsed with loss. Twice he lost golden opportunities of making a rush for the capital—in 1873, during the Federal Republic, and after Concha's death. From the moment that his cousin Alphonso XII. was proclaimed king at Sagunto, at Valencia, in Madrid, and at Logroño, by General Campos, Daban, Jovellar, Primo de Rivera, and Laserna, the star of the pretender was on the wane. Only once, a few weeks after the Alphonsist restoration, the army of Don Carlos checked the Liberal forces in Navarre, and surprised and made prisoners half a brigade, with guns and colours, at Lacar, almost under the eyes of the new king and his headquarters. This was the last Carlist success. The tide of war set in favour of Alphonso XII., whose armies swept the Carlist bands out of central Spain and Catalonia in 1875, while Marshal Quesada, in the upper Ebro valley, Navarre, and Ulava, prepared by a series of successful operations the final advance of 180,000 men, headed by Quesada and the king, which defeated the Carlists at Estella, Peña Plata, and Elgueta, thus forcing Don Carlos with a few thousand faithful Carlists to retreat and surrender to the French frontier authorities in March 1876.

The pretender went to Pau, and there, singularly enough, issued his proclamations bidding temporary adieu to the nation and to his volunteers from the same chateau where Queen Isabella, also a refugee, had issued hers in 1868. From that date Don Carlos became an exile and a wanderer, travelling much in the Old and New World, and raising some scandal by his mode of life. He fixed his residence for a time in England, then in Paris, from which he was expelled at the request of the Madrid government, and next in Austria, before he took up his abode at Viarreggio in Italy. Like all pretenders, he never gave in, and his pretensions, haughtily reasserted, often troubled the courts and countries whose hospitality he enjoyed. His great disappointment was the coldness towards him of Pope Leo XIII., and the favour shown by that pontiff for Alphonso XII. and his godson, Alphonso XIII. Don Carlos had two splendid chances of testing the power of his party in Spain, but failed to profit by them. The first was when he was invited to unfurl his flag on the death of Alphonso XII., when the perplexities and uncertainties of Castilian politics reached a climax during the first year of a long minority under a foreign queen-regent. The second was at the close of the war with the United States and after the loss of the colonies, when the discontent was so widespread that the Carlists were able to assure their prince that many Spaniards looked upon his cause as the one untried solution of the national difficulties. Don Carlos showed his usual lack of decision; he wavered between the advice of those who told him to unfurl his standard with a view to rally all the discontented and disappointed, and of those who recommended him to wait until a great *pronunciamiento*, chiefly military, should be made in his favour—a day-dream founded upon the coquetting of General Weyler and other officers with the Carlist senators and deputies in Madrid. Afterwards the pretender continued to ask his partisans to go on organizing their forces for action some day, and to push their propaganda and preparations, which was easy enough in view of the indulgence shown them by all the governments of the regency and the open favour exhibited by many of the priesthood, especially in the rural districts, the religious orders, and the Jesuits, swarming all over the kingdom. After the death of his first wife in 1893, Don Carlos married in the following year Princess Marie Bertha of Rohan. He died on the 18th of July 1909. His son by his first wife, Don Jaime, was educated in Austrian and British military schools before he entered the Russian army, in which he became a colonel of dragoons.

CARLOW, a county of Ireland in the province of Leinster, bounded N. by the counties Kildare and Wicklow, E. by Wicklow and Wexford, S. by Wexford, and W. by Queen's county and Kilkenny. Excepting Louth, it is the smallest county in Ireland, having an area of 221,424 acres, or about 346 sq. m. The surface of the county is in general level or gently undulating, and of pleasing appearance, except the elevated tract of land known as the ridge of Old Leighlin (Gallows Hill Bog, 974 ft.), forming the beginning of the coal-measures of Leinster, and the south-eastern portion of the county bordering on Wexford, where the wild and barren granitic elevations of Knockroe (1746 ft.) and Mount Leinster (2610 ft.) present a bolder aspect. Glacial deposits, which overspread the lower grounds, sometimes afford good examples of the ridge-forms known as eskers, as in the neighbourhood of Bagenalstown. There are no lakes nor canals in the county, nor does it contain the source of any important river; but on its western side it is intersected from north to south by the Barrow, which is navigable throughout the county and affords means of communication with the port of Waterford; while on the eastern border the Slaney, which is not navigable in any part of its course through the county, passes out of Carlow into Wexford at Newtownbarry.

Carlow is largely a granite county; but here the Leinster Chain does not form a uniform moorland. The mica-schists and Silurian slates of its eastern flank are seen in the diversified and hilly country on the pass over the shoulder of Mt. Leinster, between Newtownbarry and Borris. The highland drops westward to the valley of the Barrow, Carlow and Bagenalstown lying on Carboniferous Limestone, which here abuts upon the granite. On the west of the hollow, the high edge of the Castlecomer coalfields rises, scarps of limestone, grit, and coal-measures succeeding one another on the ascent. Formerly clay-ironstone was raised from the Upper Carboniferous strata.

The soil is of great natural richness, and the country is among the most generally fertile in the island. Agriculture is the chief occupation of the inhabitants, but is not so fully developed as the capabilities of the land would suggest; in effect, the extent of land under tillage shows a distinctly retrograde movement, being rather more than half that under pasture. The pasture land is of excellent quality, and generally occupied as dairy farms, the butter made in this county maintaining a high reputation in the Dublin market. The farms are frequently large, and care is given to the breeding of cattle. Sheep and poultry, however, receive the greatest attention. The staple trade of the county is

in corn, flour, meal, butter and provisions, which are exported in large quantities. There are no manufactures. The sandstone of the county is frequently of such a nature as to split easily into layers, known in commerce as Carlow flags.

Porcelain clay exists in the neighbourhood of Tullow; but no attempt is made to turn this product to use.

The Great Southern & Western railway from Kildare to Wexford follows the river Barrow through the county, with a branch from Bagenalstown to Kilkenny, while another branch from the north terminates at Tullow.

As regards population (41,964 in 1891; 37,748 in 1901), the county shows a decrease among the more serious of Irish counties, and correspondingly heavy emigration returns. Of the total, about 89% are Roman Catholics, and nearly the whole are rural. Carlow (pop. 6513), Bagenalstown (1882), and Tullow (1725) are the only towns. The county is divided into seven baronies, and contains forty-four civil parishes and parts of parishes. It belongs to the Protestant diocese of Dublin and the Roman Catholic diocese of Kildare and Leighlin. The assizes are held at Carlow, and quarter sessions at that town and also at Bagenalstown and Tullow. One member is returned to parliament.

Carlow, under the name of Catherlogh, is among the counties generally considered to have been created in the reign of John. Leinster was confirmed as a liberty to William Marshal, earl of Pembroke, by John, and Carlow, among other counties in this area, had the privileges of a palatinate on descending to one of the earl's heiresses. The relics of antiquity in the county comprise large cromlechs at Browne's Hill near Carlow and at Hacketstown, and a rath near Leighlin Bridge, in which were found several urns of baked earth, containing only small quantities of dust. Some relics of ecclesiastical and monastic buildings exist, and also the remains of several castles built after the English settlement. Old Leighlin, where the 12th century cathedral of St Lazerian is situated, is merely a village, although until the Union it returned two members to the Irish parliament.

CARLOW, the county town of Co. Carlow, Ireland, on the navigable river Barrow. Pop. of urban district (1901) 6513. It is 56 m. S.W. of Dublin by the Great Southern & Western railway. The castle (supposed to have been founded by Hugh de Lacy, appointed governor of Ireland in 1179, but sometimes attributed to King John), situated on an eminence overlooking the river, is still a chief feature of attraction in the general view of the town, although there is not much of the original building left. It consisted of a hollow quadrangle, with a massive round tower at each angle. The principal buildings are the Roman Catholic College of St Patrick (1793), a plain but spacious building in a picturesque park adjoining the Roman Catholic cathedral of the diocese of Kildare and Leighlin; the Protestant parish church, with a handsome steeple of modern erection; the court-house, where the assizes are held, an octagonal stone building with a handsome Ionic portico; and other county buildings. The cathedral, in the Perpendicular style, has a highly ornamented west front, and a monument to Bishop James Doyle (d. 1834). The Wellington Bridge over the river Barrow connects Carlow with the suburb of Graigue. Two m. N.E. of the town is one of the finest cromlechs in Ireland, and 3 m. to the west is the notable church, of Norman and pre-Norman date, of Killeshin in Queen's county. The industries of Carlow consist of brewing and flour-milling, and a considerable trade is carried on in the sale of butter and eggs.

Carlow was of early importance. In the reign of Edward III. the king's exchequer was removed thither, and £500, a large sum at that period, applied towards surrounding the town with a strong wall. In the early part of the reign of Queen Elizabeth the castle was taken, and the town burned by the Irish chieftain, Rory Oge O'More. When summoned to surrender by Ireton, the Commonwealth general, during the war of 1641, Carlow submitted without resistance. In the insurrection of 1798 the castle was attacked by an undisciplined body of insurgents. They were speedily repulsed, and suffered severe loss, no quarter being given; and, in the confusion of their flight, many of the insurgents took refuge in houses, which the king's troops immediately set on fire. Carlow obtained a charter of incorporation as early as the 13th century, and was reincorporated, with enlarged privileges, by James I. The corporation, which was styled "The Sovereign, Free Burgesses and Commonalty of the Borough of Catherlogh," was authorized to return two members to the Irish parliament. The town returned one member to the Imperial parliament until 1885.

CARLSBAD, or KAISER-KARLSBAD (Czech, *Karlovy Vary*), a town and celebrated watering-place of Bohemia, Austria, 116 m. W.N.W. of Prague by rail. Pop. (1900) 14,640. It is situated at an altitude of 1227 ft. and lies in the beautiful narrow and winding valley of the Tepl at its junction with the Eger, being hemmed in by precipitous granite hills, covered with magnificent forests of pine. The town is spread on both banks of the river and in the valley of the Eger, its houses being built up the mountain sides in tier above tier of terraces approached by long flights of steps or steep and tortuous roads. This irregularity of site and plan, together with the varied form and high-pitched roofs of the houses, makes the place very picturesque. Among the principal buildings of Carlsbad are the Catholic parish church, built in 1732–1736 in rococo style; the gorgeous Russian church, finished in 1897; the English church; and a handsome synagogue. In the first rank of the other buildings stands the famous Mühlbrunnen Colonnade, erected between 1871 and 1878, which, with its 103 monolithic granite Corinthian columns, is a fine example of modern classical architecture; the *Kurhaus* (1865); the magnificent *Kaiserbad*, built in 1895 in the French Renaissance style, and several other bathing establishments; the Sprudel Colonnade, an imposing iron and glass structure, built in 1879, within which rises the Sprudel, the principal spring of Carlsbad; and several hospitals and hospices for poor patients. Both banks of the Tepl are provided with *quais*, planted with trees, which constitute the chief promenades of the centre of the town; and there are, besides, a municipal park and several public gardens.

The mineral springs, to which Carlsbad owes its fame, rise from beneath a very hard kind of rock, known as Sprudelschale or Sprudeldecke, beneath which it is believed that there exists a large common reservoir of the hot mineral water, known as the Sprudelkessel. Several artificial apertures in the rock have been made for the escape of the steam of this subterranean cauldron, which, owing to the incrustations deposited by the water, require to be cleared at regular intervals. Altogether there are seventeen warm springs, with a temperature varying from 164° F. to 107·7° F., and two cold ones. The oldest, best-known, and at the same time the most copious spring is the Sprudel, a hot geyser with a temperature of 164° F., which gushes up in jets of 1½ ft. thick to a height of about 3½ ft., and delivers about 405 gallons of water per minute. Other springs are the Mühlbrunnen, with a temperature of 121° F., which is after the Sprudel the most used spring; the Neubrunnen (138° F.); the Kaiser-Karl-Quelle (112° F.); the Theresienbrunnen (134° F.), &c. The warm springs belong to the class of alkaline-saline waters and have all the same chemical composition, varying only in their degree of temperature. The chemical composition of the Sprudel, taken to a thousand parts of water, is: 2·405 sulphate of soda, 1·298 bicarbonate of soda, 1·042 chloride of soda, 0·186 sulphate of potash, 0·166 bicarbonate of magnesia, 0·012 bicarbonate of lithium, and 0·966 carbonic acid gas. They contain also traces of arsenic, antimony, selenium, rubidium, tin and organic substances. The water is colourless and odourless, with a slightly acidulated and salt taste, and has a specific gravity of 1·0053 at 64·4° F. The waters are used both for drinking and bathing, and are very beneficent in cases of liver affections, biliary and renal calculi, diabetes, gout, rheumatism, and uric acid troubles. They are very powerful in their effect and must not be used except under medical direction, and during the cure, a carefully-regulated diet must be observed, coupled with a moderate amount of exercise in the open air. The number of visitors in 1901 was 51,454; in 1756 it was only 257; in 1828 it was 3713; and it attained 14,182 in 1869, and 34,396 in 1890.

Carlsbad is encircled by mountains, covered with beautiful forests of pine, which are made accessible by well-kept paths. Just above the town towers the Hirschensprung (1620 ft.), a little farther the Freundschaftshöhe (1722 ft.); the Franz-Josefs-Höhe (1663 ft.); and the Aberg (1980 ft.). On the opposite bank of the Tepl lies the Rudolfshöhe (1379 ft.); the Dreikreuzberg (1805 ft.); the König Otto's Höhe (1960 ft.); and the Ewiges Leben (2086 ft.), with the Stephaniewarte, a tower, 98 ft. high, built in 1889, which commands a superb view. The town is the centre of the porcelain and stoneware industry of Bohemia, and manufactures a special liqueur (*Karlsbader Bitter*), besides various objects from the Sprudel rock and confectionery. It exported, in 1901, 2¼ millions of bottles of mineral water, and 160,000 lb of Sprudel salt, *i.e.* salt obtained by evaporation from the water of the Sprudel.

Many interesting places are to be found near Carlsbad. To the north is the village of Dallwitz, with a porcelain factory, a handsome castle and beautiful oaks extolled by Theodor Körner, under which he composed in 1812 his touching elegy on the downfall of Germany. To the east is the watering-place of Giesshübl-Puchstein with celebrated springs, which contain alkaline waters impregnated with carbonic acid gas. To the west in the valley of the Eger, the village of Aich, with a porcelain factory, and a little farther the much-visited Hans Heiling's Rock, a wild and romantic spot, with which a very touching legend is connected. To the south-east the ruined castle of Engelhaus, situated on a rock of phonolite, 2340 ft. high, built probably in the first part of the 13th century and destroyed by the Swedes in 1635. At the foot of the mountain lies the actual village of Engelhaus.

According to legend the springs of Carlsbad were discovered during a hunting expedition by the emperor Charles IV., who built the town, which derives its name from him, on both banks of the Tepl. But the hot springs were already known two centuries before, as is indicated by the name of the river *Tepl* (warm), under which name the river was known in the 12th century. Besides, on the same spot stood already in the 13th century a place called *Vary*, which means the Sprudel. The truth is, that the emperor Charles IV., after being cured here, built about 1358 a castle in the neighbourhood and accorded many privileges to the town. It obtained its charter as a town in 1370; the fame of the waters spread and it was created a royal free town in 1707 by the emperor Joseph I. The waters were used only for bathing purposes until 1520, when they began to be prescribed also for drinking. The first *Kurhaus* was erected in 1711 near the Mühlbrunnen, and was replaced by a larger one, built in 1761 by the empress Maria Theresa. Carlsbad was nearly completely destroyed by fire in 1604, and another great fire raged here in 1759. It also suffered much from inundations, especially in 1582 and 1890. In August 1819 a meeting of the ministers of the German courts took place here under the presidency of Prince Metternich, when many reactionary measures, embodied in the so-called "Carlsbad Decrees" (see below), were agreed upon and introduced in the various states of the German Confederation.

Among the extensive literature of the place see Mannl, *Carlsbad and its Mineral Springs* (Leipzig, 1850); Cartellieri, *Karlsbad als Kurort* (Karlsbad, 1888); Friedenthal, *Der Kurort Karlsbad Topographisch und Medizinisch* (Karlsbad, 1895).

CARLSBAD DECREES (*Karlsbader Beschlüsse*), the name usually given to a series of resolutions (*Beschlüsse*) passed by a conference of the ministers and envoys of the more important German states, held at Carlsbad from the 6th to the 31st of August 1819. The occasion of the meeting was the desire of Prince Metternich to take advantage of the consternation caused by recent revolutionary outrages (especially the murder of the dramatist Kotzebue by Karl Sand) to persuade the German governments to combine in a system for the suppression of the Liberal agitation in Germany. The pretended urgency of the case served as the excuse for only inviting to the conference those states whose ministers happened to be visiting Carlsbad at the time. The conferences were, therefore, actually attended by the representatives of Austria, Prussia, Saxony, Bavaria, Württemberg, Hanover, Baden, Nassau and Mecklenburg; at the fourth conference (August 9th) Baron von Fritsch, minister of state for Saxe-Weimar, who "happened to be present" at Carlsbad on that day, attended by special invitation. Prince Metternich presided over the conferences, and Friedrich von Gentz acted as secretary.

The business to be discussed, as announced in Metternich's opening address, was twofold: (1) Matters of urgent importance necessitating immediate action; (2) Questions affecting the fundamental constitution of the German Confederation, demanding more careful and prolonged discussion. To the first class belonged (*a*) the urgent necessity for a uniform system of press regulation in Germany; (*b*) the most urgent measures in regard to the supervision of universities and schools; (*c*) measures in view of the already discovered machinations of the political parties. To the second class belonged (*a*) the more clear definition of article XIII. of the Act of Confederation (*i.e.* state constitutions); (*b*) the creation of a permanent federal supreme court; (*c*) the creation of a federal executive organization (*Bundes-Executions Ordnung*) armed with power to make the decrees of the diet and the judgments of the high court effective; (*d*) the facilitation of commercial intercourse within the confederation in accordance with article XIX. of the Act of Confederation (*Beilage A. zum ersten Protokoll*, Martens, iv. p. 74).

These questions were debated in twenty-three formal conferences. On the issues raised by the first class there was practical unanimity. All were agreed that the state of Germany demanded disciplinary measures, and as the result of the deliberations it was determined to lay before the federal diet definite proposals for (1) a uniform press censorship over all periodical publications; (2) a system of "curators" to supervise the education given in universities and schools, with disciplinary enactments against professors and teachers who should use their position for purposes of political propaganda; (3) the erection of a central commission at Mainz, armed with inquisitorial powers, for the purpose of unmasking the widespread revolutionary conspiracy, the existence of which was assumed.

On the questions raised under the second class there was more fundamental difference of opinion, and by far the greater part of the time of the conference was occupied in discussing the burning question of the due interpretation of article XIII. The controversy raged round the distinction between "assemblies of estates," as laid down in the article, and "representative assemblies," such as had been already established in several German states. Gentz, in an elaborate memorandum (*Nebenbeilage zum siebenten Protokoll*, iv. p. 102), laid down that representation by estates was the only system compatible with the conservative principle, as the "outcome of a well-ordered civil society, in which the relations and rights of the several estates are due to the peculiar position of the classes and corporations on which they are based, which have been from time to time modified by law without detracting from the essentials of the sovereign power"; whereas representative assemblies are based on "the sovereignty of the people." In answer to this, Count Wintzingerode, on behalf of the king of Württemberg, placed on record (*Nebenbeilage 2 zum neunten Protokoll*, p. 147) a protest, in which he urged that to insist on the system of estates would be to stereotype caste distinctions foreign to the whole spirit of the age, would alienate public opinion from the governments, and —if enforced by the central power—would violate the sovereign independence of those states which, like Württemberg, had already established representative constitutions.

Though the majority of the ministers present favoured the Austrian interpretation of article XIII. as elaborated by Gentz, they were as little prepared as the representative of Württemberg to agree to any hasty measures for strengthening the federal government at the expense of the jealously guarded prerogatives of the minor sovereignties. The result was that the constitutional questions falling under the second class were reserved for further discussion at a general conference of German ministers to be summoned at Vienna later in the year. The

effective Carlsbad resolutions, subsequently issued as laws by the federal diet, were therefore only those dealing with the curbing of the "revolutionary" agitation. For the results of their operation see GERMANY: *History*.

The acts, protocols and resolutions of the conference of Carlsbad are given in M. de Martens's *Nouveau Recueil général de traités*, &c., t. 4, pp. 8-166 (Göttingen, 1846). An interesting criticism of the Carlsbad Decrees is appended (p. 166), addressed by Baron Hans von Gagern, Luxemburg representative in the federal diet, to Baron von Plessen, Mecklenburg plenipotentiary at the conference of Carlsbad. (W. A. P.)

CARLSTADT, KARLSTADT or KAROLOSTADT (1480–1541), German reformer, whose real name was Andreas Rudolf Bodenstein, was born at Carlstadt in Bohemia. He entered the university of Erfurt in the winter term of 1499–1500, and remained there till 1503, when he went to Cologne. In the winter term of 1504–1505 he transferred himself to the newly founded university of Wittenberg, where he soon established his reputation as a teacher of philosophy, and a zealous champion of the scholastic system of Thomas Aquinas, against the revised nominalism associated with the name of Occam. In 1508 he was made canon of the *Allerheiligenstift*, a collegiate church incorporated in the university; and in 1510 he became doctor of theology and archdeacon, his duties being to preach, to say mass once a week and to lecture before the university; in 1513 he was appointed ordinary professor of theology. In 1515 he went to Rome, where with a view to becoming provost of the *Allerheiligenstift* he studied law, taking his degree as *doctor juris utriusque*. His experiences in the papal city produced upon him the same effect as upon Luther, and when in 1516 he returned to Germany it was as an ardent opponent of the Thomist philosophy and as a champion of the Augustinian doctrine of the impotence of the human will and salvation through Divine grace alone. The 151 theses of Carlstadt, dated the 16th of September 1516, discovered by Theodor Kolde ("*Wittenberger Disputationsthesen*" in *Zeitschrift für Kirchengeschichte*, xi. p. 448, &c.), prove that, so far from owing his change of view to Luther's influence, he was at this time actually in advance of Luther. The two reformers were, in fact, never friends; though from the end of 1516 onwards the development of each was considerably influenced by the other.

In the spring of 1518, in reply to Eck's *Obelisci*, an attack on Luther's 95 theses, Carlstadt published a series of theses, maintaining the supremacy of the Holy Scriptures (which he regarded as verbally inspired) over ecclesiastical tradition and the authority of the fathers, and asserting the liability of general councils to error. Eck challenged him to a public disputation, in which Luther also took part, and which lasted from the 27th of June to the 15th of July 1519. In this dialectical warfare Carlstadt was no match for Eck; but the dispute only served to confirm him in his revolt from the dominant theology, and in three violent polemical treatises against Eck he proclaimed the doctrine of the exclusive operation of grace in the justification of believers.

This attitude led him in 1520, by a logical development, to an open attack on all those ecclesiastical practices in which the doctrine of justification by works had become crystallized; *e.g.* indulgences and the abuse of holy water and consecrated salt. At the same time he appeared as the first of modern biblical critics, denying the Mosaic authorship of the Pentateuch and classing the Scriptures into three categories of different value in accordance with the degrees of certainty as to their traditional origin. He still, however, maintained the doctrine of verbal inspiration, and attacked Luther for rejecting the epistle of James. In 1520 Carlstadt's name was included in the papal bull excommunicating Luther; after a momentary hesitation he decided to remain firm in his protestant attitude, published an appeal from the pope to a general council, and attacked the corruptions of the papacy itself in a treatise on "the holiness of the pope" (*Von päpstlicher Heiligkeit*, October 17th, 1520).

In May 1521 Carlstadt went to Denmark, on the invitation of King Christian II., to assist in the reform of the church; but his disposition was anything but conciliatory, and, though his influence is traceable in the royal law of the 26th of May 1521 abolishing the celibacy of the clergy, he was forced, by the hostility of nobles and clerics alike, to leave after a few weeks' stay. In June he was back in Wittenberg, busy with tracts on the Holy Sacrament (he still believed in the corporeal presence) and against the celibacy of the clergy (*de coelibatu*). Carlstadt has been unjustly accused of being responsible for the riots against the Mass fomented by the Augustinian friars and the students; as a matter of fact, he did his best to keep the peace, pending a decision by the elector of Saxony and the authorities of the university, and it was not till Christmas day that he himself publicly communicated the laity under both species. The next day he announced his engagement to a young lady of noble family, Anna von Mochau.

From this moment Carlstadt was accepted as the leader of Protestantism in Wittenberg; and, at his instance, auricular confession, the elevation of the Host and the rules for fasting were abolished. On the 19th of January he was married, in the presence of many of the university professors and city magistrates. A few days later the property of the religious corporations was confiscated by the city and, after pensions had been assigned to their former members, was handed over to charitable foundations. A pronouncement of Carlstadt's against pictures and images, supported by the town, also led to iconoclastic excesses.

The return of Luther early in March, however, ended Carlstadt's supremacy. The elector Frederick the Wise was strenuously opposed to any alteration in the traditional services, and at his command Luther restored communion in one kind and the elevation of the Host. Carlstadt himself, though still professor, was deprived of all influence in practical affairs, and devoted himself entirely to theological speculation, which led him ever nearer to the position of the mystics. He now denied the necessity for a clerical order at all, called himself "a new layman," doffed his ecclesiastical dress, and lived for a while as a peasant with his wife's relations at Segrena. In the middle of 1523, however, he went to Orlamünde, a living held by him with his canonry, and there in the parish church reformed the services according to his ideas, abolishing the Mass and even preaching against the necessity for sacraments at all. He still continued occasionally to lecture at Wittenberg and to fulminate against Luther's policy of compromise.

All this brought him into violent conflict with the elector, the university and Luther himself. His professorship and living were confiscated and, in September 1524, he went into exile with his wife and child. He was now exposed to great privations and hardships, but found opportunity for polemical writing, proclaiming for the first time his disbelief in the "Real Presence." He preached wherever he could gain a hearing, and visited Strassburg, Heidelberg, Zürich, Basel, Schweinfurth, Kitzingen and Nördlingen, before he found a more permanent resting-place at Rothenburg on the Tauber. He was here when the Peasants' War broke out, and was sent as a delegate to reason with the insurgents. His admonitions were unsuccessful, and he only succeeded in bringing himself under suspicion of being in part responsible for their excesses. When Rothenburg was taken by the margrave of Anspach (28th June 1525) Carlstadt had to fly for his life. His spirit was now broken, and from Frankfort he wrote to Luther humbly praying him to intercede for him with the elector. Luther agreed to do so, on receiving from Carlstadt a recantation of his heterodox views on the Lord's Supper, and as the result the latter was permitted to return to Wittenberg (1525). He was not, however, allowed to lecture, and he lived as a peasant, first at Segrena and afterwards at Bergwitz, cultivating small properties, in which he had invested the remnant of his fortune, with such poor success that at the end of 1526 he had to eke out a living as a pedlar in the little town of Kemberg. This was endurable; but not so the demand presently made upon him to take up the cudgels against Zwingli and Occolampadius. Once more he revolted; to agree with "Dr Martin's opinions on the sacrament" was as difficult as flying like a bird; he appealed to the elector to allow him to leave Saxony; but the elector's conscience was in Luther's

keeping, and Carlstadt had to fly ignominiously in order to avoid imprisonment. He escaped to Holstein, where in March 1529 he stayed with the Anabaptist Melchior Hofmann. Expelled by the authorities, he took refuge in East Friesland, where he remained till the beginning of 1530 under the protection of a nobleman in sympathy with the Helvetic reformers. His preaching gave him great influence, but towards the close of the year persecution again sent him on his travels. He ultimately reached Zürich, where the recommendations of Bucer and Oecolampadius secured him a friendly reception by Zwingli, who procured him employment. After Zwingli's death he remained in close intercourse with the Zürich preachers, who defended him against renewed attacks on Luther's part; and finally, in 1534, on Bullinger's recommendation, he was called to Basel as preacher at the church of St Peter and professor at the university. Here he remained till his death on the 24th of December 1541.

During these latter years Carlstadt's attitude became more moderate. His championship of the town council against the theocratic claims of Antistes Myconius and the ecclesiastical council, in the matter of the control of the university, was perhaps in consonance with his earlier views on the relations of clergy and laity. He was, however, also instrumental in restoring the abolished doctorate of theology and other degrees; and, despatched on a mission to Strassburg in 1536, to take part in a discussion on a proposed compromise in the matter of the Lord's Supper between the theologians of Strassburg and Wittenberg, he displayed a conciliatory attitude which earned him the praise of Bucer. Carlstadt's historical significance lies in the fact that he was one of the pioneers of the Reformation. But he was a thinker and dreamer rather than a man of affairs, and though he had the moral and physical courage to carry his principles to their logical conclusions (he was the first priest to write against celibacy, and the first to take a wife), he lacked the balance of mind and sturdy common sense that inspired Luther's policy of consideration for "the weaker brethren" and built up the Evangelical Church on a conservative basis. But though Carlstadt was on friendly terms, and corresponded with Münzer and other Anabaptists, he did not share their antinomian views, nor was he responsible for their excesses. His opinion as to the relation of faith and "good works" was practically that expressed in articles XI. and XII. of the Church of England. In reply to Luther's violent onslaught on him in his *Wider die himmlischen Propheten* he issued from Rothenburg his *Anzeig etlicher Hauptartikel christlicher Lehre*, a compendious exposition of his views, in which he says: "Those who urge to good works do so, not that the conscience may be justified by works, but that their freedom may redound to God's glory and that their neighbours may be fired to praise God."

See C. F. Jaeger, *Andreas Bodenstein von Karlstadt* (Stuttgart, 1856); Hermann Barge, *Andreas Bodenstein von Karlstadt*, vol. i. (Leipzig, 1905).

CARLYLE, ALEXANDER (1722–1805), Scottish divine, was born on the 26th of January 1722, in Dumfriesshire, and passed his youth and early manhood at Prestonpans, where he witnessed the battle of 1745. He was educated at Edinburgh (M.A. 1743), Glasgow and Leiden. From 1748 until his death on the 28th of August 1805 he was minister at Inveresk in Midlothian, and during this long career rose to high eminence in his church not only as leader of the moderate or "broad" Church section, but as moderator of the General Assembly 1770 and dean of the Chapel Royal in 1789. His influence was enhanced by his personal appearance, which was so striking as to earn him the name of "Jupiter Carlyle"; and his autobiography (published 1860), though written in his closing years and not extending beyond the year 1770, is abundantly interesting as a picture of Scottish life, social and ecclesiastical, in the 18th century. Carlyle's memory recalled the Porteous Riots of 1736, and less remotely his friendship with Adam Smith, David Hume, and John Home, the dramatist, for witnessing the performance of whose tragedy *Douglas* he was censured in 1757. He was distinctly a *bon vivant*, but withal an upright, conscientious and capable minister.

CARLYLE, JOSEPH DACRE (1759–1804), British orientalist, was born in 1759 at Carlisle, where his father was a physician. He went in 1775 to Cambridge, was elected a fellow of Queens' College in 1779, taking the degree of B.D. in 1793. With the assistance of a native of Bagdad known in England as David Zamio, then resident at Cambridge, he attained great proficiency in Arabic literature; and after succeeding Dr Paley in the chancellorship of Carlisle, he was appointed, in 1795, professor of Arabic in Cambridge University. His translation from the Arabic of Yusuf ibn Taghri Birdi, the *Rerum Egypticarum Annales*, appeared in 1792, and in 1796 a volume of *Specimens of Arabic Poetry*, from the earliest times to the fall of the Caliphate, with some account of the authors. Carlyle was appointed chaplain by Lord Elgin to the embassy at Constantinople in 1799, and prosecuted his researches in Eastern literature in a tour through Asia Minor, Palestine, Greece and Italy, collecting in his travels several valuable Greek and Syriac MSS. for a projected critical edition of the New Testament, collated with the Syriac and other versions—a work, however, which he did not live to complete. On his return to England in 1801 he was presented by the bishop of Carlisle to the living of Newcastle-on-Tyne, where he died on the 12th of April 1804. After his death there appeared a volume of poems descriptive of the scenes of his travels, with prefaces extracted from his journal. Among other works which he left unfinished was an edition of the Bible in Arabic, completed by H. Ford and published in 1811.

CARLYLE, THOMAS (1795–1881), British essayist, historian and philosopher, born on the 4th of December 1795 at Ecclefechan, in Annandale, was the eldest of the nine children of James Carlyle by his second wife, Janet Aitken. The father was by trade a mason, and afterwards a small farmer. He had joined a sect of seceders from the kirk, and had all the characteristics of the typical Scottish Calvinist. He was respected for his integrity and independence, and a stern outside covered warm affections. The family tie between all the Carlyles was unusually strong, and Thomas regarded his father with a reverence which found forcible expression in his *Reminiscences*. He always showed the tenderest love for his mother, and was the best of brothers. The narrow means of his parents were made sufficient by strict frugality. He was sent to the parish school when seven, and to Annan grammar-school when ten years old. His pugnacity brought him into troubles with his fellows at Annan; but he soon showed an appetite for learning which induced his father to educate him for the ministry. He walked to Edinburgh in November 1809, and entered the university. He cared little for any of the professors, except Sir John Leslie, from whom he learned some mathematics. He acquired a little classical knowledge, but the most valuable influence was that of his contemporaries. A few lads in positions similar to his own began to look up to him as an intellectual leader, and their correspondence with him shows remarkable interest in literary matters. In 1814 Carlyle, still looking forward to the career of a minister, obtained the mathematical mastership at Annan. The salary of £60 or £70 a year enabled him to save a little money. He went to Edinburgh once or twice, to deliver the discourses required from students of divinity. He does not seem, however, to have taken to his profession very earnestly. He was too shy and proud to see many of the Annan people, and found his chief solace in reading such books as he could get. In 1816 he was appointed, through the recommendation of Leslie, to a school at Kirkcaldy, where Edward Irving, Carlyle's senior by three years, was also master of a school. Irving's severity as a teacher had offended some of the parents, who set up Carlyle to be his rival. A previous meeting with Irving, also a native of Annan, had led to a little passage of arms, but Irving now welcomed Carlyle with a generosity which entirely won his heart, and the rivals soon became the closest of friends. The intimacy, affectionately commemorated in the *Reminiscences*, was of great importance to Carlyle's whole career. "But for Irving," he says, "I had never known what the communion of man with man means." Irving had a library, in which Carlyle devoured Gibbon and much French literature, and they made various excursions

together. Carlyle did his duties as a schoolmaster punctiliously, but found the life thoroughly uncongenial. No man was less fitted by temperament for the necessary drudgery and worry. A passing admiration for a Miss Gordon is supposed to have suggested the "Blumine" of *Sartor Resartus*; but he made no new friendships, and when Irving left at the end of 1818 Carlyle also resigned his post.

He had by this time resolved to give up the ministry. He has given no details of the intellectual change which alienated him from the church. He had, however, been led, by whatever process, to abandon the dogmatic system of his forefathers, though he was and always remained in profound sympathy with the spirit of their teaching. A period of severe struggle followed. He studied law for a time, but liked it no better than schoolmastering. He took a pupil or two, and wrote articles for the *Edinburgh Encyclopaedia* under the editorship of Brewster. He occasionally visited his family, and their unfailing confidence helped to keep up his courage. Meanwhile he was going through a spiritual crisis. Atheism seemed for a time to be the only alternative to his old creed. It was, however, profoundly repugnant to him. At last, one day in June 1821, after three weeks' total sleeplessness, he went through the crisis afterwards described quite "literally" in *Sartor Resartus*. He cast out the spirit of negation, and henceforth the temper of his misery was changed to one, not of "whining," but of "indignation and grim fire-eyed defiance." That, he says, was his spiritual new-birth, though certainly not into a life of serenity. The conversion was coincident with Carlyle's submission to a new and very potent influence. In 1819 he had begun to study German, with which he soon acquired a very remarkable familiarity. Many of his contemporaries were awakening to the importance of German thought, and Carlyle's knowledge enabled him before long to take a conspicuous part in diffusing the new intellectual light. The chief object of his reverence was Goethe. In many most important respects no two men could be more unlike; but, for the present, Carlyle seems to have seen in Goethe a proof that it was possible to reject outworn dogmas without sinking into materialism. Goethe, by singularly different methods, had emerged from a merely negative position into a lofty and coherent conception of the universe. Meanwhile, Carlyle's various anxieties were beginning to be complicated by physical derangement. A rat, he declared, was gnawing at the pit of his stomach. He was already suffering from the ailments, whatever their precise nature, from which he never escaped. He gave vent to his irritability by lamentations so grotesquely exaggerated as to make it difficult to estimate the real extent of the evil.

Irving's friendship now became serviceable. Carlyle's confession of the radical difference of religious opinion had not alienated his friend, who was settling in London, and used his opportunities for promoting Carlyle's interest. In January 1822 Carlyle, through Irving's recommendation, became tutor to Charles and Arthur Buller, who were to be students at Edinburgh. Carlyle's salary was £200 a year, and this, with the proceeds of some literary work, enabled him at once to help his brother John to study medicine and his brother Alexander to take up a farm. Carlyle spent some time with the elder Bullers, but found a life of dependence upon fashionable people humiliating and unsatisfactory. He employed himself at intervals upon a life of Schiller and a translation of *Wilhelm Meister*. He received £50 for a translation of Legendre's *Geometry*; and an introduction, explaining the theory of proportion, is said by De Morgan to show that he could have gained distinction as an expounder of mathematical principles. He finally gave up his tutorship in July 1824, and for a time tried to find employment in London. The impressions made upon him by London men of letters were most unfavourable. Carlyle felt by this time conscious of having a message to deliver to mankind, and his comrades, he thought, were making literature a trade instead of a vocation, and prostituting their talents to frivolous journalism. He went once to see Coleridge, who was then delivering his oracular utterances at Highgate, and the only result was the singularly vivid portrait given in a famous chapter in his life of Sterling. Coleridge seemed to him to be ineffectual as a philosopher, and personally to be a melancholy instance of genius running to waste. Carlyle, conscious of great abilities, and impressed by such instances of the deleterious effects of the social atmosphere of London, resolved to settle in his native district. There he could live frugally and achieve some real work. He could, for one thing, be the interpreter of Germany to England. A friendly letter from Goethe, acknowledging the translation of *Wilhelm Meister*, reached him at the end of 1824 and greatly encouraged him. Goethe afterwards spoke warmly of the life of Schiller, and desired it to be translated into German. Letters occasionally passed between them in later years, which were edited by Professor Charles Eliot Norton in 1887. Goethe received Carlyle's homage with kind complacency. The gift of a seal to Goethe on his birthday in 1831 "from fifteen English friends," including Scott and Wordsworth, was suggested and carried out by Carlyle. The interest in German, which Carlyle did so much to promote, suggested to him other translations and reviews during the next few years, and he made some preparations for a history of German literature. British curiosity, however, about such matters seems to have been soon satisfied, and the demand for such work slackened.

Carlyle was meanwhile passing through the most important crisis of his personal history. Jane Baillie Welsh, born 1801, was the only child of Dr Welsh of Haddington. She had shown precocious talent, and was sent to the school at Haddington where Edward Irving (*q.v.*) was a master. After her father's death in 1819 she lived with her mother, and her wit and beauty attracted many admirers. Her old tutor, Irving, was now at Kirkcaldy, where he became engaged to a Miss Martin. He visited Haddington occasionally in the following years, and a strong mutual regard arose between him and Miss Welsh. They contemplated a marriage, and Irving endeavoured to obtain a release from his previous engagement. The Martin family held him to his word, and he took a final leave of Miss Welsh in 1822. Meanwhile he had brought Carlyle from Edinburgh and introduced him to the Welshes. Carlyle was attracted by the brilliant abilities of the young lady, procured books for her and wrote letters to her as an intellectual guide. The two were to perform a new variation upon the theme of Abelard and Héloïse. [A good deal of uncertainty long covered the precise character of their relations. Until 1909, when Mr. Alexander Carlyle published his edition of the "love-letters," the full material was not accessible; they had been read by Carlyle's biographer, Froude, and also by Professor Charles Norton, and Norton (in his edition of Carlyle's *Early Letters*, 1886) declared that Froude had distorted the significance of this correspondence in a sense injurious to the writers. The publication of the letters certainly seems to justify Norton's view.] Miss Welsh's previous affair with Irving had far less importance than Froude ascribes to it; and she soon came to regard her past love as a childish fancy. She recognized Carlyle's vast intellectual superiority, and the respect gradually deepened into genuine love. The process, however, took some time. Her father had bequeathed to her his whole property (£200 to £300 a year). In 1823 she made it over to her mother, but left the whole to Carlyle in the event of her own and her mother's death. She still declared that she did not love him well enough to become his wife. In 1824 she gradually relented so far as to say that she would marry if he could achieve independence. She had been brought up in a station superior to that of the Carlyles, and could not accept the life of hardship which would be necessary in his present circumstances. Carlyle, accustomed to his father's household, was less frightened by the prospect of poverty. He was determined not to abandon his vocation as a man of genius by following the lower though more profitable paths to literary success, and expected that his wife should partake the necessary sacrifice of comfort. The natural result of such discussions followed. The attraction became stronger on both sides, in spite of occasional spasms of doubt.

An odd incident precipitated the result. A friend of Irving's, Mrs Basil Montague, wrote to Miss Welsh, to exhort her to suppress her love for Irving, who had married Miss Martin in 1823. Miss Welsh replied by announcing her intention to marry Carlyle; and then told him the whole story, of which he had previously been ignorant. He properly begged her not to yield to the impulse without due consideration. She answered by coming at once to his father's house, where he was staying; and the marriage was finally settled. It took place on the 17th of October 1826.

Carlyle had now to arrange the mode of life which should enable him to fulfil his aspiration. His wife had made over her income to her mother, but he had saved a small sum upon which to begin housekeeping. A passing suggestion from Mrs Carlyle that they might live with her mother was judiciously abandoned. Carlyle had thought of occupying Craigenputtock, a remote and dreary farm belonging to Mrs Welsh. His wife objected his utter incapacity as a farmer; and they finally took a small house at Comely Bank, Edinburgh, where they could live on a humble scale. The brilliant conversation of both attracted some notice in the literary society of Edinburgh. The most important connexion was with Francis, Lord Jeffrey, still editor of the *Edinburgh Review*. Though Jeffrey had no intellectual sympathy with Carlyle, he accepted some articles for the *Review* and became warmly attached to Mrs Carlyle. Carlyle began to be known as leader of a new "mystic" school, and his earnings enabled him to send his brother John to study in Germany. The public appetite, however, for "mysticism" was not keen. In spite of support from Jeffrey and other friends, Carlyle failed in a candidature for a professorship at St Andrews. His brother, Alexander, had now taken the farm at Craigenputtock, and the Carlyles decided to settle at the separate dwelling-house there, which would bring them nearer to Mrs Welsh. They went there in 1828, and began a hard struggle. Carlyle, indomitably determined to make no concessions for immediate profit, wrote slowly and carefully, and turned out some of his most finished work. He laboured "passionately" at *Sartor Resartus*, and made articles out of fragments originally intended for the history of German literature. The money difficulty soon became more pressing. John, whom he was still helping, was trying unsuccessfully to set up as a doctor in London; and Alexander's farming failed. In spite of such drawbacks, Carlyle in later years looked back upon the life at Craigenputtock as on the whole a comparatively healthy and even happy period, as it was certainly one of most strenuous and courageous endeavour. Though often absorbed in his work and made both gloomy and irritable by his anxieties, he found relief in rides with his wife, and occasionally visiting their relations. Their letters during temporary separations are most affectionate. The bleak climate, however, the solitude, and the necessity of managing a household with a single servant, were excessively trying to a delicate woman, though Mrs Carlyle concealed from her husband the extent of her sacrifices. The position was gradually becoming untenable. In the autumn of 1831 Carlyle was forced to accept a loan of £50 from Jeffrey, and went in search of work to London, whither his wife followed him. He made some engagements with publishers, though no one would take *Sartor Resartus*, and returned to Craigenputtock in the spring of 1832. Jeffrey, stimulated perhaps by his sympathy for Mrs Carlyle, was characteristically generous. Besides pressing loans upon both Thomas and John Carlyle, he offered to settle an annuity of £100 upon Thomas, and finally enabled John to support himself by recommending him to a medical position.[1] Carlyle's proud spirit of independence made him reject Jeffrey's help as long as possible; and even his acknowledgment of the generosity (in the *Reminiscences*) is tinged with something disagreeably like resentment. In 1834 he applied to Jeffrey for a post at the Edinburgh Observatory. Jeffrey naturally declined to appoint a man who, in spite of some mathematical knowledge, had no special qualification, and administered a general lecture upon Carlyle's arrogance and eccentricity which left a permanent sense of injury.

In the beginning of 1833 the Carlyles made another trial of Edinburgh. There Carlyle found materials in the Advocates' Library for the article on the *Diamond Necklace*, one of his most perfect writings, which led him to study the history of the French Revolution. *Sartor Resartus* was at last appearing in *Fraser's Magazine*, though the rate of payment was cut down, and the publisher reported that it was received with "unqualified dissatisfaction." Edinburgh society did not attract him, and he retreated once more to Craigenputtock. After another winter the necessity of some change became obvious. The Carlyles resolved to "burn their ships." They went to London in the summer of 1834, and took a house at 5 (now 24) Cheyne Row, Chelsea, which Carlyle inhabited till his death; the house has since been bought for the public. Irving, who had welcomed him on former occasions, was just dying,—a victim, as Carlyle thought, to fashionable cajoleries. A few young men were beginning to show appreciation. J. S. Mill had made Carlyle's acquaintance in the previous visit to London, and had corresponded with him. Mill had introduced Ralph Waldo Emerson, who visited Craigenputtock in 1833. Carlyle was charmed with Emerson, and their letters published by Professor Norton show that his regard never cooled. Emerson's interest showed that Carlyle's fame was already spreading in America. Carlyle's connexion with Charles Buller, a zealous utilitarian, introduced him to the circle of "philosophical radicals."

Carlyle called himself in some sense a radical; and J. S. Mill, though not an intellectual disciple, was a very warm admirer of his friend's genius. Carlyle had some expectation of the editorship of the *London Review*, started by Sir W. Molesworth at this time as an organ of philosophical radicalism. The combination would clearly have been explosive. Meanwhile Mill, who had collected many books upon the French Revolution, was eager to help Carlyle in the history which he was now beginning. He set to work at once and finished the first volume in five months. The manuscript, while entrusted to Mill for annotation, was burnt by an accident. Mill induced Carlyle to accept in compensation £100, which was urgently needed. Carlyle took up the task again and finished the whole on the 12th of January 1837. "I can tell the world," he said to his wife, "you have not had for a hundred years any book that comes more direct and flamingly from the heart of a loving man. Do what you like with it, you ——"

The publication, six months later, of the *French Revolution* marks the turning-point of Carlyle's career. Many readers hold it to be the best, as it is certainly the most characteristic, of Carlyle's books. The failure of *Sartor Resartus* to attract average readers is quite intelligible. It contains, indeed, some of the most impressive expositions of his philosophical position, and some of his most beautiful and perfectly written passages. But there is something forced and clumsy, in spite of the flashes of grim humour, in the machinery of the *Clothes Philosophy*. The mannerism, which has been attributed to an imitation of Jean Paul, appeared to Carlyle himself to be derived rather from the phrases current in his father's house, and in any case gave an appropriate dialect for the expression of his peculiar idiosyncrasy. But it could not be appreciated by readers who would not take the trouble to learn a new language. In the *French Revolution* Carlyle had discovered his real strength. He was always at his best when his imagination was set to work upon a solid framework of fact. The book shows a unique combination: on the one hand is the singularly shrewd insight into character and the vivid realization of the picturesque; on the other is the "mysticism" or poetical philosophy which relieves the events against a background of mystery. The contrast is marked by the humour which seems to combine a cynical view of human folly with a deeply pathetic sense of the sadness and suffering of life. The convictions, whatever their value, came, as he said, "flamingly from the heart." It was, of course, impossible for Carlyle to satisfy modern requirements of matter-of-fact accuracy.

[1] John Aitken Carlyle (1801–1879) finally settled near the Carlyles in Chelsea. He began an English prose version of Dante's *Divine Comedy*—which has earned him the name of "Dante Carlyle"—but only completed the translation of the *Inferno* (1849). The work included a critical edition of the text and a valuable introduction and notes.

He could not in the time have assimilated all the materials even then extant, and later accumulations would necessitate a complete revision. Considered as a "prose epic," or a vivid utterance of the thought of the period, it has a permanent and unique value.

The book was speedily successful. It was reviewed by Mill in the *Westminster* and by Thackeray in *The Times*, and Carlyle, after a heroic struggle, was at last touching land. In each of the years 1837 to 1840 he gave a course of lectures, of which the last only (upon "Hero Worship") was published; they materially helped his finances. By Emerson's management he also received something during the same period from American publishers. At the age of forty-five he had thus become independent. He had also established a position among the chief writers of the day. Young disciples, among whom John Sterling was the most accepted, were gathering round him, and he became an object of social curiosity. Monckton Milnes (Lord Houghton), who won universal popularity by the most genuine kindliness of nature, became a cordial friend. Another important intimacy was with the Barings, afterwards Lord and Lady Ashburton. Carlyle's conversational powers were extraordinary; though, as he won greater recognition as a prophet, he indulged too freely in didactic monologue. In his prophetic capacity he published two remarkable books: *Chartism* (1829), enlarged from an article which Lockhart, though personally approving, was afraid to take for the *Quarterly*; and *Past and Present* (1843), in which the recently published *Mediaeval Chronicle* was taken as a text for the exposure of modern evils. They may be regarded as expositions of the doctrine implicitly set forth in the *French Revolution*. Carlyle was a "radical" as sharing the sentiments of the class in which he was born. He had been profoundly moved by the widely-spread distresses in his earlier years. When the yeomanry were called out to suppress riots after the Peace, his sympathies were with the people rather than with the authorities. So far he was in harmony with Mill and the "philosophical radicals." A fundamental divergence of principle, however, existed and was soon indicated by his speedy separation from the party and alienation from Mill himself. The Revolution, according to him, meant the sweeping away of effete beliefs and institutions, but implied also the necessity of a reconstructive process. *Chartism* begins with a fierce attack upon the *laissez faire* theory, which showed blindness to this necessity. The prevalent political economy, in which that theory was embodied, made a principle of neglecting the very evils which it should be the great function of government to remedy. Carlyle's doctrines, entirely opposed to the ordinary opinions of Whigs and Radicals, found afterwards an expositor in his ardent disciple Ruskin, and have obvious affinities with more recent socialism. At the time he was as one crying in the wilderness to little practical purpose. Liberals were scandalized by his apparent identification of "right" with "might," implied in the demand for a strong government; and though he often declared the true interpretation to be that the right would ultimately become might, his desire for strong government seemed too often to sanction the inverse view. He came into collision with philanthropists, and was supposed to approve of despotism for its own sake.

His religious position was equally unintelligible to the average mind. While unequivocally rejecting the accepted creeds, and so scandalizing even liberal theologians, he was still more hostile to simply sceptical and materialist tendencies. He was, as he called himself, a "mystic"; and his creed was too vague to be put into any formula beyond a condemnation of atheism. One corollary was the famous doctrine of "hero worship" first expounded in his lectures. Any philosophy of history which emphasized the importance of general causes seemed to him to imply a simply mechanical doctrine and to deny the efficacy of the great spiritual forces. He met it by making biography the essence of history, or attributing all great events to the "heroes," who are the successive embodiments of divine revelations. This belief was implied in his next great work, the *Life and Letters of Oliver Cromwell*, published in 1845. The great Puritan hero was a man after his own heart, and the portrait drawn by so sympathetic a writer is not only intensely vivid, but a very effective rehabilitation of misrepresented character. The "biographical" view of history, however, implies the weakness, not only of unqualified approval of all Cromwell's actions, but of omitting any attempt to estimate the Protector's real relation to the social and political development of the time. The question, what was Cromwell's real and permanent achievement, is not answered nor distinctly considered. The effect may be partly due to the peculiar form of the book as a detached series of documents and comments. The composition introduced Carlyle to the "Dryasdust" rubbish heaps of which he here and ever afterwards bitterly complained. A conscientious desire to unearth the facts, and the effort of extracting from the dullest records the materials for graphic pictures, made the process of production excessively painful. For some years after *Cromwell* Carlyle wrote little. His growing acceptance by publishers, and the inheritance of her property by Mrs Carlyle on her mother's death in 1842, finally removed the stimulus of money pressure. He visited Ireland in 1846 and again in 1849, when he made a long tour in company with Sir C. Gavan Duffy, then a young member of the Nationalist party (see Sir C. G. Duffy's *Conversations with Carlyle*, 1892, for an interesting narrative). Carlyle's strong convictions as to the misery and misgovernment of Ireland recommended him to men who had taken part in the rising of 1848. Although the remedies acceptable to a eulogist of Cromwell could not be to their taste, they admired his moral teaching; and he received their attentions, as Sir C. G. Duffy testifies, with conspicuous courtesy. His aversion from the ordinary radicalism led to an article upon slavery in 1849, to which Mill replied, and which caused their final alienation. It was followed in 1850 by the *Latterday Pamphlets*, containing "sulphurous" denunciations of the do-nothing principle. They gave general offence, and the disapproval, according to Froude, stopped the sale for years. The *Life* of Sterling (d. 1844), which appeared in 1851, was intended to correct the life by Julius Hare, which had given too much prominence to theological questions. The subject roused Carlyle's tenderest mood, and the *Life* is one of the most perfect in the language.

Carlyle meanwhile was suffering domestic troubles, unfortunately not exceptional in their nature, though the exceptional intellect and characters of the persons concerned have given them unusual prominence. Carlyle's constitutional irritability made him intensely sensitive to petty annoyances. He suffered the torments of dyspepsia; he was often sleepless, and the crowing of "demon-fowls" in neighbours' yards drove him wild. Composition meant for him intense absorption in his work; solitude and quiet were essential; and he resented interruptions by grotesque explosions of humorously exaggerated wrath. Mrs Carlyle had to pass many hours alone, and the management of the household and of devices intended to shield him from annoyances was left entirely to her. House-cleanings and struggles with builders during the construction of a "sound-proof room" taxed her energy, while Carlyle was hiding himself with his family in Scotland or staying at English country houses. Nothing could be more affectionate than his behaviour to his wife on serious occasions, such as the death of her mother, and he could be considerate when his attention was called to the facts. But he was often oblivious to the strain upon her energies, and had little command of his temper. An unfortunate aggravation of the difficulty arose from his intimacy with the Ashburtons. Lady Ashburton, a woman of singular social charm and great ability, appreciated the author, but apparently accepted the company of the author's wife rather as a necessity than as an additional charm. Mrs Carlyle was hurt by the fine lady's condescension and her husband's accessibility to aristocratic blandishments. Carlyle, as a wise man, should have yielded to his wife's wishes; unluckily, he was content to point out that her jealousy was unreasonable, and, upon that very insufficient ground, to disregard it and to continue his intimacy with the Ashburtons on the old terms. Mrs Carlyle bitterly resented his conduct. She had been willing to renounce any aspirations of her own and to sink herself in his glory, but she

naturally expected him to recognize her devotion and to value her society beyond all others. She had just cause of complaint, and a remarkable power, as her letters prove, of seeing things plainly and despising sentimental consolations. She was childless, and had time to brood over her wrongs. She formed a little circle of friends, attached to her rather than to her husband; and to one of them, Giuseppe Mazzini, she confided her troubles in 1846. He gave her admirable advice; and the alienation from her husband, though it continued still to smoulder, led to no further results. A journal written at the same time gives a painful record of her sufferings, and after her death made Carlyle conscious for the first time of their full extent. The death of Lady Ashburton in 1857 removed this cause of jealousy; and Lord Ashburton married a second wife in 1858, who became a warm friend of both Carlyles. The cloud which had separated them was thus at last dispersed. Meanwhile Carlyle had become absorbed in his best and most laborious work. Soon after the completion of the *Cromwell* he had thought of Frederick for his next hero, and had in 1845 contemplated a visit to Germany to collect materials. He did not, however, settle down finally to the work till 1851. He shut himself up in his study to wrestle with the Prussian Dryasdusts, whom he discovered to be as wearisome as their Puritan predecessors and more voluminous. He went to Scotland to see his mother, to whom he had always shown the tenderest affection, on her deathbed at the end of 1853. He returned to shut himself up in the "sound-proof room." He twice visited Germany (1852 and 1858) to see Frederick's battlefields and obtain materials; and he occasionally went to the Ashburtons and his relations in Scotland. The first two volumes of *Frederick the Great* appeared in 1858, and succeeding volumes in 1862, 1864 and 1865. The success was great from the first, though it did little to clear up Carlyle's gloom. The book is in some respects his masterpiece, and its merits are beyond question. Carlyle had spared no pains in research. The descriptions of the campaigns are admirably vivid, and show his singular eye for scenery. These narratives are said to be used by military students in Germany, and at least convince the non-military student that he can understand the story. The book was declared by Emerson to be the wittiest ever written. Many episodes, describing the society at the Prussian court and the relations of Frederick to Voltaire, are unsurpassable as humorous portraiture. The effort to fuse the masses of raw material into a well-proportioned whole is perhaps not quite successful; and Carlyle had not the full sympathy with Frederick which had given interest to the *Cromwell*. A hero-worshipper with half-concealed doubts as to his hero is in an awkward position. Carlyle's general conception of history made him comparatively blind to aspects of the subject which would, to writers of other schools, have a great importance. The extraordinary power of the book is undeniable, though it does not show the fire which animated the *French Revolution*. A certain depression and weariness of spirit darken the general tone.

During the later labours Mrs Carlyle's health had been breaking. Carlyle, now that happier relations had been restored, did his best to give her the needed comforts; and in spite of his immersion in *Frederick*, showed her all possible attention in later years. She had apparently recovered from an almost hopeless illness, when at the end of 1865 he was elected to the rectorship of the university of Edinburgh. He delivered an address there on the 2nd of April 1866, unusually mild in tone, and received with general applause. He was still detained in Scotland when Mrs Carlyle died suddenly while driving in her carriage. The immediate cause was the shock of an accident to her dog. She had once hurt her mother's feelings by refusing to use some wax candles. She had preserved them ever since, and by her direction they were now lighted in the chamber of death. Carlyle was overpowered by her loss. His life thenceforward became more and more secluded, and he gradually became incapable of work. He went to Mentone in the winter of 1866 and began the *Reminiscences*. He afterwards annotated the letters from his life, published (1883) as *Letters and Memorials*. He was, as Froude says, impressed by the story of Johnson's "penance" at Uttoxeter, and desired to make a posthumous confession of his shortcomings in his relations to his wife. A few later utterances made known his opinions of current affairs. He joined the committee for the defence of Governor Eyre in 1867; he also wrote in 1867 an article upon "shooting Niagara," that is, upon the tendency of the Reform Bill of that year; and in 1870 he wrote a letter defending the German case against France. The worth of his *Frederick* was acknowledged by the Prussian Order of Merit in 1874. In the same year Disraeli offered him the Grand Cross of the Bath and a pension. He declined very courteously, and felt some regret for previous remarks upon the minister. The length of his literary career was now softening old antipathies, and he was the object of general respect. His infirmities enforced a very retired life, but he was constantly visited by Froude, and occasionally by his disciple Ruskin. A small number of other friends paid him constant attention. His conversation was still interesting, especially when it turned upon his recollections, and though his judgments were sometimes severe enough, he never condescended to the scandalous. His views of the future were gloomy. The world seemed to be going from bad to worse, with little heed to his warnings. He would sometimes regret that it was no longer permissible to leave it in the old Roman fashion. He sank gradually, and died on the 4th of February 1881. A place in Westminster Abbey was offered, but he was buried, according to his own desire, by the side of his parents at Ecclefechan. He left Craigenputtock, which had become his own property, to found bursaries at the university of Edinburgh. He gave his books to Harvard College.

Carlyle's appearance has been made familiar by many portraits, none of them, according to Froude, satisfactory. The statue by Boehm on the Chelsea Embankment, however, is characteristic; and there is a fine painting by Watts in the National Portrait Gallery. J. McNeill Whistler's portrait of him is in the possession of the Glasgow corporation.

During Carlyle's later years the antagonism roused by his attacks upon popular opinions had subsided; and upon his death general expression was given to the emotions natural upon the loss of a remarkable man of genius. The rapid publication of the *Reminiscences* by Froude produced a sudden revulsion of feeling. Carlyle became the object of general condemnation. Froude's biography, and the *Memorials* of Mrs Carlyle, published soon afterwards, strengthened the hostile feeling. Carlyle had appended to the *Reminiscences* an injunction to his friends not to publish them as they stood, and added that no part could ever be published without the strictest editing. Afterwards, when he had almost forgotten what he had written, he verbally empowered Froude to use his own judgment: Froude accordingly published the book at once, without any editing, and with many inaccuracies. Omissions of a few passages written from memory at a time of profound nervous depression would have altered the whole character of the book. Froude in this and the later publications held that he was giving effect to Carlyle's wish to imitate Johnson's "penance." No one, said Boswell, should persuade him to make his lion into a cat. Froude intended, in the same spirit, to give the shades as well as the lights in the portrait of his hero. His admiration for Carlyle probably led him to assume too early that his readers would approach the story from the same point of view, that is, with an admiration too warm to be repelled by the admissions. Moreover, Froude's characteristic desire for picturesque effect, unchecked by any painstaking accuracy, led to his reading preconceived impressions into his documents. The result was that Carlyle was too often judged by his defects, and regarded as a selfish and eccentric misanthrope with flashes of genius, rather than as a man with many of the highest qualities of mind and character clouded by constitutional infirmities. Yet it would be difficult to speak too strongly of the great qualities which underlay the superficial defects. Through long years of poverty and obscurity Carlyle showed unsurpassed fidelity to his vocation and superiority to the lower temptations which have ruined so many literary careers. His ambition might be interpreted as selfishness, but certainly

showed no coldness of heart. His unstinted generosity to his brothers during his worst times is only one proof of the singular strength of his family affections. No one was more devoted to such congenial friends as Irving and Sterling. He is not the only man whom absorption in work and infirmity of temper have made into a provoking husband, though few wives have had Mrs Carlyle's capacity for expressing the sense of injustice. The knowledge that the deepest devotion underlies misunderstandings is often a very imperfect consolation; but such devotion clearly existed all through, and proves the defect to have been relatively superficial.

The harsh judgments of individuals in the *Reminiscences* had no parallel in his own writings. He scarcely ever mentions a contemporary, and was never involved in a personal controversy. But the harshness certainly reflects a characteristic attitude of mind. Carlyle was throughout a pessimist or a prophet denouncing a backsliding world. His most popular contemporaries seemed to him to be false guides, and charlatans had ousted the heroes. The general condemnation of "shams" and cant had, of course, particular applications, though he left them to be inferred by his readers. Carlyle was the exponent of many of the deepest convictions of his time. Nobody could be more in sympathy with aspirations for a spiritual religion and for a lofty idealism in political and social life. To most minds, however, which cherish such aspirations the gentler optimism of men like Emerson was more congenial. They believed in the progress of the race and the triumph of the nobler elements. Though Carlyle, especially in his earlier years, could deliver an invigorating and encouraging, if not a sanguine doctrine, his utterances were more generally couched in the key of denunciation, and betrayed a growing despondency. Materialism and low moral principles seemed to him to be gaining the upper hand; and the hope that religion might survive the "old clothes" in which it had been draped seemed to grow fainter. The ordinary mind complained that he had no specific remedy to propose for the growing evils of the time; and the more cultivated idealist was alienated by the gloom and the tendency to despair. To a later generation it will probably appear that, whatever the exaggerations and the misconceptions to which he was led, his vehement attacks at least called attention to rather grave limitations and defects in the current beliefs and social tendencies of the time. The mannerisms and grotesque exaggerations of his writings annoyed persons of refinement, and suggest Matthew Arnold's advice to flee "Carlylese" as you would flee the devil. Yet the shrewd common-sense, the biting humour, the power of graphic description and the imaginative "mysticism" give them a unique attraction for many even who do not fully sympathize with the implied philosophy or with the Puritanical code of ethics. The letters and autobiographical writings, whether they attract or repel sympathy, are at least a series of documents of profound interest for any one who cares to study character, and display an almost unique idiosyncrasy. (L. S.)

The chief authorities for Carlyle's life are his own *Reminiscences*, the *Letters of Jane Welsh Carlyle*, the *Love Letters of Thomas Carlyle and Jane Welsh* (ed. A. Carlyle), and the four volumes of J. A. Froude's biography; Froude was Carlyle's literary executor. Prof. C. E. Norton's edition of the *Reminiscences* and his collection of Carlyle's *Early Letters* correct some of Froude's inaccuracies. A list of many articles upon Carlyle is given by Mr Ireland in *Notes and Queries*, sixth series, vol. iv. Among other authors may be noticed Henry James, sen., in *Literary Remains*; Prof. Masson, *Carlyle, Personally and in his Writings*; Conway, *Thomas Carlyle*; Larkin, *The Open Secret of Carlyle's Life*; Mrs Oliphant in *Macmillan's Magazine* for April 1881; G. S. Venables in *Fortnightly Review* for May 1883 and November 1884. A good deal of controversy has arisen relating to Froude's treatment of the relations between Carlyle and his wife, and during 1903–1904 this was pushed to a somewhat unsavoury extent. Those who are curious to pry into the question of Carlyle's marital capacity, and the issues between Froude's assailants and his defenders, may consult *New Letters and Memorials of Jane Welsh Carlyle*, with introduction by Sir James Crichton-Browne; *My Relations with Carlyle*, by J. A. Froude; *The Nemesis of Froude*, by Sir J. Crichton-Browne and Alexander Carlyle; and articles in the *Contemporary Review* (June, July, August, 1903), and *Nineteenth Century and After* (May, July, 1903). See also Herbert Paul's *Life of Froude* (1905). The precise truth in these matters is hardly recoverable, even if it concerns posterity: and though Froude was often inaccurate, he was given full authority by Carlyle, he had all the unpublished material before him, and he was dead and unable to reply to criticism when the later attacks were made.

CARMAGNOLA, FRANCESCO BUSSONE, Count of (1390–1432), Italian soldier of fortune, was born at Carmagnola near Turin, and began his military career when twelve years old under Facino Cane, a *condottiere* then in the service of Gian Galeazzo Visconti, duke of Milan. On the death of the latter his duchy was divided among his captains, but his son and heir, Filippo Maria, determined to reconquer it by force of arms. Facino Cane being dead, Visconti applied to Carmagnola, then in his thirtieth year, and gave him command of the army. That general's success was astonishingly rapid, and soon the whole duchy was brought once more under Visconti's sway. But Filippo Maria, although he rewarded Carmagnola generously, feared that he might become a danger to himself, and instead of giving him further military commands made him governor of Genoa. Carmagnola felt greatly aggrieved, and failing to obtain a personal interview with the duke, threw up his commission and offered his services to the Venetians (1425). He was well received in Venice, for the republic was beginning to fear the ambitions of the Visconti, and the new doge, Francesco Foscari, was anxious to join the Florentines and go to war with Milan. Carmagnola himself represented the duke's forces as much less numerous than they were supposed to be, and said that the moment was an opportune one to attack him. These arguments, combined with the doge's warlike temper, prevailed; Carmagnola was made captain-general of St Mark in 1426, and war was declared. But while the republic was desirous of rapid and conclusive operations, it was to the interest of Carmagnola, as indeed to all other soldiers of fortune, to make the operations last as long as possible, to avoid decisive operations, and to liberate all prisoners quickly. Consequently the campaign dragged on interminably, some battles were won and others lost, truces and peace treaties were made only to be broken, and no definite result was achieved. Carmagnola's most important success was the battle of Maclodio (1427), but he did not follow it up. The republic, impatient of his dilatoriness, raised his emoluments and promised him immense fiefs including the lordship of Milan, so as to increase his ardour, but in vain. At the same time Carmagnola was perpetually receiving messengers from Visconti, who offered him great rewards if he would abandon the Venetians. The general trifled with his past as with his present employers, believing in his foolish vanity that he held the fate of both in his hand. But the Venetians were dangerous masters to trifle with, and when they at last lost all patience, the Council of Ten determined to bring him to justice. Summoned to Venice to discuss future operations on the 29th of March 1432, he came without suspicion. On his arrival at the ducal palace he was seized, imprisoned and brought to trial for treason against the republic. Although the doge befriended him he was condemned to death and beheaded on the 5th of May. A man of third-rate ability, his great mistake was that he failed to see that he could not do with a solvent and strong government what he could with bankrupt tyrants without military resources, and that the astute Visconti meant to ruin him for his abandonment.

Bibliography.—The best account of Carmagnola is Horatio Brown's essay in his *Studies in Venetian History* (London, 1907); see also A. Battistella, *Il Conte di Carmagnola* (Genoa, 1889); E. Ricotti, *Storia delle Compagnie di Ventura* (Turin, 1845). Alessandro Manzoni (*q.v.*) made this episode the subject of a poetical drama, *Il Conte di Carmagnola* (1826). (L. V.*)

CARMAGNOLA, a town of Italy, in the province of Turin, 18 m. by rail S. of Turin. Pop. (1901) 2447 (town), 11,721 (commune). It is the junction where the lines for Savona and Cuneo diverge; it is also connected with Turin by a steam tramway via Carignano. Carmagnola is a place of medieval origin. The town was captured by the French in 1796.

CARMAGNOLE (from Carmagnola, the town in Italy), a word first applied to a Piedmontese peasant costume, well known in the south of France, and brought to Paris by the revolutionaries

of Marseilles in 1798. It consisted of a short skirted coat with rows of metal buttons, a tricoloured waistcoat and red cap, and became the popular dress of the Jacobins. The name was then given to the famous revolutionary song, composed in 1792, the tune of which, and the wild dance which accompanied it, may have also been brought into France by the Piedmontese. The original first verse began:—

"Monsieur Veto (*i.e.* Louis XVI.) avait promis
D'être fidèle à sa patrie."

and each verse ends with the refrain:—

"Vive le son, vive le son,
Dansons la Carmagnole,
Vive le son
Du Canon."

The words were constantly altered and added to during the Terror and later; thus the well-known lines,

"Madame Veto avait promis
De faire égorger tout Paris
. . . . . .
On lui coupa la tête," &c.,

were added after the execution of Marie Antoinette. Played in double time the tune was a favourite march in the Revolutionary armies, until it was forbidden by Napoleon, on becoming First Consul.

CARMARTHEN (*Caerfyrddin*), a municipal borough, contributory parliamentary borough (united with Llanelly since 1832), and county town of Carmarthenshire, and a county of itself, finely situated on the right bank of the Towy, which is here tidal and navigable for small craft. Pop. (1901) 10,025. It is the terminal station of a branch of the London & North-Western railway coming southward from Shrewsbury, and is a station on the main line of the Great Western running to Fishguard; it is also the terminus of a branch-line of the Great Western running to Newcastle-Emlyn. The station buildings lie on the left bank of the river, which is here spanned by a fine old stone bridge. There are works for the manufacture of woollens and ropes, also tanneries, but it is as the central market of a large and fertile district that Carmarthen is most important. The weekly Saturday market is well attended, and affords interesting scenes of modern Welsh agricultural life. From the convenient and accessible position of the town, the gaol and lunatic asylum serving for the three south-western counties of Wales—Cardigan, Pembroke and Carmarthen—have been fixed here. Although historically one of the most important towns in South Wales, Carmarthen can boast of very few ancient buildings, and the general aspect of the town is modern. A well-preserved gateway of red sandstone and portions of two towers of the castle are included in the buildings of the present gaol, and the old parish church of St Peter contains some interesting monuments, amongst them being the altar tomb (of the 16th century) of Sir Rhys ap Thomas, K.G., and his wife, which was removed hither for safety at the Reformation from the desecrated church of the neighbouring Priory of St John. Some vestiges of this celebrated monastic house, which formerly owned the famous Welsh MS. known as the "Black Book of Carmarthen," are visible between the present Priory Street and the river. Of the more recent erections in the town, mention may be made of the granite obelisk in memory of General Sir Thomas Picton (1758–1815) and the bronze statue of General Sir William Nott (1784–1846).

Carmarthen is commonly reputed to occupy the site of the Roman station of Maridunum, and its present name is popularly associated with the wizard-statesman Merlin, or Merddyn, whose memory and prophecies are well remembered in these parts of Wales and whose home is popularly believed to have been the conspicuous hill above Abergwili, known as Merlin's Hill. Another derivation of the name is to be found in *Caer-môr-din*, signifying "a fortified place near the sea." In any case, the antiquity of the town is undisputed, and it served as the seat of government for Ystrad Tywi until the year 877, when Prince Cadell of South Wales abandoned Carmarthen for Dinefawr, near Llandilo, probably on account of the maritime raids of the Danes and Saxons. Towards the close of the 11th century a castle was built here by the Normans, and for the next two hundred years town and castle were frequently taken and retaken by Welsh or English. On the annexation of Wales, Edward I. established here his courts of chancery and exchequer and the great sessions for South Wales. Edward III., by the Statute Staple of 1353, declared Carmarthen the sole staple for Wales, ordering that every bale of Welsh wool should be sealed or "cocketed" here before it left the Principality. The earliest charter recorded was granted in 1201 under King John; a charter of James I. in 1604 constituted Carmarthen a county of itself; and under a charter by George III. in 1764, which had been specially petitioned for by the citizens, the two separate jurisdictions of Old and New Carmarthen were fused and henceforth "called by the name of Our Borough of Carmarthen." In 1555 Bishop Farrar of St David's was publicly burned for heresy under Queen Mary at the Market Cross, which was ruthlessly destroyed in 1846 to provide a site for General Nott's statue. In 1646 General Laugharne took and demolished the castle in the name of the parliament, and in 1649 Oliver Cromwell resided at Carmarthen on his way to Ireland. In 1684 the duke of Beaufort with a numerous train made his state entry into Carmarthen as lord-president of Wales and the Marches. With the rise of Llanelly the industrial importance of Carmarthen has tended to decline; but owing to its central position, its close connexion with the bishops of St David's and its historic past the town is still the chief focus of all social, political and ecclesiastical movements in the three counties of Cardigan, Pembroke and Carmarthen. Carmarthen was created a parliamentary borough in 1536.

CARMARTHENSHIRE (*Sîr Gaerfyrddin*, colloquially known as *Sîr Gâr*), a county of South Wales bounded N. by Cardigan, E. by Brecon and Glamorgan, W. by Pembroke and S. by Carmarthen Bay of the Bristol Channel. The modern county has an area of 918 sq. m., and is therefore the largest in size of the South Welsh counties. Almost the whole of its surface is hilly and irregular, though the coast-line is fringed with extensive stretches of marsh or sandy burrows. Much of the scenery in the county, particularly in the upper valley of the Towy, is exceedingly beautiful and varied. On its eastern borders adjoining Breconshire rises the imposing range of the Black Mountains (*Mynydd Dû*), sometimes called the Carmarthenshire Beacons, where the Carmarthen Van attains an elevation of 2632 ft. Mynydd Mallaen in the wild districts of the north-east corner of the county is 1430 ft. in height, but otherwise few of the numberless rounded hills with which Carmarthenshire is thickly studded exceed 1000 ft. The principal river is the Towy (*Tywi*), which, with its chief tributaries, the Gwili, the Cothi and the Sawdde, drains the central part of the county and enters the Bay at Llanstephan, 9 m. below Carmarthen. Coracles are frequently to be observed on this river, as well as on the Teifi, which separates Carmarthenshire from Cardiganshire on the north. Other streams are the Tâf, which flows through the south-western portion of the county and reaches the sea at Laugharne; the Gwendraeth, with its mouth at Kidwelly; and the Loughor, or Llwchwr, which rises in the Black Mountains and forms for several miles the boundary between the counties of Carmarthen and Glamorgan until it falls into Carmarthen Bay at Loughor. All these rivers contain salmon, sewin (*gleisiad*) and trout in fair numbers, and are consequently frequented by anglers. With the exception of the Van Pool in the Black Mountains the lakes of the county are inconsiderable in size.

Geology.—The oldest rocks in Carmarthenshire come to the surface in the Vale of Towy at Llanarthney and near Carmarthen; they consist of black shales of Tremadoc (Cambrian) age, and are succeeded by conglomerates, sandstones and shales, with beds of volcanic ash and lava, of Arenig (Ordovician) age, which have been brought up along a belt of intense folding and faulting which follows the Towy from Llangadock to Carmarthen and extends westwards to the edge of the county at Whitland. The Llandeilo shales, flags and limestones and occasional volcanic ashes, which follow, are well developed at Llangadock and Llandeilo and near Carmarthen, and are famed for their trilobites, *Asaphus tyrannus* and *Ogygia Buchi*. Shales and mudstones and impersistent limestones of Bala age come next in order, and, bounding the Vale of Towy on the north, extend as a

narrow belt north-westwards towards the Presley hills. Except for the foregoing deposits the great area between the Teifi and the Towy, of which little is known, is made up of a monotonous succession of greatly folded slates and shales with interbedded conglomerates and sandstones which give rise to scarps, ridges and moorlands; they appear to be of Llandovery age.

South of the Towy a narrow belt of steeply dipping and even inverted Silurian sandstones and mudstones (Upper Llandovery, Wenlock and Ludlow) extends south-westwards from Llandovery to Llanarthney, where they disappear under the Old Red Sandstone. This formation, which consists of red marls and sandstones with occasional thin impure limestones (cornstones), extends from near Llandovery to beyond Carmarthen Bay; its upper conglomeratic beds cap the escarpment of the Black Mountains (2460 ft.) on the south-eastern borders of the county. To the south the scarps and moorlands of the Carboniferous Limestone and Millstone Grit form the north-western rim of the South Wales coalfield. The rest of the county is occupied by the rich Coal-Measures of the Gwendraeth Valley and Llanelly districts. All the rocks in the county are affected by powerful folds and faults. Glacial deposits are plentiful in the valleys south of the Towy, striae abound on the Millstone Grit and show that the ice-sheet rose far up the slopes of the Black Mountains. Coal is the chief mineral, the iron-ore is no longer worked; the Carboniferous Limestone is burnt at Llandybie; fire-bricks are manufactured from the Millstone Grit, and a few lead-veins are found in the Ordovician rocks.

Industries.—The climate is mild, except in the upland regions, but the annual rainfall is very heavy. With the exception of its south-eastern portion, which forms part of the great South Welsh coalfield, Carmarthenshire may be considered wholly as an agricultural county. The attention of the farmers is devoted to stock-raising and dairy-farming rather than to the growth of cereals, whilst the large tracts of unenclosed hill-country form good pastures for sheep and ponies. The soil varies much, but in the lower valleys of the Towy and Tâf it is exceedingly fertile. Outside agriculture the gathering of cockles at the estuaries of the Towy and Tâf gives employment to a large number of persons, principally women; Ferryside and Laugharne being the chief centres of the cockling industry. The local textile factories at Pencader, Penboyr, Llangeler, and in the valley of the Loughor are of some importance. Gold has been found near Caio in the Cothi valley, but the yield is trifling. There are lead-mines in various places, but none of great value. The really important industries are restricted to the populous south-eastern district, where coal-mining, iron-founding and the smelting of tin and copper are carried on extensively at Llanelly, Pembrey, Tirydail, Garnant, Pontardulais, Ammanford and other centres.

Communications.—The Great Western railway traverses the lower part of the county, whilst a branch of the London & North-Western enters it at its extreme north-eastern point by a tunnel under the Sugar Loaf Mountain, and has its terminal station at Carmarthen. A branch line of the Great Western connects Llanelly with Llandilo by way of Ammanford, and another branch of the same railway runs northward from Carmarthen to Newcastle-Emlyn on the Teifi, joining the Aberystwyth branch, formerly the Manchester & Milford line, at Pencader.

Population and Administration.—The area of the county is 587,816 acres, and the population in 1891 was 130,566 and in 1901 it was 135,325. The municipal boroughs are Carmarthen (pop. 9935), Kidwelly (2285) and Llandovery (1809). Urban districts are Ammanford, Llanelly, Burry Port, Llandilo and Newcastle-Emlyn. The principal towns are Carmarthen, Llanelly (25,617), Llandilo or Llandeilo Fawr (1934), Llangadock (1578), Llandovery, Kidwelly, Pembrey (7513) and Laugharne (1439). The county is in the South Wales circuit, and assizes are held at Carmarthen. The borough of Carmarthen has a commission of the peace and separate quarter sessions. The county is divided into two parliamentary divisions, the eastern and western, and it also includes the united boroughs of Carmarthen and Llanelly, thus returning three members in all to parliament. The ancient county, which contains 75 parishes and part of another, is wholly in the diocese of St David's.

History.—Carmarthenshire originally formed part of the lands of the Dimetae conquered by the Romans, who constructed military roads and built on the Via Julia the important station of Maridunum upon or near the site of the present county town. After the retirement of the Roman forces this fortified town became known in course of time as Caerfyrddin, anglicized into Carmarthen, which subsequently gave its name to the county. During the 5th and 6th centuries Carmarthenshire, or Ystrad Tywi, was the scene of the labours of many Celtic missionaries, notably of St David and St Teilo, who brought the arts of civilization as well as the doctrines of Christianity to its rude inhabitants. In the 9th century the whole of Ystrad Tywi was annexed to the kingdom of Roderick the Great (*Rhodri Mawr*), who at his death in 877 bequeathed the principality of South Wales to his son, Cadell. The royal residence of the South Welsh princes was now fixed at Dynevor (*Dinefawr*) on the Towy near Llandilo. Cadell's son, Howell the Good (*Hywel Dda*), was the first to codify the ancient laws of Wales at his palace of Ty Gwyn Ar Dâf, the White Lodge on the banks of the Tâf, near the modern Whitland. In 1080, during the troubled reign of Rhys ap Tudor, the Normans first appeared on the shores of Carmarthen Bay, and before the end of King Henry I.'s reign had constructed the great castles of Kidwelly, Carmarthen, Laugharne and Llanstephan near the coast. From this period until the death of Prince Llewelyn (1282) the history of Carmarthenshire is national rather than local. By the Statutes of Rhuddlan (1284) Edward I. formed the counties of Cardigan and Carmarthen out of the districts of Ceredigion and Ystrad Tywi, the ancient possessions of the house of Dinefawr, which were now formally annexed to the English crown. Nearly a third of the present county, however, still remained under the jurisdiction of the Lords Marchers, and it was not until the Act 27 Henry VIII. that these districts, including the commots of Kidwelly, Iscennen and Carnwillion, were added to Edward I.'s original shire. The prosperity of the new county increased considerably under Edward III., who named Carmarthen the chief staple-town in Wales for the wool trade. The revolt of Owen Glendower had the effect of disturbing the peace of the county for a time, and the French army, landed at Milford on his behalf, was warmly received by the people of Carmarthenshire. In the summer of 1485 Sir Rhys ap Thomas, of Abermarlais and Dinefawr, marched through the county collecting recruits for Henry of Richmond, for which service he was created a knight of the Garter and made governor of all Wales. At the Reformation the removal of the episcopal residence from distant St David's to Abergwili, a village barely two miles from Carmarthen, brought the county into close touch with the chief Welsh diocese, and the new palace at Abergwili will always be associated with the first Welsh translations of the New Testament and the Prayer Book, made by Bishop Richard Davies (1500–1581) and his friend William Salesbury, of Llanrwst (16th century). In the early part of the 17th century the county witnessed the first religious revival recorded in Welsh annals, that led by Rhys Prichard (d. 1644), the Puritan vicar of Llandovery, whose poetical works, the *Canwyll y Cymry* ("the Welshman's Candle") are still studied in the principality. At the time of the Civil Wars, Richard Vaughan, earl of Carbery, the patron of Jeremy Taylor, was in command of the royal fortresses and troops, but made a very feeble and half-hearted resistance against the parliamentarian forces. During the following century the great Welsh spiritual and educational movement, which later spread over all Wales, had its origin in the quiet and remote parish of Llanddowror, near Laugharne, where the vicar, the celebrated and pious Griffith Jones (1684–1761), had become the founder of the Welsh circulating charity schools. Other prominent members of this important Methodist revival, likewise natives of Carmarthenshire, were William Williams of Pantycelyn, the well-known hymn-writer (1716–1791), and Peter Williams, the Welsh Bible commentator (1722–1796). The county was deeply implicated in the Rebecca Riots of 1842–1843.

Foremost amongst the county families of Carmarthenshire is Rhys, or Rice, of Dynevor Castle, near Llandilo, a modern castellated house standing in a beautiful park which contains the historic ruin of the old Dinefawr fortress. The present Lord Dynevor, the direct lineal descendant of the princes of South Wales, is the head of this family. Almost opposite Dynevor

Castle (formerly known as Newtown), on the left bank of the Towy, stands Golden Grove (*Gelli Aur*), once the seat of the Vaughans, earls of Carbery, whose senior line and titles became extinct early in the 18th century. The famous old mansion has been replaced by a modern Gothic structure, and is now the property of Earl Cawdor. Golden Grove contains the "Hirlas Horn," the gift of King Henry VII. to Dafydd ap Evan of Llwyndafydd, Cardiganshire, perhaps the most celebrated of Welsh historical relics. Other families of importance, extinct or existing, are Johnes, formerly of Abermarlais and now of Dolaucothi; Williams (now Drummond) of Edwinsford; Lloyd of Forest; Lloyd of Glansevin; Stepney of Llanelly and Gwynne of Taliaris.

Antiquities.—Carmarthenshire contains few memorials of the Roman occupation, but it possesses various camps and tumuli of the British period, and also a small but perfect cromlech near Llanglydwen on the banks of the Tâf. Of its many medieval castles the most important still in existence are: Kidwelly; Laugharne; Llanstephan, a fine pile of the 12th century on a hill at the mouth of the Towy; Carreg Cennen, an imposing Norman fortress crowning a cliff not far from Llandilo; and Dynevor Castle, the ancient seat of Welsh royalty, situated on a bold wooded height above the Towy. The remains of the castles at Carmarthen, Dryslwyn, Llandovery and Newcastle-Emlyn are inconsiderable. Of the monastic houses Talley Abbey (Tal-y-Llychau, a name drawn from the two small lakes in the neighbourhood of its site) was founded by Rhys ap Griffith, prince of South Wales, towards the close of the 12th century for Benedictine monks; Whitland, or Albalanda, also a Benedictine house, was probably founded by Bishop Bernard of St David's early in the 12th century, on a site long associated with Welsh monastic life; and the celebrated Augustinian Priory of St John at Carmarthen was likewise established in the 12th century. Very slight traces of these three important religious houses now exist. The parish churches of Carmarthenshire are for the most part small and of no special architectural value. Of the more noteworthy mention may be made of St Peter's at Carmarthen, and of the parish churches at Laugharne, Kidwelly, Llangadock, Abergwili and Llangathen, the last named of which contains a fine monument to Bishop Anthony Rudd (d. 1615). Many of these churches are distinguished by tall massive western towers, usually of the 12th or 13th centuries. Besides Golden Grove and Dynevor the county contains some fine historic houses, prominent amongst which are Abergwili Palace, the official residence of the bishops of St David's since the Reformation, burnt down in 1902, but rebuilt on the old lines; Aberglasney, a mansion near Llangathen, erected by Bishop Rudd and once inhabited by the poet John Dyer (1700–1758); Court Henry, an ancient seat of the Herbert family; and Abermarlais, once the property of Sir Rhys ap Thomas.

Customs, &c.—The old Welsh costume, folklore and customs have survived longer in Carmarthenshire than perhaps in any other county of Wales. The steeple-crowned beaver hat, now practically extinct, was often to be seen in the neighbourhood of Carmarthen as late as 1890, and the older women often affect the *pais-a-gŵn bâch*, the frilled mob-cap and the small plaid shawl of a previous generation. Curious instances of old Welsh superstitions are to be found amongst the peasantry of the more remote districts, particularly in the lovely country in the valleys of the Towy and Teifi, where belief in fairies, fairy-rings, goblins and "corpse-candles" still lingers. The curious mumming, known as "Mari Lwyd" (Blessed Mary), in which one of the performers wears a horse's skull decked with coloured ribbands, was prevalent round Carmarthen as late as 1885. At many parish churches the ancient service of the "Pylgain" (a name said to be a corruption of the Latin *pulli cantus*) is held at daybreak or cock-crow on Christmas morning. A species of general catechism, known as *pwnc*, is also common in the churches and Nonconformist chapels. The old custom of receiving New Year's gifts of bread and cheese, or meal and money (*calenig*), still flourishes in the rural parishes. The "bidding" before marriage (as in Cardiganshire) was formerly universal and is not yet altogether discontinued, and bidding papers were printed at Llandilo as late as 1900. The horse weddings (*priodas ceffylau*) were indulged in by the farmer class in the neighbourhood of Abergwili as late as 1880.

AUTHORITIES.—T. Nicholas, *Annals and Antiquities of the Counties of Wales* (London, 1872); W. Spurrell, *Carmarthen and its Neighbourhood* (Carmarthen, 1879); J. B. D. Tyssen and Alcwyn C. Evans, *Royal Charters, &c., relating to the Town and County of Carmarthen* (Carmarthen, 1878).

CARMATHIANS (QARMATHIANS, KARMATHIANS), a Mahommedan sect named after Hamdān Qarmat, who accepted the teaching of the Isma'īlites (see MAHOMMEDAN RELIGION: *Sects*) from Ḥosain ul-Ahwāzī, a missionary of Aḥmed, son of the Persian Abdallah ibn Maimūn, toward the close of the 9th century. This was in the Sawād of Irak, which was inhabited by a people little attached to Islam. The object of Abdallah ibn Maimūn had been to undermine Islam and the Arabian power by a secret society with various degrees, which offered inducements to all classes and creeds and led men on from an interpretation of Islam to a total rejection of its teaching and a strict personal submission to the head of the society. For the political history of the Carmathians, their conquests and their decay, see ARABIA: *History*; CALIPHATE (sect. C. §§ 16, 17, 18, 23); and EGYPT: *History* (Mahommedan period).

In their religious teaching they claimed to be Shi'ites; *i.e.* they asserted that the imamate belonged by right to the descendants of Ali. Further, they were of the Isma'īlite branch of these, *i.e.* they acknowledged the claim to the imamate of Isma'īl the eldest son of the sixth imam. The claim of Isma'īl had been passed over by his father and many Shi'ites because he had been guilty of drinking wine. The Isma'īlites said that as the imam could do no wrong, his action only showed that wine-drinking was not sinful. Abdallah taught that from the creation of man there had always been an imam sometimes known, sometimes hidden. Isma'īl was the last known; a new one was to be looked for. But while the imam was hidden, his doctrines were to be taught by his missionaries (*dā'īs*). Hamdān Qarmat was one of these, Aḥmed ibn Abdallah being nominally the chief. The adherents of this party were initiated by degrees into the secrets of its doctrines and were divided into seven (afterwards nine) classes. In the first stage the convert was taught the existence of mystery in the Koran and made to feel the necessity of a teacher who could explain it. He took an oath of complete submission and paid a sum of money. In the second stage the earlier teachers of Islam were shown to be wrong in doctrine and the imams alone were proved to be infallible. In the third it was taught that there were only seven imams and that the other sects of the Shi'ites were in error. In the fourth the disciple learnt that each of the seven imams had a prophet, who was to be obeyed in all things. The prophet of the last imam was Abdallah. The doctrine of Islam was that Mahomet was the last of the prophets. In the fifth stage the uselessness of tradition and the temporary nature of the precepts and practices of Mahomet were taught, while in the sixth the believer was induced to give up these practices (prayer, fasting, pilgrimage, &c.). At this point the Carmathian had completely ceased to be a Moslem. In the remaining degrees there was more liberty of opinion allowed and much variety of belief and teaching existed.

The last contemporary mention of the Carmathians is that of Nāṣir ibn Khosrau, who visited them in A.D. 1050. In Arabia they ceased to exercise influence. In Persia and Syria their work was taken up by the Assassins (*q.v.*). Their doctrines are said, however, to exist still in parts of Syria, Persia, Arabia and India, and to be still propagated in Zanzibar.

See *Journal asiatique* (1877), vol. i. pp. 377-386. (G. W. T.)

CARMAUX, a town of southern France, in the department of Tarn, on the left bank of the Cérou, 10 m. N. of Albi by rail. Pop. (1906) 8618. The town gives its name to an important coal-basin, and carries on the manufacture of glass.

CARMEL, the mountain promontory by which the seacoast of Palestine is interrupted south of the Bay of Acre, 32° 50′ N., 35° E. It continues as a ridge of oolitic limestone, broken by ravines and honeycombed by caves, running for about 20 m.

in a south-easterly direction, and finally joining the mountains of Samaria. Its maximum height is at *'Esfia*, 1760 ft. It was included in the territory of the tribe of Asher. No great political event is recorded in connexion with it; it appears throughout the Old Testament "either as a symbol or as a sanctuary"; its name means "garden-land." Its fruitfulness is referred to by Isaiah and by Amos; Micah describes it as wooded, to which was no doubt due its value as a hiding-place (Amos ix. 3). It is now wild, only a few patches being cultivated; most of the mountain is covered with a thick brushwood of evergreens, oaks, myrtles, pines, &c., which is gradually being cleared away. That the cultivation was once much more extensive is indicated by the large number of rock-hewn wine and olive presses. Vines and olives are now found at *'Esfia* only. The outstanding position of Carmel, its solitariness, its visibility over a wide area of country, and its fertility, marked it out as a suitable place for a sanctuary from very ancient times. It is possibly referred to in the Palestine lists of Thothmes III. as *Rosh Kodsu*, "the holy headland." An altar of Jehovah existed here from early times; it was destroyed when the Phoenician Baal claimed the country under Jezebel, and repaired by Elijah (1 Kings xviii. 30) before the great sacrifice which decided the claims of the contending deities. The traditional site of this sacrifice is at *El-Muḫraḳa*, at the eastern end of the ridge. The Druses still visit this site, where is a dilapidated structure of stones, as a holy place for sacrifice. On the bank of the Kishon below is a mound known as *Tell el-Ḳusīs*, "the Priest's mound," but the connexion that has been sought between this name and the slaughter of the priests of Baal is hardly justifiable. Other sites on the hill are traditionally connected with Elijah, and some melon-like fossils are explained as being fruits refused to him by its owner, who was punished by having them turned to stone. Elisha was stationed here for a time. Tacitus describes the hill as the site of an oracle, which Vespasian consulted. Iamblichus in his life of Pythagoras speaks of it as a place of great sanctity forbidden to the vulgar. A grove of trees, called the "Trees of the Forty" [Martyrs], still remains, no doubt in former times a sacred grove. So early as the 4th century Christian hermits began to settle here, and in 1207 the Carmelite order was organized. The monastery, founded at the fountain of Elijah in 1209, has had many vicissitudes: the monks were slaughtered or driven to Europe in 1238 and the building decayed; it was visited and refounded by St Louis in 1252; again despoiled in 1291; once more rebuilt in 1631, and, in 1635 (when the monks were massacred), sacked and turned into a mosque. Once more the monks established themselves, only to be murdered after Napoleon's retreat in 1799. The church and the monastery were entirely destroyed in 1821 by 'Abd Allah, pasha of Acre, on the plea that the monks would favour the revolting Greeks; but it was shortly afterwards rebuilt by order from the Porte, partly at 'Abd Allah's expense and partly by contributions raised in Europe, Asia and Africa by Brother Giovanni Battista of Frascati. The villages with which the mountain was once covered have been to a large extent depopulated by the Druses. (R. A. S. M.)

CARMELITES, in England called White Friars (from the white mantle over a brown habit), one of the four mendicant orders. The stories concerning the origin of this order, seriously put forward and believed in the 17th and 18th centuries, are one of the curiosities of history. It was asserted that Elias established a community of hermits on Mount Carmel, and that this community existed without break until the Christian era and was nothing else than a Jewish Carmelite order, to which belonged the Sons of the Prophets and the Essenes. Members of it were present at St Peter's first sermon on Pentecost and were converted, and built a chapel on Mount Carmel in honour of the Blessed Virgin Mary, who, as well as the apostles, enrolled herself in the order. In 1668 the Bollandist Daniel Papenbroek (1628–1714), in the March volumes of the *Acta Sanctorum*, rejected these stories as fables. A controversy arose and the Carmelites had recourse to the Inquisition. In Spain they succeeded in getting the offending volumes of the *Acta* censured, but in Rome they were less successful, and so hot did the controversy become that in 1698 a decree was issued imposing silence upon both parties, until a formal decision should be promulgated—which has not yet been done.

The historical origin of the Carmelites must be placed at the middle of the 12th century, when a crusader from Calabria, named Berthold, and ten companions established themselves as hermits near the cave of Elias on Mount Carmel. A Greek monk, Phocas, who visited the Holy Land in 1185, gives an account of them, and says that the ruins of an ancient building existed on Mount Carmel; but though it is likely enough that there had previously been Christian monks and hermits on the spot, it is impossible to place the beginning of the Carmelite institute before Berthold. About 1210 the hermits on Carmel received from Albert, Latin patriarch of Jerusalem, a rule comprising sixteen articles. This was the primitive Carmelite rule. The life prescribed was strictly eremitical: the monks were to live in separate cells or huts, devoted to prayer and work; they met only in the oratory for the liturgical services, and were to live a life of great silence, seclusion, abstinence and austerity. This rule received papal approbation in 1226. Soon, however, the losses of the Christian arms in Palestine made Carmel an unsafe place of residence for western hermits, and so, *c.* 1240, they migrated first to Cyprus and thence to Sicily, France and England. In England the first establishment was at Alnwick and the second at Aylesford, where the first general chapter of the order was held in 1247, and St Simon Stock, an English anchorite who had joined the order, was elected general. During his generalate the institute was adapted to the conditions of the western lands to which it had been transplanted, and for this purpose the original rule had to be in many ways altered: the austerities were mitigated, and the life was turned from eremitical into cenobitical, but on the mendicant rather than the monastic model. The polity and government were also organized on the same lines, and the Carmelites were turned into mendicants and became one of the four great orders of Mendicant Friars, in England distinguished as the "White Friars" from the white mantle worn over the dark brown habit. This change was made and the new rule approved in 1247, and under this form the Carmelites spread all over western Europe and became exceedingly popular, as an order closely analogous to the Dominicans and Franciscans. In the course of time, further relaxations of the rule were introduced, and during the Great Schism the Carmelites were divided between the two papal obediences, rival generals being elected,—a state of things that caused still further relaxations. To cope with existing evils Eugenius IV. approved in 1431 of a rule notably milder than that of 1247, but many houses clung to the earlier rule; thus arose among the Carmelites the same division into "observants" and "conventuals" that wrought such mischief among the Franciscans. During the 15th and 16th centuries various attempts at reform arose, as among other orders, and resulted in the formation of semi-independent congregations owing a titular obedience to the general of the order. The Carmelite friars seem to have flourished especially in England, where at the dissolution of the monasteries there were some 40 friaries. (See F. A. Gasquet, *English Monastic Life*, table and maps; *Catholic Dictionary*, art. "Carmelites.") There were no Carmelite nunneries in England, and indeed until the middle of the 15th century there were no nuns at all anywhere in the order.

Of all movements in the Carmelite order by far the most important and far-reaching in its results has been the reform initiated by St Teresa. After nearly thirty years passed in a Carmelite convent in Avila under the mitigated rule of 1431, she founded in the same city a small convent wherein a rule stricter than that of 1247 was to be observed. This was in 1562. In spite of opposition and difficulties of all kinds, she succeeded in establishing a number, not only of nunneries, but (with the co-operation of St John of the Cross, *q.v.*) also of friaries of the strict observance; so that at her death in 1582 there were of the reform 15 monasteries of men and 17 of women, all in Spain. The interesting and dramatic story of the movement should be sought for in the biographies of the two protagonists; as also

an account of the school of mystical theology founded by them, without doubt the chief contribution made by the Carmelites to religion (see MYSTICISM). Here it must suffice to say that the idea of the reform was to go behind the settlement of 1247 and to restore and emphasize the purely contemplative character of primitive Carmelite life: indeed provision was made for the reproduction, for such as desired it, of the eremitical life led by Berthold and his companions. St Teresa's additions to the rule of 1247 made the life one of extreme bodily austerity and of prolonged prayer for all, two hours of private prayer daily, in addition to the choral canonical office, being enjoined. From the fact that those of the reform wore sandals in place of shoes and stockings, they have come to be called the Discalced, or bare-footed, Carmelites, also Teresians, in distinction to the Calced or older branch of the order. In 1580 the reformed monasteries were made a separate province under the general of the order, and in 1593 this province was made by papal act an independent order with its own general and government, so that there are now two distinct orders of Carmelites. The Discalced Carmelites spread rapidly all over Catholic Europe, and then to Spanish America and the East, especially India and Persia, in which lands they have carried on to this day extensive missionary undertakings. Both observances suffered severely from the various revolutions, but they both still exist, the Discalced being by far the most numerous and thriving. There are in all some 2000 Carmelite friars, and the nuns are much more numerous. In England and Ireland there are houses, both of men and of women, belonging to each observance.

AUTHORITIES.—A full account is given by Helyot, *Hist. des ordres religieux* (1792), i. cc. 40-52; shorter accounts, continued to the end of the 19th century and giving references to all literature old and new, may be found in Max Heimbucher, *Orden u. Kongregationen* (1897), ii. §§ 92-96; Wetzer u. Welte, *Kirchenlexicon* (ed. 2), art. "Carmelitenorden"; Herzog-Hauck, *Realencyklopädie* (ed. 3), art. "Karmeliter." The story of St Teresa's reform will be found in lives of St Teresa and in her writings, especially the *Foundations*. Special reference may be made to the works of Zimmerman, a Carmelite friar, *Carmel in England* (1899), and *Monumenta historica Carmelitana*, i. (1905 foll.). (E. C. B.)

CARMICHAEL, GERSHOM (*c.* 1672–1729), Scottish philosopher, was born probably in London, the son of a Presbyterian minister who had been banished by the Scottish privy council for his religious opinions. He graduated at Edinburgh University in 1691, and became a regent at St Andrews. In 1694 he was elected a master in the university of Glasgow—an office that was converted into the professorship of moral philosophy in 1727, when the system of masters was abolished at Glasgow. Sir William Hamilton regarded him as "the real founder of the Scottish school of philosophy." He wrote *Breviuscula Introductio ad Logicam*, a treatise on logic and the psychology of the intellectual powers; *Synopsis Theologiae Naturalis*; and an edition of Pufendorf, *De Officio Hominis et Civis*, with notes and supplements of high value. His son Frederick was the author of *Sermons on Several Important Subjects* and *Sermons on Christian Zeal*, both published in 1753.

CARMINE, a pigment of a bright red colour obtained from cochineal (*q.v.*). It may be prepared by exhausting cochineal with boiling water and then treating the clear solution with alum, cream of tartar, stannous chloride, or acid oxalate of potassium; the colouring and animal matters present in the liquid are thus precipitated. Other methods are in use; sometimes white of egg, fish glue, or gelatine are added before the precipitation. The quality of carmine is affected by the temperature and the degree of illumination during its preparation—sunlight being requisite for the production of a brilliant hue. It differs also according to the amount of alumina present in it. It is sometimes adulterated with cinnabar, starch and other materials; from these the carmine can be separated by dissolving it in ammonia. Good carmine should crumble readily between the fingers when dry. Chemically, carmine is a compound of carminic acid with alumina, lime and some organic acid. Carmine is used in the manufacture of artificial flowers, water-colours, rouge, cosmetics and crimson ink, and in the painting of miniatures. "Carmine lake" is a pigment obtained by adding freshly precipitated alumina to decoction of cochineal.

CARMONA, a town of south-western Spain, in the province of Seville; 27 m. N.E. of Seville by rail. Pop. (1900) 17,215. Carmona is built on a ridge overlooking the central plain of Andalusia, from the Sierra Morena, on the north, to the peak of San Cristobal, on the south. It has a thriving trade in wine, olive oil, grain and cattle; and the annual fair, which is held in April, affords good opportunity of observing the costumes and customs of southern Spain. The citadel of Carmona, now in ruins, was formerly the principal fortress of Peter the Cruel (1350–1369), and contained a spacious palace within its defences. The principal entrance to the town is an old Moorish gateway; and the gate on the road to Cordova is partly of Roman construction. Portions of the ancient college of San Teodomir are of Moorish architecture, and the tower of the church of San Pedro is an imitation of the Giralda at Seville.

In 1881 a large Roman necropolis was discovered close to the town, beside the Seville road. It contains many rock-hewn sepulchral chambers, with niches for the cinerary urns, and occasionally with vestibules containing stone seats (*triclinia*). In 1881 an amphitheatre, and another group of tombs, all belonging to the first four centuries A.D., were disinterred near the original necropolis, and a small museum, maintained by the Carmona archaeological society, is filled with the mosaics, inscriptions, portrait-heads and other antiquities found here.

Carmona, the Roman *Carmo*, was the strongest city of Further Spain in the time of Julius Caesar (100–44 B.C.), and its strength was greatly increased by the Moors, who surrounded it with a wall and ornamented it with fountains and palaces. In 1247 Ferdinand III. of Castile took the city, and bestowed on it the motto *Sicut Lucifer lucet in Aurora, sic in Wandalia Carmona* ("As the Morning-star shines in the Dawn, so shines Carmona in Andalusia").

For an account of the antiquities of Carmona, see *Estudios arqueologicos e historicos*, by M. Sales y Ferré (Madrid, 1887).

CARNAC, a village of north-western France, in the department of Morbihan and arrondissement of Lorient, 9 m. S.S.W. of Auray by road. Pop. (1906) 667. Carnac has a handsome church in the Renaissance style of Brittany, but it owes its celebrity to the stone monuments in its vicinity, which are among the most extensive and interesting of their kind (see STONE MONUMENTS). The most remarkable consist of long avenues of menhirs or standing stones; but there is also a profusion of other erections, such as dolmens and barrows, throughout the whole district. About half a mile to the north-west of the village is the Menec system, which consists of eleven lines, numbers 874 menhirs, and extends a distance of 3376 ft. The terminal circle, whose longest diameter is 300 ft., is somewhat difficult to make out, as it is broken by the houses and gardens of a little hamlet. To the east-north-east there is another system at Kermario (Place of the Dead), which consists of 855 stones, many of them of great size—some, for example, 18 ft. in height—arranged in ten lines and extending about 4000 ft. in length. Still further in the same direction is a third system at Kerlescan (Place of Burning), composed of 262 stones, which are distributed into thirteen lines, terminated by an irregular circle, and altogether extend over a distance of 1000 ft. or more. These three systems seem once to have formed a continuous series; the menhirs, many of which have been broken up for road-mending and other purposes, have diminished in number by some thousands in modern times. The alignment of Kermario points to the dolmen of Kercado (Place of St Cado), where there is also a barrow, explored in 1863; and to the south-east of Menec stands the great tumulus of Mont St Michel, which measures 377 ft. in length, and has a height of 65 ft. The tumulus, which is crowned with a chapel, was excavated by René Galles in 1862; and the contents of the sepulchral chamber, which include several jade and fibrolite axes, are preserved in the museum at Vannes. About a mile east of the village is a small piece of moorland called the Bossenno, from the *bocenieu* or mounds with which it is covered; and here, in 1874, the explorations of

James Miln, a Scottish antiquary, brought to light the remains of a Gallo-Roman town. The tradition of Carnac is that there was once a convent of the Templars or Red Cross Knights on the spot; but this, it seems, is not supported by history. Similar traces were also discovered at Mané Bras, a height about 3 m. to the east. The rocks of which these various monuments are composed is the ordinary granite of the district, and most of them present a strange appearance from their coating of white lichens. Carnac has an interesting museum of antiquities.

See W. C. Lukis, *Guide to the Principal Chambered Barrows and other Prehistoric Monuments in the Islands of the Morbihan, &c.* (Ripon, 1875); René Galles, *Fouilles du Mont Saint Michel en Carnac* (Vannes, 1864); A. Fouquet, *Des monuments celtiques et des ruines romaines dans le Morbihan* (Vannes, 1853); James Miln, *Archaeological Researches at Carnac in Brittany: Kermario* (Edinburgh, 1881); and *Excavations at Carnac: The Bassenno and the Mont St Michel* (Edinburgh, 1877).

CARNARVON, EARLDOM OF. The earldom of Carnarvon was created in 1628 for Robert Dormer, Baron Dormer of Wyng (*c.* 1610–1643), who was killed at the first battle of Newbury whilst fighting for Charles I., and it became extinct on the death of his son Charles, the 2nd earl, in 1709. From 1714 to 1789 it was held by the family of Brydges, dukes of Chandos and marquesses of Carnarvon, and in 1793 Henry Herbert, Baron Porchester (1741–1811), was created earl of Carnarvon.

His great-grandson, HENRY HOWARD MOLYNEUX HERBERT, 4th earl of Carnarvon (1831–1890), was born on the 24th of June 1831. He succeeded to the title in 1849, on the death of his father, Henry John George, the 3rd earl (1800–1849). Soon after taking his degree at Oxford he began to play a prominent part in the deliberations of the House of Lords. In 1858 he was under secretary for the colonies, and in 1866 secretary of state. In this capacity he introduced in 1867 the bill for the federation of the British North American provinces which set so many political problems at rest; but he had not the privilege of passing it, having, before the measure became law, resigned, owing to his distaste for Disraeli's Reform Bill. Resuming office in 1874, he endeavoured to confer a similar boon on South Africa, but the times were not ripe. In 1878 he again resigned, out of opposition to Lord Beaconsfield's policy on the Eastern question; but on his party's return to power in 1885 he became lord-lieutenant of Ireland. His short period of office, memorable for a conflict on a question of personal veracity between himself and Mr Parnell as to his negotiations with the latter in respect of Home Rule, was terminated by another premature resignation. He never returned to office, and died on the 29th of June 1890. As a statesman his career was marred by extreme sensitiveness; but he was beloved as a man of worth and admired as a man of culture. He was high steward of the university of Oxford, and president of the Society of Antiquaries. The 4th earl was succeeded by his son, George Edward Stanhope Molyneux (b. 1866).

CARNARVON, a market town and municipal borough, and the county town of Carnarvonshire, north Wales, 68½ m. W. of Chester by the London & North-Western railway. Pop. (1901) 9760. It stands very nearly on the site of Caer Seint, capital of the Segontiaci, and was fortified in 1098 by Hugh Lupus, earl of Chester, after Roman occupation, a fort, baths and villa, with coins and pottery, having been exhumed here. As the castle was begun only in 1284, Edward II., supposed to have been born in its Eagle Tower on the extreme west, can only have been born outside. The castle is an irregular oblong building on the west of the town, surrounded by walls and having thirteen polygonal towers. There is still much of the town wall extant. The parish church (Llanbeblig) is some half-mile out of the town, the institutions of which include a town and county hall, a training college, and a gaol for Anglesey and Carnarvonshire jointly. Manufactures in the town are scanty, but Llanberis and Llanllyfni export hence slates, "sets" and copper ore. A steam ferry unites Carnarvon and Tan y foel, Anglesey, while a summer service of steamers runs to Menai Bridge, Bardsey, &c. The borough forms part of a district returning a member to parliament since 1536. To this district the Reform Act added Bangor. The county quarter sessions and assizes are held in the town, which has a separate commission of the peace, but no separate court of quarter sessions. Three weekly Welsh (besides English) newspapers are published here.

CARNARVONSHIRE (Welsh *Caer'narfon*, for *Caer yn Arfon*), a county of north Wales, bounded N. by the Irish Sea, E. by the county of Denbigh, S.E. by Merioneth, S. by Tremadoc and Cardigan Bays, S.W. by Carnarvon Bay, W. by the Menai Straits (separating the county from Anglesey), and N.W. by Conway Bay. Area, 565 sq. m. There is, owing to the changed bed of the Conwy stream, a small detached part of the county on the north coast of Denbighshire, stretching inland for some 2½ m. between Old Colwyn and Llandulas. About half the whole length of the county is a peninsula, Lleyn, running south-west into the Irish Sea, and forming Cardigan Bay on the south and Carnarvon Bay on the north. The county is rich in minerals, *e.g.* lead, copper, some gold. Its slate quarries are many and good. Its mountains include the highest in the British Isles, the summit of Snowdon (Wyddfa or Eryri) being 3560 ft. The principal mountains occupy the middle of the county and include Carnedd Llewelyn (3484 ft.), Carnedd Dafydd (3426), Glydyr Fawr (3279) and Glydyr Fach (3262), Elidr Fawr (3029), Moel Siabod (2860), Moel Hebog or Hebawg (2566). The valleys vary from the wildness of Pont Aberglaslyn gorge to the quiet of Nant Gwynnant. Those of Beddgelert and Llanberis—at the south and north base of Snowdon respectively—are famous, while that of the Conwy, from Llanrwst to Conway (Conwy), is well set off by the background of Snowdonia.

The largest stream is the Conwy, tidal and navigable for some 12 m. from Deganwy; this rises in Llyn Conwy, in the south-east, divides Carnarvon from Denbigh (running nearly due north) for some 30 m., and falls into the sea at Deganwy. The Seint (wrongly spelled Seiont) is a small stream rising in Snowdon and falling into the sea at Carnarvon, to which it gave its old name Segontium (Kaer Seint yn Arvon in the *Mabinogion*). The Swallow Falls are in Nant Ffrancon (the stream of the Beaver or Afanc, a mythological animal). Nant Ffrancon leads north-west from near Capel Curig, through Bettws y coed and Bethesda, reaching the sea in Beaumaris Bay. The lakes, numerous and occasionally large, include: Llyn Peris and Llyn Padarn at Llanberis, north of Snowdon; Llyn Ogwen, north of Glydyr Fawr; Llyn Cowlyd and Llyn Eigiau, both north of Capel Curig; Llyn Llydaw, on Snowdon; Llyn Cwellyn, west of Snowdon; Llyn Gwynnant, east of Snowdon; Llyniau (Nant y llef or) Nantlle, near Llanllyfni; Llyn Conway.

The greater part of the county, including the mountainous Snowdon district and nearly all the eastern portion of the promontory of Lleyn, is occupied by rocks of Ordovician age, the Arenig, Bala and Llandeilo series. These are dark slates and thin-bedded grits with enormous masses of interbedded igneous rocks, lavas and ashes, the product of contemporaneous volcanoes. At the base of Snowdon are Bala grits and slates, above them lie three beds of felspathic porphyry, which are in turn succeeded by a great mass of calcareous and sandy volcanic ashes, while upon the summit are the remnants of a lava sheet. The whole mountain is part of a syncline, the beds dipping into it from the north-west and south-east.

Next to the Ordovician, the Cambrian rocks are the most important; they are found in three separate areas; the largest is in the north-west, and extends from Bangor to Bethesda, through Llyn Cwellyn and Llanwada to the coast near Clynnogfawr. The second area lies west of Tremadoc, which has given its name to the upper division of the Cambrian system. The third forms the promontory south of Llanenga. Cambrian slates are extensively quarried at Penrhyn, Llanberis and Dinorwic. Pre-Cambrian schists and igneous rocks occupy a strip, from 2 to 3 m. wide, along the coast from Neirn to Bardsey Island. A very small area of the Denbighshire Silurian enters this county near Conway near the eastern border; it comprises Tarannon shale and Wenlock beds with graptolites.

The striking headland of the Great Orme as well as Little Orme's Head is composed of carboniferous limestone, containing corals and large *Productus* shells. A narrow strip of the same formation runs along the Menai Straits for several miles south of the tubular bridge. At the southern extremity of the limestone a small patch of coal measures is found.

Glacial drift—gravel, boulders and clay—is abundant along the northern coast, and in the neighbourhood of Snowdon it is an important feature in the landscape; massive moraines, perched blocks, striated stones and other evidences of ice action are common. On

Moel Trygarn and on the western flanks of Snowdon marine shells have been found in the drift up to an elevation of 1400 ft. above sea-level. Blown sand occurs along the coast near Conway, south-west of Carnarvon and on the south coast. Several hollows and pipes in the carboniferous limestone about Orme's Head contain clays and sands of mixed origin, including Upper Carboniferous, Triassic and drift materials. The igneous rocks, especially those of volcanic origin, constitute one of the most striking geological features of the county; they comprise felsites, rhyolites, quartz porphyries, enstatite diabases, andesite tuffs, diabases and granite.

The climate is cold and damp in winter, except in the peninsula, Lleyn, and on the mild coast. Arable land, but a small proportion of the surface, is mostly in the Conwy valley or near the sea. Principal crops are oats, barley and potatoes, with some little wheat. The valley soil (alluvial) is often fertile, chiefly as meadow and enclosed pasture. Dairy and sheep-farming occupy most farmers. The small mountain ponies, especially of Llanbedr (Conwy Vale), are famous, and Welsh ponies were known for staying power even to Arrian (*Cynegetics*). Agriculture still too much follows the old routine, besides losing by the influx of labour into the towns or to the mining industry and "set works "(stone).

The county is served by the London & North-Western railway; its terminus is Afon Wen, within 4 m. of Pwllheli. Between these stations plies the Cambrian, which runs along the Cardigan Bay coast and terminates at Pwllheli. The North Wales Narrow Gauge line runs from Dinas, south of Carnarvon, to Snowdon Ranger, 4 m. from Beddgelert. The main line of the London & North-Western runs along the northern coast, with branches from Llandudno junction to Blaenau Festiniog, along the Denbighshire side of the Conwy stream; from Menai Bridge to Carnarvon (thence continuing to Llanberis, or, by another line, to Afon Wen). The chief ports are Portmadoc, Pwllheli, Carnarvon, Port Dinorwic and Bangor. Near Portmadoc is Criccieth, with a castle resorted to by visitors; Pwllheli is also a summer resort, and a tramway runs thence to within a short distance of Abersoch, another favourite watering-place. Nefyn (some 6 m. from Pwllheli), still unserved by rail or tram, was the scene of a royal tournament in the 15th century, and is another bathing resort; near are Carreg Llam and Pistyll farm (see BARDSEY).

The area of the ancient county is 361,156 acres, with a population in 1901 of 126,883. The area of the administrative county is 365,986 acres. The inhabitants practically all speak Welsh (slightly differing, especially in Lleyn, from that of Anglesey). Over 80 is the percentage in Carnarvonshire, as against over 90 for Anglesey. The county is divided into two parliamentary divisions, south (Eifion) and north (Arfon).

The Carnarvon district of boroughs is formed of Bangor city, Carnarvon, Conway, Criccieth, Nefyn and Pwllheli. There are four municipal boroughs: Bangor (pop. 11,269), Carnarvon (9760), Conway (4681) and Pwllheli (3675). Other urban districts are: Bethesda (5281), Bettws y coed (1070), Criccieth (1406), Llandudno (9279), Llanfairfechan (2769), Penmaenmawr (3503) and Ynyscynhaiarn (4883). Carnarvon, where assizes are held, is in the north Wales circuit. Except a few parishes (in and near Llandudno) in St Asaph diocese, Carnarvonshire is in the diocese of Bangor, and contains sixty-one ecclesiastical parishes or districts, with parts of four others. Bangor, Carnarvon, Pwllheli and Llandudno are the principal towns, with Criccieth, Nefyn, Portmadoc and Tremadoc.

Carnarvonshire was occupied by the Segontiaci, with difficulty subdued by Ostorius Scapula and C. Suetonius Paulinus (Paullinus). From here Agricola crossed to conquer Anglesey. Relics of British forts and camps have been discovered. Caerhun (Caer Rhun) and Carnarvon (Caer Seint) are respectively the old Conovium and Segontium of Britannia Secunda. The county was part of Gwynedd kingdom, until Edward I. in 1277 restricted that to Snowdon proper. The early fortresses at Deganwy, Dinorwic, Dinas Dinlle, &c., and the later castles of Conwy (Conway), Carnarvon, Criccieth and Dolbadarn, bear witness to the warlike character of its inhabitants.

See Edw. Breese, *Kalendar of Gwynedd* (London, 1874).

CARNATIC, or KARNATAK (Kannada, Karnata, Karnataka-desa), a name given by Europeans to a region of southern India, between the Eastern Ghats and the Coromandel coast, in the presidency of Madras. It is ultimately derived, according to Bishop Caldwell (*Grammar of the Dravidian Languages*), from *kar*, "black," and *nadu*, "country," *i.e.* "the black country," "a term very suitable to designate the 'black cotton soil,' as it is called, of the plateau of the Southern Deccan." Properly the name is, in fact, applicable only to the country of the Kanarese extending between the Eastern and Western Ghats, over an irregular area narrowing northwards, from Palghat in the south to Bidar in the north, and including Mysore. The extension of the name to the country south of the Karnata was probably due to the Mahommedan conquerors who in the 16th century overthrew the kingdom of Vijayanagar, and who extended the name which they found used of the country north of the Ghats to that south of them. After this period the plain country of the south came to be called Karnata Payanghat, or "lowlands," as distinguished from Karnata Balaghat, or "highlands." The misapplication of the name Carnatic was carried by the British a step further than by the Mahommedans, it being confined by them to the country below the Ghats, Mysore not being included. Officially, however, this name is no longer applied, "the Carnatic" having become a mere geographical term. Administratively the name Carnatic (or rather Karnatak) is now applied only to the Bombay portion of the original Karnata, viz. the districts of Belgaum, Dharwar and Bijapur, part of North Kanara, and the native states of the Southern Mahratta agency and Kolhapur.

The region generally known to Europeans as the Carnatic, though no longer a political or administrative division, is of great historical importance. It extended along the eastern coast about 600 m. in length, and from 50 to 100 m. in breadth. It was bounded on the north by the Guntur circar, and thence it stretched southward to Cape Comorin. It was divided into the Southern, Central and Northern Carnatic. The region south of the river Coleroon, which passes the town of Trichinopoly, was called the Southern Carnatic. The principal towns of this division were Tanjore, Trichinopoly, Madura, Tranquebar, Negapatam and Tinnevelly. The Central Carnatic extended from the Coleroon river to the river Pennar; its chief towns were Madras, Pondicherry, Arcot, Vellore, Cuddalore, Pulicat, Nellore, &c. The Northern Carnatic extended from the river Pennar to the northern limit of the country; and the chief town was Ongole.[1] The Carnatic, as above defined, comprehended within its limits the maritime provinces of Nellore, Chingleput, South Arcot, Tanjore, Madura and Tinnevelly, besides the inland districts of North Arcot and Trichinopoly. The population of this region consists chiefly of Brahmanical Hindus, the Mahommedans being but thinly scattered over the country. The Brahmans rent a great proportion of the land, and also fill different offices in the collection of the revenue and the administration of justice. Throughout the country they appropriate to themselves a particular quarter in every town, generally the strongest part of it. Large temples and other public monuments of civilization abound. The temples are commonly built in the middle of a square area, and enclosed by a wall 15 or 20 ft. high, which conceals them completely from the public view, as they are never raised above it.

At the earliest period of which any records exist, the country known as the Carnatic was divided between the Pandya and Chola kingdoms, which with that of Chera or Kerala formed the three Tamil kingdoms of southern India. The Pandya kingdom practically coincided in extent with the districts of Madura and Tinnevelly; that of the Cholas extended along the Coromandel coast from Nellore to Pudukottai, being bounded on the north by the Pennar river and on the south by the Southern Vellaru. The government of the country was shared for centuries with these dynasties by numerous independent or semi-independent chiefs, evidence of whose perennial internecine conflicts is

[1] As a geographical term, Carnatic is not now applied to the district north of Pennar.

preserved in the multitudes of forts and fortresses the deserted ruins of which crown almost all the elevated points. In spite, however, of this passion of the military classes for war the Tamil civilization developed in the country was of a high type. This was largely due to the wealth of the country, famous in the earliest times as now for its pearl fisheries. Of this fishery Korkai (the Greek Κόλχοι), now a village on the Tambraparni river in Tinnevelly, but once the Pandya capital, was the centre long before the Christian era. In Pliny's day, owing to the silting up of the harbour, its glory had already decayed and the Pandya capital had been removed to Madura (*Hist. Nat.* vi. cap. xxiii. 26), famous later as a centre of Tamil literature. The Chola kingdom, which four centuries before Christ had been recognized as independent by the great Maurya king Asoka, had for its chief port Kaviripaddinam at the mouth of the Cauvery, every vestige of which is now buried in sand. For the first two centuries after Christ a large sea-borne trade was carried on between the Roman empire and the Tamil kingdoms; but after Caracalla's massacre at Alexandria in A.D. 215 this ceased, and with it all intercourse with Europe for centuries. Henceforward, until the 9th century, the history of the country is illustrated only by occasional and broken lights. The 4th century saw the rise of the Pallava power,[1] which for some 400 years encroached on, without extinguishing, the Tamil kingdoms. When in A.D. 640 the Chinese traveller Hsüan Tsang visited Kanchi (Conjevaram), the capital of the Pallava king, he learned that the kingdom of Chola (Chu-li-ya) embraced but a small territory, wild, and inhabited by a scanty and fierce population; in the Pandya kingdom (Malakuta), which was under Pallava suzerainty, literature was dead, Buddhism all but extinct, while Hinduism and the naked Jain saints divided the religious allegiance of the people, and the pearl fisheries continued to flourish. The power of the Pallava kings was shaken by the victory of Vikramaditya Chalukya in A.D. 740, and shattered by Aditya Chola at the close of the 9th century. From this time onward the inscriptional records are abundant. The Chola kingdom, which in the 9th century had been weak, now revived, its power culminating in the victories of Rajaraja the Great, who defeated the Chalukyas after a four years' war, and, about A.D. 994, forced the Pandya kings to become his tributaries. A magnificent temple at Tanjore, once his capital, preserves the records of his victories engraved upon its walls. His career of conquest was continued by his son Rajendra Choladeva I., self-styled Gangaikonda owing to his victorious advance to the Ganges, who succeeded to the throne in A.D. 1018. The ruins of the new capital which he built, called Gangaikonda Cholapuram, still stand in a desolate region of the Trichinopoly district. His successors continued the eternal wars with the Chalukyas and other dynasties, and the Chola power continued in the ascendant until the death of Kulottunga Chola III. in 1278, when a disputed succession caused its downfall and gave the Pandyas the opportunity of gaining for a few years the upper hand in the south. In 1310, however, the Mahommedan invasion under Malik Kafur overwhelmed the Hindu states of southern India in a common ruin. Though crushed, however, they were not extinguished; a period of anarchy followed, the struggle between the Chola kings and the Mussulmans issuing in the establishment at Kanchi of a usurping Hindu dynasty which ruled till the end of the 14th century, while in 1365 a branch of the Pandyas succeeded in re-establishing itself in part of the kingdom of Madura, where it survived till 1623. At the beginning of the 15th century the whole country had come under the rule of the kings of Vijayanagar; but in the anarchy that followed the overthrow of the Vijayanagar empire by the Mussulmans in the 16th century, the Hindu viceroys (*nayakkas*) established in Madura, Tanjore and Kanchi made themselves independent, only in their turn to become tributary to the kings of Golconda and Bijapur, who divided the Carnatic between them. Towards the close of the 17th century the country was reduced by the armies of Aurangzeb, who in 1692 appointed Zulfikar Ali nawab of the Carnatic, with his seat at Arcot. Meanwhile, the Mahratta power had begun to develop; in 1677 Sivaji had suppressed the last remnants of the Vijayanagar power in Vellore, Gingee and Kurnool, while his brother Ekoji, who in 1674 had overthrown the Nayakkas of Tanjore, established in that city a dynasty which lasted for a century. The collapse of the Delhi power after the death of Aurangzeb produced further changes. The nawab Saadet-allah of Arcot (1710–1732) established his independence; his successor Dost Ali (1732–1740) conquered and annexed Madura in 1736, and his successors were confirmed in their position as nawabs of the Carnatic by the nizam of Hyderabad after that potentate had established his power in southern India. After the death of the nawab Mahommed Anwar-ud-din (1744–1749), the succession was disputed between Mahommed Ali and Husein Dost. In this quarrel the French and English, then competing for influence in the Carnatic, took opposite sides. The victory of the British established Mahommed Ali in power over part of the Carnatic till his death in 1795. Meanwhile, however, the country had been exposed to other troubles. In 1741 Madura, which the nawab Dost Ali (1732–1740) had added to his dominions in 1736, was conquered by the Mahrattas; and in 1743 Hyder Ali of Mysore overran and ravaged the central Carnatic. The latter was reconquered by the British, to whom Madura had fallen in 1758; and, finally, in 1801 all the possessions of the nawab of the Carnatic were transferred to them by a treaty which stipulated that an annual revenue of several lakhs of pagodas should be reserved to the nawab, and that the British should undertake to support a sufficient civil and military force for the protection of the country and the collection of the revenue. On the death of the nawab in 1853 it was determined to put an end to the nominal sovereignty, a liberal establishment being provided for the family.

The southern Carnatic, when it came into the possession of the British, was occupied by military chieftains called poligars, who ruled over the country, and held lands by doubtful tenures. They were unquestionably a disorderly race; and the country, by their incessant feuds and plunderings, was one continued scene of strife and violence. Under British rule they were reduced to order, and their forts and military establishments were destroyed.

See INDIA: *History*. For the various applications of the name Carnatic see the *Imperial Gazetteer of India* (Oxford, 1908), *s.v.*; for the results of the latest researches in the early history of the country see V. A. Smith, *Early History of India* (2nd ed., Oxford, 1908), and Robert Sewell, *A Forgotten Empire* (Vijayanagar), (London, 1900).

CARNATION (*Dianthus Caryophyllus*), natural order Caryophyllaceae), a garden flower, a native of southern Europe, but occasionally found in an apparently wild state in England. It has long been held in high estimation for the beauty and the delightful fragrance of its blossoms. The varieties are numerous, and are ranged under three groups, called *bizarres*, *flakes* and *picotees*. The last, from their distinctness of character, are now generally looked upon as if they were a different plant, whereas they are, in truth, but a seminal development from the carnation itself, their number and variety being entirely owing to the assiduous endeavours of the modern florist to vary and to improve them.

The true carnations, as distinguished from picotees, are those which have the colours arranged in longitudinal stripes or bars of variable width on each petal, the ground colour being white. The *bizarres* are those in which stripes of two distinct colours occur on the white ground, and it is on the purity of the white ground and the clearness and evenness of the striping that the technical merit of each variety rests. There are scarlet bizarres

[1] The Pallavas are supposed by some authorities to be identical with the Pahlavas (Parthians of Persia), who, with the Sakas and Yavanas, settled in western India about A.D. 100. Mr Vincent Smith, however, who in the 1st edition (1904) of his *Early History of India* maintained this view, says in the 2nd edition (1908, p. 423) that "recent research does not support this hypothesis," and that "it seems more likely that the Pallavas were a tribe, clan or caste which was formed in the northern part of the existing Madras Presidency." The evidence points to their having been a race distinct from the Tamils.

marked with scarlet and maroon, crimson bizarres marked with crimson and purple, and pink and purple bizarres marked with those two colours. The *flakes* have stripes of only one colour on the white ground; purple flakes are striped with purple, scarlet flakes with scarlet, and rose flakes with rose colour. The *selfs*, those showing one colour only, as white, yellow, crimson, purple, &c., are commonly called *cloves*.

The *picotee* has the petals laced instead of striped with a distinct colour; the subgroups are red-edged, purple-edged, rose-edged and scarlet-edged, all having white grounds; each group divides into two sections, the heavy-edged and the light-edged. In the heavy-edged the colour appears to be laid on in little touches, passing from the edge inwards, but so closely that they coalesce into one line of colour from $\frac{1}{12}$ to $\frac{1}{8}$ of an inch broad, and more or less feathered on the inner edge, the less feathered the better; the light-edged display only a fine edge, or "wire" edge, of colour on the white ground. Yellow picotees are a group of great beauty, but deficient in correct marking.

During the decade 1898–1908 a new American race of carnations became very popular with British growers. As the plants flower chiefly during the winter—from October till the end of March—they are known as "winter flowering" or "perpetual"; they are remarkable for the charming delicacy and colouring of the blossoms and for the length of the flower-stalks. This enables them to be used with great effect during the dullest months of the year for all kinds of floral decorations. These varieties are propagated by layers or cuttings or "pipings."

"Marguerite" carnations are lovely annuals remarkable for their beautifully fringed blossoms. They are easily raised from seeds every year, and should be treated like half-hardy annuals.

What trade growers call "jacks" are seedling carnations with single flowers of no great value or beauty. Thousands of these are raised every year for supplying "grass" (as the foliage is called) to put with choicer varieties. Costermongers take advantage of the ordinary householders' ignorance of plants by selling "jacks" as choice varieties at a high price.

Carnations are usually propagated by "layering" the non-flowering shoots about the second or third week in July, in the open air; but almost at any period when proper shoots can be obtained under glass. Cuttings or "pipings" are also inserted in rich but very gritty soil in cold frames, or in beds with gentle bottom heat in greenhouses. The rooted layers may be removed and potted or planted out towards the end of September, or early in October, the choice sorts being potted in rather small pots and kept in a cold frame during winter, when damp is dangerous.

New varieties can only be obtained from carefully saved seeds, or when a "sport" is produced—*i.e.* when a shoot with a flower differing entirely in colour from that of the parent plant appears unexpectedly. "Malmaison" carnations arose in this way, and are largely cultivated in greenhouses.

The soil for carnations and picotees should be a good turfy loam, free from wireworm, and as fibry as it can be obtained; to four parts of this add one part of rotten manure and one of leaf-mould, with sufficient sharp sand to keep it loose. A moderate addition of old lime rubbish will also be an advantage. This should be laid up in a dry place, and frequently turned over so as to be in a free friable condition for use towards the end of February or early in March.

Carnations are subject to several diseases, the worst being the "rust" (*Uromyces Caryophilinus*), "leaf-spot" and maggot. The first two are checked or prevented by spraying the plants with sulphide of potassium (1 oz. to 10 gallons of water), taking care to avoid the painted woodwork; while the only way to deal with the carnation maggot is to pierce the centre of attacked plants with a needle, and to destroy the eggs whenever they are observed.

Descriptive lists of the best varieties may be had from all the leading nurserymen.

CARNEA, one of the great national festivals of Sparta, held in honour of Apollo Carneus. Whether Carneus (or Carnus) was originally an old Peloponnesian divinity subsequently identified with Apollo, or merely an "emanation" from him, is uncertain; but there seems no reason to doubt that Carneus means "the god of flocks and herds" (Hesychius, *s.v.* Κάρνος), in a wider sense, of the harvest and the vintage. The chief centre of his worship was Sparta, where the Carnea took place every year from the 7th to the 15th of the month Carneus (= Metageitnion, August). During this period all military operations were suspended. The Carnea appears to have been at once agrarian, military and piacular in character. In the last aspect it is supposed to commemorate the death of Carnus, an Acarnanian seer and favourite of Apollo, who, being suspected of espionage, was slain by one of the Heraclidae during the passage of the Dorians from Naupactus to Peloponnesus. By way of punishment, Apollo visited the army with a pestilence, which only ceased after the institution of the Carnea. The tradition is probably intended to explain the sacrifice of an animal (perhaps a later substitute for a human being) as the representative of the god.

The agrarian and military sides of the festival are clearly distinguished. (1) Five unmarried youths (Καρνεᾶται) were chosen by lot from each [tribe] for four years, to superintend the proceedings, the officiating priest being called ἀγητής ("leader"). A man decked with garlands (possibly the priest himself) started running, pursued by a band of young men called σταφυλοδρόμοι ("running with bunches of grapes in their hands"); if he was caught, it was a guarantee of good fortune to the city; if not, the reverse. (2) In the second part of the festival nine tents were set up in the country, in each of which nine citizens, representing the phratries (or *obae*), feasted together in honour of the god (for huts or booths extemporized as shelters compare the Jewish feast of Tabernacles; and see W. Warde Fowler in *Classical Review*, March 1908, on the country festival in Tibullus ii. 1). According to Demetrius of Scepsis (in Athenaeus iv. 141), the Carnea was an imitation of life in camp, and everything was done in accordance with the command of a herald. In regard to the sacrifice, which doubtless formed part of the ceremonial, all that is known is that a ram was sacrificed at Thurii. Other indications point to the festival having assumed a military character at an early date, as might have been expected among the warlike Dorians, although some scholars deny this. The general meaning of the agrarian ceremony is clear, and has numerous parallels in north European harvest-customs, in which an animal (or man disguised as an animal) was pursued by the reapers, the animal if caught being usually killed; in any case, both the man and the animal represent the vegetation spirit. E. H. Binney in *Classical Review* (March 1905) suggests that the story of Alcestis was performed at the Carnea (to which it may have become attached with the name of Apollo) as a vegetation drama, and "embodied a Death and Resurrection ceremony."

The great importance attached to the festival and its month is shown in several instances. It was responsible for the delay which prevented the Spartans from assisting the Athenians at the battle of Marathon (Herodotus vi. 106), and for the despatch of a small advance guard under Leonidas to hold Thermopylae instead of the main army (Herodotus vii. 206). Again, when Epidaurus was attacked in 419 by Argos, the movements of the Spartans under Agis against the latter were interrupted until the end of the month, while the Argives (on whom, as Dorians, the custom was equally binding), by manipulating the calendar, avoided the necessity of suspending operations (see Grote, *Hist. of Greece*, ch. 56; Thucydides v. 54).

See S. Wide, *Lakonische Kulte* (1893), and article "Karneios" in Roscher's *Lexikon*; L. Couve in Daremberg and Saglio's *Dictionnaire des antiquités*; W. Mannhardt, *Mythologische Forschungen* (1883), p. 170, and *Wald- und Feldkulte* (2nd ed., 1905), ii. 254; L. R. Farnell, *Cults of the Greek States*, iv. (1907); G. Schömann, *Griechische Altertümer* (ed. J. H. Lipsius, 1902); J. G. Frazer on Pausanias, iii. 13, 3; H. Usener in *Rheinisches Museum*, liii. (1898), p. 377; J. Vürtheim in *Mnemosyne*, xxxi. (1903), p. 234.

CARNEADES (214–129 B.C.), Greek philosopher, founder of the Third or New Academy, was born at Cyrene. Little is known of his life. He learned dialectics under Diogenes the Stoic, and under Hegesinus, the third leader of the Academy in descent from Arcesilaus. The chief objects of his study, however,

were the works of Chrysippus, opposition to whose views is the mainspring of his philosophy. "If Chrysippus had not been," he is reported to have said, "I had not been either." In 155, together with Diogenes the Stoic and Critolaus the Peripatetic, he was sent on an embassy to Rome to justify certain depredations committed by the Athenians in the territory of Oropus. On this occasion he delivered two speeches on successive days, one in favour of justice, the other against it. His powerful reasoning excited among the Roman youth an enthusiasm for philosophical speculations, and the elder Cato insisted on Carneades and his companions being dismissed from the city.

Carneades, practically a 5th-century sophist, is the most important of the ancient sceptics. Negatively, his philosophy is a polemic against the Stoic theory of knowledge in all its aspects. All our sensations are relative, and acquaint us, not with things as they are, but only with the impressions that things produce upon us. Experience, he says, clearly shows that there is no true impression. There is no notion that may not deceive us; it is impossible to distinguish between false and true impressions; therefore the Stoic *φαντασία καταληπτική* (see STOICS) must be given up. There is no criterion of truth. Carneades also assailed Stoic theology and physics. In answer to the doctrine of final cause, of design in nature, he points to those things which cause destruction and danger to man, to the evil committed by men endowed with reason, to the miserable condition of humanity, and to the misfortunes that assail the good man. There is, he concludes, no evidence for the doctrine of a divine superintending providence. Even if there were orderly connexion of parts in the universe, this may have resulted quite naturally. No proof can be advanced to show that this world is anything but the product of natural forces. Carneades further attacked the very idea of God. He points out the contradiction between the attributes of infinity and individuality. Like Aristotle, he insists that virtue, being relative, cannot be ascribed to God. Not even intelligence can be an attribute of the divine Being. Nor can he be conceived of as corporeal or incorporeal. If corporeal, he must be simple or compound; if a simple and elementary substance, he is incapable of life and thought; if compound, he contains in himself the elements of dissolution. If incorporeal, he can neither act nor feel. In fact, nothing whatever can be asserted with certainty in regard to God. The general line of argument followed by Carneades anticipates much in modern thought.

The positive side of his teaching resembles in all essentials that of Arcesilaus (*q.v.*). Knowledge being impossible, a wise man should practise *ἐποχή* (suspension of judgment). He will not even be sure that he can be sure of nothing. Ideas or notions are never true, but only probable; nevertheless, there are degrees of probability, and hence degrees of belief, leading to action. According to Carneades, an impression may be probable in itself; probable and uncontradicted (*ἀπερίσπαστος*, lit. "not pulled aside," not distracted by synchronous sensations, but shown to be in harmony with them) when compared with others; probable, uncontradicted, and thoroughly investigated and confirmed. In the first degree there is a strong persuasion of the propriety of the impression made; the second and third degrees are produced by comparisons of the impression with others associated with it, and an analysis of itself. His views on the *summum bonum* are not clearly known even to his disciple and successor Clitomachus. He seems to have held that virtue consisted in the direction of activity towards the satisfaction of the natural impulses. Carneades left no written works; his opinions seem to have been systematized by Clitomachus.

See A. Geffers, *De Arcesilae Successoribus* (1845); C. Gouraud, *De Carneadis Vita et Placitis* (1848); V. Brochard, *Les Sceptiques grecs* (1887); C. Martha, "Le Philosophe Carnéade à Rome," in *Revue des deux mondes*, xxix. (1878), and the histories of philosophy; also ACADEMY, GREEK.

CARNEGIE, ANDREW (1837–), American "captain of industry" and benefactor, was born in humble circumstances in Dunfermline, Scotland, on the 25th of November 1837. In 1848 his father, who had been a Chartist, emigrated to America, settling in Allegheny City, Pennsylvania. The raw Scots lad started work at an early age as a bobbin-boy in a cotton factory, and a few years later was engaged as a telegraph clerk and operator. His capacity was perceived by Mr T. A. Scott of the Pennsylvania railway, who employed him as a secretary; and in 1859, when Scott became vice-president of the company, he made Carnegie superintendent of the western division of the line. In this post he was responsible for several improvements in the service; and when the Civil War opened he accompanied Scott, then assistant secretary of war, to the front. The first sources of the enormous wealth he subsequently attained were his introduction of sleeping-cars for railways, and his purchase (1864) of Storey Farm on Oil Creek, where a large profit was secured from the oil-wells. But this was only a preliminary to the success attending his development of the iron and steel industries at Pittsburg. Foreseeing the extent to which the demand would grow in America for iron and steel, he started the Keystone Bridge works, built the Edgar Thomson steel-rail mill, bought out the rival Homestead steel works, and by 1888 had under his control an extensive plant served by tributary coal and iron fields, a railway 425 m. long, and a line of lake steamships. As years went by, the various Carnegie companies represented in this industry prospered to such an extent that in 1901, when they were incorporated in the United States Steel Corporation, a trust organized by Mr J. Pierpont Morgan, and Mr Carnegie himself retired from business, he was bought out at a figure equivalent to a capital of approximately £100,000,000.

From this time forward public attention was turned from the shrewd business capacity which had enabled him to accumulate such a fortune to the public-spirited way in which he devoted himself to utilizing it on philanthropic objects. His views on social subjects, and the responsibilities which great wealth involved, were already known in a book entitled *Triumphant Democracy*, published in 1886, and in his *Gospel of Wealth* (1900). He acquired Skibo Castle, in Sutherlandshire, Scotland, and made his home partly there and partly in New York; and he devoted his life to the work of providing the capital for purposes of public interest, and social and educational advancement. Among these the provision of public libraries in the United States and United Kingdom (and similarly in other English-speaking countries) was especially prominent, and "Carnegie libraries" gradually sprang up on all sides, his method being to build and equip, but only on condition that the local authority provided site and maintenance, and thus to secure local interest and responsibility. By the end of 1908 he had distributed over £10,000,000 for founding libraries alone. He gave £2,000,000 in 1901 to start the Carnegie Institute at Pittsburg, and the same amount (1902) to found the Carnegie Institution at Washington, and in both of these, and other, cases he added later to the original endowment. In Scotland he gave £2,000,000 in 1901 to establish a trust for providing funds for assisting education at the Scottish universities, a benefaction which led in 1906 to his being elected lord rector of Edinburgh University. He was a large benefactor of the Tuskegee Institute under Booker Washington for negro education. He also established large pension funds—in 1901 for his former employés at Homestead, and in 1905 for American college professors. His benefactions in the shape of buildings and endowments for education and research are too numerous for detailed enumeration, and are noted in this work under the headings of the various localities. But mention must also be made of his founding of Carnegie Hero Fund commissions, in America (1904) and in the United Kingdom (1908), for the recognition of deeds of heroism; his contribution of £500,000 in 1903 for the erection of a Temple of Peace at The Hague, and of £150,000 for a Pan-American Palace in Washington as a home for the International Bureau of American republics. In all his ideas he was dominated by an intense belief in the future and influence of the English-speaking people, in their democratic government and alliance for the purpose of peace and the abolition of war, and in the progress of education on unsectarian lines. He was a powerful supporter of the movement for spelling reform, as a means of promoting

the spread of the English language. Mr Carnegie married in 1887 and had one daughter. Among other publications by him were *An American Four-in-hand in Britain* (1883), *Round the World* (1884), *The Empire of Business* (1902), a *Life of James Watt* (1905) and *Problems of To-day* (1908).

CARNEGIE, a borough of Allegheny county, Pennsylvania, U.S.A., 6 m. S.W. of Pittsburg. Pop. (1900) 7330, of whom 1816 were foreign-born. It is served by the Pittsburg, Cincinnati, Chicago & St Louis, the Pittsburg, Chartiers & Youghiogheny, and the Wabash Pittsburg Terminal railways, and the Pittsburg street railway. Carnegie is situated in the beautiful valley of Chartiers Creek, and is in one of the coal and natural gas districts of the state. In the borough are a Carnegie library and St Paul's orphan asylum. Among the borough's manufactures are steel, lead, glass, ploughs and enamel- and tin-ware. There are alkaline and lithia mineral springs here. In 1894 Carnegie, named in honour of Andrew Carnegie, was formed by the union of the boroughs Chartiers and Mansfield.

CARNELIAN, a red variety of chalcedony, much used as an ornamental stone, especially for seals. The old name was cornelian, said to have been given in reference either to the horny appearance of the stone (Lat. *cornu*, "horn") or to its resemblance in colour to the berry of the cornel; but the original word was corrupted to carnelian, probably in allusion to its reddish colour (*carneus*, "flesh-coloured"). Some carnelian, however, is brown, yellow or even white. Certain kinds of brown and bright red chalcedony, much resembling carnelian, pass under the name of sard (*q.v.*). The Hebrew *odem* was probably a red stone, either carnelian, sard or jasper. All carnelian is translucent and is thus distinguished from jasper of similar colour, which is always opaque. The red colour of typical carnelian is due to the presence of ferric oxide. This is often developed artificially by exposure to sunshine, or to artificial heat, whereby any ferric hydrate in the stone becomes more or less dehydrated; or the stone is treated with a solution of an iron salt, like ferrous sulphate, and then heated, when ferric oxide is formed in the pores of the stone. An opaque white surface is sometimes produced artificially on a red carnelian: this is said to be done by coating the stone with carbonate of soda and then placing it on a red-hot iron; or by using a mixture of potash, white lead and certain vegetable juices, and heating it on charcoal. Inscriptions and figures in white on red carnelian ("burnt carnelian") are well known from the East. Much carnelian comes from India, being mostly derived from agate-gravels, resulting from the disintegration of the Deccan traps, in the neighbourhood of Ratanpur, near Broach. A good deal of the carnelian now sold, however, is Brazilian agate, artificially stained. (See AGATE.)

CARNESECCHI, PIETRO (1508–1567), Italian humanist, was the son of a Florentine merchant, who under the patronage of the Medici, and especially of Giovanni de' Medici as Pope Clement VII., rapidly rose to high office at the papal court. He came into touch with the new learning at the house of his maternal uncle, Cardinal Bernardo Dovizzi, in Rome. At the age of twenty-five he held several rich livings, had been notary and protonotary to the Curia, and was first secretary to the pope, in which capacity he conducted the correspondence with the nuncios (among them Pier Paolo Bergerio in Germany) and a host of other duties. By his conduct at the conference with Francis I. at Marseilles he won the favour of Catherine de' Medici and other influential personages at the French court, who in later days befriended him. He made the acquaintance of the Spanish reformer Juan de Valdes at Rome, and got to know him as a theologian at Naples, being especially drawn to him through the appreciation expressed by Bernardino Ochino, and through their mutual friendship with the Lady Julia Gonzaga, whose spiritual adviser he became after the death of Valdes. He became a leading spirit in the literary and religious circle that gathered round Valdes in Naples, and that aimed at effecting from within the spiritual reformation of the church. Under Valdes' influence he whole-heartedly accepted Luther's doctrine of justification by faith, though he repudiated a policy of schism. When the movement of suppression began, Carnesecchi was implicated. For a time he found shelter with his friends in Paris, and from 1552 he was in Venice leading the party of reform in that city. In 1557 he was cited (for the second time) before the tribunal in Rome, but refused to appear. The death of Paul IV. and the accession of Pius IV. in 1559 made his position easier, and he came to live in Rome. With the accession of Pius V. (Michael Ghislieri) in 1565 the Inquisition renewed its activities with fiercer zeal than ever. Carnesecchi was in Venice when the news reached him, and betook himself to Florence, where, thinking himself safe, he was betrayed by Cosimo, the duke, who wished to curry favour with the pope. From July 1566 he lay in prison over a year. On the 21st of September 1567 sentence of degradation and death was passed on him and sixteen others, ambassadors from Florence vainly kneeling to the pope for some mitigation, and on the 1st of October he was publicly beheaded and then burned.

CARNIOLA (Ger. *Krain*), a duchy and crown-land of Austria, bounded N. by Carinthia, N.E. by Styria, S.E. and S. by Croatia, and W. by Görz and Gradisca, Trieste and Istria. It has an area of 3856 sq. m. Carniola is for the most part a mountainous region, occupied in the N. by the Alps, and in the S. by the Karst (*q.v.*) or Carso Mountains. It is traversed by the Julian Alps, the Karawankas and the Steiner Alps, which belong all to the southern zone of the Eastern Alps. The highest point in the Julian Alps is formed by the three sugar-loaf peaks of the Triglav or Terglou (9394 ft.), which offers one of the finest views in the whole of the Alps, and which bears on its northern declivity the only glacier in the province. The Triglav is the dividing range between the Alps and the Karst Mountains, and its huge mass also forms the barrier between three races: the German, the Slavonic and the Italian. Other high peaks are the Mangart (8784 ft.) and the Jaluz (8708 ft.). The Karawankas, which form the boundary between Carinthia and Carniola, have as their highest peak the Stou or Stuhlberg (7344 ft.), and are traversed by the Loibl Pass (4492 ft.). They are continued by the Steiner or Santhaler Alps, which have as their highest peak the Grintouz or Grintovc (8393 ft.). This peak is situated on the threefold boundary of Carinthia, Carniola and Styria, and affords a magnificent view of the whole Alpine neighbouring region. The southern part of Carniola is occupied by the following divisions of the northern ramifications of the Karst Mountains: the Birnbaumer Wald with the highest peak, the Nanos (4275 ft.), and the Krainer Schneeberg (5890 ft.); the Hornwald with the highest peak, the Hornbüchl (3608 ft.), and the Uskokengebirge (3874 ft.). The portion of Carniola belonging to the Karst region presents a great number of caves, subterranean streams, funnels and similar phenomena. Amongst the best-known are the grottos of Adelsberg, the larger ones of Planina and the Kreuzberghöhle near Laas.

With the exception of the Idria and the Wippach, which as tributaries of the Isonzo belong to the basin of the Adriatic, Carniola belongs to the watershed of the Save. The Save or Sau rises within the duchy, and is formed by the junction at Radmannsdorf of its two head-streams the Wurzener Save and the Wocheiner Save. Its principal affluents are the Kanker and the Steiner Feistritz on the left, and the Zeyer or Sora, the Laibach and the Gurk on the right. The most remarkable of these rivers is the Laibach, which rises in the Karst region under the name of Poik, takes afterwards a subterranean course and traverses the Adelsberg grotto, and appears again on the surface near Planina under the name of Unz. Shortly after this it takes for the second time a subterranean course, to appear finally on the surface near Oberlaibach. The small torrent of Rothwein, which flows into the Wurzener Save, forms near Veldes the splendid series of cascades known as the Rothwein Fall. Amongst the principal lakes are the Wochein, the Weissenfels, the Veldes, and the seven small lakes of the Triglav; while in the Karst region lies the famous periodical lake of Zirknitz, known to the Romans as *Lacus Lugens* or *Lugea Palus*.

The climate is rather severe, and the southern part is exposed to the cold north-eastern wind, known as the Bora. The mean

annual temperature at Laibach is 48·4° F., and the rainfall amounts to 72 ins. Of the total area only 14·8% is under cultivation, and the crops do not suffice for the needs of the province; forests occupy 44·4%, 17·2% are meadows, 15·7% are pastures, and 1·17% of the soil is covered by vineyards. Large quantities of flax are grown, while the timber trade is of considerable importance. Fish and game are plentiful, and the silkworm is bred in the warmer districts. The principal mining product is mercury, extracted at Idria, while iron and copper ore, zinc and coal are also found. The industry is not well developed, but the weaving of linen and lace is pursued as a household industry.

Carniola had in 1900 a population of 508,348, which corresponds to 132 inhabitants per sq. m. Nearly 95% were Slovenes and 5% Germans, while 99% of the population belonged to the Roman Catholic Church. The local diet, of which the bishop of Laibach is a member *ex officio*, is composed of thirty-seven members, and Carniola sends eleven deputies to the Reichsrat at Vienna. For administrative purposes the province is divided into eleven districts and one autonomous municipality, Laibach (pop. 36,547), the capital. Other important places are Oberlaibach (5882), Idria (5772), Gurkfeld (5294), Zirknitz (5266), Adelsberg (3636), Neumarktl (2626), Krainburg (2484) and Gottschee (2421).

Carniola derives its modern name from the Slavonic word *Krajina* (frontier). During the Roman Empire it formed part of Noricum and Pannonia. The Slavonic population settled here during the end of the 6th and the beginning of the 7th century. Conquered by Charlemagne, the most of the district was bestowed on the duke of Friuli; but in the 10th century the title of margrave of Carniola began to be borne by a family resident in the castle of Kieselberg near Krainburg. Various parts of the present territory were, however, held by other lords, such as the duke of Carinthia and the bishop of Freising. Towards the close of the 14th century all the separate portions had come by inheritance or bequest into the hands of Rudolph IV. of Austria, who took the title of duke of Carniola; and since then the duchy has remained a part of the Austrian possessions, except during the short period from 1809 to 1813, when it was incorporated with the French Illyrian Provinces. In 1849 it became a separate crown-land.

See Dimitz, *Geschichte Krains von der ältesten Zeit bis 1813* (4 vols., Laibach, 1874–1876).

CARNIVAL (Med. Lat. *carnelevarium*, from *caro*, *carnis*, flesh, and *levare*, to lighten or put aside; the derivation from *valere*, to say farewell, is unsupported), the last three days preceding Lent, which in Roman Catholic countries are given up to feasting and merry-making. Anciently the carnival was held to begin on twelfth night (6th January) and last till midnight of Shrove Tuesday. There is little doubt that this period of licence represents a compromise which the church always inclined to make with the pagan festivals and that the carnival really represents the Roman Saturnalia. Rome has ever been the headquarters of carnival, and though some popes, notably Clement IX. and XI. and Benedict XIII., made efforts to stem the tide of Bacchanalian revelry, many of the popes were great patrons and promoters of carnival keeping. Paul II. was notable in this respect. In his time the Jews of Rome were compelled to pay yearly a sum of 1130 golden florins (the thirty being added as a special memorial of Judas and the thirty pieces of silver), which was expended on the carnival. A decree of Paul II., minutely providing for the diversions, orders that four rings of silver gilt should be provided, two in the Piazza Navona and two at the Monte Testaccio—one at each place for the burghers and the other for the retainers of the nobles to practise riding at the ring. The pope also orders a great variety of races, the expenses of which are to be paid from the papal exchequer—one to be run by the Jews, another for Christian children, another for Christian young men, another for sexagenarians, a fifth for asses, and a sixth for buffaloes. Under Julius III. we have long accounts of bull-hunts—or rather bull-baits—in the Forum, with gorgeous descriptions of the magnificence of the dresses, and enormous suppers in the palace of the Conservatori in the capitol, where seven cardinals, together with the duke Orazio Farnese, supped at one table, and all the ladies by themselves at another. After the supper the whole party went into the courtyard of the palace, which was turned into the semblance of a theatre, "to see a most charming comedy which was admirably played, and lasted so long that it was not over till ten o'clock!" Even the austere and rigid Paul IV. (*ob.* 1559) used to keep carnival by inviting all the Sacred College to dine with him. Sixtus V., who was elected in 1585, set himself to the keeping of carnival after a different fashion. Determined to repress the lawlessness and crime incident to the period, he set up gibbets in conspicuous places, as well as whipping-posts, the former as a hint to robbers and cut-throats, the latter in store for minor offenders. We find, further, from the provisions made at the time, that Sixtus reformed the evil custom of throwing dirt and dust and flour at passengers, permitting only flowers or sweetmeats to be thrown.

The later popes for the most part restricted the public festivities of the carnival to the last six or seven days immediately preceding Ash Wednesday. The municipal authorities of the city, on whom the regulation of such matters now depends, allow ten days. The carnival sports at Rome anciently consisted of three divisions: (1) the races in the Corso (formerly called the Via Lata, and taking its present name from them), which appear to have been from time immemorial a part of the festivity; (2) the spectacular pageant of the Agona; (3) that of the Testaccio.

Of other Italian cities, Venice used in old times to be the principal home, after Rome, of carnival. To-day Turin, Milan, Florence, Naples, all put forth competing programmes. In old times Florence was conspicuous for the licentiousness of its carnival; and the *Canti Carnascialeschi*, or carnival songs, of Lorenzo de' Medici show to what extent the licence was carried. The carnival in Spain lasts four days, including Ash Wednesday. In France the merry-making is restricted almost entirely to Shrove Tuesday, or *mardi gras*. In Russia, where no Ash Wednesday is observed, carnival gaieties last a week from Sunday to Sunday.

CARNIVORA, the zoological order typified by the larger carnivorous placental land mammals of the present day, such as lions, tigers and wolves, but also including species like bears whose diet is largely vegetable, as well as a number of smaller flesh-eating species, together with the seals and their relatives, and an extinct Tertiary group. Apart from this distinct group (see CREODONTA), the Carnivora are characterized by the following features. They are unguiculate, or clawed mammals, with never less than four toes to each foot, of which the first is never opposable to the rest; the claws, or nails, being more or less pointed although occasionally rudimentary. The teeth comprise a deciduous and a permanent series, all being rooted, and the latter divisible into the usual four series. In front there is a series of small pointed incisors, usually three in number, on each side of both jaws, of which the first is always the smallest and the third the largest, the difference being most marked in the upper jaw; these are followed by strong conical, pointed, recurved canines; the premolars and molars are variable, but generally, especially in the anterior part of the series, more or less compressed, pointed and trenchant; if the crowns are flat and tuberculated, they are never complex or divided into lobes by deep inflexions of enamel. The condyle of the lower jaw is a transversely placed half-cylinder working in a deep glenoid fossa of corresponding form. The brain varies much in size and form, but the hemispheres are never destitute of convolutions. The stomach is always simple and pyriform; the caecum is either absent or short and simple; and the colon is not sacculated or much wider than the small intestine. Vesiculae seminales are never developed, but Cowper's glands may be present or absent. The uterus is two-horned, and the teats are abdominal and variable in number; while the placenta is deciduate, and almost always zonary. The clavicle is often absent, and when present never complete. The radius and ulna are distinct; the scaphoid and lunar of the tarsus are united;

there is never an os centrale in the adult; and the fibula is distinct.

The large majority of the species subsist chiefly on animal food, though many are omnivorous, and a few chiefly vegetable-eaters. The more typical forms live altogether on recently-killed warm-blooded animals, and their whole organization is thoroughly adapted to a predaceous mode of life. In conformity with this manner of obtaining their subsistence, they are generally bold and savage in disposition, though some are capable of being domesticated, and when placed under favourable circumstances exhibit a high degree of intelligence.

I. Fissipedia

The typical section of the group, the Carnivora Vera, Fissipedia or Carnassidentia, includes all the existing terrestrial members of the order, together with the otters and sea-otters. In this section the fore-limbs never have the first digit, or the hind-limbs the first and fifth digits, longer than the others; and the incisors are $\frac{3}{3}$ on each side, with very rare exceptions. The cerebral hemispheres are more or less elongated; always with three or four convolutions on the outer surface forming arches above each other, the lowest surrounding the Sylvian fissure. In the cheek-series there is one specially modified tooth in each jaw, to which the name of "sectorial" or "carnassial" is applied. The teeth in front of this are more or less sharp-pointed and compressed; the teeth behind broad and tuberculated. The characters of the sectorial teeth deserve special attention, as, though fundamentally the same throughout the group, they are greatly modified in different genera. The upper sectorial is the most posterior of the teeth which have predecessors, and is therefore reckoned as the last premolar (*p.* 4 of the typical dentition). It consists of a more or less compressed blade supported on two roots and an inner lobe supported by a distinct root (see fig. 1). The blade when fully developed has three cusps (1, 2 and 3), but the anterior is always small, and often absent. The middle cusp is conical, high and pointed;

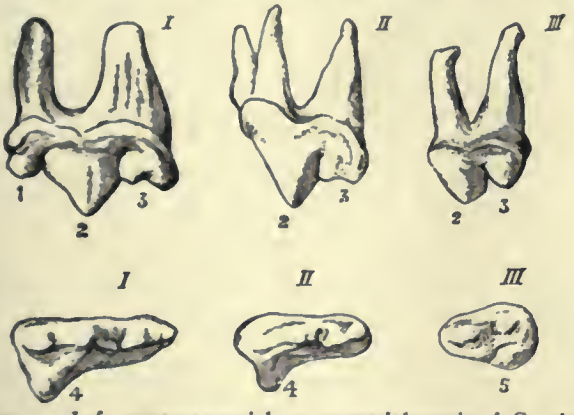

Fig. 1.—Left upper sectorial or carnassial teeth of Carnivora. I, *Felis*; II, *Canis*; III, *Ursus*. 1, anterior, 2, middle, and 3, posterior cusp of blade; 4, inner cusp supported on distinct root; 5, inner cusp, posterior in position, and without distinct root, characteristic of the *Ursidae*.

and the posterior cusp has a compressed, straight, knife-like edge. The inner cusp (4) varies in extent, but is generally placed near the anterior end of the blade, though sometimes median in position. In the *Ursidae* alone both the inner cusp and its root are wanting, and there is often a small internal and posterior cusp (5) without root. In this family also the sectorial is relatively to the other teeth much smaller than in other Carnivora. The lower sectorial (fig. 2) is the most anterior of the teeth without predecessors in the milk-series, and is therefore reckoned the first molar. It has two roots supporting a crown, consisting when fully developed of a compressed bilobed blade (1 and 2), a heel (4), and an inner tubercle (3). The cusps of the blade, of which the hinder (2) is the larger, are separated by a notch, generally prolonged into a linear fissure. In the specialized *Felidae* (I) the blade alone is developed, both heel and inner tubercle being absent or rudimentary. In *Meles* (V) and *Ursus* (VI) the heel is greatly developed, broad and tuberculated. The blade in these cases is generally placed obliquely, its flat or convex (outer) side looking forwards, so that the two lobes or cusps are almost side by side, instead of anterior and posterior. The inner tubercle (3) is generally a conical pointed cusp, placed to the inner side of the hinder lobe of the blade. The special characters of these teeth are more disguised in the sea-otter than in any other species, but even here they can be traced.

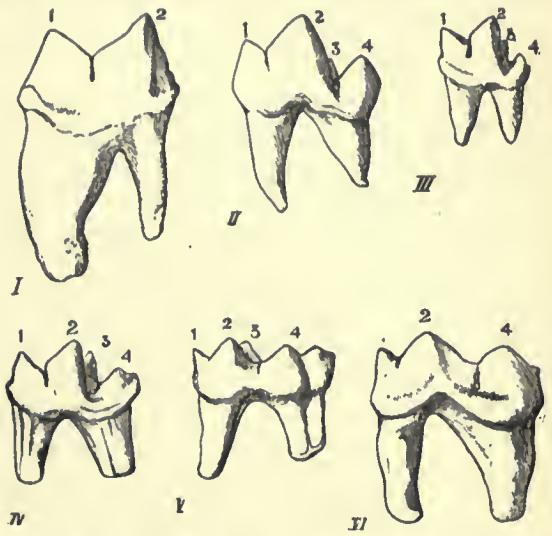

Fig. 2.—Left lower sectorial or carnassial teeth of Carnivora. I, *Felis*; II, *Canis*; III, *Herpestes*; IV, *Lutra*; V, *Meles*; VI, *Ursus*. 1, Anterior cusp of blade; 2, posterior cusp of blade; 3, inner tubercle; 4, heel. It will be seen that the relative size of the two roots varies according to the development of the portion of the crown they respectively support.

The toes are nearly always armed with large, strong, curved and sharp claws, ensheathing the terminal phalanges and held firmly in place by broad plates of bone reflected over their attached ends from the bases of the phalanges. In the *Felidae* these claws are "retractile"; the terminal phalange with the claw attached, folding back in the fore-foot into a sheath by the outer or ulnar side of the middle phalange of the digit, and retained in this position when at rest by a strong elastic ligament. In the hind-foot the terminal joint or phalange is retracted on to the top, and not the side of the middle phalange. By the action of the deep flexor muscles the terminal phalanges are straightened, the claws protruded from their sheath, and the soft "velvety" paw becomes suddenly converted into a formidable weapon of offence. The habitual retraction of the claws preserves their points from wear.

The land Carnivora are best divided into two subgroups or sections—(A) the Aeluroidea, or Herpestoidea, and (B) the Arctoidea; the recognition of a third section, Cynoidea, being rendered untenable by the evidence of extinct forms.

(A) *Aeluroidea.*—In this section, which comprises the cats (*Felidae*), civets (*Viverridae*) and hyenas (*Hyaenidae*), the tympanic bone is more or less ring-like, and forms only a part of the outer wall of the tympanic cavity; an inflated alisphenoid bulla is developed; and the external auditory meatus is short. In the nasal chamber the maxillo-turbinal is small and doubly folded, and does not cut off the naso-turbinal and adjacent bones from the nasal aperture. The carotid canal in the skull is short or absent. Cowper's glands are present, as is a prostate gland and a caecum, as well as a duodenal-jejunal flexure in the intestine, but an os penis is either wanting or small.

Cat tribe.

The members of the cat tribe, or *Felidae*, are collectively characterized by the following features. An alisphenoid is lacking on the lower aspect of the skull. In existing forms the usual dental formula is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{2}$, *m.* $\frac{1}{1}$; the upper molar being rudimentary and placed on the inner side of the carnassial, but the first premolar may be absent, while, as an abnormality, there may be a small second lower molar, which is constantly present in

some of the extinct forms. The auditory bulla and the tympanic are divided by an internal partition. The paroccipital process is separate from, or only extends to a slight degree upon the auditory bulla. The thoracic vertebrae number 13; the feet are digitigrade, with five front and four hind toes, of which the claws are retractile; and the metatarsus is haired all round. Anal glands are present.

As regards the teeth, when considered in more detail, the incisors are small, and the canines large, strong, slightly recurved, with trenchant edges and sharp points, and placed wide apart. The premolars are compressed and sharp-pointed; the most posterior in the upper jaw (the sectorial) being a large tooth, consisting of a compressed blade, divided into three unequal cusps supported by two roots, with a small inner lobe placed near the front and supported by a distinct root (fig. 1, I). The upper molar is a small tubercular tooth placed more or less transversely at the inner side of the hinder end of the last. In the lower jaw the molar (sectorial) is reduced to the blade, which is large, trenchant, compressed and divided into two subequal lobes (fig. 2, I). Occasionally it has a rudimentary heel, but never an inner tubercle. The skull generally is short and rounded, though proportionally more elongated in the larger forms; with the facial portion short and broad, and the zygomatic arches wide and strong. The auditory bullae are large, rounded and smooth. Vertebrae: C. 7, D. 13, L. 7, S. 3, Ca. 13-29. Clavicles better developed than in other Carnivora, but not articulating with either the shoulder-bones or sternum. Of the five front toes, the third and fourth are nearly equal and longest, the second slightly, and the fifth considerably shorter. The first is still shorter, not reaching the metacarpophalangeal articulation of the second. In the hind-feet the third and fourth toes are the longest, the second and fifth somewhat shorter and nearly equal, while the first is represented only by the rudimentary metatarsal bone. The claws are large, strongly curved, compressed, very sharp, and exhibit the retractile condition in the highest degree. The tail varies greatly in length, being in some species a mere stump, in others nearly as long as the body. The ears are of moderate size, more or less triangular and pointed; and the eyes rather large, with the iris mobile, and with a pupillary aperture which contracts under the influence of light in some species to a narrow vertical slit, in others to an oval, and in some to a circular aperture. The tongue is thickly covered with sharp, pointed, recurved horny papillae; and the caecum is small and simple.

As in structure so in habits, the cat may be considered the most specialized of all Carnivora, although they exhibit many features connecting them with extinct types. All the members of the group feed almost exclusively on warm-blooded animals which they have themselves killed, but one Indian species, *Felis viverrina*, is said to prey on fish, and even fresh-water molluscs. Unlike dogs, they never associate in packs, and rarely hunt their prey on open ground, but from some place of concealment wait until the unsuspecting victim comes within reach, or with noiseless and stealthy tread, crouching close to the ground for concealment, approach near enough to make the fatal spring. In this manner they frequently attack and kill animals considerably exceeding their own size. They are mostly nocturnal, and the greater number, especially the smaller species, more or less arboreal. None are aquatic, and all take to the water with reluctance, though some may habitually haunt the banks of rivers or pools, because they more easily obtain their prey in such situations. The numerous species are widely diffused over the greater part of the habitable world, though most abundant in the warm latitudes of both hemispheres. None are, however, found in the Australian region, or in Madagascar. Although the Old World and New World cats (except perhaps the northern lynx) are all specifically distinct, no common structural character has been pointed out by which the former can be separated from the latter. On the contrary, most of the groups into which the family may be divided have representatives in both hemispheres.

Notwithstanding the considerable diversity in external appearance and size between different members of this extensive family, the structural differences are but slight. The principal differences are to be found in the form of the cranium, especially of the nasal and adjoining bones, the completeness of the bony orbit posteriorly, the development of the first upper premolar and of the inner lobe of the upper sectorial, the length of the tail, the form of the pupil, and the condition and coloration of the fur, especially the presence or absence of tufts or pencils of hair on the external ears.

In the typical genus *Felis*, which includes the great majority of the species, and has a distribution coextensive with that of the family, the upper sectorial tooth has a distinct inner cusp, the claws are completely contractile, the tail is long or moderate, and the ears do not carry distinct tufts of hair. As regards the larger species, the lion (*F. leo*), tiger (*F. tigris*), leopard (*F. pardus*), ounce or snow-leopard (*F. uncia*) and clouded leopard (*F. nebulosa*) are described in separate articles. Of other Old World species it must suffice to mention that the Tibetan Fontanier's cat (*F. tristis*), and the Indian marbled cat (*F. marmorata*), an ally of the above-mentioned clouded leopard, appear to be the Asiatic representatives of the American ocelots. The Tibetan Pallas's cat (*F. manul*) has been made the type of a distinct genus, *Trichaelurus*, in allusion to its long coat. One of the largest of the smaller species is the African serval, *q.v.* (*F. serval*), which is yellow with solid black spots, has long limbs, and a relatively short tail. Numerous "tiger-cats" and "leopard-cats," such as the spotted *F. bengalensis* and the uniformly chestnut *F. badia*, inhabit tropical Asia; while representative species occur in Africa. The jungle-cat (*F. chaus*), which in its slightly tufted ears and shorter tail foreshadows the lynxes, is common to both continents. Another African species (*F. ocreata*) appears to have been the chief progenitor of the European domestic cat, which has, however, apparently been crossed to some extent with the ordinary wild cat (*F. catus*). Of the New World species, *F. concolor*, the puma or couguar, commonly called "panther" in the United States, is about the size of a leopard, but of a uniform brown colour, spotted only when young, and is extensively distributed in both North and South America, ranging between the parallels of 60° N. and 50° S., where it is represented by numerous local races, varying in size and colour. *F. onca*, the jaguar, is a larger and more powerful animal than the last, and more resembles the leopard in its colours; it is also found in both North and South America, although with a less extensive range, reaching northwards only as far as Texas, and southwards nearly to Patagonia (see JAGUAR). *F. pardalis* and several allied smaller, elegantly-spotted species inhabiting the intratropical regions of America, are commonly confounded under the name of ocelot or tiger-cat. *F. yaguarondi*, rather larger than the domestic cat, with an elongated head and body, and of a uniform brownish-grey colour, ranges from northern Mexico to Paraguay; while the allied *F. eyra* is a small cat, weasel-like in form, having an elongated head, body and tail, and short limbs, and is of a uniform light reddish-brown colour. It is a native of South America and Mexico. *F. pajeros* is the Pampas cat.

The typical lynxes, as represented by *Lynx borealis* (*L. lynx*), the southern *L. pardina*, and the American *L. rufa*, are a northern group common to both hemispheres, and characterized by their tufted ears, short tail, and the presence of a rudimentary heel to the lower carnassial tooth. As a rule, they are more or less spotted in winter, but tend to become uniformly-coloured in summer. They are connected with the more typical cats by the long-tailed and uniformly red caracal, *Lynx* (*Caracal*) *caracal*, of India, Persia and Africa, and the propriety of separating them from *Felis* may be open to doubt (see LYNX and CARACAL).

However this may be, there can be no doubt of the right of the hunting-leopard or chita (cheeta), as, in common with the leopard, it is called in India, to distinction from all the other cats as a distinct genus, under the name of *Cynaelurus jubatus*. From all the other *Felidae* this animal, which is common to Asia and Africa, is distinguished by the inner lobe of the upper sectorial tooth, though supported by a distinct root, having no salient cusp upon it, by the tubercular molar being more in a line with the other teeth, and by the claws being smaller, less curved and less completely retractile, owing to the feebler development of the elastic ligaments. The skull is short and high, with the frontal region broad and elevated in consequence of the large development of air-sinuses. The head is small and round, the body light, the limbs and tail long, and the colour pale yellowish-brown with small solid black spots (see CHEETA).

Civet tribe.

The family *Viverridae*, which includes the civet-cats, genets and mongooses, is nearly allied to the *Felidae*, but its members have a fuller dentition, and exhibit certain other structural differences from the cats, to the largest of which they make no approach in the matter of bodily size. As a rule, there is an alisphenoid canal; the cheek-dentition is $p.\ \frac{3 \text{ or } 4}{3 \text{ or } 4}$, $m.\ \frac{1 \text{ or } 2}{1 \text{ or } 2}$. The bulla is small and the tympanic large, with a low division between them; and the paroccipital process is leaf-like and spread over the bulla. The number of dorsal vertebrae, except in the aberrant *Proteles*, is 13 or 14; the claws may be either completely or partially retractile or non-retractile; generally each foot has five toes, but there may be four in front and five behind, the reverse of this, or only four on each foot; the gait may be either digitigrade or partially plantigrade; and the metatarsus may be either hairy or naked inferiorly. Anal, and in some cases also perineal, glands are developed. The family is limited to the warmer parts of the Old World.

Considerable difference of opinion prevails with regard to the serial position of the fossa, or foussa (*Cryptoprocta ferox*), of Madagascar, some writers considering that its affinities are so close to the *Felidae* that it ought not to be included in the present family at all. Others, on the contrary, see no reason to separate it from the *Viverrinae* or more typical representatives of the civet-tribe. As a medium course, it may be regarded as the sole representative of a special subfamily—*Cryptoproctinae*—of the *Viverridae*. The subfamily and genus are characterized by possessing a total of 36 teeth, arranged as *i.* $\frac{6}{6}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1}{1}$. The teeth generally closely resemble those of the *Felidae*, the first premolar of both jaws being very minute and early deciduous; the upper sectorial has a small inner lobe, quite at the anterior part; the molar is small and placed transversely; and the lower sectorial has a large trenchant bilobed blade, and a minute heel, but no inner tubercle. The skull is generally like that of *Felis*, but proportionally longer and narrower, with the orbit widely open behind. Vertebrae: C. 7, D. 13, L. 7, S. 3, Ca. 29. Body elongated. Limbs moderate in size. Feet subplantigrade, with five well-developed toes on each, carrying sharp, compressed, retractile claws. Ears moderate. Tail long and

cylindrical. The foussa is a sandy-coloured animal with an exceedingly long tail (see Foussa).

The more typical members of the group, constituting the subfamily *Viverrinae*, are characterized by their sharp, curved and largely retractile claws, the presence of five toes to each foot, and of perineal and one pair of anal glands, and a tympanic bone which retains to a great extent the primitive ring-like form, so that the external auditory meatus has scarcely any inferior lip, its orifice being close to the tympanic ring. The first representatives of the subfamily are the civet-cats, or civets (*Viverra* and *Viverricula*), and the genets (*Genetta*), in all of which the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1}{1}$; total 40. The skull is elongated, with the facial portion small and compressed, and the orbits well-defined but incomplete behind. Vertebrae: C. 7, D. 13, L. 7 (or D. 14, L. 6), S. 3, Ca. 22-30. Body elongated and compressed. Head pointed in front; ears rather small. Extremities short. Feet small and rounded. Toes short, the first on fore and hind feet much shorter than the others. Palms and soles covered with hair, except the pads of the feet and toes, and in some species a narrow central line on the under side of the sole, extending backwards nearly to the heel. Tail moderate or long. The pair of large glands situated on the perineum (in both sexes) secretes an oily substance of a peculiarly penetrating odour. In the true civets, which include the largest members of the group, the teeth are stouter and less compressed than in the other genera; the second upper molar being especially large, and the auditory bulla smaller and more pointed in front; the body is shorter and stouter; the limbs are longer; the tail shorter and tapering. The under side of the tarsus is completely covered with hair, and the claws are longer and less retractile. Fur rather long and loose, and in the middle line of the neck and back especially elongated so as to form a sort of crest or mane. Pupil circular when contracted. Perineal glands greatly developed. These characters apply especially to *V. civetta*, the African civet, or civet-cat, as it is commonly called, an animal rather larger than a fox, and an inhabitant of intratropical Africa. *V. zibetta*, the Indian civet, of about equal size, approaches in many respects, especially in the characters of the teeth and feet and absence of the crest of elongated hair on the back, to the next section. It inhabits Bengal, China, the Malay Peninsula and adjoining islands. *V. tangalunga* is a smaller but nearly allied animal from the same part of the world. From these three species and the next the civet of commerce, once so much admired as a perfume in England, and still largely used in the East, is obtained. The animals are kept in cages, and the odoriferous secretion collected by scraping the interior of the perineal follicles with a spoon or spatula. The single representative of the genus *Viverricula* resembles in many respects the genets, but agrees with the civets in having the whole of the under side of the tarsus hairy; the alisphenoid canal is generally absent. *V. malaccensis*, the rasse, inhabiting India, China, Java and Sumatra, is an elegant little animal which affords a favourite perfume to the Javanese. The genets (*Genetta*) are smaller animals, with more elongated and slender bodies, and shorter limbs than the civets. The skull is elongated and narrow; and the auditory bulla large, elongated and rounded at both ends. The teeth are compressed and sharp-pointed, with a lobe on the inner side of the third, upper premolar not present in the previous genera. Pupil contracting to a linear aperture. Tail long, slender, ringed. Fur short and soft, spotted or cloudy. Under side of the metatarsus with a narrow longitudinal bald streak. *Genetta vulgaris*, or *G. genetta*, the common genet, is found in France south of the river Loire, Spain, south-western Asia and North Africa. *G. felina*, *senegalensis*, *tigrina*, *victoriae* and *pardalis* are other named species, all African in habitat.

The Malagasy fossane (*Fossa daubentoni*), which has but little markings on the fur of the adult, differs by the absence of a scent-pouch and the presence of a couple of bare spots on the under surface of the metatarsus. The beautiful linsangs (*Linsanga* or *Prionodon*), ranging from the eastern Himalaya to Java and Borneo, are represented by two or three species, easily recognizable by the broad transverse bands of blackish brown and yellow with which the body and tail are marked. They are specially distinguished by having only one pair of upper molars, thereby resembling the cats, with which, in correlation with their arboreal habits, they agree in their highly retractile claws, and the hairy surface of the under side of the metatarsus. About 15 in. is the length of the type species. In West Africa the linsangs are represented by *Poiana richardsoni*, a small species with a spotted genet-like coat, and also with a narrow naked stripe on the under surface of the metatarsus, as in genets.

Here may be placed the two African spotted palm-civets of the genus *Nandinia*, namely *N. binotata* from the west and *N. gerrardi* from the east forest-region. In common with the true palm-civets, they have a dentition numerically identical with that of *Viverra* and *Genetta*, but the cusps of the hinder premolars and molars are much less sharp and pointed. They are peculiar in that the wall of the inner chamber of the auditory bulla never ossifies, while the paroccipital process is not flattened out and spread over the bulla. In this respect they resemble the Miocene European genus *Amphictis*, as they do in the form of their teeth, so that they may be regarded as nearly related to the ancestral *Viverridae*, and forming in some degree a connecting link between the present and the next subfamily. *Nandinia* is also peculiar in possessing a kind of rudimentary marsupial pouch. Apparently *Eupleres goudoti*, of Madagascar, which has been generally classed in the *Herpestinae*, is a nearly related animal, characterized by the reduction of its dentition, due to insectivorous habits (fig. 3); the canines being small, the anterior premolars canine-like, and the hinder premolars molariform. It is a uniformly-coloured creature of medium size.

The palm-civets, or paradoxures, constituting the Asiatic genus *Paradoxurus*, have, as already stated, the following dental formula, viz. *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$, total 40; the cusps of the molars being low and blunted, and these teeth in the upper jaw much broader than in the civets. The head is pointed in front, with small rounded ears; the limbs are of medium length, with the soles of the feet almost completely naked, and fully retractile claws; while the long tail is not prehensile and clothed with hair of moderate length.

Fig. 3.—Skull of *Eupleres goudoti*. $\frac{2}{3}$ nat. size.

Spots are the chief type of marking. The vertebrae number C. 7, D. 13, L. 7, S. 3, Ca. 29-36. Numerous relatively large species ranging from India to Borneo, Sumatra and Celebes, with one in Tibet, represent the genus. Nearly allied are *Arctogale leucotis*, with a wide distribution, and *A. trivirgata*, of Java, both longitudinally striped species, with small and slightly separated molars, and a prolonged bony palate (see Palm-Civet).

The binturong (*Arctictis binturong*) has typically the same dental formula as the last, but the posterior upper molar and the first lower premolar are often absent. Molars small and rounded, with a distinct interval between every two, but formed generally on the same pattern as *Paradoxurus*. Vertebrae: C. 7, D. 14, L. 5, S. 3, Ca. 34. Body elongated; head broad behind, with a small pointed face, long and numerous whiskers, and small ears, rounded, but clothed with a pencil of long hairs. Eyes small. Limbs short, with the soles of the feet broad and entirely naked. Tail very long and prehensile. Fur long and harsh. Caecum extremely small. The binturong inhabits southern Asia from Nepal through the Malay Peninsula to the islands of Sumatra and Java. Although structurally agreeing closely with the paradoxures, its tufted ears, long, coarse and dark hair, and prehensile tail give it a very different external appearance. It is slow and cautious in its movements, chiefly if not entirely arboreal, and appears to feed on vegetables as well as animal substances (see Binturong).

Hemigale is another modification of the paradoxure type, represented by *H. hardwickei* of Borneo, an elegant-looking animal, smaller and more slender than the paradoxures, of light grey colour, with transverse broad dark bands across the back and loins.

Cynogale also contains one Bornean species, *C. bennetti*, a curious otter-like modification of the viverrine type, having semi-aquatic habits, both swimming in the water and climbing trees, living upon fish, crustaceans, small mammals, birds and fruits. The number and general arrangement of the teeth are as in *Paradoxurus*, but the premolars are peculiarly elongated, compressed, pointed and recurved, though the molars are tuberculated. The head is elongated, with the muzzle broad and depressed, the whiskers are very long and abundant, and the ears small and rounded. Toes short and slightly webbed at the base. Tail short, cylindrical, covered with short hair. Fur very dense and soft, of a dark-brown colour, mixed with black and grey.

In the mongoose group, or *Herpestinae*, the tympanic or anterior portion of the auditory bulla is produced into an ossified external auditory meatus of considerable length; while the paroccipital process never projects below the bulla, on the hinder surface of which, in adult animals, it is spread out and completely lost. The toes are straight, with long, unsheathed, non-retractile claws.

In the typical mongooses or ichneumons, *Herpestes*, the dental formula is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4 \text{ or } 3}{4 \text{ or } 3}$, *m.* $\frac{2}{2}$; total 40 or 36; the molars having generally strongly-developed, sharply-pointed cusps. The skull is elongated and constricted behind the orbits. The face is short and compressed, with the frontal region broad and arched. Post-orbital processes of frontal and jugal bones well developed, generally meeting so as to complete the circle of the orbit behind. Vertebrae: C. 7, D. 13, L. 7, S. 3, Ca. 21-26. Head pointed in front. Ears short and rounded. Body long and slender. Extremities short. Five toes on each foot, the first, especially that on the hind-foot, very short. Toes free, or but slightly palmated. Soles of fore-feet and terminal portion of those of hind-pair naked; under surface of metatarsus clothed with hair. Tail long or moderate, generally thick at the base, and sometimes covered with more or less elongated hair. The longer hairs covering the body and tail almost always ringed. The genus is common to the warmer parts of

Asia and Africa, and while many of the species, like the Egyptian *H. ichneumon* and the ordinary Indian mongoose, *H. mungo*, are pepper-and-salt coloured, the large African *H. albicauda* has the terminal two-thirds of the tail clothed with long white hairs (see ICHNEUMON).

The following distinct African and Malagasy generic representatives of the subfamily are recognized, viz. *Helogale*, with $\frac{3}{3}$ premolars, and containing the small South African *H. parvula* and a variety of the same. *Bdeogale crassicauda* and two allied tropical African species differ from *Herpestes* in having only four toes on each foot. The orbit is nearly complete, and the tail of moderate length and rather bushy. In *Cynictis*, which has the orbit completely closed, there are five front and four hind toes; and the skull is shorter and broader than in *Herpestes*, rather contracted behind the orbits, the face short, and the anterior chamber of the auditory bulla very large. The front claws are elongated. Includes only *C. penicillata* from South Africa.

All the foregoing herpestines have the nose short, with its under surface flat, bald, and with a median longitudinal groove. The remaining forms have the nose more or less produced, with its under side convex, and a space between the nostrils and the upper lip covered with closely pressed hairs, and without any median groove. The South African *Rhynchogale muelleri*, a reddish animal with five toes to each foot and $\frac{4}{4}$ (abnormally $\frac{3}{3}$) premolars, alone represents the first genus. The cusimanses (*Crossarchus*), which differ by having only $\frac{3}{3}$ premolars, and thus a total of 36 teeth, include, on the other hand, several species. The muzzle is elongated, the claws on the fore-feet are long and curved, the first front toe is very short; the under surface of the metatarsus naked; and the tail shorter than the body, tapering. Fur harsh. Includes *C. obscurus*, the cusimanse, a small burrowing animal from West Africa, of uniform dark-brown colour, *C. fasciatus*, *C. zebra*, *C. gambianus* and others. Lastly, we have *Suricata*, a more distinct genus than any of the above. The dental formula is as in the last, but the teeth of the molar series are remarkably short in the antero-posterior direction, corresponding with the shortness of the skull generally. Orbits complete behind. Vertebrae: C. 7, D. 15, L. 6, S. 3, Ca. 20. Though the head is short and broad, the nose is pointed and rather produced and movable, while the ears are very short. Body shorter and limbs longer than in *Herpestes*. Toes 4-4. Claws on fore-feet very long and narrow, arched, pointed and subequal. Hind-feet with shorter claws, soles hairy. Tail rather shorter than the body. One species only is known, the meerkat or suricate, *S. tetradactyla*, a small grey-brown animal, with dark transverse stripes on the hinder part of the back, from South Africa.

The names *Galidictis*, *Galidia* and *Hemigalidia* indicate three generic modifications of the *Herpestinae*, all inhabitants of Madagascar. The best-known, *Galidia elegans*, is a lively squirrel-like little animal with soft fur and a long bushy tail, which climbs and jumps with agility. It is of a chestnut-brown colour, the tail being ringed with darker brown. *Galidictis vittata* and *G. striata* chiefly differ from the ichneumons in their coloration, being grey with parallel longitudinal stripes of dark brown.

Considerable diversity of opinion prevails with regard to the serial position of the aard-wolf, or maned jackal (*Proteles cristatus*), of southern and eastern Africa, some authorities making it the representative of a family by itself, others referring it to the *Hyaenidae*, while others again regard it as a modified member of the *Viverridae*. After all, the distinction either way cannot be very great, since the two families just named are intimately connected by marks of the extinct *Ictitherium*. With the *Viverridae* it agrees in having the auditory bulla divided, while in the number of dorsal vertebrae it is hyena-like. The cheek-teeth are small, far apart, and almost rudimentary in character (see fig. 4), and the canines long and rather slender. The dental formula is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.m.* $\frac{4}{3 \text{ or } 4}$; total 30 or 32. Vertebrae: C. 7, D. 15, L. 5, S. 2, Ca. 24. The fore-feet with five toes; the first, though short, with a distinct claw. The hind-feet with four subequal toes; all, like those of the fore-foot, furnished with strong, blunt, non-retractile claws (see AARD-WOLF).

Hyena tribe. The hyenas or hyaenas (*Hyaenidae*) differ from the preceding family (*Viverridae*) in the absence of a distinct vertical partition between the two halves of the auditory bulla; and are further characterized by the absence of an alisphenoid canal, the reduction of the molars to $\frac{1}{1}$, and the presence of 15 dorsal vertebrae. The dental formula in the existing forms (to which alone all these remarks apply) is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{1}{1}$; total 34; the teeth, especially the canines and premolars, being very large, strong and conical. Upper sectorial with a large, distinctly trilobed blade and a moderately developed inner lobe placed at the anterior extremity of the blade. Molar very small, and placed transversely close to the hinder edge of the last, as in the *Felidae*. Lower sectorial consisting of little more than the bilobed blade. Zygomatic arches of skull very wide and strong; and sagittal crest high, giving attachment to very powerful biting muscles. Orbits incomplete behind. Vertebrae: C. 7, D. 15, L. 5, S. 4, Ca. 19. Limbs rather long, especially the anterior pair, digitigrade, four subequal toes on each, with stout non-retractile claws, the first toes being represented by rudimentary metacarpal and metatarsal bones. Tail rather short. A large post-anal median glandular pouch, into which the largely developed anal scent glands pour their secretion.

The three well-characterized species of *Hyaena* are divisible into two sections, to which some zoologists assign generic rank. In the typical species the upper molar is moderately developed and three-rooted; and an inner tubercle and heel more or less developed on the lower molar. Ears large and pointed. Hair long, forming a mane on the back and shoulders. Represented firstly by *H. striata*,

FIG. 4.—Skull and Dentition of Aard-Wolf (*Proteles cristatus*). × $\frac{1}{2}$.

the striped hyena of northern and eastern Africa and southern Asia; and *H. brunnea* of South Africa, in some respects intermediate between this and the next section. In the second section, forming the subgenus *Crocuta*, the upper molar is extremely small, two- or one-rooted, often deciduous; the lower molar without trace of inner tubercle, and with an extremely small heel. Ears moderate, rounded. Hair not elongated to form a mane. The spotted hyena, *Hyaena* (*Crocuta*) *crocuta*, of which, like the striped species, there are several local races, represents this group, and ranges all over Africa south of the Sahara. In dental characters the first section inclines more to the *Viverridae*, the second to the *Felidae*; or the second may be considered as the more specialized form, as it certainly is in its visceral anatomy, especially in that of the reproductive organs of the female. (See HYENA.)

(B) *Arctoidea*.—So far as the auditory region of the skull is concerned, the existing representatives of the dog tribe or *Canidae* are to a great extent intermediate between the cat and civet group (*Aeluroidea*) on the one hand, and the typical representatives of the bear and weasel group on the other. They were consequently at one time classed in an intermediate group—the Cynoidea; but fossil forms show such a complete transition from dogs to bears as to demonstrate the artificial character of such a division. Consequently, the dogs are included in the bear-group. In this wider sense the Arctoidea will be characterized by the tympanic bone being disk-shaped and forming the whole of the outer wall of the tympanic cavity; the large size of the external auditory meatus or tube; and the large and branching maxillo-turbinal bone, which cuts off the naso-turbinal and two adjacent bones from the anterior nasal chamber. The tympanic bulla has no internal partition. There is a large carotid canal. Cowper's glands are lacking; and there is a large penial bone.

Dog tribe. From all the other members of the group the *Canidae* are broadly distinguished (in the case of existing forms) by the large and well-developed tympanic bulla, with which the paroccipital process is in contact. An alisphenoid canal is present. The feet are digitigrade, usually with five (in one instance four) front and always four hind-toes. The molars—generally $\frac{7}{8}$—have tall cusps, and the sectorials are large and powerful (figs. 1 and 2). The intestine has both a duodeno-jejunal flexure and a caecum. A prostate gland is present; but there are no glands in the vasa deferentia; the penial bone is grooved; and anal glands are generally developed. The distribution of the family is cosmopolitan. The normal dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{3}$; total 42; thus differing from the typical series only by the loss of the last pair of upper molars (present in certain extinct forms). In the characters of the teeth the group is the most primitive of all Carnivora. Typically the upper sectorial (fig. 1, II) consists of a stout blade, of which the anterior cusp is almost obsolete, the middle cusp large, conical and pointed backwards, and the posterior cusp in the form of a compressed ridge; the inner lobe is very small, and placed at the fore part of the tooth. The first molar is more than half the antero-posterior length of the sectorial, and considerably wider than long; its crown consists of two prominent conical cusps, of which the anterior is the larger, and a low, broad inward prolongation, supporting two more or less distinct cusps and a raised inner border. The second molar resembles the first in general form, but is considerably smaller. The lower sectorial (fig. 2, II) is a large tooth, with a strong compressed bilobed blade, the hinder lobe being considerably the larger and more pointed, a small but distinct inner tubercle

placed at the hinder margin of the posterior lobe of the blade, and a broad, low, tuberculated heel, occupying about one-third of the whole length of the tooth. The second molar is less than half the length of the first, with a pair of cusps placed side by side anteriorly, and a less distinct posterior pair. The third is an extremely small and simple tooth with a subcircular tuberculated crown and single root.

Views differ in regard to the best classification of the *Canidae*, some writers adopting a number of generic groups, while others consider that very few meet the needs of the case. In retaining the old genus *Canis* in the wide sense, that is to say, inclusive of the foxes, Professor Max Weber is followed. The best cranial character by which the different members of the family may be distinguished is that in dogs, wolves and jackals the post-orbital process of the frontal bone is regularly smooth and convex above, with its extremity bent downwards, whereas in foxes the process is hollowed above, with its outer margin (particularly of the anterior border) somewhat raised. This modification coincides in the main with the division of the group into two parallel series, the Thooids or Lupine forms and Alopecoids or Vulpine forms, characterized by the presence of frontal air-sinuses in the former, which not only affects the external form but to a still greater degree the shape of the anterior part of the cranial cavity, and the absence of such sinuses in the latter. The pupil of the eye when contracted is round in most members of the first group, and vertically elliptical in the others, but more observations are required before this character can be absolutely relied upon. The form and length of the tail is often used for the purposes of classification, but its characters do not coincide

FIG. 5.—The African Hunting-Dog (*Lycaon pictus*).

with those of the cranium, as many of the South American *Canidae* have the long bushy tails of foxes and the skulls of wolves.

The most aberrant representative of the thooid series is the African hunting-dog (*Lycaon pictus*, fig. 5), which differs from the other members of this series by the teeth being rather more massive and rounded, the skull shorter and broader, and the presence of but four toes on each limb, as in *Hyena*. The hunting-dog, from south and east Africa, is very distinct externally from all other *Canidae*; being nearly as large as a mastiff, with large, broadly ovate erect ears and a singular colouring, often consisting of unsymmetrical large spots of white, yellow and black. It presents some curious superficial resemblances to *Hyena crocuta*, perhaps a case of mimetic analogy, and hunts its prey in large packs. Several local races, one of which comes from Somaliland, differing in size and colour, are recognized (see HUNTING-DOG). Nearly related to the hunting-dog are the dholes or wild dogs of Asia, as represented by the Central Asian *Cyon primaevus* and the Indo-Malay *C. javanicus*. They have, however, five front-toes, but lack the last lower molar; while they agree with *Lycaon* and *Speothos* in that the heel of the lower sectorial tooth has only a single compressed cutting cusp, in place of a large outer and a smaller inner cusp as in *Canis*. Dholes are whole-coloured animals, with short heads; and hunt in packs. The bush-dog (*Speothos*, or *Icticyon venaticus*) of Guiana is a small, short-legged, short-tailed and short-haired species characterized by the molars being only $\frac{2 \text{ or } 1}{2}$; the carnassial having no inner cusp. The long-haired raccoon-dog (*Nyctereutes procyonoides*) of Japan and China agrees essentially in everything but general appearance (which is strangely raccoon-like) with *Canis*. The typical group of the latter includes some of the largest members of the family, such as the true wolves of the northern parts of both Old and New Worlds (*C. lupus*, &c.), and the various breeds of the domestic dog (*C. familiaris*), the origin of which is still involved in obscurity. Some naturalists believe it to be a distinct species, descended from one that no longer exists in a wild state; others have sought to find its progenitors in some one of the wild or half-wild races, either of true dogs, wolves or jackals; while others again believe that it is derived from the mingling of two or more wild species or races. It is probably the earliest animal domesticated by man, and few if any other species have undergone such an extraordinary amount of variation in size, form and proportion of limbs, ears and tail, variations which have been perpetuated and increased by careful selective breeding (see DOG). The dingo or Australian dog is met with wild, and also as the domestic companion of the aboriginal race of the country, by whom it appears to have been originally introduced. It is nearly related to a half-wild dog inhabiting Java, and also to the pariah dogs of India and other eastern countries. Dogs were also in the possession of the natives of New Zealand and other islands of the Pacific, where no placental mammals exist naturally, on their discovery by Europeans in the 18th century. The slender-jawed *C. simensis* of Abyssinia and the South American *C. jubatus* and *C. antarcticus* are also generally placed in this group. On the other hand, the North American coyote (*C. latrans*), with its numerous subspecies, and the Old World jackals, such as the Indo-European *C. aureus*, the Indian *C. pallipes*, and the African *C. lupaster*, *C. anthus*, *C. adustus*, *C. variegatus* and *C. mesomelas* (the black-backed jackal), although closely related to the wolves, have been placed in a separate group under the name of *Lupulus*. Again, *Thous* (or *Lycalopex*), is a group proposed for certain South American *Canidae*, locally known as foxes, and distinguished from all the foregoing by their fox-like aspect and longer tails, although with skulls of the thooid type. Among these are the bright-coloured colpeo, *C. magellanicus*, the darker *C. thous*, *C. azarae*, *C. griseus*, *C. cancrivorus* and *C. brasiliensis*. Some of these, such as *C. azarae* and *C. griseus*, show a further approximation to the fox in that the pupil of the eye forms a vertical slit. More distinct from all the preceding are the members of the alopecoid or vulpine section, which are unknown in South America. The characteristic feature of the skull has been already mentioned. In addition to this, reference may be made to the elliptical (in place of circular) pupil of the eye, and the general presence of ten (rarely eight) teats instead of a smaller number. The typical groups constituting the subgenus (or genus) *Vulpes*, is represented by numerous species and races spread over the Old World and North America. Foremost among these is the European fox (*C. vulpes*—otherwise *Vulpes alopex*, or *V. vulpes*), represented in the Himalaya by the variety *C. v. montanus* and in North Africa by *C. v. niloticus*, while the North American *C. pennsylvanicus* or *fulvus*, can scarcely be regarded as more than a local race. On the other hand, the Asiatic *C. bengalensis* and *C. corsac*, and the North American *C. velox* (kit-fox) are smaller and perfectly distinct species. From all these the North American *C. cinereo-argentatus* (grey fox) and *C. littoralis* are distinguished by having a fringe of stiff hairs in the tail, whence they are separated as *Urocyon*. Again, the Arctic fox (*C. lagopus*), of which there is a blue and a white phase, has the tail very full and bushy and the soles of the feet thickly haired, and has hence been distinguished as *Leucocyon*. Lastly, we have the elegant little African foxes known as fennecs (*Fennecus*), such as *C. zerda* and *C. famelicus* of the north, and the southern *C. chama*, all pale-coloured animals, with enormously long ears, and correspondingly inflated auditory bullae to the skull (see WOLF, JACKAL, FOX).

Whatever differences of opinion may obtain among naturalists as to the propriety of separating generically the foxes from the wolves and dogs, there can be none as to the claim of the long-eared fox (*Otocyon megalotis*) of south and east Africa to represent a genus by itself. In this animal the dental formula is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{3 \text{ or } 4}{4}$; total 46 or 48. The molar teeth being in excess of almost all other placental mammals with a differentiated series of teeth. They have the same general characters as in *Canis*, with very pointed cusps. The lower sectorial shows little of the typical character, having five cusps on the crown-surface; these can, however, be identified as the inner tubercle, the two greatly reduced and obliquely placed lobes of the blade, and two cusps on the heel. The skull generally resembles that of the smaller foxes, particularly the fennecs. The auditory bullae are very large. The hinder edge of the lower jaw has a peculiar form, owing to the great development of an expanded, compressed and somewhat inverted subangular process. Vertebrae: C. 7, D. 13, L. 7, S. 3, Ca. 22. Ears very large. Limbs rather long, with the normal number of toes. The two parietal ridges on the skull remain widely separated, so that no sagittal crest is formed. The animal is somewhat smaller than an ordinary fox. In the year 1880 Professor Huxley suggested that in the long-eared fox we have an animal nearly representing the stock from which have been evolved all the other representatives of the dog and fox tribe. One of the main grounds for arriving at this conclusion was the fact that this animal has very generally four true molars in each jaw, and always that number in the lower jaw; whereas three is the maximum number of these teeth to be met with in nearly all placental mammals, other than whales, manatis, armadillos and certain others. The additional molars in *Otocyon* were regarded as survivals from a primitive type when a larger number was the

rule. Palaeontology has, however, made great strides since 1880, and the idea that the earlier mammals had more teeth than their descendants has not only received no confirmation, but has been practically disproved. Consequently Miss Albertina Carlsson had a comparatively easy task (in a paper published in the *Zoologisches Jahrbuch* for 1905) in demonstrating that the long-eared fox is a specialized, and to some extent degraded, form rather than a primitive type. This, however, is not all, for the lady points out that, as was suggested years previously by the present writer, the creature is really the descendant of the fossil *Canis curvipalatus* of northern India. This is a circumstance of considerable interest from a distributional point of view, as affording one more instance of the intimate relationship between the Tertiary mammalian fauna of India and the existing mammals of Africa.

In regard to the members of the dog-tribe as a whole, it may be stated that they are generally sociable animals, hunting their prey in packs. Many species burrow in the ground; none habitually climb trees. Though mostly carnivorous, feeding chiefly on animals they have chased and killed themselves, many, especially among the smaller species, eat garbage, carrion, insects, and also fruit, berries and other vegetable substances. The upper surface of the tail of the fox has a gland covered with coarse straight hair. This gland, which emits an aromatic odour, is found in all *Canidae*, with possibly the exception of *Lycaon pictus*. Although the bases of the hair covering the gland are usually almost white, the tips are always black; this colour being generally extended to the surrounding hairs, and often forming dark bars on the buttocks. The dark spot on the back of the tail is particularly conspicuous, notably in such widely separated species as the wolves, Azara's dog and the fennec.

Although its existing representatives are very different, the bear-family or *Ursidae*, as will be more fully mentioned in the sequel, was in past times intimately connected with the *Canidae*.

Bear tribe. In common with the next two families, the modern *Ursidae* are characterized by the very small tympanic bulla, and the broad paroccipital process, which is, however, independent of the bulla. The feet are more or less completely plantigrade and five-toed. The intestine has neither duodeno jejunal flexure nor a caecum; the prostate gland is rudimentary; but glands occur in the vasa deferentia; and the penial bone is cylindrical. As distinctive characteristics of the *Ursidae*, may be mentioned the presence of an alisphenoid canal on the base of the skull; the general absence of a perforation on the inner side of the lower end of the humerus; the presence of two pairs of upper and three of lower molars, which are mostly elongated and low-cusped; and the non-cutting character and fore-and-aft shortening of the upper sectorial, which has no inner root and one inner cusp (fig. 1, III.). Anal glands are apparently wanting. The short tail, bulky build, completely plantigrade feet and clumsy gait are features eminently characteristic of the bears.

The great majority of existing bears may be included in the typical genus *Ursus*, of which, in this wide sense, the leading characteristics will be as follows. The dentition is $i.\frac{3}{3}$, $c.\frac{1}{1}$, $p.\frac{4}{4}$, $m.\frac{2}{3} = 42$; but the three anterior premolars, above and below, are one-rooted, rudimentary and frequently wanting. Usually the first (placed close to the canine) is present, and after a considerable interval the third, which is situated close to the other teeth of the cheek-series. The fourth (upper sectorial) differs essentially from the corresponding tooth of other Carnivora in that the inner lobe is not supported by a distinct root; its sectorial characters being very slightly marked. The crowns of both true molars are longer than broad, with flattened, tuberculated, grinding surfaces; the second having a large backward prolongation or heel. The lower sectorial has a small and indistinct blade and greatly developed tubercular heel; the second molar is of about the same length, but with a broader and more flattened tubercular crown; while the third is smaller. The milk-teeth are comparatively small, and shed at an early age. The skull is more or less elongated, with the orbits small and incomplete behind, and the palate prolonged considerably behind the last molar. Vertebrae: C. 7, D. 14, L. 6, S. 5, Ca. 8-10. Body heavy. Feet broad, completely plantigrade; the five toes on each well developed, and armed with long compressed and moderately curved, non-retractile claws, the soles being generally naked. Tail very short. Ears moderate, erect, rounded, hairy. Fur generally long, soft and shaggy.

Bears are animals of considerable bulk, and include among them the largest members of the order. Though the species are not numerous, they are widely spread over the earth, although absent from Africa south of the Sahara and Australasia. As a rule, they are omnivorous, or vegetable feeders, even the polar bear, which subsists for most of the year on flesh and fish, eating grass in summer. On the other hand, many of the brown bears live largely on salmon in summer. Among the various species the white polar bear of the Arctic regions, *Ursus* (*Thalassarctus*) *maritimus*, differs from the rest by its small and low head, small, narrow and simple molars, and the presence of a certain amount of hair on the soles of the feet. The typical group of the genus is represented by the brown bear (*U. arctus*) of Europe and Asia, of which there are many local races, such as the Syrian *U. a. syriacus*, the Himalayan *U. a. isabellinus*, the North Asiatic *U. a. collaris*, and the nearly allied Kamchadale race, which is of great size. In Alaska the group is represented by huge bears, which can scarcely claim specific distinctness from *U. arctus*; and if these are ranked only as races, it is practically impossible to regard the Rocky Mountain grizzly bear (*U. horribilis*) as of higher rank, although it naturally differs more from the Asiatic animal. On the other hand, the small and light-coloured *U. pruinosus* of Tibet may be allowed specific rank. More distinct is the North American black bear *U. americanus*, and its white relative *U. kermodei* of British Columbia; and perhaps we should affiliate to this group the Himalayan and Japanese black bears (*U. torquatus* and *U. japonicus*). Very distinct is the small Malay sun-bear *U.* (*Helarctus*) *malayanus*, characterized by its short, smooth fur, extensile tongue, short and wide head, and broad molars. Finally, the spectacled bear of the Andes, *U.* (*Tremarctus*) *ornatus*, which is also a broad-skulled black species, differs from all the rest in having a perforation, or foramen, on the inner side of the lower end of the humerus. A second genus, *Melursus*, represented by the Indian sloth-bear (*M. ursinus*), differs from the preceding in having only two pairs of upper incisors, the small size of the cheek-teeth, and the extensile lips. Ants, white-ants, fruits and honey form the chief food of this shaggy black species,—a diet which accounts for its feeble dentition (see BEAR).

The parti-coloured bear or giant panda (*Aeluropus melanoleucus*, fig. 6) of eastern Tibet and north-west China forms in some degree a connecting link between the bears and the true panda, although placed by Professor E. R. Lankester in the same family as the latter. In the number of the teeth, and to some extent in the character of the molars, as well as in the abbreviated tail, *Aeluropus* resembles the bears, but in the structure of the sectorial tooth, the presence of an extra radial carpal bone, and the osteology generally, it is more like the panda. In the absence of an alisphenoid canal to the

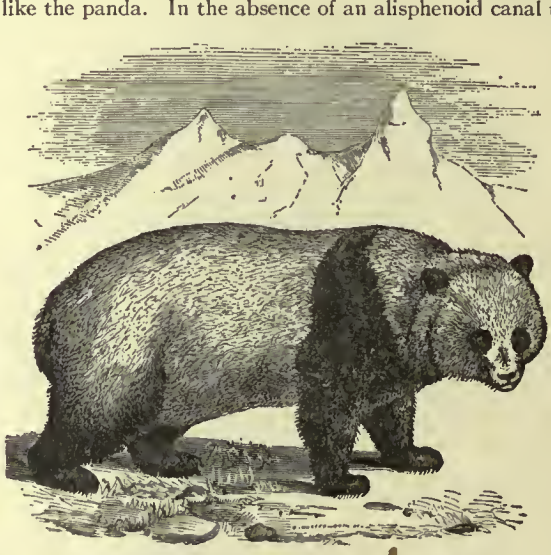

FIG. 6.—The Parti-coloured Bear, or Giant Panda (*Aeluropus melanoleucus*).

skull it differs both from the latter and the bears, and thereby resembles the raccoons; while in having a perforation at the lower end of the humerus, it agrees with the spectacled bear, the panda and raccoons. The dentition is $i.\frac{3}{3}$, $c.\frac{1}{1}$, $p.\frac{3}{3}$, $m.\frac{2}{3}$; total 40; premolars increasing in size from first to last, and two-rooted except the first; the first upper molar with quadrate crown, broader than long; and the second larger than the first. Skull with the zygomatic arches and sagittal crest immensely developed, ascending branch of lower jaw very high, giving great space for attachment of temporal muscle, and facial portion short. Bony palate not extending behind the last molar. No alisphenoid canal. Feet bear-like, but soles more hairy, and perhaps less completely plantigrade. Fur long and thick; and tail extremely short. Humerus with a perforation on the inner side of the lower end; a very large extra radial carpal bone. The colour of this strange animal is black and white (fig. 6).

With the panda (*Aelurus fulgens*) we reach an undoubted representative of the *Procyonidae*, or raccoon tribe, differing, however, from all the rest except the doubtful *Aeluropus*, in its Asiatic habitat. If the latter be included, the family may be defined as follows. Molars $\frac{3}{3}$, except in *Aeluropus*, with blunt or sharp cusps; no alisphenoid canal, except in *Aelurus*; humerus generally with a foramen; feet plantigrade; tail, except in *Aeluropus*, long and generally ringed.

In the panda the dentition is $i.\frac{3}{3}$, $c.\frac{1}{1}$, $p.\frac{4}{4}$, $m.\frac{2}{2}$; total 38; the first lower molar being minute and deciduous, and the upper molars broad with numerous and complicated cusps. Vertebrae: C. 7, D. 14, L. 6, S. 3, Ca. 18. Skull high and compressed, with an alisphenoid canal, a short facial portion, and the ascending branch of the lower jaw, as in *Aeluropus*, very tall. Face cat-like, with moderate, erect, pointed ears. Claws blunt. Tail cylindrical and

ringed. Fur long and thick. Extra radial carpal bone moderate. The panda is a bright golden red animal, with black under-parts, ranging from the eastern Himalaya to north-western China, where it is represented by a distinct race. Fossil species occur in the later Tertiary deposits of Europe (see PANDA).

The raccoons (*Procyon*) are the first and typical representatives of the American section of the family, in which an alisphenoid canal is always wanting. In this genus the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$; total 40; the upper molars being broad and tuberculated; the upper sectorial (like that of *Aeluropus* and *Aelurus*) having three outer cusps and a broad bicuspid inner lobe, giving an almost quadrate form to the crown. First upper molar with a large tuberculated crown, rather broader than long; second considerably smaller, with transversely oblong crown. Lower sectorial (first molar) with an extremely small and ill-defined blade, placed transversely in front, and a large inner tubercle and heel; second molar as long as the first, but narrower behind, with five obtuse cusps. Vertebrae: C. 7, D. 14, L. 6, S. 3, Ca. 16-20. Body stout. Head broad behind, but with a pointed muzzle. In walking the entire sole not applied to the ground, as it is when the animal is standing. Toes, especially of the fore-foot, very free, and capable of being spread wide apart; claws compressed, curved and pointed. Tail moderately long, cylindrical, thickly covered with hair, ringed, non-prehensile. Fur long, thick and soft. The common raccoon (*Procyon lotor*) of North America is the type of this genus; it is replaced in South America by *P. cancrivorus* (see RACCOON). The cacomistles (*Bassariscus*) are nearly allied to *Procyon*, but of more slender and elegant proportions, with sharper nose, longer tail, and more digitigrade feet, and teeth smaller and more sharply cusped. The typical *B. astuta* is from the southern parts of the United States and Mexico, while *B.* (*Wagneria*) *annulata* is Mexican and Central American.

The name *Bassaricyon* has been given to a distinct modification of the procyonine type of which at present two species are known, one from Costa Rica and the other from Ecuador respectively, named *B. gabbi* and *B. alleni*. They much resemble the kinkajou in external appearance, but the skull and teeth are more like those of *Procyon* and *Nasua*. In the coatis, *Nasua*, the dentition is as in *Procyon*, but the upper canines are larger and more strongly compressed, and the molars smaller; while the facial portion of the skull is more elongated and narrow. Vertebrae: C. 7, D. 14, L. 6, S. 3, Ca. 22-23. Body elongated and rather compressed. Nose prolonged into a somewhat upturned, obliquely-truncated, mobile snout. Tail long, non-prehensile, tapering and ringed. Coatis, or coati-mundis, live in small troops of eight to twenty, are chiefly arboreal, and feed on fruits, young birds, eggs, insects, &c. The two best-known species are *N. narica* of Mexico and Central America, and *N. rufa* of South America from Surinam to Paraguay (see COATI).

In the kinkajou (*q.v.*), an animal long known as *Cercoleptes caudivolvulus*, but whose designation it has been proposed to change to the unclassical *Potos flavus*, the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{2}{2}=36$. Molars with low flat crowns, very obscurely tuberculated. Skull short and rounded, with flat upper surface. Vertebrae: C. 7, D. 14, L. 6, S. 3, Ca. 26-28. Clavicles present, but in a very rudimentary condition. Head broad and round. Ears short. Body long and musteline. Limbs short. Tail long, tapering and prehensile. Fur short and soft. Tongue long and very extensile.

The last existing family of the land Carnivora is that typified by the martens and weasels, and hence known as the *Mustelidae*.

Weasel tribe. The group is characterized by the absence of an alisphenoid canal in the skull, the reduction of the molars to $\frac{1}{1}$ or even $\frac{1}{1}$, the medium size of the sectorial tooth in each jaw, the absence or presence of a perforation in the humerus, and the presence of anal glands. The family is cosmopolitan in distribution, with the exception of Australasia and Madagascar.

The first section of the family, forming the subfamily *Mustelinae*, is typically characterized by the short and partially webbed toes, furnished with short, compressed, sharp, curved and often partially retractile claws. The upper molar is always of moderate size and elongated in the transverse direction. In the martens and sables (*Mustela*) the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$; total 38; the upper sectorial having its inner lobe close to the anterior edge of the tooth; and the upper molar being nearly as large as the sectorial. Lower sectorial with small inner tubercle. Vertebrae: C. 7, D. 14, L. 6, S. 3, Ca. 18-23. Body long and slender. Limbs short, partially digitigrade, with the feet rounded and the toes short, with compressed, acute, semi-retractile claws. Tail moderate or long, more or less bushy. One species, *M. martes*, the pine-marten, is British; the remainder inhabit the northern regions of Europe, Asia and America. Many of the species, as the sable (*M. zibellina*), yield fur of great value (see MARTEN).

The dentition of *Putorius* differs from that of *Mustela* chiefly in the absence of the anterior premolars of both jaws. The teeth are more sharply cusped, and the lower sectorial wants the inner tubercle. External characters generally similar to those of the martens, but the body longer and more slender, and the limbs even shorter. All the species are small animals, of active, bloodthirsty and courageous disposition, living chiefly on birds and small mammals, and rather terrestrial than arboreal, dwelling among rocks, stones and outbuildings. Some of the species, as the stoat or ermine (*P. ermineus*), inhabiting cold climates, undergo a seasonal change of colour, being brown in summer and white in winter, though the change does not affect the whole of the fur, the end of the tail remaining black in all seasons. This is a large genus, having a very extensive geographical range throughout the Old and New Worlds, and includes the animals commonly known as weasels, polecats, ferrets and minks (*q.v.*).

In the glutton (*Gulo luscus*) the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$; total 38; the crowns of the teeth being stout, and the upper molar much smaller than the sectorial. Lower sectorial large, with small heel and no inner tubercle. The dentition, though really but a modification of that of the weasels, presents a general resemblance to that of hyena. Vertebrae: C. 7, D. 15, L. 5, S. 3, Ca. 15. Body and limbs stoutly made; feet large and powerful, subplantigrade, with large, compressed, much-curved and sharp-pointed claws. Soles of the feet (except the pads of the toes) covered with thick bristly hairs. Ears very small, nearly concealed by the fur. Eyes small. Tail short, thick and bushy. Fur full, long and rather coarse. The one species, the wolverine or glutton, is an inhabitant of the forest regions of northern Europe, Asia and America, and much resembles a small bear in appearance. It is a very powerful animal for its size, climbs trees and lives on squirrels, hares, beavers, reindeer, and is said to attack even horses and cows.

The South American grison and tayra represent the genus *Galictis*, in which the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{2}{2}$; total 34; the molars being small but stout, and the upper sectorial with the inner lobe near the middle of the inner border. Lower sectorial with heel small, and inner tubercle small or absent. Body long; limbs short, with non-retractile claws and naked soles. Head broad and depressed. Tail of moderate length. The species include the grison (*G. vittata*), *G. allamandi*, and the tayra (*G. barbara*); the last, which extends northward into Central America, being subgenerically separated as *Galera*. Nearly allied to these is the smaller and more weasel-like *Lyncodan patagonicus*. All the foregoing South American carnivores display a marked tendency to being darker on the lower than on the upper surface. The same feature obtains in the African and Indian ratels, or honey-badgers, constituting the genus *Mellivora*, distinguished from all the other members of the family by having only a single pair of lower molars, the dentition being *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{1}{1}$; total 32; the upper sectorial is large, with its inner cusp at the anterior end of the blade, the molar much smaller and transversely extended, having a small outer and a larger rounded inner lobe. Heel of lower sectorial very small, scarcely one-fourth of the whole length of the tooth, with but one cusp. Vertebrae: C. 7, D. 14, L. 4, S. 4, Ca. 15. Body stout, depressed; limbs short, strong; head depressed; nose rather pointed; ears rudimentary. Tail short. *M. indica*, from India, and *M. ratel*, from south and west Africa, have nearly the same general appearance and size, being rather larger than a common badger, and may be only races of the same species. Their coloration is peculiar, all the upper surface of the body, head and tail being ash-grey, while the lower parts, separated by a distinct longitudinal boundary line, are black. They live chiefly on the ground, into which they burrow, but can also climb trees. They feed on small mammals, birds, reptiles and insects, and are partial to honey.

In the Indo-Malay ferret-badger, *Helictis*, the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$; total 38. Upper sectorial with a large bicusped inner lobe, molar smaller, wider transversely than in the antero-posterior direction. Lower sectorial with heel about one-third the length of the tooth. Skull elongated, rather narrow and depressed; facial portion especially narrow; infraorbital foramen very large. Head rather small and produced in front, with an elongated, obliquely truncated, naked snout and small ears. Body elongated, limbs short. Tail short or moderate, bushy. Several species are described, such as *H. orientalis*, *maschata*, *nipalensis*, and *subaurantiaca*, from eastern Asia, all small animals, climbing trees with agility and living on fruits and berries as well as on small mammals and birds.

The African striped zorilles, or *Muis-honds* (*Ictonyx*), have a dental formula of *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{2}{2}$; total 34; the teeth much resembling those of the polecats, and the upper molar being smaller than the sectorial, and narrow from before backwards. Lower sectorial with a small narrow heel and distinct inner tubercle. General form of body musteline. Limbs short, fore-feet large and broad, with five stout, nearly straight, blunt and non-retractile claws, of which the first and fifth are considerably shorter than the others. Tail moderate, with longer hairs towards the end, giving it a bushy appearance. Hair generally long and loose. The best-known species of this genus, the Cape polecat, *Ictonyx capensis* (or *Zorilla zorilla*), is about the size of a polecat, but conspicuous by its broad, longitudinal bands of dark-brown, alternating with white. Its odour is said to be as offensive as that of the American skunks. From the Cape of Good Hope it ranges as far north as Senegal. Another species, *I. lybicus*, from Sennaar, has been described. The small striped polecat of southern Africa, *Poecilogale albinucha*, represents a genus by itself, and is a shorter-haired animal.

The skunks of America are very similar to the two genera last mentioned in their colouring, and with the latter serve to form a connecting link with the more typical *Mustelinae*, and the badger group, or *Melinae*, in which the feet are elongated, with straight toes and non-retractile, slightly curved, subcompressed, blunt claws, especially large on the fore-foot. In all cases the upper molar is

larger than the sectorial, and in the more typical genera is much longer than broad.

In the North American skunks of the genus *Mephitis* the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{1}{2}$; total 34. Upper molar larger than the sectorial, subquadrate, rather broader than long; lower sectorial with heel less than half the length of the whole tooth. Bony palate terminating posteriorly opposite the hinder border of the last molar. Facial portion of skull short and somewhat truncated in front. Vertebrae: C. 7, D. 16, L. 6, S. 2, Ca. 21. Head small. Body elongated. Limbs moderate, subplantigrade. Ears short and rounded. Tail long, abundantly clothed with long fine hair. Anal glands largely developed; their secretion, which can be discharged at the will of the animal, has an intolerably offensive odour and has rendered skunks proverbial. The South American species, which have only two upper premolars, and differ in some other characters, are generically separated under the name of *Conepatus*; while the small North American arboreal skunks are distinguished as *Spilogale* (see SKUNK).

Passing on to the more typical members of the badger group, we have first the genus *Arctonyx*, with the dentition *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$; total 38. The incisor line is curved, the outer teeth being placed posteriorly to the others: lower incisors inclined forwards. First premolars often rudimentary or absent; upper molar much larger than the sectorial, longer in the antero-posterior direction than broad; lower sectorial with a very large, low, tuberculated heel. Skull elongated and depressed; face long, narrow and concave above; bony palate extending as far backwards as the level of the glenoid fossa; and palatal bones dilated. Suborbital foramina very large. Vertebrae: C. 7, D. 16, L. 4, S. 4, Ca. 20. Snout long, naked, mobile and truncated, with large terminal nostrils, much like those of a pig. Eyes small; ears very small and rounded. Body compressed, rather than depressed. Limbs of moderate length, and partially digitigrade in walking. Tail moderate, tapering. A full soft under-fur, with longer bristly hairs interspersed. The longest-known species is *A. collaris*, the *bhalu-soor* (bear-pig) or *bali-soor* (sand-pig) of the natives of the mountains of north-eastern India, Burma and Borneo. It is rather larger than the badger, higher on its legs, and very pig-like in general aspect, of a light grey colour, with flesh-coloured snout and feet; nocturnal and omnivorous. Other species or local varieties have been described from north China and Burma.

Badger tribe.

In the genus *Mydaus* the dentition is as the last, but the cusps of the teeth are more acutely pointed. Skull elongated, face narrow and produced. Suborbital foramen small, and the palate, as in all the succeeding genera of this group, produced backwards about midway between the last molar and the glenoid fossa. Vertebrae: C. 7, D. 14-15, L. 6-5, S. 3, Ca. 12. Head pointed in front; snout produced, mobile, obliquely truncated, the nostrils being inferior. Limbs rather short and stout. Tail extremely short, but clothed with rather long bushy hair. Anal glands largely developed, and emitting an odour like that of the skunks. One species, *M. meliceps*, the teledu, a small burrowing animal from the mountains of Java, at an elevation of 7000 or more ft. above the sea-level; and a second (*M. marchei*) from the Philippines.

In the true badger of the genus *Meles* the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$; total 38. The first premolar in both jaws is extremely minute and often deciduous; while the upper molar is much larger than the sectorial, subquadrate, and as broad as long. Lower sectorial with a broad, low, tuberculated heel, more than half the length of the whole tooth. The postglenoid process of the skull so strongly developed, and the glenoid fossa so deep, that the condyle of the lower jaw is firmly held in place after the soft parts are removed. Vertebrae: C. 7, D. 15, L. 5, S. 3, Ca. 18. Muzzle pointed. Ears very short. Body stout, broad. Limbs short, strong, subplantigrade. Tail short. Typified by the common badger (*M. taxus* or *M. meles* of Europe and northern Asia, still found in many parts of England, where it lives in woods, is nocturnal, burrowing and very omnivorous, feeding on mice, reptiles, insects, fruit, acorns and roots. Other nearly allied species, *M. leucurus* and *M. chinensis*, are found in continental Asia, and *M. anakuma* in Japan.

In the nearly-allied genus *Taxidea* the dental formula is as in *Meles*, except that the rudimentary anterior premolars appear to be always wanting in the upper jaw. The upper sectorial is much larger in proportion to the other teeth; and the upper molar about the same size as the sectorial, triangular, with the apex turned backwards. Heel of lower sectorial less than half the length of the tooth. Skull very wide in the occipital region; the lambdoidal crest greatly developed, and the sagittal but slightly, contrary to what obtains in *Meles*. Vertebrae: C. 7, D. 15, L. 5, S. 3, Ca. (?). Body stoutly built and depressed. Tail short. The animals of this genus are peculiar to North America, where they represent the badgers of the Old World, resembling them much in appearance and habits. *T. americana* is the common American badger of the United States, *T. berlandieri*, the Mexican badger, being a local variety.

The third and last subfamily is that of the otters, or *Lutrinae*, in which the feet (with the exception of the hind pair in the sea-otter) are short and rounded, with the toes webbed, and the claws small, curved and blunt. The head is broad and much depressed. The upper posterior cheek-teeth are large and quadrate. The kidneys are conglomerate. Habits aquatic.

Otter tribe.

In the true otter of the genus *Lutra* the dentition is *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{3}$, *m.* $\frac{2}{2}$; total 36. Upper sectorial with a trenchant tricusped blade, and a very large inner lobe, hollowed on the free surface, with a raised sharp edge, extending along two-thirds or more of the length of the blade. Upper molar large, with a quadricuspidate crown, broader than long. Skull broad and depressed, contracted immediately behind the orbits; with the facial portion very short and the brain-case large. Vertebrae: C.7, D.14-15, L. 6-5, S. 3, Ca. 20-25. Body very long. Ears short and rounded. Limbs short. Feet completely webbed, with well-developed claws on all the toes. Tail long, thick at the base and tapering, rather depressed. Fur short and close.

Otters are more or less aquatic, living on the margins of rivers, lakes, and in some cases the sea; are expert divers and swimmers, and feed chiefly on fish. They have an extensive geographical range, and so much resemble each other in outward appearance, especially in the nearly uniform brown colouring, that in some cases the species are by no means well-defined. The Brazilian otter (*L. brasiliensis*) is a very large species from Brazil, Demerara and Surinam, with a prominent ridge along each lateral margin of the tail. In two small species the feet are only slightly webbed; claws exceedingly small or altogether wanting on some of the toes; the first upper premolar very small, sometimes wanting; and the molars very broad and massive. The species in question are *L. inunguis* of South Africa, and *L. leptonyx* or *cinerea* of India, Java and Sumatra, and have been separated as a distinct genus, Aonyx.

The sea-otter, *Latax* (or *Enhydra*) *lutra*, with a dentition of *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{1}{2}$, total 32, differs from other Carnivora in having but two incisors on each side of the lower jaw, the one corresponding to the first (very small in the true otters) being absent. Though the molar teeth generally resemble those of *Lutra* in their proportions, they differ in the exceeding roundness and massiveness of their crowns and bluntness of their cusps. Feet webbed; fore-feet short, with five subequal toes, with short compressed claws; hind-feet very large, depressed and fin-like, their phalanges flattened as in seals. The fifth toe the longest and stoutest, the rest gradually diminishing in size to the first, all with moderate claws. Tail moderate, cylindrical (see OTTER).

II. PINNIPEDIA

The second suborder is formed by the seals, walruses and eared seals, which differ from the rest of the Carnivora mainly in the limbs being modified for aquatic progression; the two upper segments being very short and partially enveloped in the general integument of the body, while the third, especially in the hind extremities, is elongated, expanded and webbed. There are always five well-developed digits on each limb. In the hind-limb the two marginal digits (first and fifth) are stouter and generally larger than the others. The teeth also differ from those of the more typical Carnivora. The incisors are always fewer than $\frac{3}{3}$. The cheek series consists generally of four premolars and one molar of uniform characters, with never more than two roots, and with conical, more or less compressed, pointed crowns, which may have accessory cusps, placed before or behind the principal one, but are never broad and tuberculated. The milk-teeth are small, simple and shed or absorbed at an early age, usually either before or within a few days after birth. The brain is relatively large, the cerebral hemispheres broad in proportion to their length, and with numerous and complex convolutions. There is a very short caecum; the kidneys are divided into numerous distinct lobules. There are no Cowper's glands. Teats two or four, abdominal. No clavicles. Tail always short. Eyes large and exposed, with flat cornea. The nostrils close by the elasticity of their walls, and are opened at will by muscular action.

The members of this group are aquatic, spending the greater part of their time in the water, swimming and diving with great facility, feeding mainly on fish, crustaceans and other marine animals, and progressing on land with difficulty, but always coming on shore for the purpose of bringing forth their young. They are generally marine, but occasionaliy ascend large rivers, and some inhabit inland seas and lakes, as the Caspian and Baikal. Though not numerous in species, they are widely distributed over the world, but occur most abundantly on the coasts of lands situated in cold and temperate zones.

As mentioned in the article CREODONTA, the true seals (*Phocidae*), together with the walruses, may be directly descended from the primitive Creodont Carnivora. The eared seals, on the other hand, show signs of affinity with the bears; but as they are of earlier geological age than the latter, they cannot be derived from that group.

The true seals (family *Phocidae*) are the most completely adapted for aquatic life of all the Pinnipedia. When on land the hind-limbs are extended backwards and take no part in progression, which is effected by a series of jumping movements produced by the muscles of the trunk, in some species aided by the fore-limbs. The soles of the feet are hairy. There is no pinna to the ear, and no scrotum, the testes being abdominal. The upper incisors have simple, pointed crowns, and vary in number in the different groups. All have well developed canines and ‖ teeth of the cheek series. In those species of which the milk-dentition is known, there are three milk molars, which precede the second, third, and fourth permanent molars; the dentition is therefore *p.* $\frac{4}{3}$, *m.* $\frac{4}{4}$, the first premolar having as usual no milk predecessor. The skull has no post-orbital process and no alisphenoid canal. The fur is stiff and adpressed, without woolly under-fur. **Seals.**

In the typical group, or subfamily *Phocinae*, the incisors are $\frac{6}{6}$. All the feet have five well-developed claws with the toes on the hind-feet subequal, the first and fifth not greatly exceeding the others in length, the interdigital membrane not extending beyond them. In the genus *Halichoerus* the dentition is *i.* $\frac{6}{6}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1}{1}$; total 34. Molars with large, simple, conical, recurved, slightly compressed crowns, having sharp anterior and posterior edges, but without accessory cusps, except sometimes the two hinder ones of the lower jaw. With the exception of the last one or two in the upper jaw and the last in the lower jaw, all are single-rooted. Vertebrae: C. 7, D. 15, L. 5, S. 4, Ca. 14. Includes only one species *H. grypus*, the grey seal of the coasts of Scandinavia and the British Isles.

In *Phoca* the dental formula is as in the last, but the teeth are smaller and more pointed. Molars with two roots (except the first in each jaw). Crowns with accessory cusps. Vertebrae: C. 7, D. 14-15, L. 5, S. 4, Ca. 11-14. Head round and short. Fore-feet short with five strong, subcompressed, slightly curved, subequal, rather sharp claws. On the hind-feet the claws much narrower and less curved. The species of this genus are widely distributed throughout the northern hemisphere, and include *P. barbata*, the bearded seal; *P. groenlandica*, the Greenland seal; *P. vitulina*, the common seal; *P. hispida*, the ringed seal of the north Atlantic; *P. caspica*, from the Caspian and Aral Seas; and *P. sibirica*, from Lake Baikal. (See SEAL).

The members of the second subfamily, *Monachinae*, have incisors $\frac{4}{4}$; and the molars two-rooted, except the first. On the hind-feet the first and fifth toes greatly exceeding the others in length, with nails rudimentary or absent. In the genus *Monachus*, the dentition is *i.* $\frac{4}{4}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1}{1}$; total 32. Crowns of molars strong, conical, compressed, hollowed on the inner side, with a strongly-marked lobed cingulum, especially on the inner side, and slightly developed accessory cusps before and behind. The first and last upper and the first lower molar smaller than the others. Vertebrae: C. 7, D. 15, L. 5, S. 2, Ca. 11. All the nails of both fore and hind feet very small and rudimentary. Represented by *M. albiventer*, the monk-seal of the Mediterranean and adjacent parts of the Atlantic, and the West Indian *M. tropicalis*.

The other genera of this section have the same dental formula, but are distinguished by the characters of the cheek-teeth and the feet. They are all inhabitants of the shores of the southern hemisphere.

In *Ogmorhinus* all the teeth of the cheek-series have three distinct pointed cusps, deeply separated from each other, of which the middle or principal cusp is largest and slightly recurved; the other two are nearly equal in size, and have their tips directed towards the middle one. Skull much elongated. One species, *O. leptonyx*, the sea-leopard, widely distributed in the Antarctic and southern temperate seas. In *Lobodon* the molars have compressed elongated crowns, with a principal recurved cusp, rounded and somewhat bulbous at the apex, and one anterior, and one, two or three posterior distinct accessory cusps. One species, *L. carcinophagus*, the crab-eating seal. In the third genus, *Leptonychotes*, represented by *L. weddelli*, the molars are small, with simple, subcompressed, conical crowns, and a broad cingulum, but no distinct accessory cusps. Finally in the white seal (*Ommatophoca rossi*) all the teeth are very small, those of the cheek-series with pointed, recurved crowns, and small posterior and still less developed anterior accessory cusps. Orbits very large. Nails rudimentary on front and absent on hind-feet. The skull bears a considerable resemblance to that of the next subfamily.

The presence of two pairs of upper and one pair of lower incisors is characteristic of the members of the subfamily *Cystophorinae*, in which the teeth of the cheek-series are generally one-rooted. The nose of the males has an appendage capable of being inflated. First and fifth toes of hind-feet greatly exceeding the others in length, with prolonged cutaneous lobes, and rudimentary or no nails. In the typical genus *Cystophora* the dentition is *i.* $\frac{4}{4}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1}{1}$; total 30; the last molar having generally two distinct roots. Beneath the skin over the face of the male, and connected with the nostrils, is a sac capable of inflation, when it forms a kind of hood covering the upper part of the head. Nails present, though small on the hind-feet. Represented by *C. cristata*, the hooded or bladder-nosed seal of the Polar Seas. In *Macrorhinus* the dentition is numerically the same as in the last, but the molars are of simpler character and all one-rooted. All the teeth, except the canines, very small relatively to the size of the animal. Hind-feet without nails. Vertebrae: C. 7, D. 15, L. 5, S. 4, Ca. 11. Nose of adult male produced into a short tubular proboscis, ordinarily flaccid, but capable of dilatation and elongation under excitement. One species, *M. leoninus*, the elephant-seal, or "sea elephant" of the whalers, the largest of the whole family, attaining the length of nearly 20 ft. Formerly abundant in the Antarctic Seas, and also found on the coast of California.

The next family is that of the walruses, or *Odobaenidae*, the single generic representative of which is in some respects intermediate between the *Phocidae* and *Otariidae*, but has a completely aberrant dentition. Walruses have no external ears, as in the *Phocidae*; but when on land the hind-feet are turned forwards and used in progression, though less completely than in the *Otariidae*. The upper canines are developed into immense tusks, which descend a long distance below the lower jaw. All the other teeth, including the lower canines, are much alike, small, simple and one-rooted, the molars with flat crowns. The skull is without post-orbital process, but has an alisphenoid canal. In the young the dentition is *i.* $\frac{6}{4}$, *c.* $\frac{1}{1}$, *p.* and *m.* $\frac{4}{4}$, but many of these teeth are, however, lost early or remain through life in a rudimentary state, concealed by the gums. The teeth which are usually developed functionally are *i.* $\frac{2}{0}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{1}{1}$; total 18. Vertebrae: C. 7, D. 14, L. 6, S. 4, Ca. 9. Head round. Eyes rather small. Muzzle short and broad, with a group of long, very stiff, bristly whiskers on each side. The remainder of the hair-covering very short and closely pressed. Tail rudimentary. Fore-feet with subequal toes, carrying five minute flattened nails. Hind-feet with subequal toes, the fifth slightly the largest, with cutaneous lobes projecting beyond the ends as in *Otaria*; first and fifth with minute flattened nails; second, third and fourth with large, elongated, subcompressed pointed nails. The two species are *Odobaenus rosmarus*, of the Atlantic, and the closely allied *O. obesus*, of the Pacific. (See WALRUS.) **Walrus.**

The third and last family of the Pinnipedia, and thus of existing Carnivora, is the *Otariidae*, which includes the eared seals, or sea-lions and sea-bears. In all these animals, when on land, the hind-feet are turned forwards under the body, and aid in supporting and moving the trunk as in ordinary quadrupeds. There are small external ears. Testes suspended in a distinct external scrotum. Skull with post-orbital processes and alisphenoid canal. Soles of feet naked. By many naturalists these seals are arranged in a number of generic groups, but as the differences between them are not very great, they may all be included in the typical genus *Otaria*. The dental formula is *i.* $\frac{2}{2}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1 \text{ or } 2}{1}$; total 34 or 36. The first and second upper incisors are small, with the summits of their crowns divided by deep transverse grooves into an anterior and a posterior cusp of nearly equal height; the third large and canine-like. Canines large, conical, pointed, recurved. Molars and premolars usually $\frac{5}{5}$, of which the second, third and fourth are preceded by milk-teeth shed a few days after birth; sometimes (as in fig. 7) a sixth upper molar (occasionally developed on one side and not the other); all with similar characters, generally single-rooted; crown moderate, compressed, pointed, with a single principal cusp, and sometimes a cingulum, and more or less developed anterior and posterior accessory cusps. Vertebrae: C. 7, D. 15, L. 5, S. 4, Ca. 9–10. Head rounded. Eyes large; ears small, narrow and pointed. Neck long. Skin of the feet extended far beyond the nails and ends of the digits, with a deeply-lobed margin. The nails small and often quite rudimentary, especially those of the first and fifth toes of both feet; the best-developed and most constant being the three middle claws of the hind-foot, which are elongated, compressed and curved. **Sea-lions.**

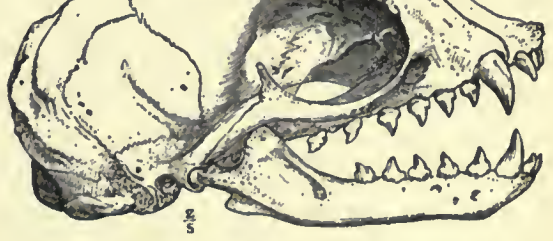

FIG. 7.—Skull and dentition of Australian Sea-Bear (*Otaria forsteri*).

Sea-bears and sea-lions are widely distributed, especially in the temperate regions of both hemispheres, though absent from the coasts of the North Atlantic. They spend more of their time on shore, and range inland to greater distances than the true seals, especially at the breeding-time, though they are obliged to return to the water to seek their food. They are gregarious and polygamous, and the males usually much larger than the females. Some possess, in addition to the stiff, close, hairy covering common to the group, a fine, dense, woolly under-fur. The skins of these, when

dressed and deprived of the longer harsh outer hairs, constitute the "sealskin" of commerce. The species include *O. stelleri*, the northern sea-lion, the largest of the genus, from the North Pacific, about 10 ft. in length; *O. jubata*, the southern sea-lion, from the Falkland Islands and Patagonia; *O. californiana*, from California; *O. ursina*, the sea-bear or fur-seal of the North Pacific, the skins of which are imported in immense numbers from the Pribiloff Islands; *O. antarctica* or *pusilla*, from the Cape of Good Hope; and *O. forsteri*, from Australia and various islands in the southern hemisphere. (See SEAL-FISHERIES.)

Little is known as to the past history of the sea-lions and sea-bears, but a skull has been obtained from the Miocene strata of Oregon, which Mr F. W. True states to be considerably larger than any existing sea-lion skull; its basal length when entire being probably about 20 in. The name *Pontoleon magnus* has been proposed for this fossil sea-lion, as the character of the skull and teeth do not agree precisely with those of any living member of the group. If, however, all the modern eared seals are included in the genus *Otaria*, there is apparently no reason to exclude the fossil species.

EXTINCT CARNIVORA

Modern Carnivora are undoubtedly the descendants of the Creodonta (*q.v.*), an extinct early Tertiary suborder. It has been observed that as the Miocene is approached, some of these Carnivora Creodonta, or Primitiva, begin to assume more and more of the characteristics of the Carnivora Vera, till at last it is difficult to determine where the one group ends and the other commences. The creodont genera *Stypolophus* and *Proviverra* show some of these modern characters; but it is not till we reach the European Oligocene genus *Amphictis*, with the dental formula *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{2}{2}$, that we meet a type in which the fourth upper premolar and the first lower molar assume the truly sectorial character of the Carnivora Vera, while the teeth behind them are proportionally reduced in size. From the *Amphictidae* are probably descended the *Viverridae*, the connecting genus being the African *Nandinia*, which, as already mentioned, retains the imperfectly ossified bulla of the ancestral forms. In another direction, *Amphictis*, through the Old World Lower Pliocene genus *Ictitherium*, has given rise to the *Hyaenidae*. The *Felidae* have apparently an ancestral type in the creodont *Palaeonictis*, which has been regarded as the direct ancestor of the sabre-toothed cats, or *Machaerodontinae* (see MACHAERODUS); but it is possible that *Palaeonictis* may be off the direct line, and that the *Felidae* are sprung from *Amphictis*. Be this as it may, from another group of creodonts, represented by *Vulpavus* (*Miacis*), *Viverravus* (*Didymictis*), and *Uintacyon*, is probably derived the Oligocene *Cynodictis*, with a dental formula like that of *Canis* or *Cyon*, a perforation to the humerus, and an apparently undivided auditory bulla; and from *Cynodictis* the transition is easy to the *Canidae*. It should be mentioned, however, that there is a group of North American Oligocene dog-like animals, such as *Daphaenus*, *Protemnocyon*, and *Temnocyon*, which agree with *Cyon* in the shortness of the jaws, and with that genus and *Speothos* in the cutting-heel of the lower sectorial. Possibly these genera may be nearly related to *Cyon*. Other dog-like North American types are *Oligohinis*, *Enhydrocyon* and *Hyaenocyon*.

By means of the *Amphicyonidae*, as represented by the Middle Tertiary genera *Proamphicyon*, *Pseudamphicyon*, and *Amphicyon*, in which there were three upper molars, we have a transition from the *Cynodictis*-type to the bear-group; one of the later intermediate forms being the Lower Pliocene Old World *Hyaenarctus*, in which the two upper molars are squared and foreshadow those of *Ursus* itself. In some unknown manner *Hyaenarctus* appears to be related to *Aeluropus*. An allied type is found in *Arctotherium* of the South American Pleistocene.

By the loss of the third lower molar and certain modifications of the other teeth and skull, the Miocene genus *Plesictis* may be derived from *Cynodictis*, its dental formula being *i.* $\frac{3}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{1 \text{ or } 2}{2}$. Now *Plesictis* is nothing more than a generalized representative of the *Mustelidae*. We have thus traced three out of the four modern arctoid families to the *Cynodictis*-type. The *Procyonidae*, or fourth family (apart from the Asiatic *Aelurus* and *Aeluropus*) are connected with the last-named genus through the North American Oligocene *Phlaeocyon*, which is stated to be in almost every respect intermediate between *Procyon* and *Cynodictis*; while the living *Bassariscus* is stated to show closer signs of affinity with *Cynodictis* than with *Phlaeocyon*.

To deal with fossil representatives of living genera, or extinct genera nearly related to groups still existing, would here be impracticable. It may be stated, however, that aberrant groups like the otters are linked up with more normal types by means of extinct forms (in this particular instance by the Miocene *Potamotherium*), so that the gaps in the phylogeny of the Carnivora are comparatively few.

LITERATURE.—The above article is based on that by Sir W. H. Flower in the 9th edition of this Encyclopaedia. The principal works on Carnivora are the following: W. H. Flower, "On the Value of the Base of the Cranium in the Classification of the Carnivora," *Proc. Zool. Soc. London*, 1869; T. H. Huxley, "Cranial and Dental Characters of the Canidae," *Proc. Zool. Soc. London*, 1880; St G. Mivart, "On the Classification and Distribution of the Aeluroidea . . . and Arctoidea," *Proc. Zool. Soc. London*, 1882 and 1885; E. R. Lankester, "On the Affinities of Aeluropus," *Trans. Linn. Soc. London*, vol. viii. part iv., 1901; Miss A. Carlsson, "Über die systematische Stellung von Nandinia," *Zool. Jahrb. Syst.*, vol. xiii., 1900, and "Ist Otocyon die Ausgangsform des Hundegeschlechts oder nicht?" *op. cit.* vol. xxii., 1905; J. L. Wortman and W. D. Matthew, "The Ancestry of Certain Members of the Canidae, Viverridae, and Procyonidae," *Bull. Amer. Mus.*, vol. xii., 1899. (R. L.*)

CARNOT, LAZARE HIPPOLYTE (1801–1888), French statesman, the second son of L. N. M. Carnot (*q.v.*), was born at Saint-Omer on the 6th of October 1801. Hippolyte Carnot lived at first in exile with his father, returning to France only in 1823. Unable then to enter active political life, he turned to literature and philosophy, publishing in 1828 a collection of *Chants helléniques* translated from the German of W. Müller, and in 1830 an *Exposé de la doctrine Saint-Simonienne*, and collaborating in the Saint-Simonian journal *Le Producteur*. He also paid several visits to England and travelled in other countries of Europe. In March 1839, after the dissolution of the chamber by Louis Philippe, he was elected deputy for Paris (re-elected in 1842 and in 1846), and sat in the group of the Radical Left, being one of the leaders of the party hostile to Louis Philippe. On the 24th of February 1848 he pronounced in favour of the republic. Lamartine chose him as minister of education in the provisional government. Carnot set to work to organize the primary school systems, proposing a law for obligatory and free primary instruction, and another for the secondary education of girls. But he declared himself against purely secular schools, holding that "the minister and the schoolmaster are the two columns on which rests the edifice of the republic." By this attitude he alienated both the Right and the Republicans of the Extreme Left, and was forced to resign on the 5th of July 1848. He was one of those who protested against the *coup d'état* of the 2nd of December 1851, but was not proscribed by Louis Napoleon. He refused to sit in the *Corps Législatif* until 1864, in order not to have to take the oath to the emperor. From 1864 to 1869 he was in the republican opposition, taking a very active part. He was defeated at the election of 1869. On the 8th of February 1871 he was named deputy for the Seine et Oise, and participated in the drawing up of the Constitutional Laws of 1875. On the 16th of December 1875, he was named by the National Assembly senator for life. He died on the 16th of March 1888, three months after the election of his elder son, M. F. S. Carnot (*q.v.*), to the presidency of the republic. He had published *Le Ministère de l'instruction publique et des cultes du 24e février au 5e juillet 1848*, (1849), *Mémoires sur Lazare Carnot* (2 vols., 1861–1864), *Mémoires de Barère* (with David Angers, 4 vols., 1842–1843). His second son, Marie Adolphe Carnot (b. 1839), became a distinguished mining-engineer and director of the École des Mines (1899), his studies in analytical chemistry placing him in the front rank of French scientists. He was made a member of the Academy of Sciences in 1895.

See Vermorel, *Les Hommes de 1848* (3rd ed., 1869); E. Spuller, *Histoire parlementaire de la Seconde République* (1891); P. de la Gorce, *Histoire du Second Empire* (1894 et seq.).

CARNOT, LAZARE NICOLAS MARGUERITE (1753–1823), French general, was born at Nolay in Burgundy in 1753. He received his training as an engineer at Mézières, becoming an officer of the Corps de Génie in 1773 and a captain ten years later. He had then just published his first work, an *Essai sur les machines en général*. In 1784 he wrote an essay on balloons, and his *Éloge* of Vauban, read by him publicly, won him the commendation of Prince Henry of Prussia. But as the result of a controversy with Montalembert, Carnot abandoned the official, or Vauban, theories of the art of fortification, and went over to the "perpendicular" school of Montalembert. He was consequently imprisoned, on the pretext of having fought a duel, and only released when selected to accompany Prince Henry of Prussia in a visit to Vauban's fortifications. In 1791 he married. The Revolution drew him into political life, and he was elected a deputy for the Pas de Calais. In the Assembly he

took a prominent part in debates connected with the army. Carnot was a stern and sincere republican, and voted for the execution of the king. In the campaigns of 1792 and 1793 he was continually employed as a commissioner in military matters, his greatest service being in April 1793 on the north-eastern frontier, where the disastrous battle of Neerwinden and the subsequent defection of Dumouriez had thrown everything into confusion. After doing what was possible to infuse energy into the operations of the French forces, he returned to Paris and was made a member of the Committee of Public Safety. He was charged with duties corresponding to those of the modern chief of the general staff and adjutant-general. As a member of the committee he signed its decrees and was thus at least technically responsible for the acts of the Reign of Terror. His energies were, however, directed to the organization, not yet of victory, but of defence. His labours were incessant; practically every military document in the archives of the committee was Carnot's own work, and he was repeatedly in the field with the armies. His part in Jourdan's great victory at Wattignies was so important that the credit of the day has often been assigned to Carnot. The winter of 1793–1794 was spent in new preparations, in instituting a severe discipline in the new and ill-trained troops of the republic, and in improvising means and material of war. He continued to visit the armies at the front, and to inspire them with energy. He acquiesced in the fall of Robespierre in 1794, but later defended Barère and others among his colleagues, declaring that he himself had constantly signed papers without reading them, as it was physically impossible to do so in the press of business. When Carnot's arrest was demanded in May 1795, a deputy cried "Will you dare to lay hands on the man who has organized victory?" Carnot had just accepted promotion to the rank of major in the engineers. Throughout 1793, when he had been the soul of the national defence, and 1794, in which year he had "organized victory" in fourteen armies, he was a simple captain.

Carnot was elected one of the five Directors in November 1795, and continued to direct the war department during the campaign of 1796. Late in 1796 he was made a member (1st class) of the Institute, which he had helped to establish. He was for two periods president of the Directory, but on the *coup d'état* of the 18th Fructidor (1797) was forced to take refuge abroad. He returned to France after the 18th Brumaire (1799) and was re-elected to the Institute in 1800. Early in 1800 he became minister of war, and he accompanied Moreau in the early part of the Rhine campaign. His chief work was, however, in reducing the expenses of the armies. Contrary to the usual custom he refused to receive presents from contractors, and he effected much-needed reforms in every part of the military administration. He tendered his resignation later in the year, but it was long before the First Consul would accept it. From 1801 he lived in retirement with his family, employing himself chiefly in scientific pursuits. As a senator he consistently opposed the increasing monarchism of Napoleon, who, however, gave him in 1809 a pension and commissioned him to write a work on fortification for the school of Metz. In these years he had published *De la corrélation des figures de géométrie* (1801), *Géométrie de position* (1803), and *Principes fondamentaux de l'équilibre et du mouvement* (1803), all of which were translated into German. His great work on fortification appeared at Paris in 1810 (*De la défense de places fortes*), and was translated for the use of almost every army in Europe. He took Montalembert as his groundwork. Without sharing Montalembert's antipathy to the bastioned trace, and his predilection for high masonry caponiers, he followed out the principle of retarding the development of the attack, and provided for the most active defence. To facilitate sorties in great force he did away with a counterscarp wall, providing instead a long gentle slope from the bottom of the ditch to the crest of the glacis. This, he imagined, would compel an assailant to maintain large forces in the advanced trenches, which he proposed to attack by vertical fire from mortars. Along the front of his fortress was built a heavy detached wall, loop-holed for fire, and sufficiently high to be a most formidable obstacle. This "Carnot wall," and, in general, Carnot's principle of active defence, played a great part in the rise of modern fortification.

He did not seek employment in the field in the aggressive wars of Napoleon, remaining a sincere republican, but in 1814, when France itself was once more in danger, Carnot at once offered his services. He was made a general of division, and Napoleon sent him to the important fortress of Antwerp as governor. His defence of that place was one of the most brilliant episodes of the campaign of 1814. On his return to Paris he addressed a political memoir to the restored king of France, which aroused much attention both in France and abroad. He joined Napoleon during the Hundred Days and was made minister of the interior, the office carrying with it the dignity of count, and on the 2nd of June he was made a peer of France. On the second Restoration he was proscribed. He lived thenceforward in Magdeburg, occupying himself still with science. But his health rapidly declined, and he died at Magdeburg on the 2nd of August 1823. His remains were solemnly removed to the Invalides in 1889. Long before this, in 1836, Antwerp had erected a statue to its defender of 1814. In 1837 Arago pronounced his *éloge* before the Académie des Sciences. The sincerity of his patriotism and his political convictions was proved in 1801–1804 and in 1814. The memory of his military career is preserved in the title, given to him in the Assembly, of "The organizer of victory." His sons, Sadi and L. Hippolyte, are separately noticed.

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CARNOT, MARIE FRANÇOIS SADI (1837–1894), fourth president of the third French Republic, son of L. Hippolyte Carnot, was born at Limoges on the 11th of August 1837. He was educated as a civil engineer, and after having highly distinguished himself at the École Polytechnique and the École des Ponts et Chaussées, obtained an appointment in the public service. His hereditary republicanism recommended him to the government of national defence, by which he was entrusted in 1870 with the task of organizing resistance in the departments of the Eure, Calvados and Seine Inférieure, and made prefect of the last named in January 1871. In the following month he was elected to the National Assembly by the department Côte d'Or. In August 1878 he was appointed secretary to the minister of public works. In September 1880 he became minister, and again in April 1885, passing almost immediately to the ministry of finance, which he held under both the Ferry and the Freycinet administrations until December 1886. When the Wilson scandals occasioned the downfall of Grévy in December 1887, Carnot's high character for integrity marked him out as a candidate for the presidency, and he obtained the support of Clémenceau and of all those who objected to the candidatures of men who have been more active in the political arena, so that he was elected by 616 votes out of 827. He assumed office at a critical period, when the republic was all but openly attacked by General Boulanger. President Carnot's ostensible part during this agitation was mainly confined to augmenting his popularity by well-timed appearances on public occasions, which gained credit for the presidency and the republic. When early in 1889, Boulanger was finally driven into exile, it fell to President Carnot's lot to appear at the head of the state on two occasions of especial interest, the celebration of the centenary of 1789 and the opening of the Paris Exhibition of that year. The perfect success of both was regarded, not unreasonably, as a popular ratification of the republic, and though continually

harassed by the formation and dissolution of ephemeral ministries, by socialist outbreaks, and the beginnings of anti-Semitism, Carnot had but one serious crisis to surmount, the Panama scandals of 1892, which, if they greatly damaged the prestige of the state, increased the respect felt for its head, against whose integrity none could breathe a word. Carnot seemed to be arriving at the zenith of popularity, when on the 24th of June 1894, after delivering at a public banquet at Lyons a speech in which he appeared to imply that he nevertheless would not seek re-election, he was stabbed by an Italian anarchist named Caserio and expired almost immediately. The horror and grief excited by this tragedy were boundless, and the president was honoured with a splendid funeral in the Panthéon, Paris.

His son, FRANÇOIS CARNOT, was first elected deputy for the Côte d'Or in 1902.

See E. Zevort, *Histoire de la Troisième République*, tome iv., "La Présidence de Carnot" (Paris, 1901).

CARNOT, SADI NICOLAS LÉONHARD (1796–1832), French physicist, elder son of L. N. M. Carnot, was born at Paris on the 1st of June 1796. He was admitted to the École Polytechnique in 1812, and late in 1814 he left with a commission in the Engineers and with prospects of rapid advancement in his profession. But Waterloo and the Restoration led to a second and final proscription of his father; and though not himself cashiered, Sadi was purposely told off for the merest drudgeries of his service. Disgusted with an employment which afforded him neither leisure for original work nor opportunities for acquiring scientific instruction, he presented himself in 1819 at the examination for admission to the staff corps (*état-major*) and obtained a lieutenancy. He then devoted himself with astonishing ardour to mathematics, chemistry, natural history, technology and even political economy. He was an enthusiast in music and other fine arts; and he habitually practised as an amusement, while deeply studying in theory, all sorts of athletic sports, including swimming and fencing. He became captain in the Engineers in 1827, but left the service altogether in the following year. His naturally feeble constitution, further weakened by excessive study, broke down finally in 1832. An attack of scarlatina led to brain fever, and he had scarcely recovered when he fell a victim to cholera, of which he died in Paris on the 24th of August 1832. He was one of the most original and profound thinkers who have ever devoted themselves to science. The only work he published was his *Réflexions sur la puissance motrice du feu et sur les machines propres à développer cette puissance* (Paris, 1824). This contains but a fragment of his scientific discoveries, but it is sufficient to put him in the very foremost rank, though its full value was not recognized until pointed out by Lord Kelvin in 1848 and 1849. Fortunately his manuscripts had been preserved, and extracts were appended to a reprint of his *Puissance motrice* by his brother, L. H. Carnot, in 1878. These show that he had not only realized for himself the true nature of heat, but had noted down for trial many of the best modern methods of finding its mechanical equivalent, such as those of J. P. Joule with the perforated piston and with the friction of water and mercury. Lord Kelvin's experiment with a current of gas forced through a porous plug is also given. "Carnot's principle" is fundamental in the theory of thermodynamics (*q.v.*).

CARNOUSTIE, a police burgh and watering-place of Forfarshire, Scotland. Pop. (1901) 5204. It lies on the North Sea, $10\frac{3}{4}$ m. E.N.E. of Dundee by the North British railway. Bathing and golfing are good. Barry Links, a triangular sandy track occupying the south-eastern corner of the shire, are used as a camping and manœuvring ground for the artillery and infantry forces of the district, and occasionally of Scotland. Its most extreme point is called Buddon Ness, off which are the dangerous shoals locally known as the Roaring Lion, in consequence of the deep boom of the waves. On the Ness two lighthouses have been built at different levels, the lights of which are visible at 13 and 16 m.

CARNUNTUM (Καρνοῦς in Ptolemy), an important Roman fortress, originally belonging to Noricum, but after the 1st century A.D. to Pannonia. It was a Celtic town, the name, which is nearly always found with K on monuments, being derived from *Kar, Karn* ("rock," "cairn"). Its extensive ruins may still be seen near Hainburg, between Deutsch-Altenburg and Petronell, in lower Austria. Its name first occurs in history during the reign of Augustus (A.D. 6), when Tiberius made it his base of operations in the campaigns against Maroboduus (Marbod). A few years later it became the centre of the Roman fortifications along the Danube from Vindobona (Vienna) to Brigetio (O-Szöny), and (under Trajan or Hadrian) the permanent quarters of the XIV legion. It was also a very old mart for the amber brought to Italy from the north. It was created a municipium by Hadrian (Aelium Carnuntum). Marcus Aurelius resided there for three years (172–175) during the war against the Marcomanni, and wrote part of his *Meditations*. Septimius Severus, at the time governor of Pannonia, was proclaimed emperor there by the soldiers (193). In the 4th century it was destroyed by the Germans, and, although partly restored by Valentinian I., it never regained its former importance, and Vindobona became the chief military centre. It was finally destroyed by the Hungarians in the middle ages.

A special society (*Carnuntumverein*) exists for the exploration of the numerous ruins, the results of which will be found in J. W. Kubitschek and S. Frankfurter, *Führer durch Carnuntum* (3rd ed., 1894); see also E. von Sacken, "Die römische Stadt Carnuntum," in *Sitzungsberichte der k. Akad. der Wissenschaften*, ix. (Vienna, 1852); article by Kubitschek in Pauly-Wissowa's *Realencyclopädie*, iii. part ii. (1899); *Corpus Inscriptionum Latinarum*, iii., part i. p. 550.

CARNUTES (Carnuti, Carnutae, Καρνουτῖνοι in Plutarch), a Celtic people of central Gaul, between the Sequana (Seine) and the Liger (Loire). Their territory corresponded to the dioceses of Chartres, Orléans and Blois, that is, the greater part of the modern departments of Eure-et-Loir, Loiret, Loir-et-Cher. It was regarded as the political and religious centre of the Gallic nation. The chief towns were Cenabum (not Genabum; Orléans) and Autricum (Chartres). According to Livy (v. 34) the Carnutes were one of the tribes which accompanied Bellovesus in his invasion of Italy during the reign of Tarquinius Priscus. In the time of Caesar they were dependents of the Remi, who on one occasion interceded for them. In 52 they joined in the rebellion of Vercingetorix. As a punishment for the treacherous murder of some Roman merchants and one of Caesar's commissariat officers at Cenabum, the town was burnt and the inhabitants put to the sword or sold as slaves. During the war they sent 12,000 men to relieve Alesia, but shared in the defeat of the Gallic army. Having attacked the Bituriges Cubi, who appealed to Caesar for assistance, they were forced to submit. Under Augustus, the Carnutes, as one of the peoples of Lugdunensis, were raised to the rank of *civitas socia* or *foederata*, retaining their own institutions, and only bound to render military service to the emperor. Up to the 3rd century Autricum (later Carnutes, whence Chartres) was the capital, but in 275 Aurelian changed Cenabum from a *vicus* into a *civitas* and named it Aurelianum or Aurelianensis urbs (whence Orléans).

See Caesar, *Bell. Gall.* v. 25, 29, vii. 8, 11, 75, viii. 5, 31; Strabo iv. pp. 191-193; R. Boutrays, *Urbis gentisque Carnutum historia* (1624); A. Desjardins, *Géographie historique de la Gaule*, ii. (1876–1893); article and bibliography in *La Grande Encyclopédie*; T. R. Holmes, *Caesar's Conquest of Gaul* (1899), p. 402, on Cenabum.

CARO, ANNIBALE (1507–1566), Italian poet, was born at Civita Nuova, in Ancona, in 1507. He became tutor in the family of Lodovico Gaddi, a rich Florentine, and then secretary to his brother Giovanni, by whom he was presented to a valuable ecclesiastical preferment at Rome. At Gaddi's death, he entered the service of the Farnese family, and became confidential secretary in succession to Pietro Lodovico, duke of Parma, and to his sons, duke Ottavio and cardinals Ranuccio and Alexander. Caro's most important work was his translation of the *Aeneid* (Venice, 1581; Paris, 1760). He is also the author of *Rime, Canzoni*, and sonnets, a comedy named *Gli Straccioni*, and two clever *jeux d'esprit*, one in praise of figs, *La Ficheide*, and another in eulogy of the big nose of Leoni Ancona, president of the Academia della Vertù. Caro's poetry is distinguished by very

considerable ability, and particularly by the freedom and grace of its versification; indeed he may be said to have brought the *verso sciolto* to the highest development it has reached in Italy. His prose works consist of translations from Aristotle, Cyprian and Gregory Nazianzen; and of letters, written in his own name and in those of the cardinals Farnese, which are remarkable both for the baseness they display and for their euphemistic polish and elegance. His fame has been greatly damaged by the virulence with which he attacked Lodovico Castelvetro in one of his canzoni, and by his meanness in denouncing him to the Holy Office as translator of some of the writings of Melanchthon. He died at Rome about 1566.

CARO, ELME MARIE (1826–1887), French philosopher, was born on the 4th of March 1826 at Poitiers. His father, a professor of philosophy, gave him an excellent education at the Stanislas College and the École Normale, where he graduated in 1848. After being professor of philosophy at several provincial universities, he received the degree of doctor, and came to Paris in 1858 as master of conferences at the École Normale. In 1861 he became inspector of the Academy of Paris, in 1864 professor of philosophy to the Faculty of Letters, and in 1874 a member of the French Academy. He married Pauline Cassin, the authoress of the *Péché de Madeleine* and other well-known novels. He died in Paris on the 13th of July 1887. In his philosophy he was mainly concerned to defend Christianity against modern Positivism. The philosophy of Cousin influenced him strongly, but his strength lay in exposition and criticism rather than in original thought. Besides important contributions to *La France* and the *Revue des deux mondes*, he wrote *Le Mysticisme au XVIIIe siècle* (1852–1854), *L'Idée de Dieu* (1864), *Le Matérialisme et la science* (1868), *Le Pessimisme au XIXe siècle* (1878), *Jours d'épreuves* (1872), *M. Littré et le positivisme* (1883), *George Sand* (1887), *Mélanges et portraits* (1888), *La Philosophie de Goethe* (2nd ed., 1880).

CAROL (O. Fr. *carole*), a hymn of praise, especially such as is sung at Christmas in the open air. The origin of the word is obscure. Diez suggests that the word is derived from *chorus*. Others ally it with *corolla*, a garland, circle or coronet,[1] the earliest sense of the word being apparently "a ring" or "circle," "a ring dance." Stonehenge, often called the Giants' Dance, was also frequently known as the Carol; thus Harding, *Chron.* lxx. x., "Within (the) Giauntes Carole, that so they hight, The (Stone hengles) that nowe so named been." The Celtic forms, often cited as giving the origin of the word, are derivatives of the English or French. The crib set up in the churches at Christmas was the centre of a dance, and some of the most famous of Latin Christmas hymns were written to dance tunes. These songs were called *Wiegenlieder* in German, *noëls* in French, and carols in English. They were originally modelled on the songs written to accompany the choric dance, which were probably the starting-point of the lyric poetry of the Germanic peoples. Strictly speaking, therefore, the word should be applied to lyrics written to dance measures; in common acceptation it is applied to the songs written for the Christmas festival. Carolling, *i.e.* the combined exercise of dance and song, found its way from pagan ritual into the Christian church, and the clergy, however averse they might be from heathen survivals, had to content themselves in this, as in many other cases, with limiting the practice. The third council of Toledo (589) forbade dancing in the churches on the vigils of saints' days, and secular dances in church were forbidden by the council of Auxerre in the next year. Even as late as 1209 it was necessary for the council of Avignon to forbid theatrical dances and secular songs in churches. Religious dances persisted longest on Shrove Tuesday, and a castanet dance by the choristers round the lectern is permitted three times a year in the cathedral of Seville. The Christmas festival, which synchronized with and superseded the Latin and Teutonic feasts of the winter solstice, lent itself especially to gaiety. The "crib" of the Saviour was set up in the churches or in private houses, in the traditional setting of the stable, with earthen figures of the Holy Family, the ox and the ass; and carols were sung and danced around it. The "rocking of the cradle" was the occasion of dialogue between Joseph and Mary which was not without elements of comedy, and gave rise to lullabies such as the well-known German *Dormi fili*. The adoration of the shepherds and the visit of the Magi also provided matter for dramatic and choral representation. The singing of the carol has survived in places where the institution of the "crib," said to have been originated by St Francis of Assisi to inculcate the doctrine of the incarnation, has been long in disuse, but in the West Riding of Yorkshire the children who go round carol-singing still carry "milly-boxes" (My Lady boxes) containing figures which represent the Virgin and Child.

That carol-singing early became a pretext for the asking of alms is obvious from an Anglo-Norman carol preserved in the British Museum (MS. Reg. 16 E. viii.), *Seigneurs ore entendey à nus*, which is little more than a drinking song. Carols were an important element in the mystery plays of the Nativity, and one of these, included in the *Marguerites de la Marguerite des princesses, très-illustre reine de Navarre* (Lyons, 1547), incidentally gives evidence of the connexion of dancing and carol-singing, for the shepherds and shepherdesses open their chorus at the manger with "*Dansons, chantons, faisons rage.*" There is a long English carol relating the chief incidents of the life of Christ, which is a curious example of the mixture of the sacred and profane common in this species of composition. It begins "To-morrow shall be my dancing day," and has for refrain—

> "Sing, oh! my love, oh! my love, my love, my love;
> This have I done for my true love."

There are extant numerous carols dating from the 15th century which have the characteristic features of folksong. The famous Cherry-tree Carol, "Joseph was an old man," is based on an old legend which is related in the Coventry mystery plays. "I saw three ships come sailing in," and "The Camel and the Crane," though of more modern date, preserve curious legends. Numerous entries in the household accounts of the Tudor sovereigns show that carol-singing was popular throughout the 16th century, and the literature of Christmas was enriched in the next century by poems which are often included in collections of carols, though they were probably written to be read rather than sung. Milton, Crashaw, Southwell, Ben Jonson, George Herbert and George Wither all produced Christmas poems, but the richest collection by any one poet is to be found in the poems of Herrick, whose "Come, bring with a noise" is a typical carol of the jovial kind, and may well have been written to a dance tune. Among 18th-century religious carols perhaps the most famous is Charles Wesley's "Hark, how all the welkin rings," better known in the variant, "Hark, the herald angels sing." The artificial modern revival of carol-singing has produced a quantity of new carols, the best of which are perhaps mostly derived from medieval Latin Christmas hymns. Among the many modern Christmas poems one of the most striking is Swinburne's "Three Damsels in the Queen's Chamber," which is, however, a ballad rather than a carol.

The earliest printed collection of carols was issued by Wynkyn de Worde in 1521. It contained the famous Boar's Head carol, *Caput apri defero, Reddens laudes Domino*, which in a slightly altered form is sung at Queen's College, Oxford, on the bringing in of the boar's head. Modern collections of ancient carols are derived chiefly from three tracts belonging to the collection of Anthony à Wood, preserved in the Bodleian library, from a 15th-century MS. (Sloane 2593), a 16th-century MS. with the music (Add. 5665), and other MSS. in the British Museum, and from oral tradition. In the 18th century T. Bloomer of Birmingham published a number of carols in the form of broadsides. Among the numerous collections of French carols is *Noei Borguignon de Gui Barôzai* (1720), giving the words and the music of thirty-four *noëls*, many of them very free in character.

[1] In architecture, the term "carol" (also wrongly spelled "carrel" or "carrol") is used, in the sense of an enclosure, of a small chapel or oratory enclosed by screens, and also sometimes of the rails of the screens themselves. It is more particularly applied to the separate seats near the windows of a cloister (*q.v.*), used by the monks for the purposes of study, &c. The term "carol" has, by a mistake, been sometimes used of a scroll bearing an inscription of a text, &c.

The term *noël* passed into the English carol as a favourite refrain, "nowell," and seems to have been in common use in France as an equivalent for *vivat*.

Among the more important modern collections of Christmas carols are: *Songs and Carols* (1847), edited by T. Wright for the Percy Society from Sloane MS. 2593; W. Sandys, *Christmastide, its History, Festivities and Carols* (1852); *Christmas with the Poets* (edited by V. H., 4th ed., 1872); T. Helmore and J. M. Neale, *Carols for Christmastide* (1853–1854), with music; R. R. Chope, *Carols* (new and complete edition, 1894), a tune-book for church use, with an introduction by S. Baring-Gould; H. R. Bramley, *Christmas Carols, New and Old*, the music by Dr Stainer; A. H. Bullen, *Carols and Poems* (1885); J. A. Fuller Maitland and W. S. Rockstro, *Thirteen Carols of the Fifteenth Century*, from a Trinity Coll., Cambridge, MS. (1891). See also Julian's *Dictionary of Hymnology*, *s.v.* "Carol"; E. Cortet, *Essai sur les fêtes religieuses* (1867).

CAROLINE (1683–1737), wife of George II., king of Great Britain and Ireland, was a daughter of John Frederick, margrave of Brandenburg-Ansbach (d. 1686). Born at Ansbach on the 1st of March 1683, the princess passed her youth mainly at Dresden and Berlin, where she enjoyed the close friendship of Sophie Charlotte, wife of Frederick I. of Prussia; she married George Augustus, electoral prince of Hanover, in September 1705. The early years of her married life were spent in Hanover. She took a continual interest in the approaching accession of the Hanoverian dynasty to the British throne, was on very friendly terms with the old electress Sophia, and corresponded with Leibnitz, whose acquaintance she had made in Berlin. In October 1714 Caroline followed her husband and her father-in-law, now King George I., to London. As princess of Wales she was accessible and popular, and took the first place at court, filling a difficult position with tact and success. When the quarrel between the prince of Wales and his father was attaining serious proportions, Caroline naturally took the part of her husband, and matters reached a climax in 1717. Driven from court, ostracized by the king, deprived even of the custody of their children, the prince and princess took up their residence in London at Leicester House, and in the country at Richmond. They managed, however, to surround themselves with a distinguished circle; Caroline had a certain taste for literature, and among their attendants and visitors were Lord Chesterfield, Pope, Gay, Lord Hervey and his wife, the beautiful Mary Lepel. A formal reconciliation with George I. took place in 1720. In October 1727 George II. and his queen were crowned. During the rest of her life Queen Caroline's influence in English politics was very chiefly exercised in support of Sir Robert Walpole; she kept this minister in power, and in control of church patronage. She was exceedingly tolerant, and the bishops appointed by her were remarkable rather for learning than for orthodoxy. During the king's absences from England she was regent of the kingdom on four occasions. On the whole, Caroline's relations with her husband, to whom she bore eight children, were satisfactory. A clever and patient woman, she was very complaisant towards the king, flattering his vanity and acknowledging his mistresses, and she retained her influence over him to the end. She died on the 20th of November 1737.

Caroline appears in Scott's *Heart of Midlothian*; see also Lord Hervey, *Memoirs of the Reign of George II.*, ed. by J.W. Croker (1884); W. H. Wilkins, *Caroline the Illustrious* (1904); and A. D. Greenwood, *Lives of the Hanoverian Queens of England*, vol. i. (1909).

CAROLINE AMELIA AUGUSTA (1768–1821), queen of George IV. of Great Britain, second daughter of Charles William Ferdinand, duke of Brunswick-Wolfenbüttel, was born on the 17th of May 1768. She was brought up with great strictness, and her education did not fit her well for her subsequent station in life. In 1795 she was married to the then prince of Wales (see GEORGE IV.), who disliked her and separated from her after the birth of a daughter in January 1796. The princess resided at Blackheath; and as she was thought to have been badly treated by her profligate husband, the sympathies of the people were strongly in her favour. About 1806 reports reflecting on her conduct were circulated so openly that it was deemed necessary for a commission to inquire into the circumstances. The princess was acquitted of any serious fault, but various improprieties in her conduct were pointed out and censured. In 1814 she left England and travelled on the continent, residing principally in Italy. On the accession of George in 1820, orders were given that the English ambassadors should prevent the recognition of the princess as queen at any foreign court. Her name also was formally omitted from the liturgy. These acts stirred up a strong feeling in favour of the princess among the English people generally, and she at once made arrangements for returning to England and claiming her rights. She rejected a proposal that she should receive an annuity of £50,000 a year on condition of renouncing her title and remaining abroad. Further efforts at compromise proved unavailing; Caroline arrived in England on the 6th of June, and one month later a bill to dissolve her marriage with the king on the ground of adultery was brought into the House of Lords. The trial began on the 17th of August 1820, and on the 10th of November the bill, after passing the third reading, was abandoned. The public excitement had been intense, the boldness of the queen's counsel, Brougham and Denman, unparalleled, and the ministers felt that the smallness of their majority was virtual defeat. The queen was allowed to assume her title, but she was refused admittance to Westminster Hall on the coronation day, July 19, 1821. Mortification at this event seems to have hastened her death, which took place on the 7th of August of the same year.

See *A Queen of Indiscretions, the Tragedy of Caroline of Brunswick, Queen of England*, translated by F. Chapman from the Italian of Graziano Paolo Clerici (London, 1907), with numerous portraits, &c. Of contemporary authorities the *Creevy Papers* (1905) throw the most interesting sidelights on the subject.

CAROLINE ISLANDS, a widely-scattered archipelago in the Pacific Ocean, E. of the Philippines and N. of New Guinea, included in Micronesia, between 5° and 10° N., and 135° and 165° E., belonging to Germany. They fall into three main groups, the Western, Central and Eastern Carolines, the central being the most numerous, while the western include the Pelew group. The total land area is about 380 sq. m., and out of this, 307 sq. m. is covered by the four main islands, Ponape and Kusaie in the eastern group, Truk or Hogolu in the central, and Yap in the western. These islands are of considerable elevation (the highest point of Ponape approaches 3000 ft.), but the rest are generally low coral islets. The climate is equable and moist, but healthy; but the islands are subject to heavy storms. The total population is estimated at 36,000. The natives, who are Micronesian hybrids of finer physique than their kinsmen of the Pelew Islands, have a comparatively high mental standard, being careful agriculturists, and peculiarly clever boatbuilders and navigators. The Germans divide the whole archipelago into two administrative districts, eastern and western, having the seats of government at Ponape and Yap respectively. The principal article of export is copra. The islands were discovered (at least in part) by the Portuguese Diego da Rocha in 1527, and called by him the Sequeira Islands. In 1686 Admiral Francesco Lazcano, who made further explorations, renamed them the Carolines in honour of Charles II. of Spain. The islands were subsequently visited by a few travellers; but the natives have only in modern times been reconciled to the presence of foreigners; an early visit of missionaries (1731) resulted in one of several murderous attacks on white men which darken the history of the islands; and it was only in 1875 that Spain, claiming the group, made some attempt to assert her rights. These were contested by Germany, whose flag was hoisted on Yap, and the matter was referred to the arbitration of Pope Leo XIII. in 1885. He decided in favour of Spain, but gave Germany free trading rights; and in 1899 Germany took over the administration of the islands from Spain, paying 25,000,000 pesetas (nearly £1,000,000 sterling).

Ancient Stone Buildings.—In Ponape and Kusaie, massive stone structures, similar to those which occur in several other parts of the Pacific Ocean, have long been known to exist. They have been closely explored by Herr Kubary, Mr F. J. Moss, and later Mr F. W. Christian. None of the colossal structures hitherto described appears to have been erected by the present Melanesian

or Polynesian peoples, while their wide diffusion, extending as far as Easter Island, within 400 m. of the New World, points to the occupation of the Pacific lands by a prehistoric race which had made some advance in general culture. The Funafuti borings (1897) show almost beyond doubt that Polynesia is an area of comparatively recent subsidence. Hence the land connexions must have formerly been much easier and far more continuous than at present. The dolmen-builders of the New Stone Age are now known to have long occupied both Korea and Japan, from which advanced Asiatic lands they may have found little difficulty in spreading over the Polynesian world, just as in the extreme west they were able to range over Scandinavia, Great Britain and Ireland. To Neolithic man, still perhaps represented by some of the more light-coloured and more regular-featured Polynesian groups, may therefore not unreasonably be attributed these astonishing remains, which assume so many different forms according to the nature of the locality, but seem generally so out of proportion with the present restricted areas on which they stand. With the gradual subsidence of these areas their culture would necessarily degenerate, although echoes of sublime theogonies and philosophies are still heard in the oral traditions and folklore of many Polynesian groups. In the islet of Lele, close to Kusaie, at the eastern extremity of Micronesia, the ruins present the appearance of a citadel with cyclopean ramparts built of large basaltic blocks. There are also numerous canals, and what look like artificial harbours constructed amid the shallow lagoons.

In Ponape the remains are of a somewhat similar character, but on a much larger scale, and with this difference, that while those of Lele all stand on the land, those of Ponape are built in the water. The whole island is strewn with natural basaltic prisms, some of great size; and of this material, brought by boats or rafts from a distance of 30 m. and put together without any mortar, but sustained by their own weight, are built all the massive walls and other structures on the east side of the island. The walls of the main building near the entrance of Metalanim harbour form a massive quadrangle 200 ft. on all sides, with inner courts, vault and raised platform with walls 20 to 40 ft. high and from 8 to 18 ft. thick. Some of the blocks are 25 ft. long and 8 ft. in circumference, and many of them weigh from 3 to 4 tons. There are also numerous canals from 30 to 100 ft. wide, while a large number of islets, mainly artificial, covering an area of 9 sq. m., have all been built up out of the shallow waters of the lagoon round about the entrance of the harbour, with high sea-walls composed of the same huge basaltic prisms. In some places the walls of this "Pacific Venice" are now submerged to some depth, as if the land had subsided since the construction of these extensive works. Elsewhere huge breakwaters had been constructed, the fragments of which may still be seen stretching away for a distance of from 2 to 3 m. Most observers, such as Admiral Sir Cyprian Bridge and Mr Le Hunte, agree that these structures could not possibly be the work of any of the present Polynesian peoples, and attribute them to a now extinct prehistoric race, the men of the New Stone Age from the Asiatic mainland.

Stone Money.—The inhabitants of Yap are noted for possessing the most extraordinary currency, if it can be so called, in the whole world. Besides the ordinary shell money, there is a sort of stone coinage, consisting of huge calcite or limestone discs or wheels from 6 in. to 12 ft. in diameter, and weighing up to nearly 5 tons. These are all quarried in the Pelew Islands, 200 m. to the south, and are now brought to Yap in European vessels. But some were in the island long before the arrival of the whites, and must consequently have been brought by native vessels or on rafts. The stones, which are rather tokens than money, do not circulate, but are piled up round about the chief's treasure-house, and appear to be regarded as public property, although it is hard to say what particular use they can serve. They appear to be kept rather for show and ornament than for use.

See F. W. Christian, *The Caroline Islands* (London, 1899); G. Volkens, "Über die Karolinen Insel Yap," in *Verhandlungen Gesellschaft Erdkunde Berlin.*, xxviii. (1901); J. S. Kubary, *Ethnographische Beiträge zur Kentniss des Karolinen-Archipel* (Leiden, 1889–1892); De Abrade, *Historia del conflicto de las Carolinas*, &c. (Madrid, 1886).

CAROLINGIANS, the name of a family (so called from Charlemagne, its most illustrious member) which gained the throne of France A.D. 751. It appeared in history in 613, its origin being traced to Arnulf (Arnoul), bishop of Metz, and Pippin, long called Pippin of Landen, but more correctly Pippin the Old or Pippin I. Albeit of illustrious descent, the genealogies which represent Arnulf as an Aquitanian noble, and his family as connected—by more or less complicated devices—with the saints honoured in Aquitaine, are worthless, dating from the time of Louis the Pious in the 9th century. Arnulf was one of the Austrasian nobles who appealed to Clotaire II., king of Neustria, against Brunhilda, and it was in reward for his services that he received from Clotaire the bishopric of Metz (613). Pippin, also an Austrasian noble, had taken a prominent part in the revolution of 613. These two men Clotaire took as his counsellors; and when he decided in 623 to confer the kingdom of Austrasia upon his son Dagobert, they were appointed mentors to the Austrasian king, Pippin with the title of mayor of the palace. Before receiving his bishopric, Arnulf had had a son Adalgiselus, afterwards called Anchis; Pippin's daughter, called Begga in later documents, was married to Arnulf's son, and of this union was born Pippin II. Towards the end of the 7th century Pippin II., called incorrectly Pippin of Heristal, secured a preponderant authority in Austrasia, marched at the head of the Austrasians against Neustria, and gained a decisive victory at Tertry, near St Quentin (687). From that date he may be said to have been sole master of the Frankish kingdom, which he governed till his death (714). In Neustria Pippin gave the mayoralty of the palace to his son Grimoald, and afterwards to Grimoald's son Theodebald; the mayoralty in Austrasia he gave to his son Drogo, and subsequently to Drogo's children, Arnulf and Hugh. Charles Martel, however, a son of Pippin by a concubine Chalpaïda, seized the mayoralty in both kingdoms, and he it was who continued the Carolingian dynasty. Charles Martel governed from 714 to 741 , and in 751 his son Pippin III. took the title of king. The Carolingian dynasty reigned in France from 751 to 987, when it was ousted by the Capetian dynasty. In Germany descendants of Pippin reigned till the death of Louis the Child in 911; in Italy the Carolingians maintained their position until the deposition of Charles the Fat in 887. Charles, duke of Lower Lorraine, who was thrown into prison by Hugh Capet in 991, left two sons, the last male descendants of the Carolingians, Otto, who was also duke of Lower Lorraine and died without issue, and Louis, who after the year 1000 vanishes from history.

See P. A. F. Gérard and L. A. Warnkönig, *Histoire des Carolingiens* (Brussels, 1862); H. E. Bonnell, *Anfänge des Karoling. Hauses* (Berlin, 1866); J. F. Böhmer and E. Mühlbacher, *Regesten d. Kaiserreichs unter d. Karolingern* (Innsbruck, 1889 seq.); E. Mühlbacher, *Deutsche Gesch. unter d. Karolingern* (Stuttgart, 1896); F. Lot, *Les Derniers Carolingiens* (Paris, 1891). (C. Pf.)

CAROLUS-DURAN, the name adopted by the French painter Charles Auguste Emile Durand (1837–), who was born at Lille on the 4th of July 1837. He studied at the Lille Academy and then went to Paris, and in 1861 to Italy and Spain for further study, especially devoting himself to the pictures of Velasquez. His subject picture "Murdered," or "The Assassination" (1866), was one of his first successes, and is now in the Lille museum, but he became best known afterwards as a portrait-painter, and as the head of one of the principal ateliers in Paris, where some of the most brilliant artists of a later generation were his pupils. His "Lady with the Glove" (1869), a portrait of his own wife, was bought for the Luxembourg. In 1889 he was made a commander of the Legion of Honour. He became a member of the Académie des Beaux-arts in 1904, and in the next year was appointed director of the French academy at Rome in succession to Eugène Guillaume.

CARORA, an inland town of the state of Lara, Venezuela, on the Carora, a branch of the Tocuyo river, about 54 m. W. by S. of the city of Barquisimeto, and 1128 ft. above sea-level. Pop. (1908 estimate) 6000. The town is comparatively well-built

and possesses a fine parish church, and a Franciscan convent and hermitage. It was founded in 1754, and its colonial history shows considerable prosperity, its population at that time numbering 9000 to 10,000. The neighbouring country is devoted principally to raising horses, mules and cattle; and in addition to hides and leather, it exports rubber and other forest products.

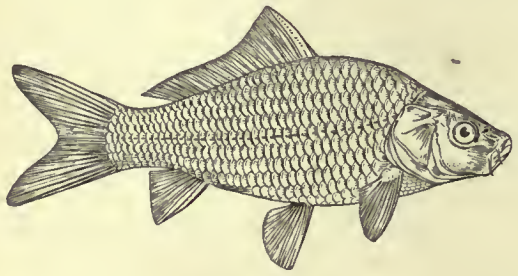
CARP, the typical fish of a large family (*Cyprinidae*) of Ostariophysi, as they have been called by M. Sagemehl, in which the air-bladder is connected with the ear by a chain of small bones (so-called Weberian ossicles). The mouth is usually more or less protractile and always toothless; the lower pharyngeal bones, which are large and falciform, subparallel to the branchial arches, are provided with teeth, often large and highly specialized, in one, two or three series (pharyngeal teeth), usually working against a horny plate attached to a vertical process of the basi-occipital bone produced under the anterior vertebrae, mastication being performed in the gullet. These teeth, adapted to various requirements, vary according to the genus, being conical, hooked, spoon-shaped, molariform, &c.

The species are extremely numerous, about 1400 being known, nearly entirely confined to fresh water, and feeding on vegetable substances or small animals. They are dispersed over the whole world with the exception of South America, Madagascar, Papuasia, and Australasia. Remains of several of the existing genera have been found in Oligocene and later beds of Europe, Sumatra and North America. One member of the *Cyprinidae* is at present known to be viviparous, but no observations have as yet been made on its habits. It is a small barbel discovered in Natal by Max Weber, and described by him under the name *Barbus viviparus*.

The *Cyprinidae*[1] are divided into four subfamilies:—*Catostominae* (mostly from North America, with a few species from China and eastern Siberia), in which the maxillary bones take a share in the border of the mouth, and the pharyngeal teeth are very numerous and form a single, comb-like series; *Cyprininae*, the great bulk of the family, more or less conforming to the type of the carp; *Cobitinae*, or loaches (Europe, Asia, Abyssinia), which are dealt with in a separate article (see LOACH); and the *Homalopterinae* (China and south-eastern Asia), mountain forms allied to the loaches, with a quite rudimentary air-bladder.

For descriptions of other Cyprinids than the carp, see GOLDFISH, BARBEL, GUDGEON, RUDD, ROACH, CHUB, DACE, MINNOW, TENCH, BREAM, BLEAK, BITTERLING, MAHSEER.

The carp itself, *Cyprinus carpio*, has a very wide distribution, having spread, through the agency of man, over nearly the whole of Europe and a part of North America, where it lives in lakes, ponds, canals, and slow-running rivers with plenty of



The Common Carp.

vegetation. The carp appears to be a native of temperate Asia and perhaps also of south-eastern Europe, and to have been introduced into other parts in the 12th and 13th century; it was first mentioned in England in 1496. The acclimatization of the carp in America has been a great success, especially in the northern waters, where, the growth continuing throughout the entire year, the fish soon attains a remarkable size. The presence of carp in Indo-China and the Malay Archipelago is probably also to be ascribed to human agency. In the British Isles the carp seldom reaches a length of 2½ ft., and a weight of 20 lb, whilst examples of that size are quite frequent on the continent, and others measuring 4½ ft. and weighing 60 lb or more are on record. The fish is characterized by its large scales (34 to 40 in the lateral line), its long dorsal fin, the first ray of which is stiff and serrated, and the presence of two small barbels on each side of the mouth. But it varies much in form and scaling, and some most aberrant varieties have been fixed by artificial selection, the principal being the king-carp or mirror-carp, in which the scales are enlarged and reduced in number, forming more or less regular longitudinal series on the sides, and the leather-carp, in which the scales have all but disappeared, the fish being covered with a thick, leathery skin. Deformed examples are not of rare occurrence.

Although partly feeding on worms and other small forms of animal life, the carp is principally a vegetarian, and the great development of its pharyngeal apparatus renders it particularly adapted to a graminivorous régime. The longevity of the fish has probably been much exaggerated, and the statements of carp of 200 years living in the ponds of Pont-Chartrain and other places in France and elsewhere do not rest on satisfactory evidence.

A close ally of the carp is the Crucian carp, *Cyprinus carassius*, chiefly distinguished by the absence of barbels. It inhabits Europe and northern and temperate Asia, and is doubtfully indigenous to Great Britain. It is a small fish, rarely exceeding a length of 8 or 9 in. It has many varieties. One of these, remarkable for its very short, thick head and deep body, is the so-called Prussian carp, *C. gibelio*, often imported into English ponds, whilst the best known is the goldfish (*q.v.*), *C. auratus*, first produced in China. (G. A. B.)

CARPACCIO, VITTORIO, or VITTORE (*c.* 1465–*c.* 1522), Italian painter, was born in Venice, of an old Venetian family. The facts of his life are obscure, but his principal works were executed between 1490 and 1519; and he ranks as one of the finest precursors of the great Venetian masters. The date of his birth is conjectural. He is first mentioned in 1472 in a will of his uncle Fra Ilario, and Dr Ludwig infers from this that he was born *c.* 1455, on the ground that no one could enter into an inheritance under the age of fifteen; but the inference ignores the possibility of a testator making his will in prospect of the beneficiary attaining his legal age. Consideration of the youthful style of his earliest dated pictures ("St Ursula" series, Venice, 1490) makes it improbable that at that time he had reached so mature an age as thirty-five; and the date of his birth is more probably to be guessed from his being about twenty-five in 1490. What is certain is that he was a pupil (not, as sometimes thought, the master) of Lazzaro Bastiani, who, like the Bellini and Vivarini, was the head of a large *atelier* in Venice, and whose own work is seen in such pictures as the "S. Veneranda" at Vienna, and the "Doge Mocenigo kneeling before the Virgin" and "Madonna and Child" (formerly attributed to Carpaccio) in the National Gallery, London. In later years Carpaccio appears to have been influenced by Cima da Conegliano (*e.g.* in the "Death of the Virgin," 1508, at Ferrara). Apart from the "St Ursula" series, his scattered series of the "Life of the Virgin" and "Life of St Stephen," and a "Dead Christ" at Berlin, may be specially mentioned.

For an authoritative and detailed account, see the *Life and Works of Vittorio Carpaccio*, by Pompeo Molmenti and Gustav Ludwig, Eng. trans. by R. H. Cust (1907); and the criticism by Roger Fry, "A Genre Painter and his Critics," in the *Quarterly Review* (London, April 1908).

CARPATHIAN MOUNTAINS[2] (Lat. *Montes Sarmatici*; Med. Lat. *Montes Nivium*), the eastern wing of the great central mountain system of Europe. With the exception of the extreme southern and south-eastern ramifications, which belong to Rumania, the Carpathians lie entirely within Austrian and

[1] The name of the fishes of the genus *Cyprinus* is derived from the island of Cyprus, the ancient sanctuary of Venus; this name is supposed to have arisen from observations of the fecundity and vivacity of carp during the spawning period.

[2] The name is derived from the Slavonic word *Chrb*, which means mountain-range. As *Chrawat*, it was first applied to the inhabitants of the region, whence it passed in the form *Krapat* or *Karpa* as the name of mountain system. In official Hungarian documents of the 13th and 14th centuries the Carpathians are named Thorchal or Tarczal, and also *Montes Nivium*.

Hungarian territory. They begin on the Danube near Pressburg, surround Hungary and Transylvania in a large semicircle, the concavity of which is towards the south-west, and end on the Danube near Orsova. The total length of the Carpathians is over 800 m., and their width varies between 7 and 230 m., the greatest width of the Carpathians corresponding with its highest altitude. Thus the system attains its greatest breadth in the Transylvanian plateau, and in the meridian of the Tatra group. It covers an area of 72,600 sq. m., and after the Alps is the most extensive mountain system of Europe. The Carpathians do not form an uninterrupted chain of mountains, but consist of several orographically and geologically distinctive groups; in fact they present as great a structural variety as the Alps; but as regards magnificence of scenery they cannot compare with the Alps. The Carpathians, which only in a few places attain an altitude of over 8000 ft., lack the bold peaks, the extensive snow-fields, the large glaciers, the high waterfalls and the numerous large lakes which are found in the Alps. They are nowhere covered by perpetual snow, and glaciers do not exist, so that the Carpathians, even in their highest altitude, recall the middle region of the Alps, with which, however, they have many points in common as regards appearance, structure and flora. The Danube separates the Carpathians from the Alps, which they meet only in two points, namely, the Leitha Mountains at Pressburg, and the Bakony Mountains at Vacz (Waitzen), while the same river separates them from the Balkan Mountains at Orsova. The valley of the March and Oder separates the Carpathians from the Silesian and Moravian chains, which belong to the middle wing of the great central mountain system of Europe. The Carpathians separate Hungary and Transylvania from Lower Austria, Moravia, Silesia, Galicia, Bukovina and Rumania, while its ramifications fill the whole northern part of Hungary, and form the quadrangular mass of the Transylvanian plateau. Unlike the other wings of the great central system of Europe, the Carpathians, which form the watershed between the northern seas and the Black Sea, are surrounded on all sides by plains, namely the great Hungarian plain on the south-west, the plain of the Lower Danube (Rumania) on the south, and the Galician plain on the north-east.

The Carpathian system can be divided into two groups: the Carpathians proper, and the mountains of Transylvania. The Carpathians proper consist of an outer wall, which forms the frontier between Hungary and the adjacent provinces of Austria, and of an inner wall which fills the whole of Upper Hungary, and forms the central group. The outer wall is a complex, roughly circular mass of about 600 m. extending from Pressburg to the valley of the Visó, and the Golden Bistritza, and is divided by the Poprad into two parts, the western Carpathians and the eastern or wooded Carpathians. Orographically, therefore, the proper Carpathians are divided into: (*a*) the western Carpathians, (*b*) the eastern or wooded Carpathians, and (*c*) the central groups.

(*a*) The western Carpathians, which begin at the *Porta Hungarica* on the Danube, just opposite the Leitha Mountains, and extend to the Poprad river, are composed of four principal groups: the Little Carpathians (also called the Pressburg group) with the highest peak Bradlo (2670 ft.); the White Carpathians or Miava group, with the highest peak Javornik (3325 ft.), and the Zemerka (3445 ft.); the Beskid proper or western Beskid group, which extends from a little west of the Jablunka pass to the river Poprad, with the highest peaks, Beskid (3115 ft.), Smrk (4395 ft.), Lissa Hora (4350 ft.) and Ossus (5106 ft.); and the Magura or Arva Magura group, which extends to the south of Beskid Mountains, and contains the Babia Gora (5650 ft.), the highest peak in the whole western Carpathians. ***Ranges.***

(*b*) The eastern or wooded Carpathians extend from the river Poprad to the sources of the river Visó and the Golden Bistritza, whence the Transylvanian Mountains begin, and form the link between these mountains and the central groups or High Carpathians. They are a monotonous sandstone range, covered with extensive forests, which up to the sources of the rivers Ung and San are also called the eastern Beskids, and are formed of small parallel ranges. The northern two-thirds of this range has a mean altitude of 3250 ft., and only in its southern portion it attains a mean altitude of 5000 ft. The principal peaks are Rusky Put (4264 ft.), Popadjé (5690 ft.), Bistra (5936 ft.), Pop Ivan (6214 ft.), Tomnatik (5035 ft.), Giumaleu (6077 ft.) and Cserna Gora (6505 ft.). the culminating peak of the whole range. To the eastern Carpathians belongs also the range of mountains extending between the Laborcza and the Upper Theiss, called Vihorlat, which attains in the peak of the same name an altitude of 3495 ft. As indicated by its name, which means "burnt," it is of volcanic origin, and plays an important part in the folklore and in the superstitious legends of the Hungarian people.

(*c*) The central groups or the High Carpathians extend from the confluence of the rivers Arva and Waag to the river Poprad, and include the highest group of the Carpathian system. They consist of the High Tatra group (see TATRA MOUNTAINS), where is found the Gerlsdorfer or Franz Josef peak (Hung. *Gerlachfalvi-Csúcs*), with an altitude of 8737 ft., the highest peak in the whole Carpathian Mountains. On its west are the Liptauer Magura, with the highest peak the Biela Szkala (6900 ft.), and on its east are the Zipser Magura, which have a mean altitude of 3000 ft. South of the central groups lies a widely extending mountain region, which fills the whole of northern Hungary, and is known as the Hungarian highland. It is composed of several groups, which are intersected by the valleys of numerous rivers, and which descend in sloping terraces towards the Danube and the Hungarian plain. The principal groups are: the Neutra or Galgóc Mountains (4400 ft.), between the rivers Waag and Neutra; the Low or Nizna Tatra, which extends to the south of the High Tatra, and has its highest peaks, the Djumbir (6700 ft.) and the Králova Hola (6400 ft.); this group is continued towards the east up to the confluence of the Göllnitz with the Hernad, by the so-called Carpathian foot-hills, with the highest peak the Zelesznik (2675 ft.). West of the Low Tatra extend the Fatra group, with the highest peak, the Great Fatra (5825 ft.), to the south and east of which lie the Schemnitz group, the Ostrowsky group, and several other groups, all of which are also called the Hungarian Ore Mountains, on account of their richness in valuable ores. South-east of the Low Tatra extend the Zips—Gömör Ore Mountains, while the most eastern group is the Hegyalja Mountains, between the Topla, Tarcza and Hernad rivers, which run southward from Eperjes to Tokaj. In their northern portion, they are also called Sóvár Mountains, and reach in their highest peak, Simonka, an altitude of 3350 ft., while their southern portion, which ends with the renowned Tokaj Hill (1650 ft.), is also called Tokaj Mountains. The smaller groups of the Hungarian highland are: on the south-west the Neograd Mountains (2850), whose offshoots reach the Danube; to the east of them extends the Matra group, with the highest peak the Saskö (3285 ft.). The Matra group is of volcanic origin, rising abruptly in the great Hungarian plain, and constitutes one of the most beautiful groups of the Carpathians; lastly, to its east extend the thickly-wooded Bükk Mountains (3100 ft.).

Throughout the whole of the Carpathian system there are numerous mountain lakes, but they cannot compare with the Alpine lakes either in extension or beauty. The largest and most numerous are found in the Tatra Mountains. These lakes are called by the people "eyes of the sea," through their belief that they are in subterranean communication with the sea. ***Lakes.***

The western and central Carpathians are much more accessible than the eastern Carpathians and the Transylvanian Mountains. The principal passes in the western Carpathians are: Strany, Hrozinkau, Wlara, Lissa and the Jablunka pass (1970 ft.), the principal route between Silesia and Hungary, crossed by the Breslau-Budapest railway; and the Jordanow pass. In the central Carpathians are: the road from Neumarkt to Késmárk through the High Tatra, the Telgárt pass over the Králova Hola from the Poprad to the Gran, and the Tylicz pass from Bartfeld to Tarnow. In the eastern Carpathians are: the Dukla pass, the Mezö-Laborcz pass crossed by the railway from Tokaj to Przemysl; the Uszok pass, crossed by the road from Ungvár to Sambor; the Vereczke pass, crossed by the railway from Lemberg to Munkács; the Delatyn or Körösmezö pass (3300 ft.), also called the Magyar route, crossed by the railway from Kolomea to Debreczen; and the Stiol pass in Bukovina. ***Passes.***

The Carpathians consist of an outer zone of newer beds and an inner zone of older rocks. Between the two zones lies a row of *Klippen*, while towards the Hungarian plain the inner zone is bordered by a fringe of volcanic eruptions of Tertiary age. The *outer zone* is continuous throughout the whole extent of the chain, and is remarkably uniform both in composition and structure. It is formed almost entirely of a succession of sandstones and shales of Cretaceous and Tertiary age—the so-called Carpathian Sandstone—and these are thrown into a series of isoclinal folds dipping constantly to the south. The folding of this zone took place during the Miocene period. The *inner zone* is not continuous, and is much more complex in structure. It is visible only in the west and in the east, while in the central Carpathians, between the Hernad and the headwaters of the Theiss, it is lost beneath the modern deposits of the Hungarian plain. In the western Carpathians the inner zone consists of a foundation of Carboniferous and older rocks, which were folded and denuded before the deposition of the succeeding strata. In the outer portion of the zone the Permian and Mesozoic beds are crushed and folded against the core of ancient rocks; in the inner portion of the zone they rest upon the old foundation with but little subsequent disturbance. In the eastern Carpathians also, the Permian and Mesozoic beds are not much folded except near the outer margin of the zone. The *Klippen* are isolated ***Geology.***

hills, chiefly of Jurassic limestone, rising up in the midst of the later and softer deposits on the inner border of the sandstone zone. Their relations to the surrounding beds are still obscure. They may be "rootless" masses brought upon the top of the later beds by thrustplanes. They may be the pinched-up summits of sharp anticlinals, which in the process of folding have been forced through the softer rocks which lay upon them. Or, finally, they may have been islands rising above the waters, in which were deposited the later beds which now surround them. The so-called *Klippen* of the Swiss Alps are now usually supposed to rest upon thrustplanes, but they are not strictly analogous, either in structure or in position, with those of the Carpathians. Of all the peculiar features of the Carpathian chain, perhaps the most remarkable is the fringe of volcanic rocks which lies along its inner margin. The outbursts began in the later part of the Eocene period, and continued into the Pliocene, outlasting the period of folding. They appear to be associated with faulting upon the inner margin of the chain. Trachytes, rhyolites, andesites and basalts occur, and a definite order of succession has been made out in several areas; but this order is not the same throughout the chain.

Climate, Flora, Fauna. The Carpathians, like the Alps, form a protective wall to the regions south of them, which enjoy a much milder climate than those situated to the north. The vegetation of these regions is naturally subjected to the different climateric conditions. The mountains themselves are mostly covered with forests, and their vegetation presents four zones: that of the beech extends to an altitude of 4000 ft.; that of the Scottish fir to 1000 ft. higher. Above this grows a species of pine, which becomes dwarfed and disappears at an altitude of about 6000 ft., beyond which is a zone of lichen and moss covered or almost bare rock. The highest parts in the High Tatra and in the Transylvanian Mountains have a flora similar to that of the Alps, more specially that of the middle region. Remarkable is the sea-shore flora, which is found in the numerous salt-impregnated lakes, ponds and marshes in Transylvania. As regards the fauna, the Carpathians still contain numerous bears, wolves and lynxes, as well as birds of prey. It presents a characteristic feature in its mollusc fauna, which contains many species not found in the neighbouring regions, and only found in the Alpine region. Cattle and sheep are pastured in great numbers on its slopes.

Minerals. The Carpathian system is richer in metallic ores than any other mountain system of Europe, and contains large quantities of gold, silver, copper, iron, lead, coal, petroleum, salt, zinc, &c., besides a great variety of useful mineral. A great number of mineral springs and thermal waters are found in the Carpathians, many of which have become frequented watering-places.

History. The systematic and scientific exploration of the Carpathians dates only from the beginning of the 19th century. The first ascension of the Lomnitzer peak in the High Tatra was made by one David or Johann Fröhlich in 1615. The first account of the Tatra Mountains was written by Georg Buchholz, a resident of Késmárk in 1664. The English naturalist, Robert Townson, explored the Tatra in 1793 and 1794, and was the first to make a few reliable measurements. The results of his exploration appeared in his book, *Travels in Hungary*, published in 1797. But the first real important work was undertaken by the Swedish naturalist, Georg Wahlenberg (1780–1851), who in 1813 explored the central Carpathians as a botanist, but afterwards also made topographical and geological studies of the system. The results of all the former explorations were embodied by A. von Sydow in an extensive work published in 1827. During the 19th century the measurements of the various parts of the Carpathians was undertaken by the ordnance survey of the Austrian army, which published their first map of the central Carpathians in 1870. A great stimulus to the study of this mountain system was given by the foundation of the Hungarian Carpathian Society in 1873, and a great deal of information has been added to our knowledge since. In 1880 two new Carpathian societies were formed: a Galician and a Transylvanian.

AUTHORITIES.—F.W. Hildebrandt, *Karpathenbilder* (Glogau, 1863); E. Sagorski and G. Schneider, *Flora Carpatorum Centralium* (2 vols., Leipzig, 1891); Muriel Dowie, *A Girl in the Carpathians* (London, 1891); *Orohydrographisches Tableau der Karpathen* (Vienna, 1886), in six maps of scale 1 : 750,000; V. Uhlig, "Bau und Bild der Karpaten," in *Bau und Bild Österreichs* (Vienna, 1903). (O. Br.; P. La.)

CARPATHUS (Ital. *Scarpanto*), an island about 30 m. south-west of Rhodes, in that part of the Mediterranean which was called, after it, the Carpathian Sea (*Carpathium Mare*). It was both in ancient and medieval times closely connected with Rhodes; it was held by noble families under Venetian suzerainty, notably the Cornari from 1306 to 1540, when it finally passed into the possession of the Turks. From its remote position Carpathus has preserved many peculiarities of dress, customs and dialect, the last resembling those of Rhodes and Cyprus.

See L. Ross, *Reisen auf den gr. Inseln* (Halle, 1840–1845); T. Bent, *Journal of Hellenic Studies*, vi. (1885), p. 235; R. M. Dawkins, *Annual of British School at Athens*, ix. and x.

CARPEAUX, JEAN BAPTISTE (1827–1875), French sculptor, was born at Valenciennes, France, on the 11th of May 1827. He was the son of a mason, and passed his early life in extreme poverty. In 1842 he came to Paris, and after working for two years in a drawing-school, was admitted to the École des Beaux-Arts on the 9th of September 1854. The Grand Prix de Rome was awarded to his statue of "Hector bearing in his arms his son Astyanax." His first work exhibited at the Salon, in 1853, did not show the spirit of an innovator, and was very unlike the work of his master Rude. At Rome he was fascinated by Donatello, and yet more influenced by Michelangelo, to whom he owes his feeling for vehement and passionate action. He sent from Rome a bust, "La Palombella," 1856; and a "Neapolitan Fisherman," 1858. This work was again exhibited in the Salon of 1859, and took a second-class medal; but it was not executed in marble till 1863. In his last year in Rome he sent home a dramatic group, "Ugolino and his Sons," and exhibited at the same time a "Bust of Princess Mathilde." This gained him a second-class medal and the favour of the Imperial family. In 1864 he executed the "Girl with a Shell," the companion figure to the young fisherman; and although in 1865 he did not exhibit at the Salon, busts of "Mme. A. E. André," of "Giraud" the painter, and of "Mlle. Benedetti" showed that he was not idle. He was working at the same time on the decorations of the Pavillon de Flore, of which the pediment alone was seen at the Salon, though the bas-relief below is an even better example of his style. After producing a statue of the prince imperial, Carpeaux was made chevalier of the Legion of Honour in 1866. Two years later he received an important commission to execute one of the four groups for the façade of the new opera house. His group, representing "Dancing," 1869, was greeted with indignant protests; it is nevertheless a sound work, full of movement, with no fault but that of exceeding the limitations prescribed. In 1869 he exhibited a "Bust of M. Garnier," and followed this up with two pieces intended for his native city: a statue of Watteau, and a bas-relief, "Valenciennes repelling Invasion." During the Commune he came to England, and made a "Bust of Gounod" in 1871. His last important work was a fountain, the "Four Quarters of the World," in which the globe is sustained by four female figures personifying Europe, Asia, Africa and America. This fountain is now in the Avenue de l'Observatoire in Paris. Carpeaux, though exhausted by illness, continued designing indefatigably, till he died at the Château de Bécon, near Courbevoie, on the 12th of October 1875, after being promoted to the higher grade of the Legion of Honour. Many of his best drawings have been presented by Prince Stirbey to the city of Valenciennes.

See Ernest Chesneau, *Carpeaux, sa vie et son œuvre* (Paris, 1880); Paul Foucart, *Catalogue du Musée Carpeaux, Valenciennes* (Paris, 1882); Jules Claretie, *J. Carpeaux* (1882); François Bournand, *J. B. Carpeaux* (1893).

CARPENTARIA, GULF OF, an extensive arm of the sea deeply indenting the north coast of Australia, between 10° 40′ and 17° 40′ S., and 135° 30′ and 142 ° E. Its length is 480 m. and its extreme breadth (E. to W.) 420 m. It is bounded E. by Cape York Peninsula, and W. by the Northern Territory of South Australia. Near its southern extremity is situated a group of islands called Wellesley; and towards the western side are the Sir Edward Pellew Islands, the Groote Eylandt and others. A large number of rivers find their way to the gulf, and some are of considerable size. On the eastern side there is the Mitchell river; at the south-east corner the Gilbert, the Norman, the Flinders, the Leichhardt and the Gregory; and on the west the Roper river. Jan Carstensz, who undertook a voyage of discovery in this part of the globe in 1623, gave the name of Carpentier to a small river near Cape Duyfhen in honour of Pieter Carpentier, at that time governor-general of the Dutch East Indies; and after the second voyage of Abel Tasman in 1644, the gulf, which he had successfully explored, began to appear on the charts under its present designation.

CARPENTER, LANT (1780–1840), English Unitarian minister, was born at Kidderminster on the 2nd of September 1780, the

son of a carpet manufacturer. After some months at a nonconformist academy at Northampton, he proceeded to Glasgow University, and then joined the ministry. After a short time as assistant master at a Unitarian school near Birmingham, he was in 1802 appointed librarian at the Liverpool Athenaeum. In 1805 he became pastor of a church in Exeter, removing in 1817 to Bristol. At both Bristol and Exeter he was also engaged in school work, among his Bristol pupils being Harriet and James Martineau. Carpenter did much to broaden the spirit of English Unitarianism. The rite of baptism seemed to him a superstition, and he substituted for it a form of infant dedication. His health, undermined by his constant labours, broke down in 1839, and he was ordered to travel. He was drowned on the night of the 5th of April 1840, having been washed overboard from the steamer in which he was travelling from Leghorn to Marseilles.

CARPENTER, MARY (1807–1877), English educational and social reformer, was born on the 3rd of April 1807 at Exeter, where her father, Dr Lant Carpenter, was Unitarian minister. In 1817 the family removed to Bristol, where Dr Carpenter was called to the ministry of Lewin's Mead Meeting. As a child Mary Carpenter was unusually earnest, with a deep religious vein and a remarkable thoroughness in everything she undertook. She was educated in her father's school for boys, learning Latin, Greek and mathematics, and other subjects at that time not generally taught to girls. She early showed an aptitude for teaching, taking a class in the Sunday school, and afterwards helping her father with his pupils. When Dr Carpenter gave up his school in 1829, his daughters opened a school for girls under Mrs Carpenter's superintendence. In 1833 the raja Rammohun Roy visited Bristol, and inspired Miss Carpenter with a warm interest in India; and Dr Joseph Tuckerman of Boston about the same time aroused her sympathies for the condition of destitute children. Her life-work began with her taking part in organizing, in 1835, a "Working and Visiting Society," of which she was secretary for twenty years. In 1843 her interest in negro emancipation was aroused by a visit from Dr S. G. Howe. Her interest in general educational work was also growing. A bill introduced in this year "to make provision for the better education of children in manufacturing districts," as a first instalment of a scheme of national education, failed to pass, largely owing to Nonconformist opposition, and private effort became doubly necessary. So-called "Ragged Schools" sprang up in many places, and Miss Carpenter conceived the plan of starting one in Lewin's Mead. To this was added a night-school for adults. In spite of many difficulties this was rendered a success, chiefly owing to Miss Carpenter's unwearied enthusiasm and remarkable organizing power. In 1848 the closing of their own private school gave Miss Carpenter more leisure for philanthropic and literary work. She published a memoir of Dr Tuckerman, and a series of articles on ragged schools, which appeared in the *Inquirer* and were afterwards collected in book form. This was followed in 1851 by *Reformatory Schools for the Children of the Perishing and Dangerous Classes, and for Juvenile Offenders*. She sketched out three classes of schools as urgently needed:—(1) good free day-schools; (2) feeding industrial schools; (3) reformatory schools. This book drew public attention to her work, and from that time onwards she was drawn into personal intercourse with leading thinkers and workers. She was consulted in the drafting of educational bills, and invited to give evidence before House of Commons committees. To test the practical value of her theories, she herself started a reformatory school at Bristol, and in 1852 she published *Juvenile Delinquents, their Condition and Treatment*, which largely helped on the passing of the Juvenile Offenders Act in 1854. Now that the principle of reformatory schools was established, Miss Carpenter returned to her plea for free day-schools, contending that the ragged schools were entitled to pecuniary aid from the annual parliamentary grant. At the Oxford meeting of the British Association (1860) she read a paper on this subject, and, mainly owing to her instigation, a conference on ragged schools in relation to government grants for education was held at Birmingham (1861). In 1866 Miss Carpenter was at last able to carry out a long-cherished plan of visiting India, where she found herself an honoured guest. She visited Calcutta, Madras and Bombay, inaugurated the Bengal Social Science Association, and drew up a memorial to the governor-general dealing with female education, reformatory schools and the state of gaols. This visit was followed by others in 1868 and 1869. Her attempt to found a female normal school was unsuccessful at the time, owing to the inadequate previous education of the women, but afterwards such colleges were founded by government. A start, however, was made with a model Hindu girls' school, and here she had the co-operation of native gentlemen. Her last visit to India took place in 1875, two years before her death, when she had the satisfaction of seeing many of her schemes successfully established. At the meeting of the prison congress in 1872 she read a paper on "Women's Work in the Reformation of Women Convicts." Her work now began to attract attention abroad. Princess Alice of Hesse summoned her to Darmstadt to organize a Women's Congress. Thence she went to Neuchâtel to study the prison system of Dr Guillaume, and in 1873 to America, where she was enthusiastically received. Miss Carpenter watched with interest the increased activity of women during the busy 'seventies. She warmly supported the movement for their higher education, and herself signed the memorial to the university of London in favour of admitting them to medical degrees. She died at Bristol on the 14th of June 1877, having lived to see the accomplishment of nearly all the reforms for which she had worked and hoped. (A. Z.)

CARPENTER, WILLIAM BENJAMIN (1813–1885), English physiologist and naturalist, was born at Exeter on the 29th of October 1813. He was the eldest son of Dr Lant Carpenter. He attended medical classes at University College, London, and then went to Edinburgh, where he took the degree of M.D. in 1839. The subject of his graduation thesis, "The Physiological Inferences to be Deduced from the Structure of the Nervous System of Invertebrated Animals," indicates a line of research which had fruition in his *Principles of General and Comparative Physiology*. His work in comparative neurology was recognized in 1844 by his election to the Royal Society, which awarded him a Royal medal in 1861; and his appointment as Fullerian professor of physiology in the Royal Institution in 1845 enabled him to exhibit his powers as a teacher and lecturer, his gift of ready speech and luminous interpretation placing him in the front rank of exponents, at a time when the popularization of science was in its infancy. His manifold labours as investigator, author, editor, demonstrator and lecturer knew no cessation through life; but in assessing the value of his work, prominence should be given to his researches in marine zoology, notably in the lower organisms, as Foraminifera and Crinoids. These researches gave an impetus to deep-sea exploration, an outcome of which was in 1868 the "Lightning," and later the more famous "Challenger," expedition. He took a keen and laborious interest in the evidence adduced by Canadian geologists as to the organic nature of the so-called *Eozoon Canadense*, discovered in the Laurentian strata, and at the time of his death had nearly finished a monograph on the subject, defending the now discredited theory of its animal origin. He was an adept in the use of the microscope, and his popular treatise on *The Microscope and its Revelations* (1856) has stimulated a host of observers to the use of the "added sense" with which it has endowed man. In 1856 Carpenter became registrar of the university of London, and held the office for twenty-three years; on his resignation in 1879 he was made a C.B. in recognition of his services to education generally. Biologist as he was, Carpenter nevertheless made reservations as to the extension of the doctrine of evolution to man's intellectual and spiritual nature. In his *Principles of Mental Physiology* he asserted both the freedom of the will and the existence of the "Ego," and one of his last public engagements was the reading of a paper in support of miracles. He died in London, from injuries occasioned by the accidental upsetting of a spirit-lamp, on the 19th of November 1885.

CARPENTRAS, a town of south-eastern France, capital of an arrondissement in the department of Vaucluse 16 m. N.E. of Avignon by rail. Pop. (1906) town, 7775; commune, 10,721. The town stands on the left bank of the Auzon on an eminence, the summit of which is occupied by the church of St Siffrein, formerly a cathedral, and the adjoining law-court. St Siffrein, in its existing state, dates from the 15th and 16th centuries and is Gothic in style, but it preserves remains of a previous church of Romanesque architecture. The rich sculpture of the southern portal and the relics and works of art in the interior are of some interest. The law-court, built in 1640 as the bishop's palace, contains in its courtyard a small but well-preserved triumphal arch of the Gallo-Roman period. Other important buildings are the hospital, an imposing structure of the 18th century, opposite which is a statue of its founder, Malachie d'Inguimbert, bishop of Carpentras; and the former palace of the papal legate, which dates from 1640. Of the old fortifications the only survival is the Porte d'Orange, a gateway surmounted by a fine machicolated tower. Their site is now occupied by wide boulevards shaded by plane-trees. Water is brought to the town by an aqueduct of forty-eight arches, completed in 1734.

Carpentras is the seat of a sub-prefect and of a court of assizes, and has a tribunal of first instance, communal college for girls and boys, a large library and a museum. Felt hats, confectionery, preserved fruits and nails are its industrial products, and there are silk-works, tanneries and dye-works. There is trade in silk, wool, fruit, oil, &c. The irrigation-canal named after the town flows to the east of it (see VAUCLUSE).

Carpentras is identified with *Carpentoracte*, a town of Gallia Narbonensis mentioned by Pliny, which appears to have been of some importance during the Roman period. Its medieval history is full of vicissitudes; it was captured and plundered by Vandal, Lombard and Saracen. In later times, as capital of the Comtat Venaissin, it was frequently the residence of the popes of Avignon, to whom that province belonged from 1228 till the Revolution. Carpentras was the seat of a bishopric from the 5th century till 1805.

CARPENTRY, the art and work of a carpenter (from Lat. *carpentum*, a carriage), a workman in wood, especially for building purposes. The labour of the sawyer is applied to the division of large pieces of timber or logs into forms and sizes to suit the purposes of the carpenter and joiner. His working-place is called a sawpit, and his most important tool is a pit-saw. A cross-cut saw, axes, dogs, files, compasses, lines, lampblack, blacklead, chalk and a rule may also be regarded as necessary to him. But this method of sawing timber is now only used in remote country places, and in modern practice logs, &c., are converted into planks and small pieces at saw-mills, which are equipped with modern machinery to drive all kinds of circular saws by electricity, steam or gas.

Carpentry or carpenters' work has been divided into three principal branches— descriptive, constructive and mechanical. The first shows the lines or method for forming every species of work by the rules of geometry; the second comprises the practice of reducing the timber into particular forms, and joining the forms so produced in such a way as to make a complete whole according to the intention or design; and the third displays the relative strength of the timbers and the strains to which they are subjected by their disposition. Here we have merely to describe the practical details of the carpenter's work in the operations of building. He is distinguished from the joiner by his operations being directed to the mere carcass of a building, to things which have reference to structure only. Almost everything the carpenter does to a building is absolutely necessary to its stability and efficiency, whereas the joiner does not begin his operations until the carcass is complete, and every article of joiners' work might at any time be removed from a building without undermining it or affecting its most important qualities. Certainly in the practice of building a few things do occur regarding which it is difficult to determine to whose immediate province they belong, but the distinction is sufficiently broad for general purposes.

The carpenter frames or combines separate pieces of timber by scarfing, notching, cogging, tenoning, pinning and wedging, &c. The tools he uses are the rule, axe, adze, saws, mallet, hammers, chisels, gouges, augers, pincers, set squares, bevel, compasses, gauges, level, plumb rule, jack, trying and smoothing planes, rebate and moulding planes, and gimlets and wedges.

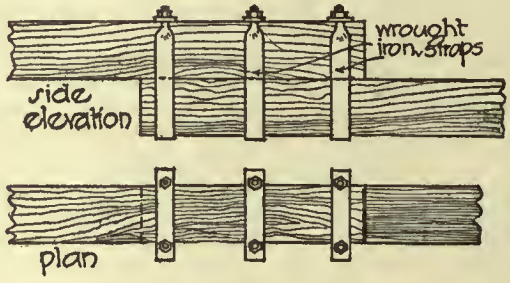


FIG. 1.—Lapped Joint.

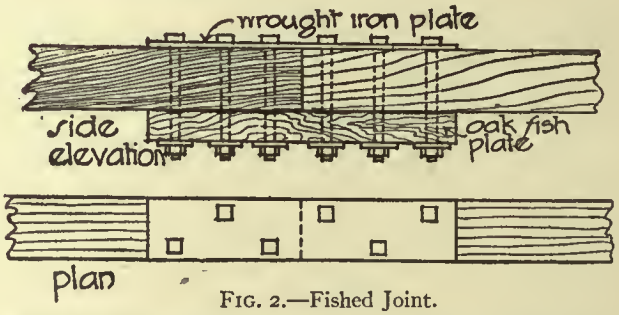
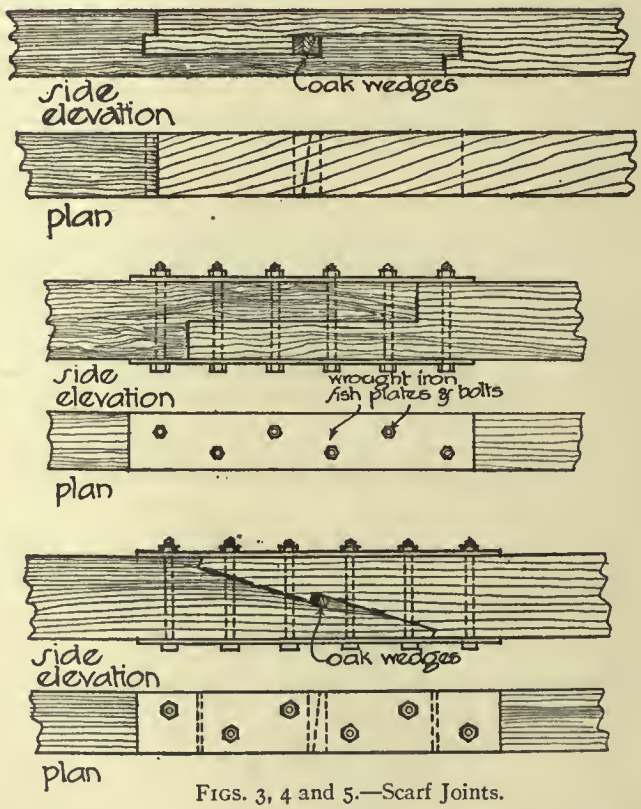


FIG. 2.—Fished Joint.



FIGS. 3, 4 and 5.—Scarf Joints.

The carpenter has little labour to put on to the stuff; his chief work consists in fixing and cutting the ends of timbers, the labour in preparing the timber being done by machinery.

Joints.—The joints in carpentry are various, and each is designed according to the thrust or strain put upon it. Those principally used are the following: lap, fished, scarf, notching, cogging, dovetailing, housing, halving, mortice and tenon, stub

tenon, dovetailed tenon, tusk tenon, joggle, bridle, foxtail wedging, mitre, birdsmouth, built-up, dowel. Illustrations are given of the most useful joints in general use, and these, together with the descriptions, will enable a good idea to be formed of their respective merits and methods of application.

The lapped joint (fig. 1) is used for temporary structures in lengthening timbers and is secured with iron straps and bolts; a very common use of the lap joint is seen in scaffolding secured with cords and wedges.

The fished joint (fig. 2) is used for lengthening beams and is constructed by butting the ends of two pieces of timber together with an iron plate on top and bottom, and bolting through the timber; these iron connecting-plates are usually about 3 ft. long and $\frac{1}{4}$ in. and $\frac{1}{2}$ in. in thickness. This joint provides a good and cheap method of accomplishing its purpose.

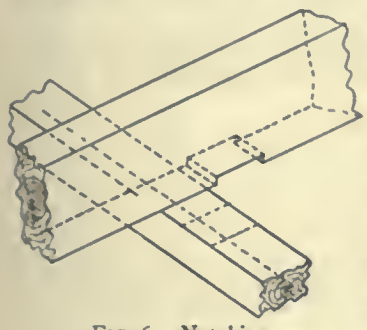


FIG. 6.—Notching.

The scarf joint (figs. 3, 4 and 5) is used for lengthening beams, and is made by cutting and notching the ends of timbers and lapping and fitting and bolting through. This method cuts into the timber, but is very strong and neat; in addition for extra strong work an iron fish-plate is used as in the fished joint.

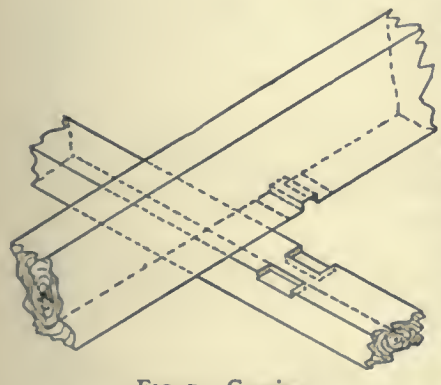


FIG. 7.—Cogging.

The ends of floor joints and rafters are usually *notched* (fig. 6) over plates to obtain a good bearing and bring them to the required levels. Where one timber crosses another as in purlins, rafters, wood floor girders, plates, &c., both timbers are notched so as to fit over each other; this *cogging* (fig. 7) serves instead of fastenings. The timbers are held together with a spike. In this way they are not weakened, and the joint is a very good one for keeping them in position.

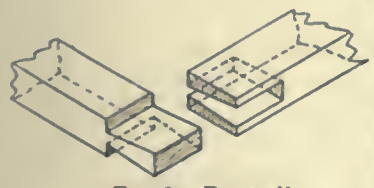


FIG. 8.—Dovetail.

Dovetailing (fig. 8) is used for connecting angles of timber together, such as lantern curbs or linings, and is the strongest form. When an end of timber is let entirely into another timber it is said to be *housed* (fig. 9). Where timbers cross one another and require to be flush on one or both faces, sinkings are cut in each so as to fit over each other (*halving*); these can either be square (fig. 10), bevelled (fig. 11) or dovetailed sinkings (fig. 12). The end of one piece of timber cut so as to leave a third of the thickness forms a *tenon*, and the piece of timber which is to be joined to it has a mortice or slot cut through it to receive the tenon; the two are then wedged or pinned with wood pins (fig. 13).

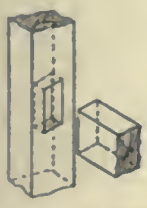


FIG. 9.—Housing.

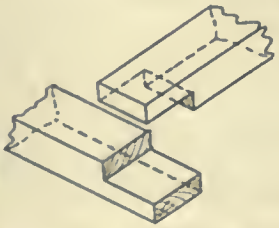


FIG. 10.—Halving.

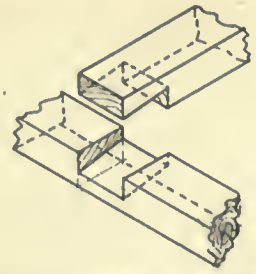


FIG. 11.—Bevelled Halving.

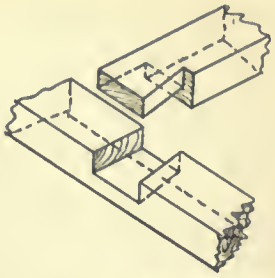


FIG. 12.—Dovetailed Halving.

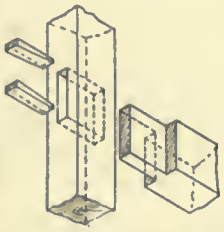


FIG. 13.—Mortice and Tenon.

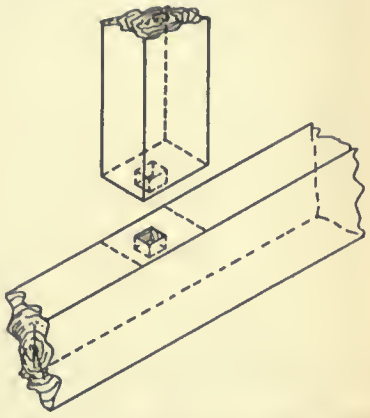


FIG. 14.—Stub Tenon or Joggle.

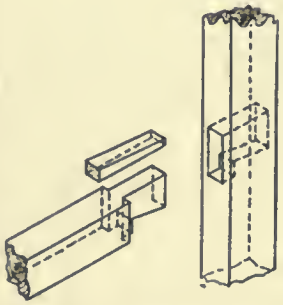


FIG. 15.—Dovetailed Tenon.

FIG. 16.—Tusk Tenon.

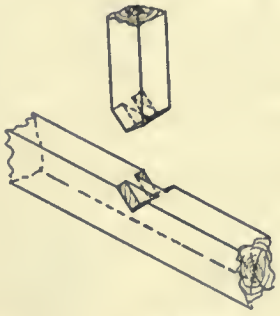


FIG. 17.—Bridle Joint.

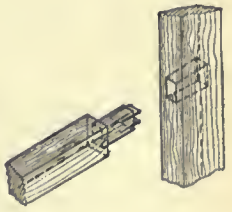


FIG. 18.—Foxtail Wedging.

A stub tenon or joggle (fig. 14) is used for fixing a post to a sill; a sinking is cut in the sill and a tenon is cut on the foot of the post to fit into the sinking to keep the post from sliding.

The purpose of a dovetailed tenon (fig. 15) is to hold two pieces of wood together with mortice and tenon so that it can be

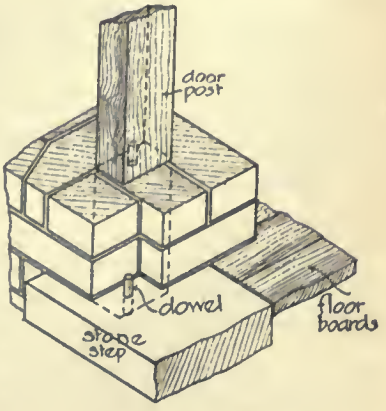


FIG. 19.—Dowelling.

taken apart when necessary. The tenon is cut dovetail shape, and a long mortice permits the wide part of the tenon to go through, and it is secured with wood wedges. Where the floor joists or rafters are trimmed round fires, wells, &c., the tusk tenon joint (fig. 16) is used for securing the trimmer joist. It is formed by cutting a tenon on the trimmer joist and passing it through the side of the trimming joist and fixing it with a wood key. Where large timbers are tusk tenoned together, the tenons do not pass right through, but are cut in about 4 in. and spiked.

A bridle joint or birdsmouth (fig. 17) is formed by cutting one end of timber either V shape or segmental, and morticing the centre of this shaped end. Similar sinkings are cut on the adjoining timber to fit one into the other; these are secured with pins and also various other forms of fastenings. Foxtail wedging (fig. 18) is a method very similar to mortice and tenon. But the tenon does not go through the full thickness of the timber; and also on the end of the tenon are inserted two wedges, so that when the tenon is driven home the wedges split it and wedge tightly into the mortice. This joint is used mostly in joinery. The mitre is a universal joint, used for connecting angles of timber as in the case of picture frames. Built-up joints involve a system of lapping and bolting and fishing, as in the case of temporary structures, for large spans of centering for arches, and for derrick cranes. Dowels are usually 3 or 4 in. long and driven into a circular hole in the foot of a door frame or post; the other end is let into a hole in the sill (fig. 19).

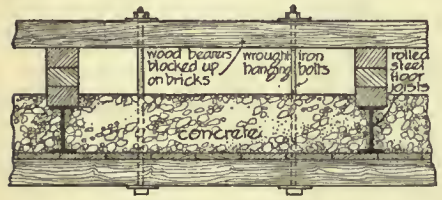


FIG. 20.—Method of supporting Centering for Concrete.

Centering.—Centering is temporary timber or framing erected so as to carry concrete floors or arches of brick or stone, &c.; when the work has set the centering is removed gradually. The centering for concrete floors is usually composed of scaffold boards resting on wood bearers (fig. 20). One wood bearer rests along on top of the steel joists; through this bearer long bolts are suspended, and to the bottom of these bolts a second bearer is fixed, and on the bottom bearer the scaffold boards rest. Another method, not much used now, is to fit the boards to the size of the floor and prop them up on legs, but among other disadvantages this process takes up much space and is more costly.

Turning piece is a name given to centering required for turning an arch over (fig. 21); it is only 4½ in. wide on the soffit or bed, and is generally cut out of a piece of 3 or 4 in. stuff, the top edge being made circular to the shape of the arch. It is kept

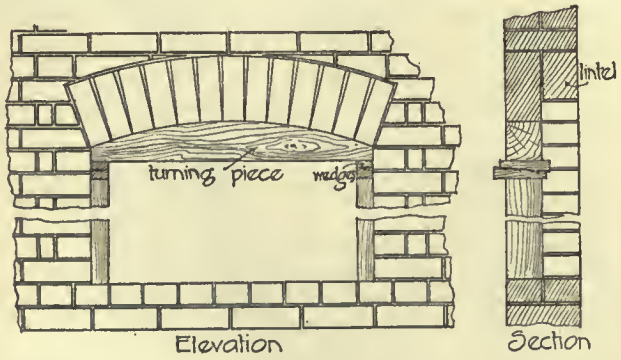


FIG. 21.

in position whilst the arch is setting with struts from ground or sills and is nailed to the reveals, a couple of cross traces being wedged between. In the case of a semicircular or elliptical arch with 4½ in. soffit this turning piece would be constructed of ribs cut out of 4 in. stuff with ties and braces. Or the ribs could be cut out of 1 in. stuff, in which case there must be one set of ribs outside and one inside secured with ties and braces; each set of ribs when formed of thin stuff is made of two thicknesses nailed together so as to lap the joints. For spans up to 15 ft. the thin ribs would be used, and for spans above 15 ft. ribs out of 4 in. stuff and upwards. For arches with 9 in. soffit and upwards, whether segmental or semicircular or elliptical, the centres are formed with the thin ribs and laggings up to 15 ft. span; above 15 ft. with 4 in. ribs and upwards (fig. 22). The

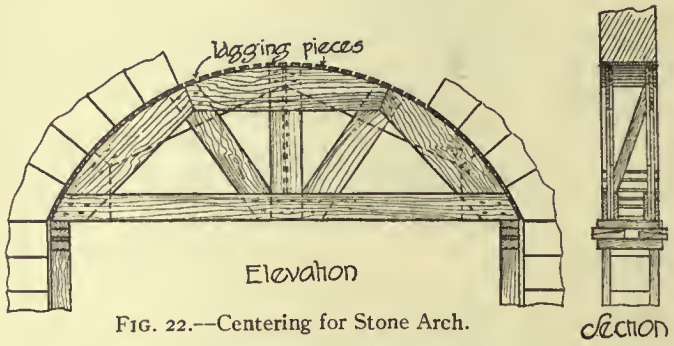


FIG. 22.—Centering for Stone Arch.

lower member of centres is called the tie, and is fixed so as to tie the extremities together and to keep the centre from spreading. Where the span is great, these ties, instead of being fixed straight, are given a rise so as to allow for access or traffic underneath. Braces are necessary to support the ribs from buckling in, and must be strong enough and so arranged as to withstand all stresses. Laggings are small pieces or strips of wood nailed on the ribs to form the surface on which to build the arch, and are spaced 1 in. apart for ordinary arches; for gauged arches they are nailed close together and the joints planed off. When centres are required to be taken down, the wedges upon which the centre rests are first removed so as to allow the arch to take its bearing gradually. Centres for brick sewers and vault arching are formed in the same way as previously mentioned, with ribs and laggings, but the thickness of the timbers depends upon the weight to be carried.

Floors.—For ordinary residential purposes floors are chiefly constructed of timber. Up to about the year 1895 nearly

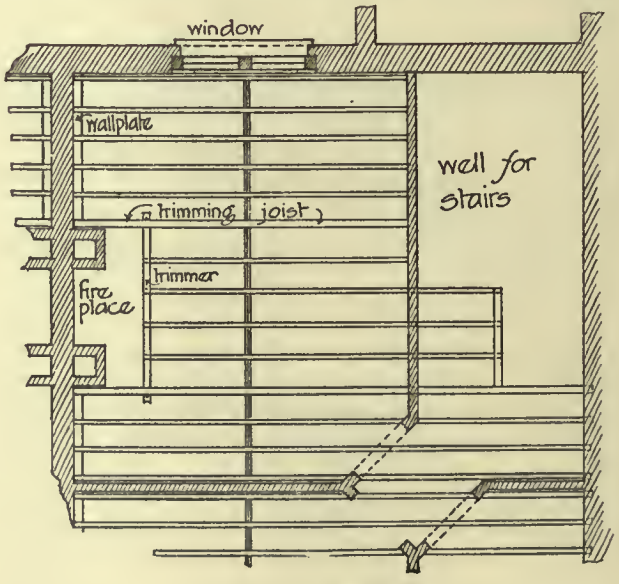


FIG. 23.—Single Floor.

every modern building was constructed with wood joists, but because of evidence adduced by fire brigade experts and the serious fires that have occurred fire-resisting floors have been introduced. These consist of steel girders and joists, filled in with concrete or various patented brick materials in accordance with such by-laws as those passed by the London County Council and other authorities. The majority of the floors of public

buildings, factories, schools, and large residential flats are now constructed of fire-resisting materials. There are two descriptions of flooring, single and double.

Single flooring.

Single flooring (fig. 23) consists of one row of wood joists resting on a wall or partition at each end without any intermediate support, and receiving the floor boards on the upper surface and the ceiling on the underside. Joists should never be less than 2 in. thick, or they are liable to split when the floor brads are driven in; the thickness varies

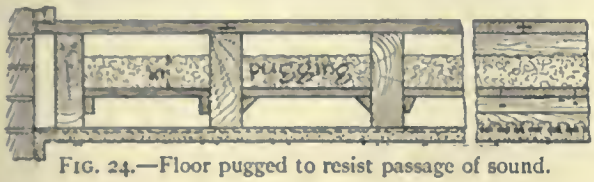


FIG. 24.—Floor pugged to resist passage of sound.

from 2 to 4 in. and the depth from 5 to 11 in. (see *By-laws*, below); the distance between each joist is usually 12 in. in the clear, but greater strength is obtained in a floor by having deep joists and placing them closer together. These floors are made firm and prevented from buckling by the use of strutting as mentioned hereafter.

The efficiency of single flooring is materially affected by the necessity which constantly occurs in practice of trimming round fireplaces and flues, and round well holes such as lifts, staircases, &c. Trimming is a method of supporting the end of a joist by tenoning it into timber crossing it; the timber so tenoned is called the trimmer joist, and the timber morticed for the tenon of the trimmer is called the trimming joist, while the intermediate timbers tenoned into the trimmer are known as the trimmed

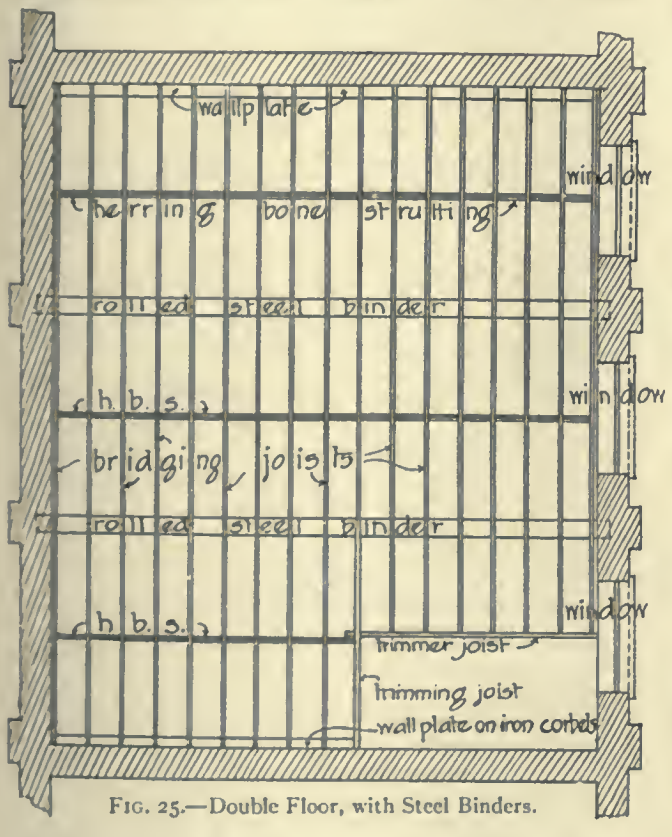


FIG. 25.—Double Floor, with Steel Binders.

joists. This system has to be resorted to when it is impossible to get a bearing on the wall.

A trimmer requires for the most part to be carried or supported at one or both ends by the trimming joists, and both the trimmer and the trimming joists are necessarily made stouter than if they had to bear no more than their own share of the stress. In the usual practice the trimmer and trimming joists are 1 in. thicker than the common joists, but there are special regulations and by-laws set out in the various districts and boroughs (see *By-laws*, below) to which attention must be given.

The principal objection to single flooring is that the sound passes through from floor to floor, so that, in some cases, conversation in one room can almost be understood in another. To stop

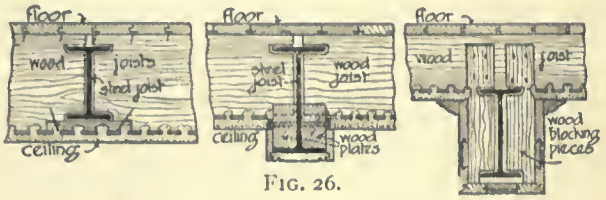


FIG. 26.

the sound from passing through floors the remedy is to pug them (fig. 24). This consists in using rough boarding resting on fillets nailed to the sides of the joists about half-way up the depth of the joists, and then filling in on top of the boarding with slag wool usually 3 in. thick. Also to further prevent sound from

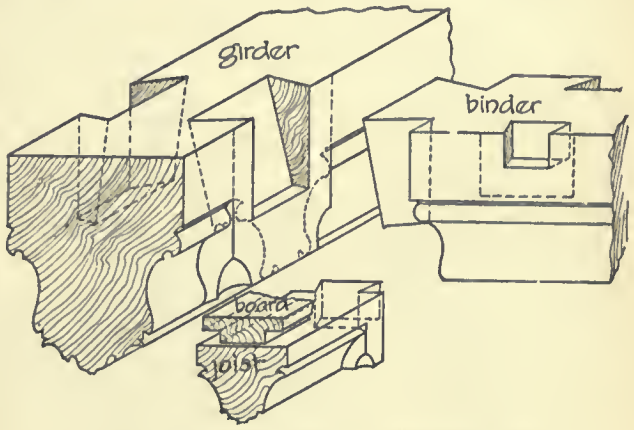


FIG. 27.—Construction of a Medieval Floor.

passing through floors the flooring should be tongued and the ceiling should have a good thick floating coat; in poor work the stuff on ceilings is very stinted. In days gone by, ceiling joists were put at right angles to the floor joists, but this took up head room and was costly, and the arrangement is obsolete.

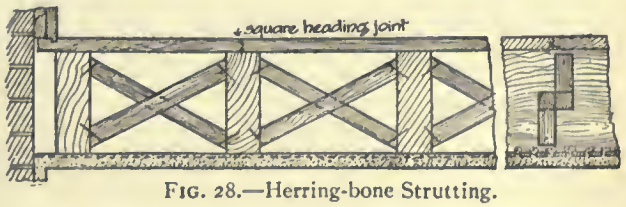


FIG. 28.—Herring-bone Strutting.

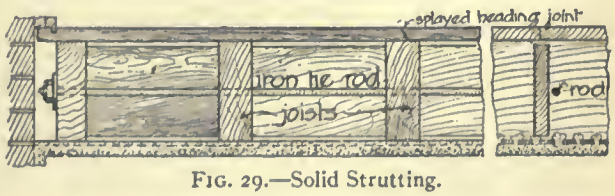


FIG. 29.—Solid Strutting.

Double flooring.

Double flooring (fig. 25) consists of single fir joists trimmed into steel girders; in earlier times a double floor consisted of fir joists called binding, bridging and ceiling joists, but these are very little used now and the single fir joists and steel girders have taken their place. Steel girders span from wall to wall, and on their flanges are bolted wood plates to receive the ends of the single joists which are notched over plates and run at right angles to the

girders (fig. 26). The bearings of the joists on the wall also rest on wall plates, so as to get a level bed, and are sometimes notched over them. Wall plates, which are usually $4\frac{1}{2}$ in. × 3 in. and are bedded on walls in motar, take the ends of joists and distribute the weight along the wall. The plates bolted on the side of girders are of sizes to suit the width of the flanges.

The medieval floor (fig. 27) consisted of the framed floor with wood girders, binding, bridging and ceiling joists, and the underside of all the timbers was usually wrought, the girders and binders being boldly moulded and the other timbers either square or stop chamfered.

Flooring is strengthened by the use of strutting, either herring-bone (fig. 28) or solid (fig. 29). Herring-bone strutting consists of two pieces of timber, usually 2 in. × 2 in., fixed diagonally between each joist in continuous rows, the rows being about 6 ft. apart. Solid strutting consists of $1\frac{1}{4}$ in. boards, nearly the same depth as the joists and fitted tightly between the joists, and nailed in continuous rows 6 ft. apart. Where heavy weights are likely to be put on floors long bolts are passed through the centre of joists at the side of strutting; since this draws the strutting tightly together and does not produce any forcing stress on the walls, it is undoubtedly the best method.

Floors are usually constructed to carry the following loads (including weight of floor):—

Residences, $1\frac{1}{4}$ cwt. per foot super of floor space.
Public buildings, $1\frac{1}{2}$ cwt. per foot super of floor space.
Factories, $2\frac{1}{2}$ to 4 cwt. per foot super of floor space.

Local By-laws.—With regard to floor joists in domestic buildings, the following are required in the Hornsey district, in the north of London. The size of every common bearing floor joist up to 3 ft. long in clear shall be 3 in. × $2\frac{1}{2}$ in.; from 3 ft. to 6 ft. in clear it shall be $4\frac{1}{2}$ in. × 3 in.; from 6 ft. to 8 ft., $6\frac{1}{2}$ in. × $2\frac{1}{2}$ in.; from 8 ft. to 12 ft., 7 in. × $2\frac{1}{2}$ in., and so on according to the clear span. The Hornsey by-laws with regard to trimmers are as follows:—A trimmer joist shall not receive more than six common joists, and the thickness of a trimming joist receiving a trimmer at not more than 3 ft. from one end and of every trimmer joist shall be $\frac{1}{8}$th of an inch greater than the thickness for a common joist of the same bearing for every common joist carried by a trimmer. For example, if the common joists are 7 in. × $2\frac{1}{2}$ in. and the trimmer has six joists trimmed into same, the size of trimmer would have to be 7 in. × $3\frac{1}{4}$ in. The Hornsey council also requires that the floor boards shall not be less than $\frac{7}{8}$ths of an inch thick.

There is little difference in the requirements of the various localities. For example, the regulations of the Croydon council require that every common bearing joist for lengths up to 3 ft. 4 in. in clear shall be 3 in. × $2\frac{1}{2}$ in.; for lengths between 3 ft. 4 in. and 5 ft. 4 in., 4 in. × 2 in.; for lengths between 5 ft. 4 in. and 7 ft. 4 in., 4 in. × 3 in.; and so on according to the clear span. The Croydon by-laws with regard to trimmers are as follows:—A trimmer joist shall not receive more than six common joists, and the thickness of a trimming joist shall be $1\frac{1}{2}$ in. thicker than that for common joists of the same bearing, and the thickness of a trimmer joist shall be $\frac{1}{2}$ in. thicker for every joist trimmed into same than the common joist. For example, if the common joists are 4 in. × 3 in. the trimming joists would have to be 4 in. × $4\frac{1}{2}$ in., and the trimmer joist would have to be 4 in. × $4\frac{1}{2}$ in.

Partitions.—Partitions are screens used to divide large floor spaces into smaller rooms and are sometimes constructed to carry the floors above by a system of trussing. They are built of various materials; those in use now are common stud partitions, bricknogged partitions, and solid deal and hardwood partitions, $4\frac{1}{2}$ in. brick walls or bricks laid on their sides, so making a 3 in. partition, and various patent partitions such as coke breeze concrete or hollow brick partitions (see BRICKWORK), iron and wire partitions, and plaster slab partitions (see PLASTERWORK).

There are two kinds of stud or quarter partitions, common and trussed.

Common partitions (fig. 30) simply act as a screen to divide

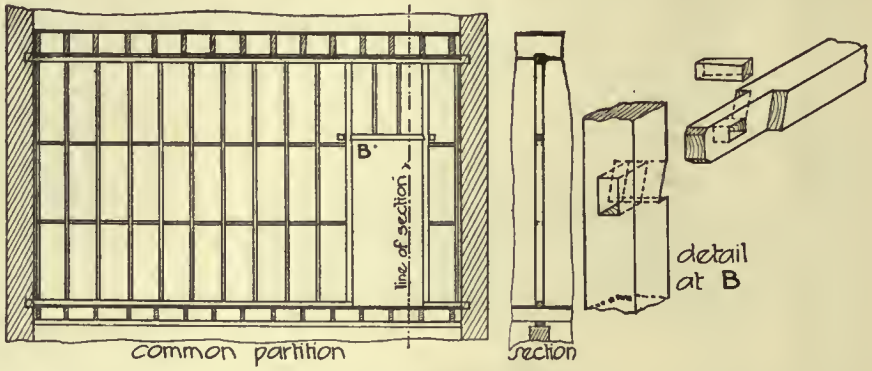


FIG. 30.—Common Partition.

one room from another, and do not carry any weight. They weigh about 25 lb per foot superficial including plastering on both sides, and are composed of 4 in. × 3 in. head and sill and 4 in. × 2 in. upright studs; 4 in. × 2 in. nogging pieces are fitted between the studs to keep them from bending in, and are placed parallel with the head, usually 4 ft. apart. Where door-openings occur in these partitions the studs next the opening are 4 in. × 3 in. Should the floor boards have been laid, the sill of the partition would be laid direct on them, but if the partitions are erected at the time of building the structure the sill should either rest directly over a joist, if parallel with it, or at right angles to the joists; should the position of the sill come between two joists, that is, parallel with them, then short pieces called bridging pieces of 4 in. × 2 in. stuff are wedged between the two joists and nailed to carry the sill. ***Common partitions.***

Trussed partitions (fig. 31) are very similar to the last, but they are so built as to carry their own weight and also to support floors, and in addition have braces; the head and sill are larger, and calculated according to the clear bearing and the weight put upon them. There are ***Trussed partitions.***

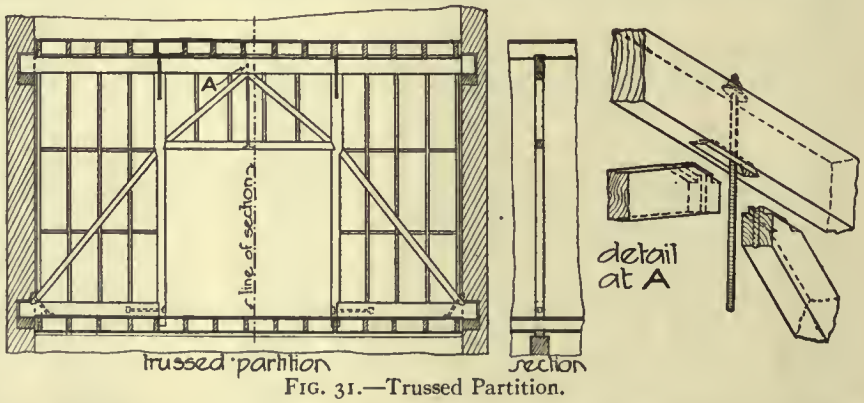


FIG. 31.—Trussed Partition.

two forms of trussing, namely, queen post (fig. 32) and king post (fig. 33).

Bricknogged partitions are formed in the same manner as the common stud partition, except that the studs are placed usually 18 or 27 in. apart in the clear instead of 12 in., and the 18 and 27 in. widths being multiples of a brick dimension, they are filled in with brickwork $4\frac{1}{2}$ in. thick and always built in cement. These are used to prevent sound from passing from one room to another, and also to prevent fire from spreading, and are vermin-proof. Another method is to fill the space between the studs with coke breeze concrete instead of brickwork. ***Bricknogged partitions.***

Timber partitions have the advantages that they are light and cheap and substantial, and the disadvantages that they are not fire-resisting or sound-resisting or vermin-proof; they should never be erected in damp positions such as the

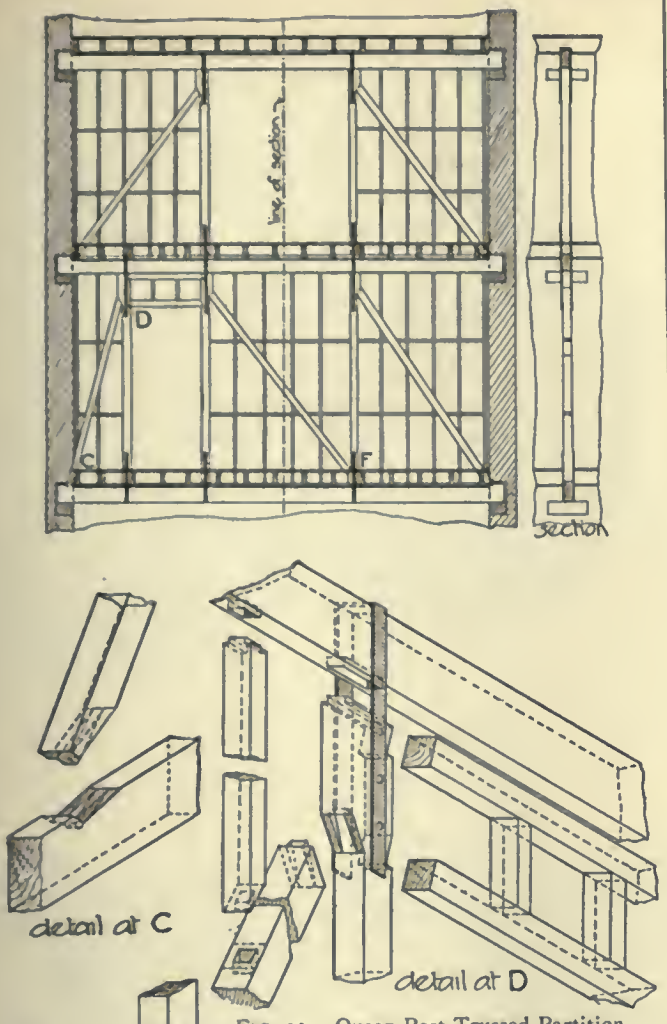


FIG. 32.—Queen Post Trussed Partition.

lower floors of buildings.

Solid wood partitions are used in offices and classrooms of schools, the upper portions usually being glazed; where these partitions enclose a staircase

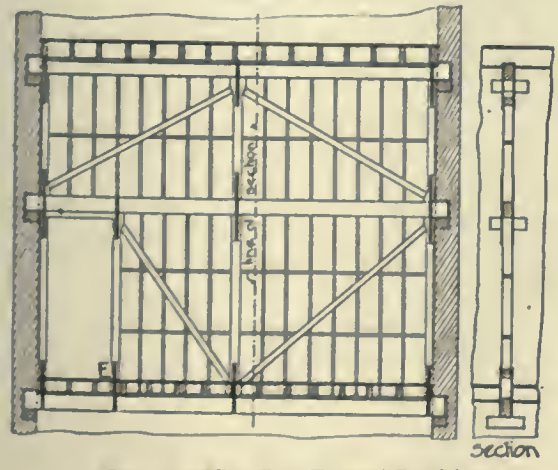


FIG. 33.—King Post Trussed Partition.

in a public building the London Building Act requires them to be of 2 in. hardwood, with only small panels of fire-resisting glass.

Timber Work.—Half timber work consists of a framework of timber; the upper storeys of suburban and country residences are often thus treated, and the spaces between the timbers are filled in with brickwork and plastered inside, and rough cast outside, though sometimes tiles are hung on the outside. In some instances in country places there is no filling between the timbers, and both sides are lath and plastered, and in others the timbers are solid, or facing pieces are simply plugged to the walls, the joints being pinned with hardwood pins. Half timber work (fig. 34) well designed has a very pleasing, homely and rural effect. The best and most durable wood to use is English oak worked smooth on the external face and usually painted; the by-laws of various authorities differ considerably as to the method of construction and in the restrictions as to its use. Some very fine early examples are to be seen in England, as at Holborn Bars, London, in the old parts of Bristol, and at Moreton Old Hall, near Congleton, Cheshire (see HOUSE, Plate IV. fig. 13).

Timber-framed permanent buildings are not used in the towns of England, not being allowed by the by-laws. In some English villages timber bungalows are allowed, plastered inside, and either rough cast outside, or with tiles, or with sheet iron painted.

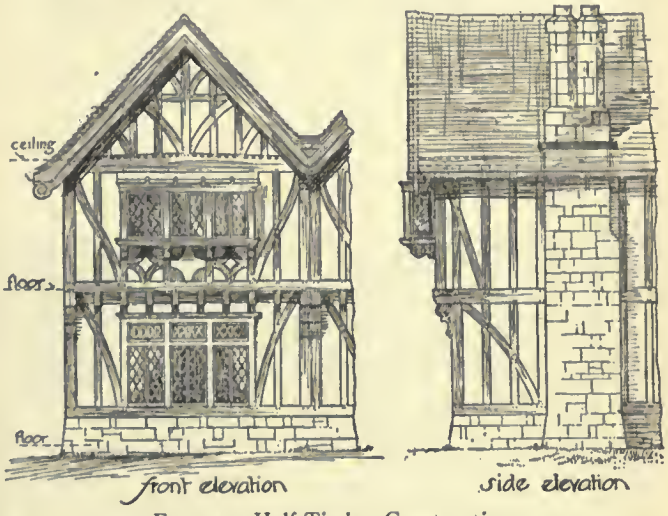


FIG. 34.—Half Timber Construction.

At the garden city of Letchworth, in Hertfordshire, there are a few timber-framed bungalows (erected about 1904 and originally intended to be used as week-end cottages), the outsides of which are covered with sheet iron and painted. Other instances of the temporary use of this kind of building are found in soldiers' barracks, offices and chapels.

In America and the British colonies this class of building is very largely erected on the outskirts of the cities. In American practice in framing the walls of wooden buildings two distinct methods are used and are distinguished as "braced" and "balloon."

The Braced (fig. 35) was the only kind in use previous to about the year 1850. In this method of framing the sills, posts, girts and plates are made of heavy timber morticed and pinned together and braced with 4 in. × 4 in. or 4 in. × 6 in. braces and common studding. To frame a building in this way it is necessary to cut all the pieces and make all the mortice holes on the ground, and then fit them together and raise a whole side at a time or at least one storey of it. The common studs are only one storey high.

The Balloon frame (fig. 36) is composed of much smaller scantlings and is more rapidly erected and less expensive. The method is to first lay the sill, generally 4 in. × 6 in., halved at the angles. After the floor is laid, the corner posts, usually 4 in. × 6 in., are erected and temporarily secured in place with the aid of stays. The common studs are then set

up and spiked to the sill, and a temporary board nailed across their face on the inside. These common studs are the full height from sill to roof plate, and the second tier of floor joists are supported by notching a $1\frac{1}{4}$ in. × 7 in. board, called a false girt or ribbon, into their inside edge at the height to receive the floor joists. The ends of the joists are also placed against a stud and spiked. The tops of the studs are cut to a line, and a 2 in. × 4 in. plate is spiked on top, an additional 2 in. × 4 in. plate being placed on the top of

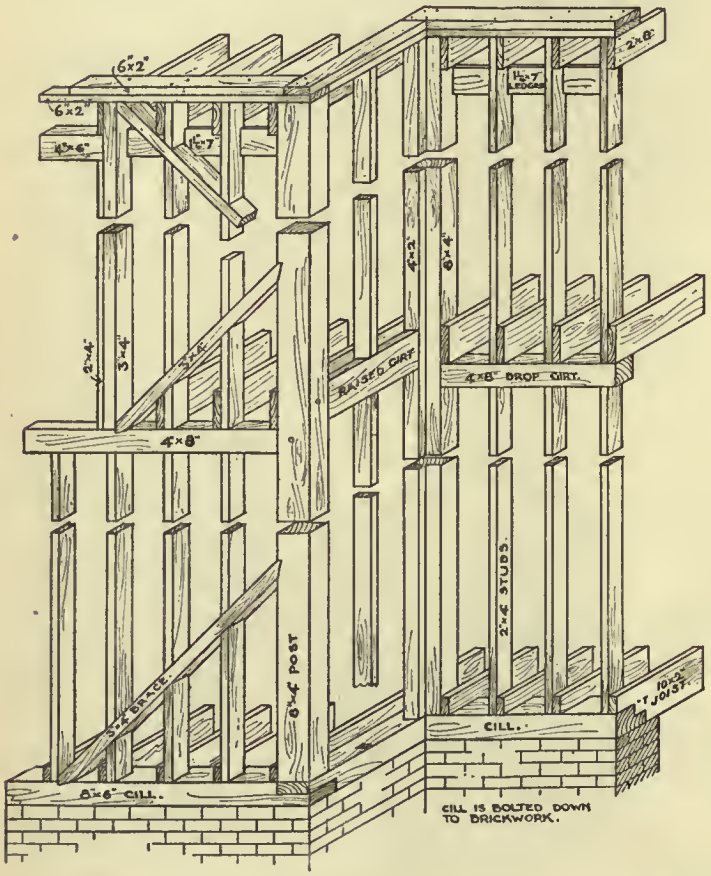


FIG. 35.—Braced Frame.

the last breaking joint. Should the studs not be long enough to reach the plate, then short pieces are fished on with pieces of wood spiked on both sides. The diagram shows a portion of the framework of a two-storey house constructed in the manner described. In the balloon frame the timbers are held together entirely by nails and spikes, thus permitting them to be put up rapidly. The studs are doubled where windows or openings occur. In both these methods dwarf brick foundations should be built, upon which to rest the sill. For buildings of a superior kind a combination of the braced and balloon frames is sometimes adopted.

The sides of frame buildings are covered with siding, which is fastened to a sheathing of rough boards nailed to the studs. The siding may consist of matched boards placed diagonally, or of clapboards or weather boards—which are thin boards thicker at one edge than the other, and arranged horizontally with the thick edge downwards and overlapping the thin edge of the board below. Shingles or wooden tiles are also employed.

AUTHORITIES.—The following are the principal publications on carpentry: T. Tredgold, *Carpentry*; Peter Nicholson, *Carpenter and Joiner*; J. Newlands, *Carpenter's Assistant*; J. Gwilt, *Encyclopaedia of Architecture*; Rivington, *Building Construction* (elementary and advanced); E. L. Tarbuck, *Encyclopaedia of Practical Carpentry and Joinery*; A. W. Pugin, *Details of Ancient Timber Houses*; Beresford Pite, *Building Construction*; J. P. Allen, *Building Construction*; H. Adams, *Notes on Building*; C. F. Mitchell, *Building Construction* (elementary and advanced); Burrell, *Building Construction*; F. E. Kidder, *Building Construction* (U.S.A.); E. E. Viollet le Duc, *Dictionnaire*; J. K. Krafft, *L'Art de la charpente*. (J. Bt.)

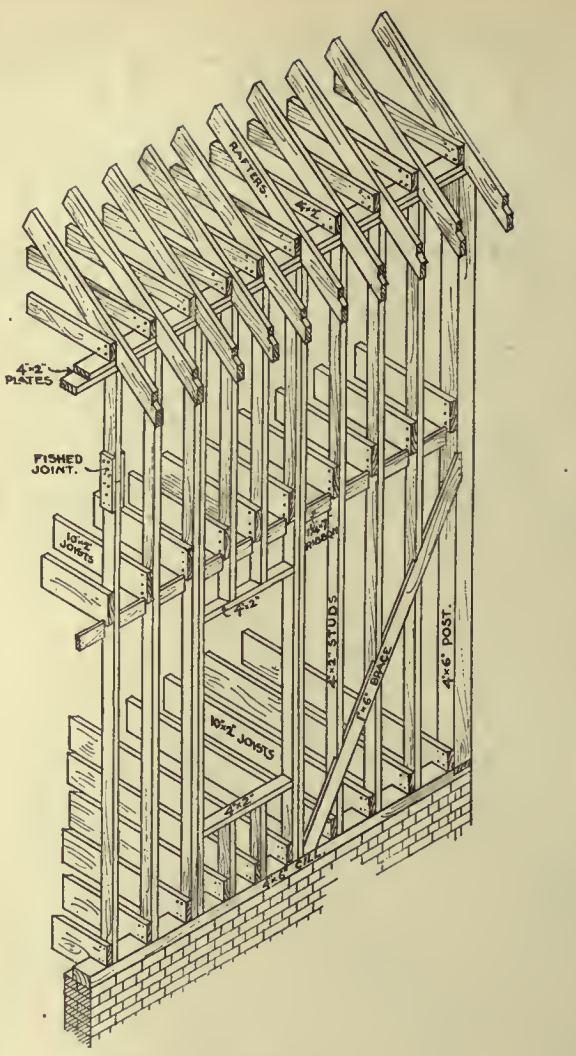


FIG. 36.—Balloon Frame.

CARPET, the name given to any kind of textile covering for the ground or the floor, the like of which has also been in use on couches and seats and sometimes even for wall or tent hangings or curtains. In modern times, however, carpet usually means a patterned fabric woven with a raised surface of tufts (either cut or looped), and used as a floor covering. Other floor coverings are and have been made also without such a tufted surface, and of these some are simple shuttle-woven materials plain or enriched with needlework or printed with patterns; others are woven after the manner of tapestry-weaving (see TAPESTRY) or in imitation of it, and a further class of carpets is made of felt (see FELT). This last material is entirely different from that of shuttle or tapestry weaving. Although carpet weaving by hand is, and for centuries has been, an Oriental industry, it has also been, and is still, pursued in many European countries. Carpet-weaving by steam-driven machinery is solely European in origin, and was not brought to the condition of meeting a widespread demand until the 19th century.

History.

In connexion with the word "carpet" (Lat. *carpita*, rug; O. Fr. *carpite*) notice may be taken of the Gr. *τάπης* and the Lat. *tapetium*, whence also comes the Fr. *tapis* (the present word for "carpet") as well as our own word "tapestry." This latter, though now more particularly descriptive of hangings and curtains woven in a special way, was, in later medieval times, indiscriminately applied to them and to stuffs used as floor and seat coverings. From a very early period classical writers make mention of them. In ancient Egypt, for instance, floor and seat coverings were used in temples for religious ceremonies by the priests of Amen Ra; later on they

FIG. 1.—PART OF A LINEN COVERING OVER-WROUGHT WITH ORNAMENT IN LOOPS OF COLOURED WOOLS.

Egypto-Roman of the 3rd or 4th century A.D.
(Victoria and Albert Museum, South Kensington.)

FIG. 2.—PART OF A LINEN COVERING OVER-WROUGHT WITH ORNAMENT IN LOOPS OF DARK-BROWN WOOL.

Egypto-Roman of the 3rd or 4th century A.D.
(Victoria and Albert Museum, South Kensington.)

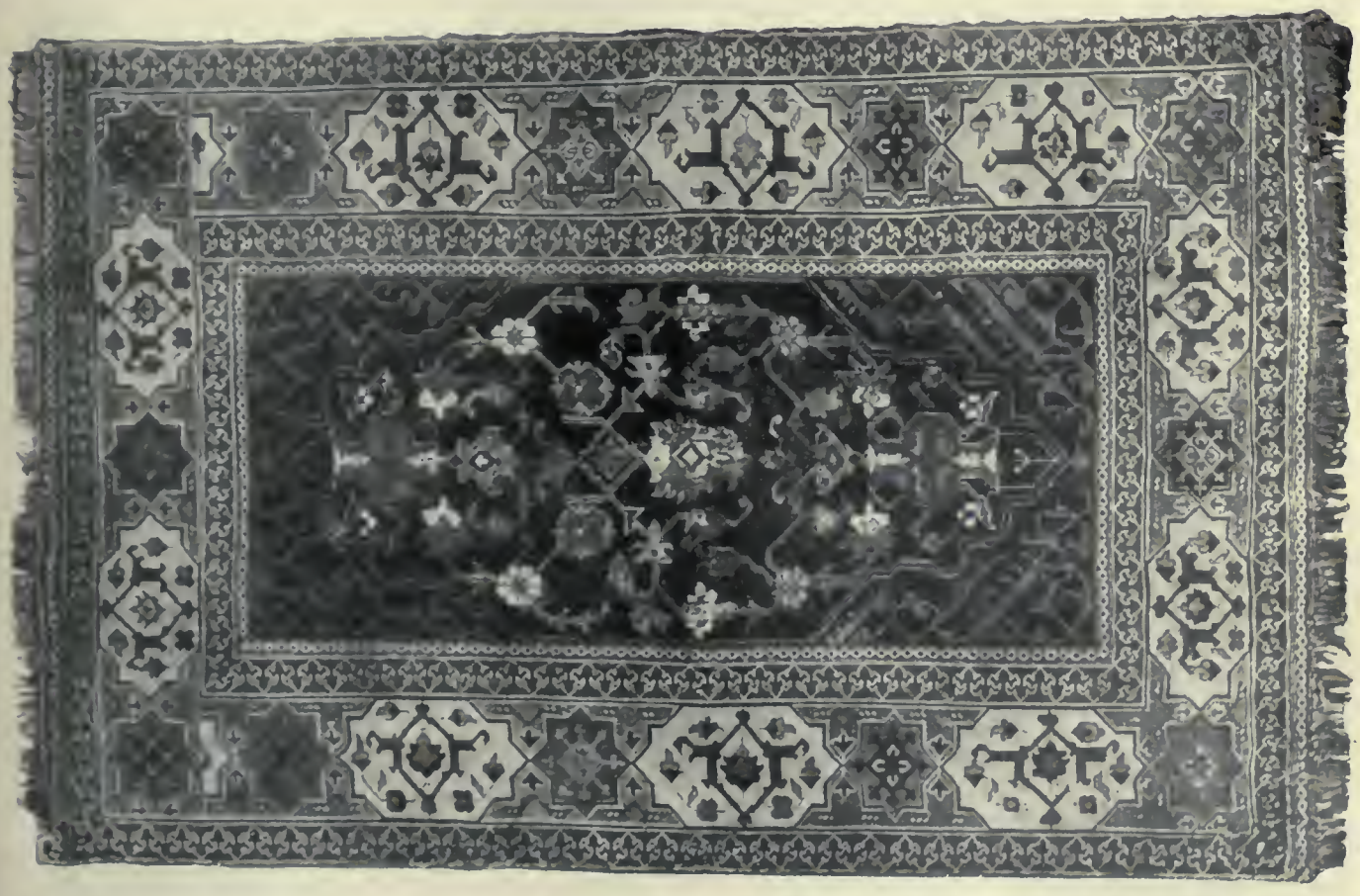


FIG. 3.—CUT PILE TURKEY CARPET, 18TH CENTURY, EXEMPLIFYING SUCH CHARACTERISTIC ANGULAR TREATMENT OF QUASI-BOTANICAL FORMS AS IS USUALLY FOUND IN CARPETS AND RUGS MADE IN ASIA MINOR. FROM DESIGNS OF PERSIAN OR MOSIL ORIGIN. (Victoria and Albert Museum.)

CARPET

FIG. 4.—RUG MADE IN PERSIA IN THE MANNER OF TAPESTRY WEAVING.

FIG. 5.—CARPET OF STOUT FLAX OR HEMP WOVEN AND THEN COMPLETELY COVERED WITH ORNAMENT WORKED IN CLOSE NEEDLE STITCHES IN COLOURED THREADS.

were used to garnish the palaces of the Pharaohs. If one may judge from rare remains of decorative textiles, in the museum at Cairo especially, dating from at least 1480 B.C., such Egyptian fabrics were of linen inwoven with coloured wools in a tapestry-weaving manner, and were not tufted or piled textures. Taken from the palace at Nineveh is a large marble slab carved in low relief with a geometrical pattern surrounded by a border of lotus flowers and buds, evidently a copy of an Assyrian floor cover or rug about 705 B.C., such as was also woven probably in the tapestry-weaving manner. On the other hand, its design equally well suggests patchwork—a method of needlework in vogue with Egyptians, at least 900 years B.C., for ornamental purposes, as indicated by the elaborately patterned canopy which covered the bier of an Egyptian queen—the mother-in-law of Shishak who took Jerusalem some three or four years after the death of Solomon—and is preserved in the museum at Cairo. In the *Odyssey*, *tapetia* are frequently mentioned, but these again, whether floor coverings or hangings, are more likely to have been flat-textured and not piled fabrics. On the tomb of Cyrus was spread a "covering of Babylonian tapestry, the carpets underneath of the finest wrought purple" (Arrian vi. 29). Athenaeus (bk. v. ch. 27) gives from Callixenus the Rhodian (*c.* 280 B.C.) an account of a banquet given by Ptolemy Philadelphus at Alexandria, and describes "the purple carpets of finest wool, with the pattern on both sides," as well as "handsomely embroidered rugs very beautifully elaborated with figures"; these again were probably not piled fabrics but kindred to the hangings in the palace of Ptolemy Philadelphus decorated with portraits, which were likely to have been of tapestry-weaving, and would be nearly the same in appearance on both sides of the fabric. Of corresponding tapestry woven work are Egypto-Roman specimens dating from the 2nd or 3rd century A.D., a considerable collection of which is in the Victoria and Albert Museum at South Kensington. From about the same period date bits of hangings or coverings woven in linen, over-wrought in a method of needlework with ornament of compact loops of worsted (Plate I. figs. 1 and 2). These are the earliest extant specimens of textiles presenting a tufted or piled surface very kindred to that of woven pile carpets of much later date. But the *modus operandi* in producing the earlier only remotely corresponds with that of the later—though making a surface of loops by means of needlework as in the Coptic or Egypto-Roman specimens of Plate I. figs. 1 and 2 seems to be a step in a progress towards the introduction at an apparently later date of tufts into loom weavings such as we find in 16th-century tufted or piled carpets.

Method of making piled carpets.

The simple traditional Oriental method of making these latter is briefly as follows:—The foundation is a warp of strong cotton or hempen or woollen or silk threads, the number of which is regulated by the breadth of the carpet and the fineness or coarseness to be given to its pile. Short lengths of coloured wool or goats' or camels' hair or silk are knotted on to each of the warp threads so that the two ends of each twist or tuft of coloured yarn, of whatever material it is, project in front. Across the width of the warp and above the range of tufts a weft thread is run in; another line or row of tufts is then knotted, and above this another weft thread is run in across the warps, and so on. These rows of tufts and weft as made are compressed together by means of a blunt fork or rude comb-like instrument, and thus a compact textile with a pile or tufted surface is produced; the projecting tufts are then carefully clipped to an even surface. In the East the rude wooden frames in which the warp-threads are stretched either stand upright upon, or are level with, the ground. They are easily transported and put together, and the weaving in them is done chiefly by wandering groups of weavers. The local surroundings, often those of rocky arid districts, in which Kurdish and other families weave carpets are well illustrated in *Oriental Rugs* by J. H. Mumford. For making pile carpets and rugs two traditional knots are in use; the first is termed the Turkish or Ghiordes knot, from Ghiordes, an old city not far from Brusa. It is in vogue principally throughout Asia Minor, as far east as Kurdistan and the Caucasus, but it is also used farther south-east in parts of Persia and India. The yard of the pile is knotted in short lengths upon the warp-threads so that the two outstanding ends of each knot alternate with every two threads of the warp. The second traditional knot is the Persian or Sehna knot, which, though better calculated to produce a close, fine, even, velvety surface, has in many parts of Persia been abandoned for the Ghiordes knot, which is a trifle more easily tied. The Persian or Sehna knot is tied so that from every space between the warp-threads one end of the knot protrudes. The number of knots to the inch tied according to either the Turkish or Persian method is determined by the size and closeness of the warp-threads and the size and number of weft-threads thrown across after each row of knots. The patterns of the fabrics made by country weavers are usually taken by them from old rugs. But in towns where weaving is conducted under more organized conditions new patterns are often devised, and are traced sometimes upon great cardboards, on which the stitches, or knots, are indicated by squares each painted in its proper colour. In some of the Persian carpets and rugs made at Sehna, Kirman and Tabriz, the warp is of silk, a material that contributes to fine compact pile textures.

Date of original pile textures.

There is much uncertainty as to the period when cut pile carpets were first made in the East. Their texture is certainly akin to that of fustian and velvet; while that of the finer Persian carpets, which were not made much earlier than about the 15th century, is practically not distinguishable from velvet, having long or heavy pile. Fustian, the English name for a cut short pile textile, is derived from Fostat (old Cairo), and such material is likely to have been made there, as soon as anywhere else, by Saracens, especially during the propitious times of the Fatimite Khalifs, who for more than two centuries previously to the 13th century were noted for the encouragement they gave to all sorts of arts and manufactures. It seems that velvet came into use in Europe not much earlier than the 14th century, and various French church inventories of the time contain entries of "*tapis velus* (cut pile carpets) *d'aultre mer, à mettre par terre*" (see *Essai sur l'histoire des tapis-series et tapis*, by W. Chocqueel, Paris, 1863, pp. 22-23). It is an open question if the making of cut pile carpets in Persia or by Saracens elsewhere preceded that of fustians and velvets or whether the developments in making the three proceeded *pari passu*.

Carpets with flat surface.

The making of carpets with a flat surface, however, is probably far older than that of cut pile carpets, and characteristic of one such old method is that in the making of Soumak carpets (Plate II. fig. 5), the ornament of which done in close needle stitches with coloured threads completely conceals the stout flax or hemp web which is the essential material of these carpets. Soumak is a distortion of Shemaka, a Caucasian town in the far east of Asia Minor. But so-called Soumak carpets are made in other districts, and the particular needlework used in them is practically of the same kind as that on a smaller scale used for the well-known Persian Nakshe or woman's trousering, and again that used on a still smaller scale in the ornamentation of valuable Kashmir shawls. Quilted and chain-stitched cotton prayer and bath rugs from Persia are referred to in the article on EMBROIDERY.

Another method of making carpets with a flat surface is that of tapestry-weaving (see Plate II. fig. 4), which, according to existing and well-authenticated specimens of considerable antiquity (already referred to), appears to be the oldest of any historic process of ornamental weaving (see TAPESTRY).

Motives in traditional designs in Oriental carpets.

Very broadly considered, the traditional designs or patterns of Oriental carpets fall into two classes: the one, prevailing to a much larger extent than the other, seems to reflect the austerity of the Sunni or orthodox Mahommedans in making patterns with abstract geometric and angular forms, stiff interlacing devices, cryptic signs and symbols and the like; whilst the other suggests the freer thought of the Shiah or unorthodox sect, in

designs of ingenious blossom and leafy scrolls, conventional arabesques, botanical and animal forms, and cartouches enclosing Kufic inscriptions (see the splendid example known as the Ardebil carpet, Plate III. fig. 7, and another in Plate IV. fig. 9). Types of the more austere design occur in carpets from Afghanistan, Turkestan, Bokhara and Asia Minor, N.W. India and even Morocco, the other types of freer design being almost special to Persian rugs and carpets.

Indian carpets.

Next in historic importance to Persia, Turkestan and Asia Minor is India, where the making of cut pile carpets—known as Kalin and Kalicha—was presumably introduced by the Mahommedans during the latter part of the 14th century. But the industry did not apparently attain importance until after the founding of the Mogul dynasty by Baber early in the 16th century. The designs mainly derived from those of Persian carpets of that period do not as a rule rise to the excellence of their prototypes. Historical centres of Indian carpet making are in Kashmir, the Punjab and Sind, and at Agra, Mirzapur, Jubbulpore, Warangal in the Deccan, Malabar and Masulipatam. Velvets are richly embroidered in gold and silver thread at Benares and Murshidabad and used as ceremonial carpets, and silk pile carpets are made at Tanjore and Salem. For the most part the best of the Indian woollen pile carpets have been produced by workers of repute engaged by princes, great nobles and wealthy persons to carry on the craft in their dwellings and palaces. These groups of highly skilled workers as part of the household staff were paid fixed salaries, but they were also allowed to execute private orders. During the 19th century the carpet industry was developed in government gaols. Produced in great quantities the prison-made carpets as a rule are less well turned out, and the competition set up betewen them and the rugs and carpets of private factories has had a somewhat detrimental effect upon the industry generally. Older in origin than the cut pile carpets are those of thinner and flat surface texture, which from almost immemorial times have been woven in cotton with blue and white or blue and red stripes in the simplest way. These are called *daris* and *satranjis*, and are made chiefly in Benares and northern India. They are also made in the south and by such aborigines retaining primitive habits as the Todas of the Nilgiri Hills, a fact which points to the age of this particular method of making ground or floor coverings.

Condition controlling designs of Oriental carpets.

A condition that has always controlled the designs of Oriental carpets is their rectangular shape, more often oblong than square. As a rule, there is a well-schemed border, enclosing the main portion or field over which the details of the pattern are symmetrically distributed. Simpler patterns in the field of a carpet or rug consist of repetitions of the same device or of a small number of different devices (see Plate II. fig. 4). Richer patterns display more organic pattern in the construction, of which the leading and continuous features are expressed as diversified bands, scrolls and curved stems; amongst these latter are very varied devices which play either predominant or subordinate parts in the whole effect of the design (Plate III. fig. 7). Angular and simplified treatments of these elaborate designs are rendered in many Asia Minor or Turkey carpets (Plate I. fig. 3); but the typical flowing and more graceful versions are of Persian origin (see Plate III. fig. 7, and Plate IV. fig. 9), usually of the 16th century. Mingled in such intricate stem designs or "arabesques" are details many of which have been derived on the one hand from Sassanian and even from far earlier Mesopotamian emblematical ornament based on cheetahs seizing gazelles, on floral forms, blossoms and buds so well conventionalized in Assyrian decoration, and on the other hand from Tatar and Chinese sources. The style, strong in suggestion of successive historical periods, seems to have been matured in Mosil engraved and damascened metal work of the 12th and 13th centuries before its occurrence in Persian carpet designs, the finest of which were produced about the reign of Shah Abbas. A good deal earlier than this period are carpets designed chiefly according to the simpler taste of the Sunnites, and such as these appear to be mentioned by Marco Polo (1256–1323) when writing that "in Turcomania they weave the handsomest carpets in the world." He quotes Conia (Konieh in Anatolia), Savast (Sivas in Asia Minor), some 300 m. north-east of Konieh, and Cassaria (Kaisaria or Caesaraea in Anatolia) as the chief weaving centres. It is the carpets from such places rather than from Persia that appear to have been the first Oriental ones known in European countries.

Carpets in Europe.

Entries of Oriental carpets are frequent in the inventories of European cathedral treasures. In England, for instance, carpets are said to have been first employed by Queen Eleanor of Castile and her suite during the latter part of the 13th century, who had them from Spain, where their manufacture was apparently carried on by Saracens or Moors in the southern part of the country. On the other hand, Pierre Dupont, a master carpet-maker of the Savonnerie (see below), gives his opinion in 1632 that the introduction of carpet-making into France was due to the Saracens after their defeat by Charles Martel in A.D. 726. But more historically precise is the record in the book of crafts (*Livre des mêtiers*) by Étienne Boileau, provost of the merchants in Paris (1258–1268), of "the tapicers or makers of *tapis sarrasinois*,[1] who say that their craft is for the service only of churches or great men like kings and nobles." In the 13th and 14th centuries Saracen weavers of rich and ornamental stuffs were also employed at Venice, which was a chief centre for importing Oriental goods, including carpets, and distributing them through western Europe. Dr Bode, in his *Vorderasiatische Knüpfteppiche*, instances Oriental carpets with patterns mainly of geometric and angular forms represented in frescoes and other paintings by Domenico di Bartolo (1440), Niccolo di Buonaccorso (1450), Lippo Memmi (1480) and others.

Of greater interest perhaps, and especially as throwing light upon the trade in, if not the making of, carpets in England somewhat in the method of contemporary Turkey carpets, is the specimen represented in Plate III. fig. 6. This may have been made in England, where foreign workmen, especially Flemings, were from early times often encouraged to settle in order to develop industries, amongst which pile carpet-making probably and tapestry-weaving certainly were included. The earliest record of tapestry-weaving works in England is that of William Sheldon's at Barcheston, Warwickshire, in 1509, and, besides wall hangings, carpets of tapestry-weaving were also possibly made there.[2] The cut pile carpet belonging to Lord Verulam (Plate III. fig. 6) was perhaps made at Norwich. It has a repeating and simply contrived continuous pattern of carnations and intertwining stems with a large lozenge in the centre bearing the royal arms of England with the letters E. R. (Elizabeth Regina) and the date 1570. It also has the arms of the borough of Ipswich and those of the family of Harbottle. The sequence or continuity of its border pattern fails in the corners at one end of the rug or carpet in a way very common to many Asia Minor and Spanish carpets (see Plate I. fig. 3, Plate II. fig. 4, and Plate IV. fig. 10); not, however, to the majority of Persian carpets (see Plate III. fig. 7, and Plate IV. fig. 8). A large cut pile carpet in the Victoria and Albert Museum has a repeating pattern of star devices, rather Moorish in style, with the inscription on one end of the border, "Feare God and Keep His Commandments, made in the yeare 1603," and in the field the shield of arms of Sir Edward Apsley of Thakeham, Sussex, impaling those of his wife, Elizabeth Elmes of Lifford, Northamptonshire. This may have been made in England. A carpet of very similar design, especially in its border, is to be seen in a painting by Marc Gheeraedts of the conference at old Somerset House of English and Spanish plenipotentiaries (1604), now in the National Portrait Gallery, London. A more important and

[1] The *tapissiers sarrasinois* were apparently the makers of piled or velvety carpets, and have always been written about in contra-distinction to the *tapissiers de haute lisse* or *tapissiers nostrez*, who it appears did not weave piled or velvety material, but made tapestry-woven hangings and coverings for furniture.

[2] In Hakluyt's *Voyages* mention is made of directions having been given to Morgan Hubblethorne, a dyer, to proceed (about 1579) to Persia to learn the arts of dyeing and of making carpets.

finer carpet belongs to the Girdlers' Company (Plate IV. fig. 8), and is of Persian design, into which are introduced the arms of the company, shields with eagles, and white panels with English letters, the monogram of Robert Bell the master in 1634, but this was made at Lahore[1] to his order.

Before dealing with later phases of the carpet industry in England, mention may now be made of Spanish carpets, of European as distinct from Saracenic or Persian design; the making of them dates at least from the end of the 15th century or the beginning of the 16th century. It is only within recent years that specimens of them have been obtained for public collections, and at present little is known of the factories in Spain whence they came. A large and most interesting series is shown in the Victoria and Albert Museum, and a portion of one of the earlier of the Spanish cut pile carpets in that museum is given in Plate IV. fig. 10. The inner repeating pattern has suggestions of a lingering Moorish influence, but a superior version of it with better definition is to be seen in extant bits of Spanish shuttle-woven silks of the 16th century. The border of distorted dragon-like creatures is of a Renaissance style, and this style is more pronounced in other Spanish carpets having borders of poorly treated Italian 16th-century pilaster ornament. Beside cut pile, many Spanish carpets of the 17th and 18th centuries have looped and flat surfaces, and bear Spanish names and inscriptions; many too are of needlework in tent or cross stitch.

Spanish carpets.

Another interesting class of very fine pile carpets that has also become known comparatively recently to collectors is the so-called Polish carpets, generally made of silk pile for the ornament, which is distinctively Oriental, and of gold and silver thread textile for the ground, very much after the manner of early 17th-century Brusa fabrics. Many of these carpets are in the Czartoryski collection at Cracow. They are discussed by Dr Bode in his treatise on Oriental carpets already referred to. European coats of arms of the persons for whom they were made are often introduced into them, sometimes different in workmanship from that of the carpets, though there are specimens in which the workmanship is the same throughout. The details of their designs consist for the most part of arabesques and long curved serrated leaves similar to such as are commonly used in Rhodian pottery decoration of the 16th century, though more typical of those so frequent in 17th-century Turkish ornament. Various considerations lead to the conclusion that these so-called Polish carpets were probably made in either Constantinople or Damascus (*tapete Damaschini* frequently occur in Venetian inventories of the 16th century) rather than, as has been thought, by the Persian workmen employed at the Mazarski silk factory which lasted for a short period only during the 18th century at Sleucz in Poland.

Polish carpets.

The European carpet manufactory, of which a continuous history for some two hundred and fifty years is recorded with exceptional completeness, is that which has been maintained under successive régimes, royal, imperial and republican, in France—at the Hôtel des Gobelins in Paris. Seventy years before its organization under Colbert in 1667 as a state manufactory (*Manufacture Royale des Meubles de la Couronne*), Henry IV. had founded royal art workshops for all sorts of decorative work, at the Louvre; and here in 1604 a workroom was established for making Oriental carpets by the side of that which existed for making *tapis flamands*. In 1610 letters patent were granted to the Sieur Fortier, who has been reputed to be the first inventor in France of the art of making in silk and wool real Turkey and other piled carpets with grounds of gold thread, which must have been sumptuous fabrics probably resembling the so-called Polish carpets of this date. Some ten years later it is recorded that Pierre Dupont and Simon Lourdet started a pile carpet (*tapis veloutés*) manufactory at Chaillot (Paris) in large premises which had been used for the manufacture of soap—whence the name of "Savonnerie." To this converted manufactory were transferred in 1631 the carpet-makers from the Louvre, and under the direct patronage of the crown it continued its operations for many years at Chaillot. It was not until 1828 that the making of *tapis de la Savonnerie* (pile carpets of a fine velvety character) was transferred to the Hôtel des Gobelins. Here, in contradistinction to the Savonnerie, carpets are made others which, like those of Beauvais (where a manufactory of hangings and carpets was established by Colbert in 1664), are *tapis ras* or non-piled carpets, being of tapestry-weaving, as also are those made by old-established firms at Aubusson and at Felletin, where the manufacture was flourishing, at the former place in 1732 and at the latter in 1737.

Carpets made in France.

Returning now to England, there are evidences towards the end of the 17th century, if not earlier, that Walloon and Flemish makers of Turkey pile carpets had settled and set up works in different parts of the country. A protective charter, for instance, was granted in 1701 by William III. to weavers in Axminster and Wilton. The ultimate celebrity of the pile carpet industry at Wilton was due mainly to the interest taken in it during the earlier part of the 18th century by Henry, earl of Pembroke and Montgomery, who in the course of his travels abroad collected certain French and Walloon carpet-makers to work for him in Wiltshire—over them he put two Frenchmen, Antoine Dufossy and Pierre Jemale. More notable, however, than these is Père Norbert, who naturalized himself as an Englishman, changed his name to Parisot, and started a manufactory of pile carpets and a training school in the craft at Fulham about 1751. In 1753 he wrote and published "An account of the new manufactory of Tapestry after the manner of that at the Gobelins, and of carpets after the manner of that at Chaillot (*i.e.* Savonnerie) now undertaken at Fulham by Mr Peter Parisot." Two refugee French carpet-makers from the Savonnerie had arrived in London in 1750, and started weaving a specimen carpet in Westminster. Parisot, having found them out, induced the duke of Cumberland to furnish funds for their removal to better workrooms at Paddington. The carpet when finished was presented by the duke to the princess dowager of Wales. Parisot quarrelled with his two employees, enticed others to come over, and then removed the carpet works from Paddington to Fulham. A worker, J. Baptiste Grignon, writing to "Mr Parisot in Foulleme Manufactory," mentions the marked preference "shown by the English court for velvet," and how much a "chair-back he had worked in the manner of the Savonnerie had been admired." Correspondence published in the *Nouvelles Archives de l'art français* (1878) largely relates to the efforts of the French government to stop the emigration to England of workers from the Gobelins and the Savonnerie. Parisot's Fulham works were sold up in 1755. He then tried to start a manufactory at Exeter, but apparently without success, as in 1756 his Exeter stock was sold in the Great Piazza auction rooms, Covent Garden. Joseph Baretti (Dr Johnson's friend), writing from Plymouth on the 18th of April 1760, alludes to his having that morning visited the Exeter manufactory of *tapisseries de Gobelins* "founded by a distinguished anti-Jesuit—the renowned Father Nobert." Previously to this a Mr Passavant of Exeter[2] had received in 1758 a premium from the Society of Arts of London for making a carpet in "imitation of those brought from the East and called Turky carpets." Similar premiums had been awarded by the society in 1757 to a Mr Moore of Chiswell Street, Moorfields, and to a Mr Whitty of Axminster. In 1759 a society's premium was won by Mr Jeffer of Frome. In the *Transactions of the Society*, vol. i., dated 1783, it is stated that by their rewards, the manufacture of "Turky carpets is now established in different parts of the kingdom, and brought to a degree of elegance and beauty which the Turky carpets never attained." Such records as these convey a fair notion of the sporadic attempts which immediately preceded a systematic manufacture of pile carpets in this country. Whilst the Wilton industry survived, that actually

[1] The Royal Factory at Lahore was established by Akbar the Great in the 16th century.

[2] A wealthy serge-maker of Swiss nationality, who had been settled for some years in Exeter, and bought up the plant of Parisot's Exeter works. (See *Bulletin de la société de l'histoire de l'art français*, p. 97, vol. 1875 to 1878.)

carried on at Axminster died towards the end of the 18th century, and the name of Axminster like that of Savonnerie carpets now perpetuates the memory of a locally deceased manufactory, much as in a parallel way Brussels carpets seem to owe their name to the renown of Brussels as an important centre in the 15th and 16th centuries for tapestry-weaving.

Before the existence of steam-driven carpet-making machinery in England, employers, following the example set by the French, applied the Jacquard apparatus, for regulating and facilitating the weaving of patterns, to the hand manufacture of carpets. This was early in the 19th century; a great acceleration in producing English carpets occurred, severely threatening the industry as pursued (largely for *tapis ras*) at Tournai in Belgium, at Nîmes, Abbeville, Aubusson, Beauvais, Tourcoing and Lannoy in France. The severity of the competition, however, was still more increased when English enterprise, developing the inventions of Erastus B. Bigelow (1814–1879) of America and Mr William Wood of England, took the lead in perfecting Jacquard weaving carpet looms worked by steam, which resulted in the setting up of many power-loom carpet manufactories in the United Kingdom. It was not until 1880 that French pile carpet manufacturers began to adopt similar carpet power-looms, importing them from England.

Modern machinery.

These machines for weaving pile carpets, either looped (*bouclé*) as in Brussels, or cut (*velouté*) as in Wilton or Axminster carpets, were similar in all respects to such as had been in use by the important English manufacturers—Crossley of Halifax, Templeton of Glasgow, Humphreys of Kidderminster, Southwell of Bridgnorth, and others. A so-called tapestry carpet weaving-loom was invented by Richard Whytock of Edinburgh in 1832, but it was not brought to sufficient completeness for sustained manufacture until 1855. The essential feature of Mr Whytock's process was that the warp-threads were dyed and parti-coloured, in such a way that when woven the several points of colour formed the pattern of the whole fabric. Although the name "tapestry" is used, the texture of these wares has but a remote likeness to that of hand-made tapestry hangings and carpets such as those of the Gobelins and Aubusson manufactories, nor is it the same as the texture of Brussels carpets. Machine-made tapestry carpets are also called "ingrain" carpets, because the wool or worsted is dyed in the grain, *i.e.* before manufacture. Germany in her manufacture of carpets resorts chiefly to the "ingrain" process, but in common with Holland and Belgium she produces pile (looped and cut) carpets from power-looms. In the United States of America there are many similar and very important carpet manufactories; and Austria produces fine cut pile carpets (*veloutés*), the designs of which are largely derived from those of the Aubusson tapestry-woven carpets (*tapis ras*).

Lengths or pieces of felt and other substantial material are frequently made for floor and stair carpeting, and are often printed with patterns. These of course come into quite another class technically. The technological aspects of the several branches of carpet manufacture by machinery are treated in the articles on Textile-Printing and Weaving. Briefly, the products of carpet manufacture practically fall into three main divisions: (1) Pile carpets (*tapis moquettes*) which are either looped (*bouclé*) or cut (*velouté*); (2) flat surface carpets (*tapis ras*) as in hand tapestry-woven material; and (3) printed stuffs used for carpeting.

Whilst the production of carpets by steam power predominates in Europe and the United States of America, and at one time appeared to be giving the *coup de grâce* to the craft of making carpets by hand, there has been in recent times a revival in this latter, and many carpets of characteristic modern design, several of them made in England, are due to the influence of the late William Morris, who devoted much of his varied energies to tapestry weaving and pile carpet weaving by hand, both of which crafts are being fostered as cottage industries in parts of Ireland, as well as in England. At the same time leading English carpet manufactures continue to produce hand-made carpets as occasion requires. In France a much more systematic existence of tapestry weaving and pile carpet making by hand has been maintained and is of course attributable to the perennial activity of the state tapestry works in Paris (at the Gobelins workshops) and in Beauvais, and of corresponding works managed by private enterprise at Aubusson and elsewhere.

Modern hand-made carpets.

Designing patterns for English carpet manufacture is now more organized than it was, and greater thought and invention are given to devising ornament suitable to the purpose of floor coverings. Before 1850 and for a few years later, rather rude realistic representations of animals and botanical forms (decadent versions of Savonnerie designs) were often wrought in rugs and carpets, and survivals of these are still to be met with, but the lessons that have been subsequently derived from intelligent study of Oriental designs have resulted in the definite designing of conventional forms for surface patterns. The early movement in this direction owes much to the teaching of Owen Jones, and in its later and rather freer phases the Morris influence has been powerful. Schools of art at Glasgow, at Manchester, Birmingham and elsewhere in the United Kingdom have trained and continue to train designers, whose work has contributed to the formation of an English style with a new note, which, as a French writer puts it, has created a sensation in France, in Germany, in fact in all Europe and America.

France retains that facility of execution and liveliness in invention which have been nurtured for over three hundred years by systematic governmental solicitude for education in decorative design and enterprise in perfecting manufacture. Her Aubusson and Savonnerie carpets have maintained a style of design in form and colour entirely different from any that clearly throws back to Oriental principles, and many of the designs for the finer and larger of these carpets are schemed with large central oval panels, garlands of flowers and fantastic frames very much on the plan of what is frequently to be seen in the decoration of ceilings. At the same time the style called *l'art nouveau* has become developed. It largely grows from very fanciful dispositions of free-growing natural forms, as well as curiously curved and tenuous forms, many of which are bone-like and fibre-like in character, flat in treatment and rather thin and washy in colour, and its influence has slightly percolated into designs for pile carpets. This style, sometimes intermixed with the more robust, less fantastic and rather fuller-coloured English style, has found followers in England, America and Germany, but the bulk of the designs now used in power carpet looms seems to be mainly of Oriental descent.

The more important art museums in Europe contain collections of Oriental carpets, and the history of many is fairly well established. The subject has become one of serious study, the results of which have been published and elucidated by means of well-executed coloured reproductions of carpets and rugs preserved in both public and private collections.

Bibliography.—(1) *An Account of the New Manufactory of Tapestry after the manner of that at the Gobelins; and of Carpets after the manner of that at Chaillot, &c., now undertaken at Fulham, by Mr Peter Parisot* (London, Dodsley, 1753, 8vo). This is probably the only account of carpet-making in England during the 18th century; it is of peculiar interest in that respect, and as containing a statement that "the Manufacture of Chaillot is altogether of wool, and worked in the manner of Velvet. All sorts of Figures of Men and Animals may be imitated in this work; but Fruits and Flowers answer better; and the properest employment for this Art is to make Carpets and all sorts of Skreens." (2) *Essai sur l'histoire et la situation actuelle de l'industrie des tapisseries et tapis*, by W. Chocqueel (Paris, 1863). (3) Vol. xi. of *Reports on the Paris Universal Exhibition of 1867*, containing "Report on Carpets. Tapestry and other stuffs for Furniture," by Matthew Digby Wyatt, F.S.A. (1868). In reviewing the modern products shown at the exhibition, Sir Digby Wyatt discusses at some length the aesthetics of carpet design. (4) *British Manufacturing Industries*, edited by G. Phillips Bevan, "Carpets," by Christopher Fresser (London, 1876). (5) *Altorientalische Teppichmuster nach Bildern und Originalen des xv.-xvi. Jahrhunderts*, by Julius Lessing (Berlin, 1877). Numerous references are made in this illustrated work to the carpet designs that occur in paintings by Italian and Flemish masters. (6) *Eastern Carpets*, by Vincent J. Robinson, with water-colour drawings by E. Julia Robinson (London, 1882, large 4to). In this publication,

FIG. 6.—CUT PILE WORSTED CARPET, BEARING ROYAL ARMS OF ENGLAND WITH E. R. (ELIZABETH REGINA); DATE 1570.

V. 306.

FIG. 7.—VERY FINE CUT PILE PERSIAN CARPET KNOWN AS THE HOLY CARPET OF THE MOSQUE AT ARDEBIL.

CARPET

FIG. 8.—FINE CUT PILE LAHORE CARPET (*c.* 1664) BELONGING TO THE GIRDLERS' COMPANY AND PRESERVED IN THEIR HALL IN LONDON, OF PERSIAN DESIGN.

FIG. 9.—CORNER OF A CUT PILE CARPET OF PERSIAN MANUFACTURE, 16TH CENTURY.

FIG. 10.—CUT PILE CARPET OF SPANISH MANUFACTURE, EARLY 16TH CENTURY.

which precedes by nine or ten years the more learned works by Riegl and Bode, there are two examples, one ascribed to the manufactory at Alcaraz in La Mancha, and one to the supposed manufactory of the 17th century at Warsaw. By the light of later and more complete investigations Mr Robinson's ascriptions are scarcely borne out. (7) *Oriental Carpets*, by Herbert Coxon (London, 1884, 8vo). (8) *Altorientalische Teppiche*, by Alois Riegl (Leipzig, 1891); a useful book of reference (containing thirty-six illustrations) of manufacturing, archaeological and artistic interest. (9) *Jahrbuch der kunsthistorischen Sammlungen des Allerhöchsten Kaiserhauses*, vol. xiii. (Wien, 1892). Containing an important and finely illustrated article, "Ältere orientalische Teppiche aus dem Besitze des Allerhöchsten Kaiserhauses," by Alois Riegl, in the course of which comparisons are made between the designs in Persian MS. illustrations, in engraved metal work and those of carpets. (10) *Oriental Carpets*, published by the Austrian Commercial Museum (English edition by C. Purdon Clarke) (Vienna, 1892–1896). This contains a series of monographs by I. M. Stockel, Smyrna; Dr William Bode, Berlin; Vincent Robinson, London; M. Gerspach, Paris; T. A. Churchill, Tehran; Sir George Birdwood, London; C. Purdon Clarke, London; and Alois Riegl, Vienna, and a preface by A. von Scala, Vienna. (11) *Ancient Oriental Carpets*, a supplement to the above, four parts containing twenty-five plates with text (Leipzig, 1906, large folio). (12) *Vorderasiatische Knüpfteppiche aus älterer Zeit*, by Wilhelm Bode (Leipzig, 1901). This learned treatise gives *inter alia* suggestive notes upon the production of the so-called Polish carpets and of Spanish carpets. (13) *Ein orientalischer Teppich vom Jahre 1202 und die ältesten orientalischen Teppiche*, by Alois Riegl (Berlin, 1895). A coloured illustration is given of a pile curtain with a triple niche design and an Armenian inscription that it was made by "Gorzi the Artist" to the glory of the church of St Hripsime—an Armenian martyr. The date 651 appears in the inscription, but Riegl adduces valid reasons for reading it as the equivalent of A.D. 1202. Another pile carpet of conventional garden design, probably not of earlier manufacture than 14th century, is also illustrated and carefully discussed, especially in connexion with the appearance in it of well-authenticated Sassanid devices—streams with fishes and birds, &c. (14) *Report on Carpets at the Paris Exhibition of 1900*, by Ferdinand Leborgne (1901, 8vo). (15) *Oriental Rugs*, by John Kimberly Mumford (London, 1901), contains twenty-four colour-plate and autotype reproductions of rugs and eight photo-engravings of phases of the rug industry—amongst which latter are: "A Nomad Studio," "Kurdish Girls at the Loom," "Boy Weavers of Tabriz," and a "Rug Market in Iran." (16) *Rugs, Oriental and Occidental*, by Rosa Belle Holt (Chicago, 1901), well illustrated, with colour-plate reproductions of various types of rugs, including less known Chinese and Navajo specimens. (17) *The Art Workers' Quarterly*, vol. iii. No. 11, July 1904; article on the pile carpet belonging to the Worshipful Company of Girdlers of the City of London, by A. F. Kendrick, with a colour-plate of this remarkable carpet, made to the order of the master of the company in 1634 at Lahore. (18) *Journal of Indian Art and Industry: Indian Carpets and Rugs* (parts 87 to 94) (London, 1905 and 1906). Upwards of ninety-nine illustrations of many varieties of Indian and Persian carpets are given in this publication, a large number showing debased versions of fine designs, *e.g.* some from the Punjab, Warangal, Mirzapur and Elura; those from Yarkand exhibit Tatar and Chinese influences. (19) *A History of Oriental Carpets before 1800*, by F. R. Martin, published by the State Printing Office in Vienna (Bernard Quaritch, London, 1906). This contains a series of excellent reproductions in colours of Oriental carpets, many of which, being presents to kings of Sweden by the shah of Persia in the 17th century, are to be seen in the castles of Stockholm and Copenhagen—others are in the Imperial Museum at Constantinople or belong to private owners. (A. S. C.)

CARPET-BAGGER, a political slang term for a person who stands as a candidate for election in a locality in which he is a stranger. It is particularly used of such a candidate sent down by the central party organization. The term was first used in the western states of America of speculative bankers who were said to have started business with no other property than what they could carry in a carpet-bag, and absconded when they failed. The term became of general use in American politics in the reconstruction period after the Civil War, as a term of contempt for the northern political adventurers in the South who, by the help of the negro vote, gained control of the administration.

CARPET-KNIGHT, properly one who has been knighted in time of peace on the carpet before the king's throne, and not on the field of battle as an immediate reward for valour. It is used as a term of reproach for a soldier who stays at home, and avoids active service and its hardships, with a particular reference to the carpet of a lady's chamber, in which such a *fainéant* soldier lingers.

CARPI, GIROLAMO DA (1501–1556), Italian historical and portrait painter, born at Ferrara, was one of Benvenuto Garofalo's best pupils. Becoming infatuated with the work of Correggio, he quitted Ferrara, and spent several years in copying that master's paintings at Parma, Modena and elsewhere, succeeding in aping his mannerisms so well as to be able to dispose of his own works as originals by Correggio. It is probable that not a few pictures yet attributed to the great painter are in reality the work of his parasite. Da Carpi's best paintings are a Descent of the Holy Spirit, in the church of St Francis at Rovigo; a Madonna, an Adoration of the Magi, and a St Catharine, at Bologna; and the St George and the St Jerome, at Ferrara.

CARPI, UGO DA, Italian 15th-century painter, was long held the inventor of the art of painting in chiaroscuro, afterwards brought to such perfection by Parmigiano and by Baltasar Peruzzi of Siena. The researches of Michael Huber (1727–1804) and Johann Gottlob Immanuel Breitkopf (1719–1794) have proved, however, that this art was known and practised in Germany by Johann Ulrich Pilgrim (Wächtlin) and Nikolaus Alexander Mair (1450–*c.* 1520), at least as early as 1499, while the date of the oldest of Da Carpi's prints is 1518. Printing in chiaroscuro is performed by using several blocks. Da Carpi usually employed three—one for the outline and darker shadows, another for the lighter shadows, and a third for the half-tint. By means of them he printed engravings after several pictures and after some of the cartoons of Raphael. Of these a Sybil, a Descent from the Cross, and a History of Simon the Sorcerer are the most remarkable.

CARPI, a Dacian tribe established upon the lower Danube from the 1st century B.C. They rose to considerable power during the 3rd century A.D., and claiming to be superior to the Goths accordingly demanded that their incursions into Roman territory likewise should be bought off by tribute. When this was refused they invaded in force, but were beaten back by the emperor Philip. After this they joined with the Goths in their successful inroads until both nations were defeated by Claudius Gothicus. Later, after repeated defeats under Diocletian and Galerius, they were taken under Roman protection and the greater part established in the provinces of Pannonia and Moesia; some were left beyond the Danube, and they are last heard of as allies of the Huns and Sciri in the time of Theodosius I. Ptolemy speaks of Harpii and a town Harpis. This was no doubt the form the name assumed in the mouths of their Germanic neighbours, Bastarnae and Goths. (E. H. M.)

CARPI, a town and episcopal see of Emilia, Italy, in the province of Modena, 9 m. N.N.W. by rail from the town of Modena. Pop. (1905) 7118 (town), 27,135 (commune). It is the junction of a branch line to Reggio nell' Emilia via Correggio, and the centre of a fertile agricultural district. Carpi contains several Renaissance buildings of interest, the façade of the old cathedral (an early Romanesque building in origin, with some early 15th-century frescoes), the new cathedral (after 1513), perhaps the nave of S. Niccolò and a palace, all being by Baldassare Peruzzi: while the prince's palace (with a good court and a chapel containing frescoes by Bernardino Loschi of Parma, 1489–1540) and the colonnades opposite the theatre are also good. These, and the fortifications, are all due to Alberto Pio of Carpi, a pupil of Aldus Manutius, expelled in 1525 by Charles V., the principality being given to the house of Este.

CARPINI, JOANNES DE PLANO, the first noteworthy European explorer of the Mongol empire (in the 13th century), and the author of the earliest important Western work on northern and central Asia, Russian Europe, and other regions of the Tatar dominion. He appears to have been a native of Umbria, where a place formerly called Pian del Carpine, but now Piano della Magione, stands near Perugia, on the road to Cortona. He was one of the companions and disciples of his countryman St Francis of Assisi, and from sundry indications can hardly have been younger than the latter, born in 1182. Joannes bore a high repute in the order, and took a foremost part in the

propagation of its teaching in northern Europe, holding successively the offices of warden (*custos*) in Saxony, and of provincial (*minister*) of Germany, and afterwards of Spain, perhaps of Barbary, and of Cologne. He was in the last post at the time of the great Mongol invasion of eastern Europe and of the disastrous battle of Liegnitz (April 9, 1241), which threatened to cast European Christendom beneath the feet of barbarous hordes. The dread of the Tatars was, however, still on men's mind four years later, when Pope Innocent IV. despatched the first formal Catholic mission to the Mongols (1245), partly to protest against the latter's invasion of Christian lands, partly to gain trustworthy information regarding the hordes and their purposes; behind there may have lurked the beginnings of a policy much developed in after-time—that of opening diplomatic intercourse with a power whose alliance might be invaluable against Islam.

At the head of this mission the pope placed Friar Joannes, at this time certainly not far from sixty-five years of age; and to his discretion nearly everything in the accomplishment of the mission seems to have been left. The legate started from Lyons, where the pope then resided, on Easter day (April 16, 1245), accompanied by another friar, one Stephen of Bohemia, who broke down at Kanev near Kiev, and was left behind. After seeking counsel of an old friend, Wenceslaus, king of Bohemia, Carpini was joined at Breslau by another Minorite, Benedict the Pole, appointed to act as interpreter. The onward journey lay by Kiev; the Tatar posts were entered at Kanev; and thence the route ran across the Dnieper (*Neper, Nepere*, in Carpini and Benedict) to the Don and Volga (*Ethil* in Benedict; Carpini is the first Western to give us the modern name). Upon the last-named stood the *Ordu* or camp of Batu, the famous conqueror of eastern Europe, and the supreme Mongol commander on the western frontiers of the empire, as well as one of the most senior princes of the house of Jenghiz. Here the envoys, with their presents, had to pass between two fires, before being presented to the prince (beginning of April 1246). Batu ordered them to proceed onward to the court of the supreme khan in Mongolia; and on Easter day once more (April 8, 1246) they started on the second and most formidable part of their journey—"so ill," writes the legate, "that we could scarcely sit a horse; and throughout all that Lent our food had been nought but millet with salt and water, and with only snow melted in a kettle for drink." Their bodies were tightly bandaged to enable them to endure the excessive fatigue of this enormous ride, which led them across the *Jaec* or Ural river, and north of the Caspian and the Aral to the Jaxartes or Syr Darià (*quidam fluvius magnus cujus nomen ignoramus*), and the Mahommedan cities which then stood on its banks; then along the shores of the Dzungarian lakes; and so forward, till, on the feast of St Mary Magdalene (July 22), they reached at last the imperial camp called *Sira Orda* (*i.e.* Yellow Pavilion), near Karakorum and the Orkhon river—this stout-hearted old man having thus ridden something like 3000 m. in 106 days.

Since the death of Okkodai the imperial authority had been in *interregnum*. Kuyuk, Okkodai's eldest son, had now been designated to the throne; his formal election in a great *Kurultai*, or diet of the tribes, took place while the friars were at Sira Orda, along with 3000 to 4000 envoys and deputies from all parts of Asia and eastern Europe, bearing homage, tribute and presents. They afterwards, on the 24th of August, witnessed the formal enthronement at another camp in the vicinity called the Golden Ordu, after which they were presented to the emperor. It was not till November that they got their dismissal, bearing a letter to the pope in Mongol, Arabic and Latin, which was little else than a brief imperious assertion of the khan's office as the scourge of God. Then commenced their long winter journey homeward; often they had to lie on the bare snow, or on the ground scraped bare of snow with the traveller's foot. They reached Kiev on the 9th of June 1247. There, and on their further journey, the Slavonic Christians welcomed them as risen from the dead, with festive hospitality. Crossing the Rhine at Cologne, they found the pope still at Lyons, and there delivered their report and the khan's letter.

Not long afterwards Friar Joannes was rewarded with the archbishopric of Antivari in Dalmatia, and was sent as legate to St Louis. The date of his death may be fixed, with the help of the *Franciscan Martyrology* and other authorities, as the 1st of August 1252; hence it is clear that John did not long survive the hardships of his journey.

He recorded the information that he had collected in a work, variously entitled in the MSS. *Historia Mongalorum quos nos Tartaros appellamus*, and *Liber Tartarorum*, or *Tatarorum*. This treatise is divided into eight ample chapters on the country, climate, manners, religion, character, history, policy and tactics of the Tatars, and on the best way of opposing them, followed by a single (ninth) chapter on the regions passed through. The book thus answers to its title. Like some other famous medieval itineraries it shows an entire absence of a traveller's or author's egotism, and contains, even in the last chapter, scarcely any personal narrative. Carpini was not only an old man when he went cheerfully upon this mission, but was, as we know from accidental evidence in the annals of his order, a fat and heavy man (*vir gravis et corpulentus*), insomuch that during his preachings in Germany he was fain, contrary to Franciscan precedent, to ride a donkey. Yet not a word approaching more nearly to complaint than those which we have quoted above appears in his narrative. His book, both as to personal and geographical detail, is inferior to that written a few years later by a younger brother of the same Order, Louis IX.'s most noteworthy envoy to the Mongols, William of Rubrouck or Rubruquis. But in spite of these defects, due partly to his conception of his task, and in spite of the credulity with which he incorporates the Oriental tales, sometimes of childish absurdity, from which Rubruquis is so free, Friar Joannes' *Historia* is in many ways the chief literary memorial of European overland expansion before Marco Polo. It first revealed the Mongol world to Catholic Christendom; its account of Tatar manners, customs and history is perhaps the best treatment of the subject by any Christian writer of the middle ages. We may especially notice, moreover, its four name-lists:—of the nations conquered by the Mongols; of the nations which had up to this time (1245–1247) successfully resisted; of the Mongol princes; and of the witnesses to the truth of his narrative, including various merchants trading in Kiev whom he had met. All these catalogues, unrivalled in Western medieval literature, are of the utmost historical value. To the accuracy of Carpini's statements upon Mongol life, a modern educated Mongol, Galsang Gomboyev, has borne detailed and interesting testimony (see *Mélanges asiat. tirés du Bullet. Hist. Philol. de l'Acad. Imp. de St Pétersbourg*, ii. p. 650, 1856).

The book must have been prepared immediately after the return of the traveller, for the Friar Salimbeni, who met him in France in the year of his return (1247), gives us these interesting particulars:—"He was a clever and conversable man, well lettered, a great discourser, and full of a diversity of experience. . . . He wrote a big book about the Tattars (*sic*), and about other marvels that he had seen, and whenever he felt weary of telling about the Tattars, he would cause that book of his to be read, as I have often heard and seen" ("Chron. Fr. Salimbeni Parmensis" in *Monum. Histor. ad Prov. et Placent. pertinentia*, Parma, 1857).

For a long time the work was but partially known, and that chiefly through an abridgment in the vast compilation of Vincent of Beauvais (*Speculum Historiale*) made in the generation following the traveller's own, and printed first in 1473. Hakluyt (1598) and Bergeron (1634) published portions of the original work; but the complete and genuine text was not printed till 1838, when it was put forth by the late M. D'Avezac, an editorial masterpiece, embodied (1839) in the 4th volume of the *Recueil de voyages et de mémoires* of the Geographical Society of Paris.

Joannes' companion, Benedictus Polonus, also left a brief narrative taken down from his oral relation. This was first published by M. D'Avezac in the work just named.

The following four MSS. may be noticed: (1) "Corpus," *i.e.* Corpus Christi College, Cambridge, No. 181; (2) "Petau," *i.e.* Leiden University, 77 (formerly 104)—both these are certainly earlier

than 1300; (3) "Colbert," *i.e.* Paris, National Library, Fonds Lat. 2477, of about 1350; (4) "London-Lumley," *i.e.* London, British Museum, MSS. Reg. 13 A xiv., of late 13th century. Three other MSS. certainly exist; yet six more are perhaps to be found, but none of these possesses the value of those given above. Besides the editions referred to in the body of the article, we may also mention (1) P. Girolamo Golubovich, *Biblioteca bio-bibliografica della Terra Santa e dell' Oriente Francescano* (1906), vol. i. (1215–1300), pp. 190-213; (2) *William of Rubruck . . . with . . . John of Pian de Carpine*, edited by W. W. Rockhill, Hakluyt Society (1900), especially pp. 1-39; (3) C. Raymond Beazley, *Dawn of Modern Geography*, ii. (1901), 279-317, 375-380; iii. 85, 544, 553; and *Carpini and Rubruquis*, Hakluyt Society (1903), especially pp. vii.-xviii. 43-144, 249-295. (H. Y.; C. R. B.)

CARPOCRATES, a Gnostic of the 2nd century, about whose life and opinions comparatively little is known. He is said to have been a native of Alexandria and by birth a Jew. His family, however, seem to have been converted to Christianity. With Epiphanes, his son, he was the leader of a philosophic school basing its theories mainly upon Platonism, and striving to amalgamate Plato's *Republic* with the Christian ideal of human brotherhood. The image of Jesus was crowned along with those of Pythagoras, Plato and Aristotle. Carpocrates made especial use of the doctrines of reminiscence and pre-existence of souls. He regarded the world as formed by inferior spirits who are out of harmony with the supreme unity, knowledge of which is the true *Gnosis*. The souls which remember their pre-existing state can attain to this contemplation of unity, and thereby rise superior to all the ordinary doctrines of religion or life. Jesus is but a man in whom this reminiscence is unusually strong, and who has consequently attained to unusual spiritual excellence and power. To the Gnostic the things of the world are worthless; they are to him matters of indifference. From this position it easily followed that actions, being merely external, were morally indifferent, and that the true Gnostic should abandon himself to every lust with perfect indifference. The express declaration of these antinomian principles is said to have been given by Epiphanes. The notorious licentiousness of the sect was the carrying out of their theory into practice.

CARPZOV (Latinized *Carpzovius*), the name of a family, many of whose members attained distinction in Saxony in the 17th and 18th centuries as jurists, theologians and statesmen. The family traced its origin to Simon Carpzov, who was burgomaster of Brandenburg in the middle of the 16th century, and who left two sons, Joachim (d. 1628), master-general of the ordnance in the service of the king of Denmark, and BENEDIKT (1565–1624), an eminent jurist.

BENEDIKT CARPZOV was born in Brandenburg on the 22nd of October 1565, and after studying at Frankfort and Wittenberg, and visiting other German universities, was made doctor of laws at Wittenberg in 1590. He was admitted to the faculty of law in 1592, appointed professor of institutions in 1599, and promoted to the chair *Digesti infortiati et novi* in 1601. In 1602 he was summoned by Sophia, widow of the elector Christian I. of Saxony, to her court at Colditz, as chancellor, and was at the same time appointed councillor of the court of appeal at Dresden. After the death of the electress in 1623 he returned to Wittenberg, and died there on the 26th of November 1624, leaving five sons. He published a collection of writings entitled *Disputationes juridicae*.

BENEDIKT CARPZOV (1595–1666), second of the name, was the second son of the preceding, and like him was a great lawyer. He was born at Wittenberg on the 27th of May 1595, was at first a professor at Leipzig, obtained an honourable post at Dresden in 1639, became ordinary of the faculty of jurists at Leipzig in 1645, and was named privy councillor at Dresden in 1653. Among his works which had a very extensive influence on the administration of justice, even beyond the limits of Saxony, are *Definitiones forenses* (1638), *Practica nova Imperialis Saxonica rerum criminalium* (1635), *Opus decisionum illustrium Saxoniae* (1646), *Processus juris Saxonici* (1657), and others. He did much, both by his writings and by his official work, to systematize the body of German jurisprudence which had resulted from the intersection of the common law of Saxony with the Roman and Canon laws. His last years were spent at Leipzig, and his time was entirely devoted to sacred studies. He read the Bible through fifty-three times, studying also the comments of Osiander and Cramer, and making voluminous notes. These have been allowed to remain in manuscript. He died at Leipzig on the 30th of August 1666.

JOHANN BENEDIKT CARPZOV (1607–1657), fourth son of the first Benedikt, was born at Rochlitz in 1607. He became professor of theology at Leipzig in 1643, made himself chiefly known by his *Isagoge in Libros Ecclesiarum Lutheranarum Symbolicos* (published in 1665), and died at Leipzig on the 22nd of October 1657, leaving five sons, all of whom attained some literary eminence.

AUGUST CARPZOV (1612–1683), fifth son of the first Benedikt, distinguished himself as a diplomatist. Born at Colditz on the 4th of June 1612, he studied at the universities of Wittenberg, Leipzig and Jena, and in 1637 was appointed advocate of the court of justice (*Hofgericht*) at Wittenberg. Entering the service of Frederick William II., duke of Saxe-Altenburg, he took part in the negotiations which led to the peace of Westphalia in 1648, and was appointed chancellor by the duke in 1649. From 1672 to 1680 he was chief minister of Ernest I. and Frederick I., dukes of Saxe-Coburg-Gotha, and died at Coburg on the 19th of November 1683. August, who was a man of earnest piety, wrote *Der gekreuzigte Jesus* (1679) and some treatises on jurisprudence.

JOHANN GOTTLOB CARPZOV (1679–1767), grandson of Johann Benedikt, was born at Dresden in 1679. He was educated at Wittenberg, Leipzig and Altdorf, became a learned theologian, and in 1719 was appointed professor of Oriental languages at Leipzig. In 1730 he was made superintendent and first pastor at Lübeck. His most important works were the *Introductio in libros canonicos bibliorum Veteris Testamenti* (1721), *Critica sacra V.T.* (1728), and *Apparatus Historico-criticus Antiquitatum V. Test.* (1748). He died at Lübeck on the 7th of April 1767.

JOHANN BENEDIKT CARPZOV (1720–1803), great-grandson of the first Johann Benedikt, was born at Leipzig, became professor of philosophy there in 1747, and in the following year removed to Helmstädt as professor of poetry and Greek. In 1749 he was named also professor of theology. He was author of various philological works, wrote a dissertation on Mencius, and published an edition of Musaeus. He died on the 28th of April 1803.

On the family of Carpzov, see Dreyhaupt, *Beschreibung des Saalkreises*, Beilagen zu Theil 2. S. 26.

CARRANZA, BARTOLOMÉ (1503–1576), Spanish theologian, sometimes called de Miranda or de Carranza y Miranda, younger son of Pedro Carranza, a man of noble family, was born at Miranda d'Arga, Navarre, in 1503. He studied (1515–1520) at Alcalá, where Sancho Carranza, his uncle, was professor; entering (1520) the Dominican order, and then (1521–1525) at Salamanca and at Valladolid, where from 1527 he was teacher of theology. No Spaniard save Melchior Canus rivalled him in learning; students from all parts of Spain flocked to hear him. In 1530 he was denounced to the Inquisition as limiting the papal power and leaning to opinions of Erasmus, but the process failed; he was made professor of philosophy and (1533–1539) regent in theology. In 1539, as representative to the chapter-general of his order he visited Rome; here he was made doctor of theology, and while he mixed with the liberal circle associated with Juan de Valdés, he had also the confidence of Paul III. Returning to Valladolid, he acted as censor (*cualificador*) of books (including versions of the Bible) for the Inquisition. In 1540 he was nominated to the sees of Canaria and of Cusco, Peru, but declined both. Charles V. chose him as envoy to the council of Trent (1546). He insisted on the imperative duty of bishops and clergy to reside in their benefices, publishing at Venice (1547) his discourse to the council *De necessaria residentia personali*, which he treated as *juris divini*. His Lenten sermon to the council, on justification, caused much remark. He was made provincial of his order for Castile. Charles sent him to England (1554) with his son Philip on occasion of the marriage with Mary. He became Mary's confessor, and laboured earnestly for the re-establishment of the old religion, especially in Oxford.

In 1557 Philip appointed him to the archbishopric of Toledo; he accepted with reluctance, and was consecrated at Brussels on the 27th of February 1558. He was at the deathbed of Charles V. (21st of September) and gave him extreme unction; then raised a curious controversy as to whether Charles, in his last moments, had been infected with Lutheranism. The same year he was again denounced to the Inquisition, on the ground of his *Comentarios sobre el Catechismo* (Antwerp, 1558), which in 1563, however, was approved by a commission of the council of Trent. He had evidently lost favour with Philip, by whose order he was arrested at Tordelaguna (1559) and imprisoned for nearly eight years, and the book was placed on the Index. The process dragged on. Carranza appealed to Rome, was taken thither in December 1566, and confined for ten years in the castle of St Angelo. The final judgment found no proof of heresy, but compelled him to abjure sixteen errors, rather extorted than extracted from his writings, suspended him from his see for five years, and secluded him to the Dominican cloister of Sta Maria sopra Minerva. Seven days after his abjuration he died, on the 2nd of May 1576. He was succeeded in his see by the inquisitor-general, Gaspar Quiroga. Yet the Spanish people honoured him as a saint; Gregory XIII. placed a laudatory inscription on his tomb in the church of Sta Maria. His real crime was not heresy but reform. His *Summa Conciliorum et Pontificum* (Venice, 1546) has been often reprinted (as late as 1821), and has permanent value.

See P. Salazar de Miranda, *Vida* (1788); H. Laugwitz, *Bartholomäus Carranza* (1870); J. A. Llorente, *Hist. Inquisition in Spain* (English abridgment, 1826); Hefele in I. Goschler's *Dict. encyclopédique de la théol. cath.* (1858). (A. Go.*)

CARRARA, or Carraresi, a powerful family of Longobard origin which ruled Padua in the 14th century. They take their name from the village of Carrara near Padua, and the first recorded member of the house is Gamberto (d. before 970). In the wars between Guelphs and Ghibellines the Carraresi at first took the latter side, but they subsequently went over to the Guelphs. This brought them into conflict with Ezzelino da Romano; Jacopo da Carrara was besieged by Ezzelino in his castle of Agna, and while trying to escape was drowned. Another Jacopo led the Paduans in 1312 against Cangrande della Scala, lord of Verona, and though taken prisoner managed to negotiate a peace in 1318. To put an end to the perpetual civil strife the Paduans elected him their lord, and he seems to have governed well, leaving the city at his death (1324) to his nephew Marsiglio, a man famed for his cunning. But Cangrande was bent on acquiring Padua, and Marsiglio, unable to resist, gave it over to him and was appointed its governor. Cangrande died in 1319, being succeeded by his nephew Martino, and Marsiglio soon began to meditate treachery; he negotiated with the Venetians in 1336, and in the following year he secretly introduced Venetian troops into Padua, arrested Alberto della Scala, Martino's brother, then in charge of the town, and thus regained the lordship. He died in 1338, and was succeeded by his relative Ubertino, a typical medieval tyrant, who earned an unenviable notoriety for his murders and acts of treachery, but was also a patron of the arts; he built the Palazzo dei Principi, the castle of Este, constructed a number of roads and canals, and protected commerce. He died in 1345. His distant kinsman Marsiglietto da Carrara succeeded to him, but was immediately assassinated by Jacopo da Carrara, a prince famed as the friend of Petrarch. In 1350 Jacopo was murdered by Guglielmo da Carrara, and his brother Jacopino succeeded, reigning together with his nephew Francesco.

In 1355 Francesco (il Vecchio) rose against his uncle and imprisoned him. Francesco changed the traditional policy of his house by quarrelling with the Venetians, in the hope of obtaining more advantages from the Visconti of Milan. When the former were at war with Hungary over Dalmatia in 1356 and asked Carrara to help them, he refused. Their resentment was all the more bitter when at the instance of the pope he mediated between them and Hungary and brought about peace on terms unfavourable to the republic. He received Feltre, Belluno and Cividale from the Hungarian king, but in 1369 a frontier dispute led to war between him and Venice. After some defeats, Venice was victorious and dictated peace; Carrara had to pay a huge indemnity and ask the republic's pardon (1373). In 1378 he joined the league against Venice formed by Genoa, Hungary and the Scala, and took part in the siege of Chioggia. But the Venetians were victorious, and by the peace of Turin Carrara found himself in the *status quo ante*, but he bought Treviso from Austria, to whom Venice had given it in the day of her trouble. In 1385 the Venetians set the Scala against Carrara, who thereupon allied himself with the treacherous Gian Galeazzo Visconti. The Scala were expelled from Verona, but Carrara and Visconti quarrelled over the division of the spoils. Visconti was determined to capture Padua as well as Verona, and made an alliance with Venice and the house of Este for the purpose. Francesco, seeing that the situation was hopeless, surrendered to Visconti, in whose hands he remained a prisoner until his death in 1392.

Francesco Novello, his son, resisted bravely, but was compelled to surrender owing to dissensions in Padua itself. He was forced to renounce his dominions, and received a castle near Asti, but he escaped to France, and after a series of romantic adventures succeeded in making peace with Venice, who was becoming alarmed at the restless ambition and treachery of Visconti; in 1390 he raised a small armed force and seized Padua, where he was enthusiastically welcomed by the citizens, and for several years reigned there in peace. But in 1399 Visconti recommenced his wars of conquest, which were to have included Padua had not death cut short his schemes in 1402. Carrara then allied himself with Guglielmo Scala, seized Verona, and tried to capture Vicenza. But the Vicentini had always hated the Carraresi, and after a short siege gave themselves over to Venice. This led to a war between that republic and Padua, for now that Visconti was dead the Venetians had no longer any reason to protect Carrara. Padua and Verona were besieged; the latter, defended by Novello's son Jacopo, was soon captured. Novello himself, besieged in his capital, although repeatedly offered favourable terms, held out for some months hoping for help from Florence and also from certain Venetian nobles with whom he was intriguing. Hunger, plague, the treachery of his captains and internal discontent at last forced him to surrender (November 1405). He and his sons Francesco III. and Jacopo were conveyed to Venice, and at first treated with consideration; but when their intrigues with Venetian traitors for the overthrow of the republic came to light, they were tried, condemned, and strangled in prison (1406). Novello's other son Marsiglio made a desperate attempt to recover Padua in 1435, but was discovered and killed. With him the house of Carrara ceased from troubling.

Bibliography.—G. Gattaro, "Istoria Padovana," in *Muratori's Rer. It. Script.* xvii., a very full account; P. P. Vergerius, *Vitae Carrarensium, ibid.* xii., untrustworthy; Verci, *Storia della Marca Trivigiana* (Venice, 1789); P. Litta, *Le Famiglie celebri italiane*, vol. iii. (Milan, 1831); W. Lenel, *Studien zur Geschichte Paduas und Veronas im XIII. Jahrh.* (Strassburg, 1893); G. Cittadella, *Storia della Dominazione Carrarese in Padova* (Padua, 1842); and Horatio Brown's brilliant essay on "The Carraresi" in his *Studies in Venetian History* (London, 1907). (L. V.*)

CARRARA, a town of Tuscany, Italy, in the province of Massa e Carrara, 390 ft. above sea-level, 3 m. by rail N.N.E. of Avenza, which is 16 m. E.S.E. of Spezia. Pop. (1881) 26,325; (1905) town, 38,100; commune, 48,493. The cathedral (1272–1385) is a fine Gothic building dating from the period of Pisan supremacy; the other churches, and indeed all the principal buildings of the town, are constructed of the local marble, to which the place owes its importance. The Accademia di Belle Arti contains several Roman antiquities found in the quarries, and some modern works by local sculptors. A large theatre was inaugurated in 1892. Some of the quarries were worked in Roman times (see Luna), but were abandoned after the downfall of the western empire, until the growth of Pisan architecture and sculpture in the 12th and 13th centuries created a demand for it. The quarries now extend over almost the whole of the Apuan Alps, and some 600 of them are being worked, of which

345, with 4400 workmen, are at Carrara itself, and 50 (700 men) at Massa. The amount exported in 1899 was 180,000 tons. The quarries are served by a separate railway, with several branch lines.

CARREL, JEAN BAPTISTE NICOLAS ARMAND (1800–1836), French publicist, was born at Rouen on the 8th of May 1800. His father was a merchant in good circumstances, and he received a liberal education at the college of Rouen, afterwards attending the military school at St Cyr. He had an intense admiration for the great generals of Napoleon, and his uncompromising spirit, bold uprightness and independent views marked him as a man to be suspected. Entering the army as sub-lieutenant he took a secret but active part in the unsuccessful conspiracy of Belfort. On the outbreak of war with Spain in 1823, Carrel, whose sympathies were altogether with the liberal cause, sent in his resignation, and succeeded in effecting his escape to Barcelona. He enrolled himself in the foreign legion and fought gallantly against his former comrades. Near Figuières the legion was compelled to surrender, and Carrel became the prisoner of his old general, Damas. There was considerable difficulty about the terms of capitulation, and one council of war condemned Carrel to death. Fortunately some informality prevented the sentence being executed, and he was soon afterwards acquitted and set at liberty. His career as a soldier being then finally closed, Carrel resolved to devote himself to literature. He came to Paris and began as secretary to Augustin Thierry, the historian. His services were found to be of great value, and he not only obtained admirable training in habits of composition, but was led to investigate for himself some of the most interesting portions of English history. His first work of importance (he had already written one or two historical abstracts) was the *History of the Counter-Revolution in England*, an exceedingly able political study of the events which culminated in the Revolution of 1688. He gradually became known as a skilful writer in various periodicals; but it was not till he formed his connexion with the *National* that he became a power in France. The *National* was at first conducted by Thiers, Mignet and Carrel in conjunction; but after the revolution of July, Thiers and Mignet assumed office, and the whole management fell into the hands of Carrel. Under his direction this journal became the first political organ in Paris. His judgment was unusually clear, his principles solid and well founded, his sincerity and honesty beyond question; and to these qualities he united an admirable style, lucid, precise and well balanced. As the defender of democracy he had frequently to face serious dangers. He was once in Ste Pelagie, and several times before the tribunal to answer for his journal. Nor was he in less danger from private enmities. Before his last fatal encounter he was twice engaged in duels with editors of rival papers. The dispute which led to the duel with Émile de Girardin was one of small moment, and might have been amicably arranged had it not been for some slight obstinacy on Carrel's part. The meeting took place on the morning of the 22nd of July 1836. De Girardin was wounded in the thigh, Carrel in the groin. The wound was at once seen to be dangerous, and Carrel was conveyed to the house of a friend, where he died after two days' suffering.

His works, with biographical notice by Littré, were published in five volumes (Paris, 1858). A fine estimate of his character will be found in Mill's *Dissertations*, vol. i.

CARRERA, JOSÉ MIGUEL (1785–1821), the principal leader in the early fighting for the independence of Chile, was born at Santiago on the 15th of October 1785. Sent to Spain for a military career, he served in the Spanish army in the Napoleonic war, but returned to Chile in July 1811, where his vigorous character and military experience enabled him by means of a series of coup d'états to place himself at the head of the nationalist government. Though at first he laboured patriotically to establish a stable administration, to promote education, and to organize the Chilean forces, his selfish arrogant spirit produced dissensions between himself and other patriots, and it was his rivalry with Bernardo O'Higgins that led to the defeat of the nationalist forces at Rancagua in 1814. In the expedition of 1817, led by José de San Martin and Bernardo O'Higgins, which resulted in the liberation of Chile, Carrera had no share, owing to his hostility to the leaders, but he attempted to procure in the United States materials for a fresh enterprise of his own. The Argentine government, however, suspicious of his intentions, would not allow him to go to Chile, and Carrera, enraged by this treatment and by the execution of his brothers at Mendoza by the San Martin party, proceeded to organize rebellion in Argentina, but was eventually captured and shot at Mendoza on the 4th of September 1821.

See A. Valdes, *Revolucion Chilena y Campañas de la Independencia* (Santiago, 1888), which is practically a vindication of Carrera's career; also P. B. Figueroa, *Diccionario biografico de Chile, 1550-1887* (Santiago, 1888), and J. B. Suarez, *Rasgos biograficos de hombres notables de Chile* (Valparaiso, 1886), both giving biographical sketches of prominent characters in Chilean history.

CARRIAGE, a term which in its widest signification is used, as its derivation permits, for any form of "carrying"; thus, a person's "carriage" is still spoken of in the sense of the way he bears himself. But it is more specifically the general term for all vehicular structures employed for the purposes of transport of merchandise and movable goods and of human beings. Such vehicles are generally mounted on wheels, but the sledge and the litter are types of the exception to this rule. Within this definition a vast variety of forms is included, ranging from the coster's barrow and rude farm-cart up to the luxuriously appointed sleeping-cars of railways and the state carriages of royal personages. A narrower application, however, limits the term to such vehicles as are used for the conveyance of persons and are drawn by horses, and it is with carriages in this restricted sense that we are here concerned. Tramcars, railway carriages and motor-cars are dealt with in other articles.

History.—A wheeled carriage appears to have been in very general use in Egypt at an early period, called a car or chariot (*q.v.*); in the Bible the word is usually translated "chariot." The bodies of these chariots were small, usually containing only two persons standing upright. They were very light, and could be driven at great speed. They were narrow, and therefore suitable to Eastern cities, in which the streets were very narrow, and to mountainous roads, which were often only 4 ft. wide. From Egypt the use of chariots spread into other countries, and they were used in war in large numbers on the great plains of Asia. We read of the 900 chariots of Jabin, king of Canaan; how David took 700 chariots from the kings of Syria and 1000 from the king of Zobah. Solomon had 1400 chariots, and his merchants supplied northern Syria and the surrounding countries with chariots brought out of Egypt at 600 shekels (about £50) apiece. From the ancient sculptures preserved from Nineveh and Babylon, some of which are in the British Museum, we observe the use of chariots continued for the purpose of hunting as well as for war. Homer describes the chief warriors on both sides at the siege of Troy as going into battle and fighting from their chariots. The Roman nation as it increased in power adopted the car, though chiefly for purposes of show and state. A beautiful marble model of one of these still exists at the Vatican in Rome: a copy of it and the horses drawing it is in the museum at South Kensington. The war chariots used by the Persians were larger; the idea seems to have been to form a sort of turret upon the car, from which several warriors might shoot or throw their spears. These chariots were provided with curved blades projecting from the axle-trees. Alexander the Great, king of Macedon, invading Asia was met upon the banks of the river Indus by King Porus, in whose army were a number of elephants and also several thousand chariots. On Alexander's return from India towards Persia, he travelled in a chariot drawn by eight horses, followed by an innumerable number of others covered with rich carpets and purple coverlets. After Alexander's death a funeral car was prepared to convey his body from Babylon to Alexandria in Egypt, and this car has perhaps never been excelled in the annals of coach-building. It was designed by the celebrated architect Hieronymus, and took two years to build. It was 18 ft. long and 12 ft. wide, on four massive wheels, and drawn by sixty-four mules, eight abreast. The car was composed

of a platform, with a lofty roof, supported by eighteen columns, and was profusely adorned with drapery, gold and jewels; round the edge of the roof was a row of golden bells; in the centre was a throne, and before it the coffin; around were placed the weapons of war and the armour that Alexander had used.

The Romans established the use of carriages as a private means of conveyance, and with them carriages attained great variety of form as well as richness of ornamentation. In all times the employment of carriages depended greatly on the condition of the roads over which they had to be driven, and the establishment of good roads, such as the Appian Way, constructed 331 B.C., and others, greatly facilitated the development of carriage travelling among the Romans. In Rome itself, and probably also in other large towns, it was necessary to restrict travelling in carriages to a few persons of high rank, owing to the narrowness and crowded state of the streets. For the same reason the transport of goods along the streets was forbidden between sunrise and sunset. For long journeys and to convey large parties the *reda* and *carruca* appear to have been mostly used, but what their construction and arrangements were is not known. During the empire the carriage which appears in representations of public ceremonials is the *carpentum*. It is very slight, with two wheels, sometimes covered, and generally drawn by two horses. If a carriage had four horses they were yoked abreast, among the Greeks and Romans, not in two pairs as now. From the *carruca* are traced the modern European names,—the English *carriage*, the French *carrosse* and the Italian *carrozza*. The *sirpea* was a very ancient form of vehicle, the body of which was of osier basket-work. It originated with the Gauls, by whom it was named *benna*, and by them it was employed for the conveyance of persons and goods in time of peace, and baggage during war. With its name are connected the modern French *banne*, *banneton*, *vannerie* and *panier*,—all indicating basket-work.

The ancient Britons used a car for warlike purposes which was evidently new to the Romans. It was open in front, instead of at the back as in their cars; and the pole, which went straight out between the horses, was broad, so that the driver could walk along, and if needful drive from the end. Above all, it possessed a seat, and was called *essedum* from this peculiarity. For war purposes this car was provided with scythes projecting from the ends of the axle-trees. Cicero, writing to a friend in Britain, remarks "that there appeared to be very little worth bringing away from Britain except the chariots, of which he wished his friend to bring him one as a pattern."

The Roman vehicles were sometimes very splendidly ornamented with gold and precious stones; and covered carriages seem more and more to have become appendages of Roman pomp and magnificence. Sumptuary laws were enacted on account of the public extravagance, but they were little regarded, and were altogether abrogated by the emperor Alexander Severus. Suetonius states that Nero took with him on his travels no less than a thousand carriages.

On the introduction of the feudal system the use of carriages was for some time prohibited, as tending to render the vassals less fit for military service. Men of all grades and professions rode on horses or mules, and sometimes the monks and women on she-asses. Horseback was the general mode of travelling; and hence the members of the council, who at the diet and on other occasions were employed as ambassadors, were called *Rittmeister*. In this manner also great lords made their public entry into cities.

Covered carriages (see COACH) were known in the beginning of the 15th century, but their use was confined to ladies of the first rank; and as it was accounted a reproach for men to ride in them, the electors and princes sometimes excused their non-attendance at meetings of the state by the plea that their health would not permit them to ride on horseback. Covered carriages were for a long time forbidden even to women; but about the end of the 15th century they began to be employed by the emperor, kings and princes in journeys, and afterwards on state occasions. In 1474 the emperor Frederick III. visited Frankfort in a close carriage, and again in the following year in a very magnificent covered carriage. Shortly afterwards carriages began to be splendidly decorated; that, for instance, of the electress of Brandenburg at the tournament held at Ruppin in 1509 was gilded all over, and that of the duchess of Mecklenburg was hung with red satin. When Cardinal Dietrichstein made his entrance into Vienna in 1611, forty carriages went to meet him; and in the same year the consort of the emperor Matthias made her public entrance on her marriage in a carriage covered with perfumed leather. The wedding carriage of the first wife of the emperor Leopold, who was a Spanish princess, cost, together with the harness, 38,000 florins. Those of the emperor are thus described: "In the imperial coaches no great magnificence was to be seen; they were covered over with red cloth and black nails. The harness was black, and in the whole work there was no gold. The panels were of glass, and on this account they were called the imperial glass coaches. On festivals the harness was ornamented with red silk fringes. The imperial coaches were distinguished only by their having leather traces; but the ladies in the imperial suite were obliged to be contented with carriages the traces of which were made of ropes." At the magnificent court of Duke Ernest Augustus at Hanover, in 1681, there were fifty gilt coaches with six horses each. The first time that ambassadors appeared in coaches on a public solemnity was at the imperial commission held at Erfurt in 1613. Soon after this time coaches became common all over Germany, notwithstanding various orders and admonitions to deter vassals from using them. These vehicles appear to have been of very rude construction. Beckmann describes a view he had seen of Bremen, painted by John Landwehr in 1661, in which was represented a long quadrangular carriage, apparently not suspended by straps, and covered with a canopy supported by four pillars, but without curtains. In the side was a small door, and in front a low seat or box; the coachman sat upon the horses; and the dress of the persons within proved them to be burgomasters. At Paris in the 14th, 15th and even 16th centuries, the French monarchs rode commonly on horses, the servants of the court on mules, and the princesses and principal ladies sometimes on asses. Persons even of the highest rank sometimes sat behind their equerry on the same horse. Carriages, however, were used at a very early period in France; for there is still extant an ordinance of Philip the Fair, issued in 1294, by which citizens' wives are prohibited from using them. It appears, however, that about 1550 there were only three carriages at Paris,—one belonging to the queen, another to Diana of Poitiers, and the third to René de Laval, a very corpulent nobleman who was unable to ride on horseback. The coaches used in the time of Henry IV. were not suspended by straps (an improvement referred to the time of Louis XIV.), though they were provided with a canopy supported by four ornamental pillars, and with curtains of stuff or leather.

Occasional allusion is made to the use of some kinds of vehicles in England during the middle ages. In *The Squyr of Low Degree*, a poem of a period anterior to Chaucer, a description of a sumptuous carriage occurs:

> "To-morrow ye shall on hunting fare
> And ride, my daughter, in a chare.
> It shall be cover'd with velvet red,
> And cloth of fine gold all about your head,
> With damask white and azure blue
> Well diaper'd with lilies new."

Chaucer himself describes a chare as

> "With gold wrought and pierrie."

When Richard II. of England, towards the end of the 14th century, was obliged to fly before his rebellious subjects, he and all his followers were on horseback, while his mother alone used a carriage. The oldest carriages used in England were known as chares, cars, chariots, caroches and whirlicotes; but these became less fashionable when Ann, the wife of Richard II., showed the English ladies how gracefully she could ride on the side-saddle, Stow, in his *Survey of London*, remarking, "so was riding in those whirlicotes and chariots forsaken except at coronations and such like spectacles."

There were curious sumptuary laws enacted during the 16th century in various Italian cities against the excessive use of silk, velvet, embroidery and gilding, on the coverings of coaches and the trappings of horses. In 1564 Pope Pius IV. exhorted the cardinals and bishops not to ride in coaches, according to the fashion of the times, but to leave such things to women, and themselves ride on horseback. The use of coaches in Germany in the 16th century was not less common than in Italy. The current of trade, especially from the East, had for a long time poured into those two countries towards Holland, enriching all the cities in its progress. Macpherson, in his *History of Commerce*, says that Antwerp possessed 500 coaches in 1560. France and England appear to have been behind the rest of Europe at this period.

The first coach in England was made in 1555 for the earl of Rutland by Walter Rippon, who also made a coach in 1556 for Queen Mary, and in 1564 a state coach for Queen Elizabeth. That one of the carriages used by Queen Elizabeth could be opened and closed at pleasure may be inferred from her causing at Warwick during one of her progresses—"every part and side of her coach to be opened that all her subjects present might behold her, which most gladly they desired."

Coaches of the type now properly so-called were first known in England about the year 1580, and were introduced, according to Stow, from Germany by Henry Fitzalan, 12th earl of Arundel. By the beginning of the 17th century the use of coaches had become so prevalent in England that in 1601 the attention of parliament was drawn to the subject, and a bill "to restrain the excessive use of coaches" was introduced, which, however, was rejected on the second reading. Their use told severely on the occupation of the Thames watermen, and Taylor the poet and waterman complained bitterly both in prose and verse against the new-fangled practice:—

> "Carroaches, coaches, jades, and Flanders mares
> Doe rob us of our shares, our wares, our fares.
> Against the ground we stand and knock our heels
> Whilest all our profit runs away on wheeles."

The sneers of wits and watermen notwithstanding, coaches became so common, that in the early part of the 17th century they were estimated to number more than 6000 in London and its surrounding country.

We now arrive gradually at the modern conception of carriage-building. No trace of glass windows or complete doors for coaches seems to have existed up to 1650. But plain and rude as was the first coach of Louis XIV., it was in his reign, which lasted till 1715, that the most rapid progress was made. The credit for this is equally due to Germany, Italy, France and England. There is very little mention made by historians of steel springs, but they were first applied to wheel carriages about 1670, prior to which bodies were suspended by long straps from the four corners to pillars erected upon the under carriage. The great advantage of the introduction of springs was speedily recognized as reducing vibration, enabling carriages to be built much lighter and lessening the draught for the horses. In the diary of Samuel Pepys there are many amusing and interesting references to the art of coach-building, which was beginning to attract much attention at that period.

In the French *Encyclopédie* (1772) by Diderot there are elaborate descriptions of the art of coach-building, the workshops and tools used, and plates of the different carriages in use. The 18th century is remarkable for the rapid development which took place, more especially in the manufacture of state carriages of a sumptuous and ornate character, which were largely in demand by the various courts of Europe. One of the most beautiful of these is that belonging to the imperial family of Vienna, which was built in 1696, and is shaped with all the curves that are familiar to us in cabinets and furniture of the style of Louis XIV. The panels are beautifully painted with nymphs in the style of Rubens. There is an unusual quantity of plate glass in the panels, and on the centre of the roof is a large imperial crown. In 1757 was built the elaborate state coach of the city of London, and in 1761 the royal state coach of England, built for King George III. (see COACH). During the reigns of George II. and George III. all English manufactures had received an immense impulse from the energy of the men of the time, in which they were much encouraged by the action of the Society of Arts in offering money prizes for improvements; and in these coach-builders largely participated.

In the year 1804 Obadiah Elliot patented his plan for hanging vehicles upon elliptical springs, thus dispensing with the heavy wood and iron perch and cross beds, invariably used in four-wheeled carriages up to that time. Elliot was rewarded by the grant of a gold medal by the Society of Arts, and extensive orders for the carriages of a lighter character, which he was thus enabled to produce.

Of carriages much in fashion and characteristic of this period may be mentioned the "curricle," a cabriolet (see below) on two wheels, driven with a pair of horses, the balance being secured by an ornamental bar across the horses' backs, connected by a leather brace to a spring under the pole. For lack of perfect safety this was gradually superseded by the "gentleman's cabriolet," for one horse, on C springs, fitted with folding leather hood and platform behind, on which stood a youthful trim servant in top-boots, popularly termed a "tiger." To produce this satisfactorily, the best coach-building talent was required, and to work it a horse of exceptional strength and breeding was needful, but when complete this equipage had a distinction never surpassed. During this period the pair-horse "mail phaeton" was introduced, and has enjoyed a long period of popularity. As a travelling carriage with the needful appointments the "britzska," having a straight body with ogee curves at front and back, with single folding hood, and hung on C springs, was a distinctive and popular feature among carriages of the period from 1824 until after 1840. Of two-wheeled vehicles the "stanhope" and "tilbury" gigs, the "dog cart" and "tandem cart," came into use during these years, and have afforded facilities of agreeable locomotion to many thousands of people at a moderate cost. But the greatest improvement of this period was the introduction of the "brougham." Several attempts had been made to arrive at a light carriage of this description, but it was not until 1839 that a carriage was produced to a design adopted by Lord Brougham, and called after him. The "victoria" was known as a carriage for public hire in continental cities for several years before being adopted as a fashionable carriage by the wealthy classes. In 1869 the prince of Wales brought one from Paris of the cab shape, and Baron Rothschild brought one from Vienna of the square shape, examples speedily followed. In various elegant and artistic forms, either as an elliptic or C spring, it has since become a most popular and convenient carriage.

Public carriages for hire, or hackney (*q.v.*) coaches, were first established in London in 1625. In 1635 the number was restricted to fifty. Still they increased, notwithstanding the opposition of the court and king, who thought they would break up the roads, till in 1650 there were as many as 300. In Paris they were introduced during the minority of Louis XIV. by Nicholas Sauvage, who lived in the rue St Martin at the sign of St Fiacre, from which circumstance hackney carriages in Paris have since been called *fiacres*. In 1694 the number in London had increased to 700. Many of these were old private coaches of the nobility and gentry, and it was not until 1790 that coaches on a smaller scale were built specially for hackney purposes (see COACH).

We are told that in 1673 there were stage coaches from London to York, to Chester and to Exeter, having each forty horses on the road, and carrying each six inside-passengers. The coach occupied eight days travelling to Exeter. In 1706 a coach went from London to York every Monday, Wednesday and Friday, performing the journey in four days. In the same year there was a coach from London to Birmingham starting on Monday and arriving on Wednesday. In 1754 a coach was started from Manchester called the flying coach, which was advertised to reach London in four days and a half. In 1784 coaches became universal at the speed of 8 m. an hour.

In the year 1786 the prince of Wales, afterwards George IV., began to erect the pavilion at Brighton, and this led to a great increase of traffic, so that in 1820 no less than 70 coaches daily visited and left Brighton. The number continued to increase, until in 1835 there were as many as 700 mail coaches throughout Great Britain and Ireland. The system of road construction introduced by Mr McAdam during this time was of great value in facilitating this development.

Notwithstanding the competition of the sedan-chair (*q.v.*), the hackney-coach held its place and grew in importance, till it was supplanted about 1820 by the *cabriolet de place*, now shortened into "cab" (*q.v.*), which had previously held a most important place in Paris. In that city the cabriolet came into great public favour about the middle of the 18th century, and in the year 1813 there were 1150 such vehicles plying in the Parisian streets. The original cabriolet was a kind of hooded gig, inside which the driver sat, besides whom there was only room left for a single passenger. For hackney purposes Mr Boulnois introduced a four-wheeled cab to carry two persons, which was followed by one to carry four persons, introduced by Mr Harvey, the prototype of the London "four-wheeler."

The hansom patent safety cab (1834) owes its invention to J. A. Hansom (*q.v.*), the architect of the Birmingham town-hall. This has passed through many stages of improvement with which the name of Forder of Wolverhampton is conspicuously associated.

The prototype of the modern "omnibus" first began plying in the streets of Paris on the 18th of March 1662, going at fixed hours, at a stated fare of five sous. Soldiers, lackeys, pages and livery servants were forbidden to enter such conveyances, which were announced to be *pour la plus grande commodité et liberté des personnes de mérite.* In the time of Charles X. the omnibus system in reality was established; for no exclusion of any class or condition of person who tendered the proper fare was permitted in the vehicles then put on various routes, and the fact of the carriages being thus "at the service of all" gave rise to the present name. The first London omnibus was started in July 1829 by the enterprising Mr Shillibeer. The first omnibuses were drawn by three horses abreast and carried twenty-two passengers, all inside. Though appearing unwieldy they were light of draught and travelled speedily. They were, however, too large for the convenience of street traffic, and were superseded by others carrying twelve passengers inside. In 1849 an outside seat along the centre of the roof was added. The London General Omnibus Company was founded in 1856; since then continual improvements in this system of public conveyance have been introduced.

Modern Private Carriages.—At the accession of Queen Victoria the means of travelling by road and horse-power, in the case of public coaches, had reached in England its utmost limits of speed and convenience, and the travelling-carriages of the nobility and the wealthy were equipped with the completest and most elaborate contrivances to secure personal comfort and safety. More particularly was this the case as regards continental tours, which had become indispensable to all who had at their command the means for this costly educational and pleasurable experience. Concurrently with this development the style and character of court equipages had also reached a consummate degree of splendour and artistic excellence. Not only was this the case in points of decoration, in which livery colour and heraldic devices were effectively employed, but also in the beauty of outline and skilful structural adaptation, in which respect carriages of that period made greater demands upon the capacity of the builder and the skill of the workman than do those of the present day. For this attainment the art of coachmaking was indebted to a very few leading men, whose genius has left its impress upon the art, and is still jealously cherished by those who in early life had experience of their achievements. The early portion of Queen Victoria's reign was an age of much emulation; the best-equipped carriages of that period, distinctive of noble families and foreign embassies, with their graceful outline and superb appointments, and harnessed to a splendid breed of horses—all harmoniously blended, perfect in symmetry and adaptation—gave to the London season, more especially on drawing-room days, and at other times in Hyde Park, an attractiveness unequalled in any other capital. After the death of the prince consort, the pageantry of that period very much declined and, except as an appendage of royalty, full-dress carriages have since been comparatively few, though there are hopes of a revival in this direction. Meanwhile, owing to the rapid development of railways and the wide extension of commerce, the demand for carriages greatly increased. The larger types gave place to others of a lighter build and more general utility, in which in some cases an infusion of American ideas made its appearance. In accordance with the universal rule of supply meeting the demand, Mr Stenson, an ironmaster of Northampton, was successful in producing a mild forging steel, which proved for some years, until the manufacture ceased, very conducive to the object of securing lightness with strength. In the early 'seventies the eminent mechanician, Sir Joseph Whitworth, in the course of his scientific studies in the perfecting of artillery, succeeded in manufacturing a steel of great purity, perfectly homogeneous and possessing marvellous tenacity and strength, known as "fluid compressed steel." Incidentally carriage-building was able to participate in the results of this discovery. Two firms well known to Sir Joseph were asked to test its merits as a material applicable to this industry. In this test much difficulty was experienced, the nature of the steel not being favourable to welding, of which so much is required in the making of coach ironwork; but after much perseverance by skilful hands this was at length accomplished, and for some years there existed not a little rivalry in the use of this material, more especially in the case of carriages on the C and under-spring principle, which for lightness, elegance and luxurious riding left nothing to be desired. Many of these carriages may be referred to to-day as rare examples of constructive skill. Unfortunately, the original cost of the material, still more of the labour to be expended upon it, and the difficulty of educating men into the art of working it, were effectual barriers to its general adoption. The idea, however, had taken hold, and attention was given by other firms to the manufacture of the steel now in general use, admitting of easier application, with approximate, if not equal, results.

From C and under-spring carriages there arose another application of springs which was very prominently before the public during this period, by means of which it was professed that two drawbacks recognized in the C and under-spring carriages were obviated, which were caused by the perch or bar which passes under the body holding the front and hind parts in rigid connexion, and yet making use of a form of spring to which the same terms may be applied. These objections are the weight of the perch, and the limitation which it causes to the facility of turning, which in narrow roads and crowded thoroughfares is an inconvenience. The objection to weight is, however, minimized by the introduction of steel, and as the more advanced builders almost always construct the perch with a

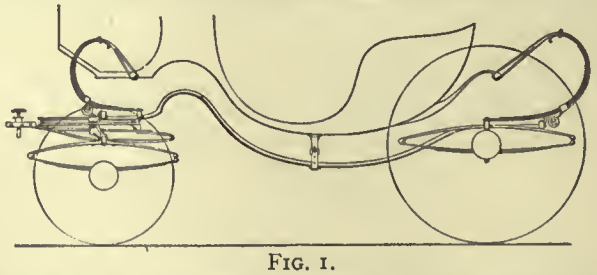


FIG. 1.

forked arch in front, allowing the wheels to pass under, the difficulty of a limited lock is in a great measure overcome (fig. 1). It must be noted, however (and this cannot be too emphatically stated), that the so-called C springs above referred to are not at all the same in action as the C spring proper; they are but an elongation of the ordinary elliptic spring in the form of the letter C (fig. 2), without adding anything to, but rather lessening their elasticity, and entirely ignoring the principle of *suspension*

by leather braces over the C spring proper, by which alone the advantage of superior ease is to be obtained.

Another improvement which stamps the period under review is the introduction of indiarubber for the tires of wheels. To produce a carriage as nearly as possible free from noise and rattle has always been the aim of high-class coachmaking. A structure composed of wood, iron and glass, with axle-trees,

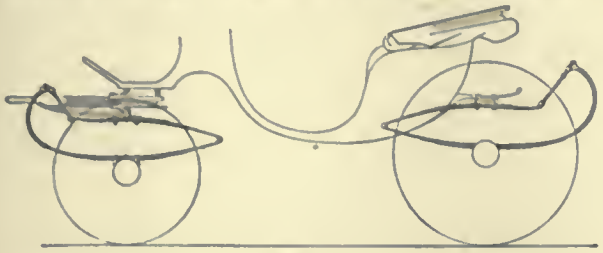


FIG. 2.

doors, windows, lamps and other parts, in use upon the road in all weathers, must from time to time require some attention with this object. To meet this difficulty, the introduction of indiarubber has been received by carriage-users as a great boon. It was about the year 1852 that Mr Reading, who at that time was known as a builder of invalid carriages, conceived the idea of encircling wheels with that material, but his method only admitted of its use on vehicles travelling slowly over good roads. This was improved upon at a later date by Uriah Scott, who, taking advantage of the tempering capacity of indiarubber by the chemical action of sulphur, produced an inner rim of such density as to hold bolts, by which it could be secured through the felloe, forming a base for the outer covering of soft pliable rubber. This system was attended with satisfactory results, and was in favour for some years with persons whose health needed such provision. Another method, originated by Mr Mulliner of Liverpool in the early 'seventies, was to screw on iron flanges to the outer and inner sides of the felloes, having a kind of lip to press into the indiarubber filling the intervening space; but the cost of this—£36 per set—rendered its adoption prohibitive. Meanwhile another invention by Uriah Scott, afterwards improved upon by an American patentee, came into use; this was known as the "rubber-cushioned axle," cylindrical rings being introduced between the axle-box and hub of the wheel, thus insulating the body of the carriage from the concussion of the road. This, however, necessitated the cutting away of so much of the timber of the hub as to impair its durability, and had, therefore, after a few years' experience, to be abandoned in favour of an invention by a Parisian builder, who introduced indiarubber bearings between the spring and axle-tree. This was thoroughly practicable, and met with general acceptance, and it is still used in conjunction with iron and steel tires. In 1890 the pneumatic tire was first applied to road carriages. Its bulky appearance is a great drawback, contrasting strongly with the qualities which distinguish a graceful equipage; and in spite of its practical advantages it never became popular in England or America. In Paris and its neighbourhood and many parts of France, pneumatic tires are to be seen in frequent use both on public and private conveyances. In another form the indiarubber tire has become of almost universal application. Owing to an ingenious invention of Mr Carment, what appeared to be an insuperable difficulty in rolling a grooved tire was overcome (fig. 3). This so simplified the application as to bring the cost within practicable limits. The grooved tire is now made in several sections, in some of which the inward projection for securing the rubber is dispensed with, this being kept in position by wires running through the whole length, and electrically welded at the point of contact. Whatever be the method chosen for securing the tire, the best tires, both for durability and ease, are those in which the rubber provided is most resilient in its nature.

FIG. 3.

For the lifting and lowering of the hoods of victorias and other such carriages, and the opening and closing of landaus, there are now many automatic contrivances, of which the simplest are the most to be preferred. The quarter-light or five-glass landau is a carriage which has been greatly improved. The complicated adjustments of pillars, windows and roof have been replaced by one simple parallel movement. The first public exhibition of a finished carriage on this principle was by an English firm at the Paris Exhibition of 1876 (fig. 4).

In the matter of style certain types of carriages have passed through marked changes. Extreme lightness was at one time considered by many the one desideratum both as to appearance and actual weight, in providing which ease of movement and comfortable seating of the occupants became secondary considerations—though to these extremes builders of repute were always opposed. Still, when at the International Exhibition of Paris 1889, it was seen that the Parisian builders had suddenly gone in the opposite direction, the world of fashion in carriages was taken by surprise. From being built upon easy, flowing, graceful lines, it was seen, with some revulsion of feeling, that

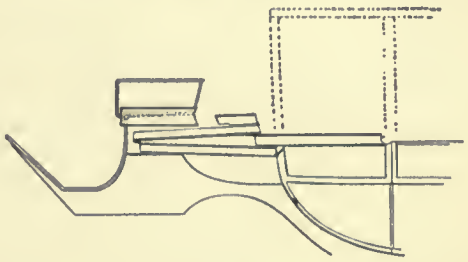


FIG. 4.

these were to be displaced by the deep, full-bodied victoria, brougham and landau. Only by slow degrees did this characteristic find acceptance with English connoisseurs, and then only in a modified form, though eventually in a greater or less degree it is now the prevailing style.

While the better types of English carriages are still pre-eminent in their constructive qualities, and represent the well-known characteristics of individual firms, some emulation may be excited by the elegant taste and careful workmanship which French builders display in points of finish, both internally and externally. Of the various types of carriages now in vogue, the victoria, in its many varieties of form, is the most popular, accompanied, as of necessity, by the double victoria, sociable, brougham, landaulet and landau. Four-in-hand coaches for private use, as well as the "road" coaches, are built on a smaller scale than formerly; 6 ft. 8 in. may now be taken as the standard height of the roof from the ground. Owing to the encouragement given by the Four-in-hand and Coaching Clubs, the ascendancy of this style of driving is still preserved to Great Britain; and in association with it the char-à-banc, mail phaeton, wagonette, and four-wheel dog-cart retain their popularity. Of two-wheeled vehicles the polo-cart and ralli-cart are most in favour, to which may be added the governess-car, which is found convenient for many purposes not implied by its name. For a few years an effort was made, but with very indifferent success, to bring into fashion the tandem-cart, which may again be considered almost obsolete in England.

America has long held a prominent position in connexion with the carriage industry. In all the chief cities manufactories on a colossal scale are to be found, producing thousands of vehicles annually and equipped with the most perfect labour-saving machinery; and as vehicles of any particular pattern—many of small value—are required, not singly, but in large numbers, much economy is exercised in their manufacture. It is remarkable that, as a contrast to the popular buggy, wagon and rockaway of the United States, which are to be found in infinite variety, carriage establishments of the wealthy are not considered complete unless furnished with some of a European character, selected from the

most eminent firms of London or Paris, in addition to others of their own manufacture. In Paris preference is given to an excess of bulk, with elaborate scroll ornamentation and diminutive windows, forming indeed, by reason of its exaggeration, a distinctive class. In respect of workmanship and finish, carriages by the best-known American builders leave nothing to be desired.

The International Exhibition of Paris 1900 brought together examples from various continental countries, in some of which a preference for curvilinear outline was displayed, but the best examples followed very closely the well-known English styles. In the French section it was interesting to find a revival of the once all-prevailing chariot, barouche and britzska, suspended on C and under-springs, with perch, but with ideas of lightness somewhat out of proportion to their general character.

Coach-making, or the carriage-manufacturing industry, is a combination of crafts rarely united in one trade, embracing as it does work in such divers materials as wood, iron, steel, brass, cloth, silk, leather, oils and colours, glass, ivory, hair, indiarubber, &c. Many divisions of labour and numerous highly-skilled artisans are consequently employed in the various stages in the construction of a high-class carriage. The workmen include body-makers, who build up the parts in which persons sit; carriage-makers, who make and fit together all the under parts of the vehicle on which the body rests; wheelwrights, joiners and fitters; several classes of smiths, for special work connected with the strengthening of the body framework by means of long edge plates, the construction of under works, tiring and wheels, manufacture of springs, axle-trees, &c. Painting is an important part of the business, those professing it being divided into body, carriage and heraldry painters. Trimmers are needed who fit up the upholstery of the interior, and budget trimmers who sew on the patent leather covering to dasher wings, &c.

A very great deal in the coach-making industry depends upon the selection of materials. Ash is the kind of wood required in the framework both of body and carriage. The quality best suited for the body is that of full-grown mild and free nature; for the carriage that which is strong and robust; that for carriage-poles should be of younger growth, straight and tough in quality. An important consideration is the seasoning of this timber. Planks of various thicknesses are required, varying from 1½ in. to 6 in., the time required for seasoning being one year for every inch of thickness. After the framework is made, the body is panelled with ¼ in. mild Honduras mahogany, plain and free from grain, every joint and groove carefully coated with ground white lead to exclude water. The roof is covered with ¼ in. wide pine boards, unless when superseded by an American invention, by which, in order to obtain the needful width frequently of 5 ft. or upwards, boards are cut from the circumference of the tree, instead of through its diameter; three thicknesses of very thin wood are then glued together under pressure, the grain of the centre running across the outer plies, the whole forming a solid covering without joints. Birch and elm of 1 in. thickness also enter into the construction in many carriages; for floor and lining boards pine is the material used.

Wheel-making is a very important branch of the business, in which, owing to the increased lightness now required, many modern improvements have been introduced. The timber used in an ordinary carriage wheel is wych elm for the naves, heart of oak for the spokes, and ash for the felloes. American hickory has of late years been also largely used for spokes in exceptionally light wheels, as well as the American method of making the rim in two sections of straight-grained ash or hickory bent to the required circle. This method has much to recommend it, more especially for wheels with indiarubber tires, in which the wood felloes are not required to be nearly so deep as for steel tires. One well-known feature in light wheels is the "Warner nave," which is a solid iron casting with mortices to receive the spokes, and being of small diameter gives the wheel a light appearance.

For springs the finest quality of steel is made from Swedish ore, but the ordinary English spring steel by the best makers leaves nothing to be desired. To secure the most perfect elasticity it is important that the tapering down of the ends of each plate should be done by hand labour on the anvil, and that the plates should not be more than ¼ in. in thickness. To obtain cheapness wholesale spring-makers adopt the method of squeezing the ends of spring plates between eccentric rollers, and so produce the tapered form, which, however, is too short and gives a lumpy and unsightly appearance to the spring when put together, so that by this they lose much of their pliability.

The iron mounting of coach work requires the skill of experienced smiths, and gives scope for much taste and judgment in shaping the work, and providing strength suited to the relative strain to which it will be subjected. Axle-trees are not made by coach-builders, but by firms who make it their special business. They are of two kinds, the "mail," which are secured to the wheel by three bolts passing through the nave, and the "collinge" (invented in 1792), the latter made secure by gun-metal cone-shaped collets and nuts. The axle boxes which are wedged into the nave are of three kinds, cast, chilled and wrought iron, in all cases case-hardened, the first being the cheapest and the last the most costly. Many attempts have been made to improve upon the collinge axle-tree, but none of them has got far beyond the experimental stage.

No branch of coach-building contributes more to the elegance of the vehicle than that of painting. To obtain the needful perfection the work has to pass through several stages before reaching the finishing colour, which must be of the finest quality. The varnish used is copal, of which there are two kinds, the one for finishing the body, the other the carriage. In first-class work as many as eighteen or twenty coats will be required to complete the various stages. After a carriage has been in use about twelve months, it is practicable to revive the brilliant gloss on the panels by hand-polishing with the aid of rottenstone and oil, a process which requires a specially trained man to do successfully.

The trimming of the interior of a carriage requires much skill and judgment on the part of the workmen in providing really comfortable, well-fitted seats and neatness of workmanship. In the middle of the 19th century figured tabaret or satin were much used, but for many years past morocco has been almost universally preferred. Silk lutestring spring curtains, Brussels or velvet pile carpet, complete the interior, unless are added neat morocco covered trays with mirror, &c., for ladies' convenience. Electric light is now frequently used for the interior, and can be applied with much neatness and efficiency. Road lamps, door handles, polished silver or brass furniture, are supplied to the coach-builder by firms whose special business it is to make them. Lever brakes are now a very ordinary requirement. Much judgment is needful to make them efficient, and careful workmanship to prevent rattle. Indiarubber is the best material for blocks applied to steel tires, and cast iron for indiarubber tires. The "Bowden wire" recently introduced is in some cases a convenient and light alternative to the long bar connecting the handle with the hind cross levers, and has the advantage of passing out of sight through the interior of the body. (J. A. M'N.)

CARRICKFERGUS, a seaport and watering-place of Co. Antrim, Ireland, in the east parliamentary division; on the northern shore of Belfast Lough, 9½ m. N.E. of Belfast by the Northern Counties (Midland) railway. Pop. of urban district (1901) 4208. It stretches for about 1 m. along the shore of the Lough. The principal building is the castle, originally built by John de Courci towards the close of the 12th century, and subsequently much enlarged. It stands on a projecting rock above the sea, and was formerly a place of much strength. It is still maintained as an arsenal, and mounted with heavy guns. The ancient donjon or keep, 90 ft. in height, is still in good preservation. The town walls, built by Sir Henry Sidney, are still visible on the west and north, and the North Gate remains. The parish church of St Nicholas, an antiquated cruciform structure with curious Elizabethan work in the north transept, and monuments of the Chichester family, was originally a chapel or oratory dependent on a Franciscan monastery. The entrance to a subterranean passage between the two establishments is still visible under the communion-table of the church. The gaol, built on the site of the monastery above mentioned, was formerly the county of Antrim prison. The court-house, which adjoins the gaol, is a modern building. The town has some trade in domestic produce, and in leather and linen manufactures, there being several flax spinning-mills and bleach-works in the immediate neighbourhood. Distilling is carried on. The harbour admits vessels of 500 tons. The fisheries are valuable, especially the oyster fisheries. At Duncrue about 2 m. from the town, rock salt of remarkable purity and in large quantity is found in the Triassic sandstone. The neighbouring country is generally hilly, and Slieve True (1100 ft.) commands a magnificent prospect.

In 1182, John de Courci, to whom Henry II. had granted all the parts of Ulster he could obtain possession of by the sword, fixed a colony in this district. The castle came in the 13th century into possession of the De Lacy family, who, being ejected, invited Edward Bruce to besiege it (1315). After a desperate resistance the garrison surrendered. In 1386, the town was burned by the Scots, and in 1400 was destroyed by the combined Scots and Irish. Subsequently, it suffered much by famine and the occasional assaults of the neighbouring Irish chieftains, whose favour the townsmen were at length forced to secure by the payment of an annual tribute. In the reign of Charles I. many Scottish Covenanters settled in the neighbourhood

to avoid the persecution directed against them. In the civil wars, from 1641, Carrickfergus was one of the chief places of refuge for the Protestants of the county of Antrim; and on the 10th of June 1642, the first Presbytery held in Ireland met here. In that year the garrison was commanded by General Robert Munro, who, having afterwards relinquished the cause of the English parliament, was surprised and taken prisoner by Sir Robert Adair in 1648. At a later period Carrickfergus was held by the partisans of James II., but surrendered in 1689 to the forces under King William's general Schomberg; and in 1690 it was visited by King William, who landed here on his expedition to Ireland. In 1760 it was surprised by a French squadron under Commodore Thurot, who landed with about 1000 men, and, after holding the place for a few days, evacuated it on the approach of the English troops. Eighteen years later Paul Jones, in his ship the "Ranger," succeeded in capturing the "Drake," a British sloop-of war, in the neighbouring bay; but he left without molesting the town. In the reign of Queen Elizabeth the town obtained a charter, and this was confirmed by James I., who added the privilege of sending two burgesses to the Irish parliament. The corporation, however, was superseded, under the provisions of the Municipal Reform Act of 1840, by a board of municipal commissioners. Carrickfergus was a parliamentary borough until 1885; and a county of a town till 1898, having previously (till 1850) been the county town of county Antrim. But its importance was sapped by the vicinity of Belfast, and its historical associations are now its chief interest.

CARRICKMACROSS, a market town of Co. Monaghan, Ireland, in the south parliamentary division, 68 m. N.W. of Dublin on a branch of the Great Northern railway. Pop. of urban district (1901) 1874. It has a pleasant, elevated site, a considerable agricultural trade, and a famous manufacture of lace, which is carried on in various conventual establishments. There are some remains of an Elizabethan castle, a seat of the earls of Essex, which was destroyed during the wars of 1641; the ruins of the old church of St Finbar commemorate the same disastrous period.

CARRICK-ON-SHANNON, a market town and the county town of Co. Leitrim, Ireland, in the south parliamentary division, beautifully situated on the left bank of the upper Shannon, between Loughs Allen and Boderg, close to the confluence of the Boyle. Pop. (1901) 1118. It is on the Sligo branch of the Midland Great Western railway, 90 m. W.N.W. of Dublin, the station being across the river in county Roscommon. Though having so small a population it is the largest town in the county, is the seat of the assizes, and has quays and some river trade. The surrounding country, with its waterways, loughs and woods, is of considerable beauty.

CARRICK-ON-SUIR, a market town of Co. Tipperary, Ireland, in the east parliamentary division, on the north (left) bank of the Suir, 14¼ m. W.N.W. from Waterford by the Waterford & Limerick line of the Great Southern & Western railway. Pop. of urban district (1901) 5406. It was formerly a walled town, and contains some ancient buildings, such as the castle, erected in 1309, formerly a seat of the dukes of Ormonde, now belonging to the Butler family, a branch of which takes the title of earl from the town. On the other side of the river, connected by a bridge of the 14th century, and another of modern erection, stands the suburb of Carrickbeg, in county Waterford, where an abbey was founded in 1336. The woollen manufactures for which the town was formerly famous are extinct. A thriving export trade is carried on in agricultural produce, condensed milk is manufactured, and slate is extensively quarried in the neighbourhood, while some coal is exported from the neighbouring fields. Dredging has improved the navigable channel of the river, which is tidal to this point and is lined with quays.

CARRIER, JEAN BAPTISTE (1756–1794), French Revolutionist and Terrorist, was born at Yolet, a village near Aurillac in Upper Auvergne. In 1790 he was a country attorney (counsellor for the *bailliage* of Aurillac) and in 1792 he was chosen deputy to the National Convention. He was already known as one of the influential members of the Cordeliers club and of that of the Jacobins. After the subjugation of Flanders he was one of the commissioners nominated in the close of 1792 by the Convention, and sent into that country In the following year he took part in establishing the Revolutionary Tribunal. He voted for the death of Louis XVI., was one of the first to call for the arrest of the duke of Orleans, and took a prominent part in the overthrow of the Girondists (on the 31st of May). After a mission into Normandy, Carrier was sent, early in October 1793, to Nantes, under orders from the Convention to suppress the revolt which was raging there, by the most severe measures. Nothing loth, he established a revolutionary tribunal, and formed a body of desperate men, called the Legion of Marat, for the purpose of destroying in the swiftest way the masses of prisoners heaped in the jails. The form of trial was soon discontinued, and the victims were sent to the guillotine or shot or cut down in the prisons *en masse*. He also had large numbers of prisoners put on board vessels with trap doors for bottoms, and sunk in the Loire. This atrocious process, known as the *Noyades* of Nantes, gained for Carrier a reputation for wanton cruelty. Since in his mission to Normandy he had been very moderate, it is possible that, as he was nervous and ill when sent to Nantes, his mind had become unbalanced by the atrocities committed by the Vendean and royalist armies. Naturally, the stories told of him are not all true. He was recalled by the Committee of Public Safety on the 8th of February 1794, took part in the attack on Robespierre on the 9th Thermidor, but was himself brought before the Revolutionary Tribunal on the 11th and guillotined on the 16th of November 1794.

See Comte Fleury, *Carrier à Nantes*, 1793–1794 (Paris, 1897); Alfred Lallié, *J. B. Carrier, représentant du Cantal à la Convention 1756–1794 d'après de nouveaux documents* (Paris, 1901). These works, and the others of Lallié, are inspired by strong royalist sympathies and are not altogether to be accepted.

CARRIER, a general term for any person who conveys the goods of another for hire, more specifically applied to the tradesmen, now largely superseded by the railway system, who convey goods in carts or wagons on the public roads. In jurisprudence, however, the term is collectively applied to all conveyers of property, whether by land or water; and in this sense the changes and enlargements of the system of transit throughout the world have given additional importance to the subject. The law by which carriers, both by land and sea, are made responsible for the goods entrusted to them, is founded on the praetorian edict of the civil law, to which the ninth title of the fourth book of the Pandect is devoted. The edict itself is contained in these few words, "*nautae, caupones, stabularii, quod cujusque salvum fore receperint, nisi restituent, in eos judicium dabo.*" The simplicity of the rule so announced has had a most beneficial influence on the commerce of the world. Throughout the great civilized region which took its law directly from Rome, and through the other less civilized countries which followed the same commercial code, it laid a foundation for the principle that the carrier's engagement to the public is a contract of indemnity. It bound him in the general case, to deliver what he had been entrusted with, or its value,—thus sweeping away all secondary questions or discussions as to the conditions of more or less culpability on his part under which loss or damage may have occurred; and it left any limitations of this general responsibility to be separately adjusted by special contract.

The law of England recognizes a distinction between a common and a private carrier. The former is one who holds himself out to the public as ready to carry for hire from place to place the goods of such persons as choose to employ him. The owner of a stage-coach, a railway company, the master of a general ship, a wharfinger carrying goods on his own lighters are common carriers; and it makes no difference that one of the *termini* of the journey is out of England. It has been held, however, that a person who carries only passengers is not a common carrier; nor of course is a person who merely engages to carry the goods of particular individuals or to carry goods upon any particular occasion. A common carrier is subject at law to peculiar liabilities. He is bound to carry the goods of any person who offers to pay his

hire, unless there is a good reason to the contrary, as, for example, when his carriage is full, or the article is not such as he is in the habit of conveying. He ought to carry the goods in the usual course without unnecessary deviation or delay. To make him liable there must be a due delivery of the goods to him in the known course of his business. His charge must be reasonable; and he must not give undue preference to any customer or class of customers. The latter principle, as enforced by statute, has come to be of great importance in the law of railway companies. In respect of goods entrusted to him, the carrier's liability, unless limited by a special contract, is, as already stated, that of an insurer. There is no question of negligence as in the case of injury to passengers, for the warranty is simply to carry safely and securely. The law, however, excepts losses or injuries occasioned immediately "by the act of God or the king's enemies"—words which have long had a strict technical signification. It would appear that concealment without fraud, on the part of the customer, will relieve the carrier from his liability for *negligence*, but not for actual *misfeasance*. Fraud or deceit by the customer (*e.g.*, in misrepresenting the real value of the goods) will relieve the carrier from his liability. The responsibility of the carrier ceases only with the delivery of the goods to the proper consignee. By the Carriers' Act 1830 the liability of carriers for gold, silver, &c. (in general "articles of great value in small compass") is determined. Should the article or parcel exceed £10 in value, the carrier is not to be liable for loss unless such value is declared by the customer and the carrier's increased charge paid. Where the value is thus declared, the carrier may, by public notice, demand an increased charge, for which he must, if required, sign a receipt. Failing such receipt or notice, the carrier must refund the increased charge and remain liable as at common law. Except as above no mere notice or declaration shall affect a carrier's liability; but he may make special contracts with his customers. The carriage of goods by sea is subject to special regulations (see AFFREIGHTMENT). The carriage of goods by railway and canal is subject to the law of common carrier, except where varied by particular statutes, as the Railway and Canal Traffic Acts 1854 to 1894 and the Regulation of Railways Acts 1840 to 1893. The effect of these acts is to prevent railway companies as common carriers from limiting by special contract their liability to receive, forward and deliver goods, unless the conditions embodied in the special contract are reasonable, and the contract is in writing and signed by, or on behalf of, the sender. A railway company must provide reasonable facilities for forwarding passengers' luggage; where luggage is taken into the carriage with a passenger, the company is responsible for it only in so far as loss or damage is due to the passenger's interference with the company's exclusive control of it. As carriers of passengers companies are bound, in the absence of any special contract, to exercise due care and diligence, and are responsible for personal injuries only when they have been occasioned by negligence or want of skill. Where there has been contributory negligence on the part of the passenger, *i.e.* where he might, by the exercise of ordinary care, have avoided the consequences of the defendants' negligence—he is not entitled to recover. By the act of 1846 (commonly called Lord Campbell's Act), when a person's death has been caused by such negligence as would have entitled him to an action had he survived, an action may be maintained against the party responsible for the negligence on behalf of the wife, husband, parent or child of the deceased. Previously such cases had been governed by the maxim *actio personalis moritur cum persona*.

CARRIÈRE, MORITZ (1817–1895), German philosopher and historian, was born at Griedel in Hesse Darmstadt on the 5th of March 1817. After studying at Giessen, Göttingen and Berlin, he spent a few years in Italy studying the fine arts, and established himself in 1842 at Giessen as a teacher of philosophy. In 1853 he was appointed professor at the university of Munich, where he lectured mainly on aesthetics. He died in Munich on the 19th of January 1895. An avowed enemy of Ultramontanism, he contributed in no small degree to making the idea of German unity more palatable to the South Germans. Carrière identified himself with the school of the younger Fichte as one who held the theistic view of the world which aimed at reconciling the contradictions between deism and pantheism. Although no obstinate adherent of antiquated forms and prejudices, he firmly upheld the fundamental truths of Christianity. His most important works are: *Aesthetik* (Leipzig, 1859; 3rd ed., 1885), supplemented by *Die Kunst im Zusammenhang der Kulturentwicklung und der Ideale der Menschheit* (3rd ed., 1877–1886); *Die philosophische Weltanschauung der Reformationszeit* (Stuttgart, 1847; 2nd ed., Leipzig, 1886), and *Die sittliche Weltordnung* (Leipzig, 1877; 2nd ed., 1891), in which he recognized both the immutability of the laws of nature and the freedom of the will. He described his view of the world and life as "real-idealism." His essay on Cromwell (in *Lebensskizzen*, 1890), which may be considered his political confession of faith, also deserves mention. His complete works were published at Leipzig, 14 vols., in 1886–1894.

See S. P. V. Lind in *Zeitschrift f. Philos.* (cvi, 1895, pp. 93-101); W. Christ in *Allgemeine deutsche Biographie* (1903).

CARRINGTON, CHARLES ROBERT WYNN-CARINGTON, 1ST EARL (1843–), English statesman, son of the 2nd Baron Carrington (d. 1868), was educated at Eton and Trinity, Cambridge, and sat in the House of Commons as a Liberal for High Wycombe from 1865 till he succeeded to the title in 1868. He was governor of New South Wales 1885–1890, lord chamberlain 1892–1895, and became president of the board of agriculture in 1905, having a seat in the cabinet in Sir H. Campbell-Bannerman's and Mr Asquith's ministries. He was created Earl Carrington and Viscount Wendover in 1895. The Carrington barony was conferred in 1796 on Robert Smith (1752–1838), M.P. for Nottingham, a member of a famous banking family, the title being suggested by one held from 1643 to 1706 in another family of Smith in no way connected. The 2nd baron married as his second wife one of the two daughters of Lord Willoughby de Eresby, and their son, through her, became in 1879 joint hereditary lord great chamberlain of England. The 2nd Baron took the surname of Carrington, afterwards altered to Carington, instead of Smith.

CARRINGTON, RICHARD CHRISTOPHER (1826–1875), English astronomer, son of a brewer at Brentford, was born in London on the 26th of May 1826. Though intended for the Church, his studies and tastes inclined him to astronomy, and with a view to gaining experience in the routine of an observatory he accepted the post of observer in the university of Durham. Finding, however, that there was little chance of obtaining instruments suitable for the work which he wished to undertake, he resigned that appointment and established in 1853 an observatory of his own at Redhill. Here he devoted three years to a survey of the zone of the heavens within 9 degrees of the North Pole, the results of which are contained in his *Redhill Catalogue of 3735 Stars*. But his name is chiefly perpetuated through his investigation of the motions of sun-spots, by which he determined the elements of the sun's rotation and made the important discovery of a systematic drift of the photosphere, causing the rotation-periods of spots to lengthen with increase of solar latitude. He died on the 27th of November 1875.

For further information see *Month. Notices Roy. Astr. Society*, xiv. 13, xviii. 23, 109, xix. 140, 161, xxxvi. 137; *Memoirs Roy. Astr. Soc.*, xxvii. 139; *The Times*, Nov. 22 and Dec. 7, 1875; *Roy. Society's Cat. Scient. Papers*, vols. i. and vii.; Introductions to Works.

CARROCCIO, a war chariot drawn by oxen, used by the medieval republics of Italy. It was a rectangular platform on which the standard of the city and an altar were erected; priests held services on the altar before the battle, and the trumpeters beside them encouraged the fighters to the fray. In battle the carroccio was surrounded by the bravest warriors in the army and it served both as a rallying-point and as the palladium of the city's honour; its capture by the enemy was regarded as an irretrievable defeat and humiliation. It was first employed by the Milanese in 1038, and played a great part in the wars of the Lombard league against the emperor Frederick Barbarossa. It was afterwards adopted by other cities, and first appears on a

Florentine battlefield in 1228. The Florentine carroccio was usually followed by a smaller car bearing the *martinella*, a bell to ring out military signals. When war was regarded as likely the *martinella* was attached to the door of the church of Santa Maria in the Mercato Nuovo in Florence and rung to warn both citizens and enemies. In times of peace the carroccio was in the keeping of some great family which had distinguished itself by signal services to the republic.

Accounts of the carroccio will be found in most histories of the Italian republics; see for instance, M. Villani's *Chronache*, vi. 5 (Florence, 1825–1826); P. Villari, *The Two First Centuries of Florentine History*, vol. i. (Engl. transl., London, 1894); Gino Capponi, *Storia della Repubblica di Firenze*, vol. i. (Florence, 1875).

CARRODUS, JOHN TIPLADY (1836–1895), English violinist, was born on the 20th of January 1836, at Keighley, in Yorkshire. He made his first appearance as a violinist at the age of nine, and had the advantage of studying between the ages of twelve and eighteen at Stuttgart, with Wilhelm Bernhard Molique. On his return to England in 1853 Costa got him engagements in the leading orchestras. He was a member of the Covent Garden opera orchestra from 1855, made his début as a solo player at a concert given on the 22nd of April 1863 by the Musical Society of London, and succeeded Sainton as leader at Covent Garden in 1869. He died at Hampstead on the 13th of July 1895. For many years he had led the Philharmonic orchestra and those of the great provincial festivals. He published two violin solos and a "*Morceau de salon*," and was a very successful teacher.

CARROLL, CHARLES (1737–1832), American political leader, of Irish ancestry, was born at Annapolis, Maryland, on the 19th of September 1737. He was educated abroad in French Jesuit colleges, studied law at Bourges, Paris and London, and in February 1765 returned to Maryland, where an estate known as "Carrollton," in Frederick county, was settled upon him; he always signed his name as "Charles Carroll of Carrollton." Before and during the War of Independence, he was a whig or patriot leader, and as such was naturally a member of the various local and provincial extra-legal bodies—committees of correspondence, committees of observation, council of safety, provincial convention (1774–1776) and constitutional convention (1776). From 1777 until 1800 he was a member of the Maryland senate. In April–June 1776 he, with Samuel Chase and Benjamin Franklin, was a member of the commission fruitlessly sent by the continental congress to Canada for the purpose of persuading the Canadians to join the thirteen revolting colonies. From 1776 to 1779 he sat in the continental congress, rendering important services as a member of the board of war, and signing on the 2nd of August 1776 the Declaration of Independence, though he had not been elected until the day on which that document was adopted. He out-lived all of the other signers. He was a member of the United States Senate from 1789 to 1792. From 1801 until his death, at Baltimore, on the 14th of November 1832, he lived in retirement, his last public act being the formal ceremony of starting the construction of the Baltimore and Ohio railway (July 4, 1828). In politics, after the formation of parties, he was a staunch Federalist. Of unusual ability, high character and great wealth, he exercised a powerful influence, particularly among his co-religionists of the Roman Catholic faith, and he used it to secure the independence of the colonies and to establish a stable central government.

See the *Life* by Kate Mason Rowland (1898).

CARROLL, JOHN (1735–1817), American Roman Catholic prelate, was born at Upper Marlborough, Prince George's county, Maryland, on the 8th of January 1735, the son of wealthy Catholic parents and a cousin of Charles Carroll "of Carrollton." He was educated at St Omer's in Flanders, becoming a novitiate in the Society of Jesus in 1753, and then at the Jesuit college in Liége, being ordained priest in 1769 and becoming professor of philosophy and theology. In 1771 he became a professed father of the Society of Jesus and professor at Bruges. As tutor to the son of Lord Stourton, he travelled through Europe in 1772–1773. After the papal brief of the 21st of July 1773 suppressed the Society of Jesus, he accompanied its English members then in Flanders to England. In 1774 he returned to America, and set to work at a mission at Rock Creek, Montgomery county, Maryland, where his mother lived. He shared the feeling for independence growing among the American colonists, foreseeing that it would mean greater religious freedom. In 1776, at the request of the continental congress, he accompanied Benjamin Franklin, Charles Carroll and Samuel Chase on their mission to secure the aid or neutrality of the French-Canadians, and though unsuccessful it gained for him the friendship of Franklin. In 1783 he took a prominent part in the petition to Rome to take the control of the American church away from London; and on Franklin's recommendation, Carroll was named prefect apostolic, the American church being recognized as a distinct body in a decree issued by Cardinal Antonelli on the 9th of June 1784. In the summer of 1785 he began his visitations; in 1786 he induced the general chapter to authorize a Catholic seminary (now Georgetown University); and at the same session it was voted that the condition of the church required a bishop, accountable directly to the pope (and not to the Congregation of the Propaganda) and chosen by the American clergy. Consent to this course was given by Antonelli in a letter of the 12th of July 1788. The clergy met at Whitemarsh, Maryland, and Baltimore was adopted as the episcopal seat, Carroll being chosen as bishop; and on the 6th of November 1789 Pius VI. issued a bull to that effect, Carroll being consecrated at Lulworth Castle, England, on the 15th of August 1790.

On his return from England the bishop saw Georgetown College completed (1791), thanks to moneys he had received from English Catholics. His first synod met on the 7th of November 1791; and on the 16th he issued the "Circular on Christian Marriage," which attacked marriage by any save "lawful pastors of our church." In 1795 the Rev. Leonard Neale (1746–1817) was appointed his coadjutor. In 1799, after the death of Washington, Bishop Carroll bade his clergy hold the 22nd of February 1800 as a day of mourning, and on that day delivered in his pro-cathedral a memorial discourse which attracted much attention. Already in 1802 he was pressing for the creation of new sees in his diocese, and the Louisiana Purchase of 1803 gave added weight to this request; in September 1805 the Propaganda made him administrator apostolic of the diocese of New Orleans, to which he appointed John Olivier as vicar general; and in 1808 Pius VII. divided Carroll's great diocese into four sees, Boston, New York, Philadelphia and Bardstown (Kentucky), suffragan to the metropolitanate of Baltimore, of which Carroll actually became archbishop by the assumption of the long delayed *pallium* on the 18th of August 1811, having consecrated three suffragans in the autumn of 1810. In 1811 ecclesiastical jurisdiction over the Danish and Dutch West Indies was bestowed upon him. Carroll was now an old man, and the shock of the war of 1812, which as a staunch Federalist he had opposed until its actual declaration, together with the action of the Holy See in appointing to the sees of Philadelphia and New York other candidates than those of his recommendation, weighed on his mind. He died in Georgetown on the 3rd of December 1815. He may well be reckoned the greatest figure in the Roman Catholic Church of the United States. His position in the church had never been easy, partly because he had been a prominent member of the Society of Jesus. The great size of his diocese had made it unwieldy; and his struggle to secure the independence of the American church had been a difficult one. As a defender of papal and episcopal authority he had, especially in Philadelphia and Baltimore, to deal with churches whose trustees insisted that they and their parishes alone could choose priests, that bishop or prefect could not object to their choice. Akin to this difficulty was the desire of Catholics of different nationalities to have separate churches, a desire often created or encouraged by intriguing and ambitious priests. Besides these and other internal annoyances, Carroll had to meet the deep-seated distrust of his church in communities settled almost exclusively by Protestants.

See John Gilmary Shea, *History of the Catholic Church in the United States*, vol. ii. (1763–1815), (Akron and New York, 1888);

and Daniel Brent, *Biographical Sketch of the Most Rev. John Carroll, First Archbishop of Baltimore, with Select Portions of His Writings*, edited by John Carroll Brent (Baltimore, 1843).

CARRONADE, a piece of ordnance invented, by the application of an old principle of gun construction, to serve as a ship's gun. The inventor was the antiquary General Robert Melville (1728–1809). He designed the piece in 1759, and called it the "smasher," but it was not adopted in the British navy till 1779, and was then known as the "carronade," from the Carron works on the Carron river in Stirlingshire, Scotland, where it was first cast by Mr Gascoigne. The carronade had a powder chamber like many of the earliest guns known, and was similar to a mortar. It was short, light, had a limited range, but was destructive at close quarters. Carronades were added to the existing armaments of guns proper or long guns. A 38-gun frigate carried ten carronades, and was therefore armed with 48 pieces of ordnance. As the official classifications were not changed, they were misleading guides to the real strength of British ships, which always carried more pieces than they were described as carrying. The same remark applies to French and American ships when the use of the carronade extended from the British to other navies.

CARROT. Wild carrot, *Daucus carota*, a member of the natural order Umbelliferae, grows wild in fields and on roadsides and sea-shores in Britain and the north temperate zone generally of the Old World. It is an annual and resembles the cultivated carrot, except in the root, which is thin and woody. It is the origin of the cultivated carrot, which can be developed from it in a few generations. M. Vilmorin succeeded in producing forms with thick fleshy roots and the biennial habit in four generations. In the cultivated carrot, during the first season of growth, the stem remains short and bears a rosette of graceful, long-stalked, branched leaves with deeply cut divisions and small, narrow ultimate segments. During this period the plant devotes its energies to storing food, chiefly sugar, in the so-called root, which consists of the upper part of the true root and the short portion of the stem between the root and the lowest leaves. A transverse section of the root shows a central core, generally yellow in colour, and an outer red or scarlet rind. The core represents the wood of an ordinary stem and the outer ring the soft outer tissue (bast and cortex). In the second season the terminal bud in the centre of the leaf-rosette grows at the expense of the stored nourishment and lengthens to form a furrowed, rather rough, branched stem, 2 or 3 ft. high, and bearing the flowers in a compound umbel. The umbel is characterized by the fact that the small leaves (bracts) which surround it, resemble the foliage leaves on a much reduced scale, and ultimately curve inwards, the whole inflorescence forming a nest-like structure. The flowers are small, the outer white, the central ones often pink or purplish. The fruit consists of two one-seeded portions, each portion bearing four rows of stiff spinous projections, which cause the fruits when dropped to cling together, and in a natural condition help to spread the seed by clinging to the fur of animals. On account of these projections the seeds cannot be sown evenly without previous rubbing with sand or dry ashes to separate them. As usual in the members of the order Umbelliferae, the wall of the fruit is penetrated lengthwise by canals containing a characteristic oil.

Carrots vary considerably in the length, shape and colour of their roots, and in the proportion of rind to core. The White Belgian, which gives the largest crops, has a very thick root which is white, becoming pale green above, where it projects above ground. For nutritive purposes it is inferior to the red varieties. The carrot delights in a deep sandy soil, which should be well drained and deeply trenched. The ground should be prepared and manured in autumn or winter. For the long-rooted sorts the soil should be at least 3 ft. deep, but the Short Horn varieties may be grown in about 6 in. of good compost laid on the top of a less suitable soil. Peat earth may be usefully employed in lightening the soil. Good carrots of the larger sorts may be grown in unfavourable soils by making large holes 18 in. deep with a crowbar, and filling them up with sandy compost in which the seeds are to be sown. The main crop is sown at the end of March or beginning of April. After sowing, it is only necessary to thin the plants, and keep them clear of weeds. The roots are taken up in autumn and stored during winter in a cool shed or cellar.

CARRYING OVER, or CONTINUATION, a stock exchange term for the operation by which the settlement of a bargain transacted for money or for a given account, may for a consideration (called either a "contango" or a "backwardation") be postponed from one settling day to another. Such a continuation is equivalent to a sale "for the day" and a repurchase for the succeeding account, or to a purchase "for the day" and a resale for the succeeding account. The price at which such transactions are adjusted is the "making-up" price of the day. (See ACCOUNT and STOCK EXCHANGE.)

CARSIOLI (mod. *Carsoli*), an ancient city of Italy, on the Via Valeria, 42 m. E. by N. of Rome. It was founded in the country of the Aequi between 302 and 298 B.C., just after the establishment of Alba Fucens, no doubt as a stronghold to guard the road to the latter. It is mentioned in 211 B.C. as one of the twelve out of thirty Latin colonies which protested their inability to furnish more men or money for the war against Hannibal. We find it used in 168 B.C. like Alba Fucens as a place of confinement for political prisoners. It was sacked in the Social War, but probably became a *municipium* after it, though we hear but little of it. The modern town of Carsoli first appears in a diploma of A.D. 866, but the old site does not seem to have been abandoned until the 13th century. It is now occupied only by vineyards, and lies about 2100 ft. above sea-level, in a plain surrounded by mountains, now called Piano del Cavaliere. The line of the city walls (originally in tufa, and reconstructed in limestone), built of rectangular blocks, can be traced, and so can the scanty remains of several buildings, including the *podium* or base, of a temple, and also the ancient branch road from the Via Valeria (which itself keeps just south-east of Carsioli), traversing the site from north to south. The forty-third milestone of the Via Valeria still lies at or near its original site; it was set up by Nerva in A.D. 97. One mile to the north-west of Carsioli are the remains of an ancient aqueduct consisting of a buttressed wall of concrete crossing a valley.

See G. J. Pfeiffer and T. Ashby in *Supplementary Papers of the American School in Rome*, i. (1905), 108 seq. (T. As.)

CARSON, CHRISTOPHER ["KIT"] (1809–1868), American hunter and scout, was born in Madison county, Kentucky, on the 24th of December 1809. When he was a year old his parents removed to Howard county, Missouri, then a frontier settlement, and the boy was early trained in the hardships and requirements of pioneer life. He served for a while as a saddler's apprentice, and after 1826 devoted himself to the life of a professional guide and hunter. He was hunter for the garrison at Bent's Fort on the Arkansas river in what is now Bent county, Colorado, from 1832 to 1840, and accompanied John C. Frémont on his exploring expeditions of 1842 and 1843–1844, and on his California expedition in 1845–1846. Carson took part in the Mexican War, and, after the rush to the Pacific Coast began, engaged as a guide to convoy emigrants and drovers across the plains and mountains. In 1854 he became Indian agent at Taos, New Mexico, in which position, through his knowledge of the Indian traits and language, he was able to exercise for many years a restraining influence over the warlike Apaches and other tribes. During the Civil War he rendered invaluable services to the Federal cause in the south-west as chief scout in charge of the various bodies of irregular scouts and rangers participating in the constant border warfare that characterized the conflict in that part of the Union. In March 1865 he was breveted brigadier-general of volunteers for gallantry in the battle of Valverde (on the 21st of February 1862) and for distinguished services in New Mexico, and after the war resumed his position as Indian agent, which he held until his death at Fort Lyon, Colorado, on the 23rd of May 1868. "Kit" Carson occupies in the latter period of American pioneer history a position somewhat similar to that held by Daniel Boone and David Crockett at an earlier period, as the typical frontier

hero and Indian fighter, and his hairbreadth escapes and personal prowess are the subject of innumerable stories.

See Charles Burdett, *Life of Kit Carson, the Great Western Hunter and Guide* (New York, 1859; new ed., 1877); and De Witt C. Peters, *The Life and Adventures of Kit Carson, the Nestor of the Rocky Mountains, from Facts Narrated by Himself* (New York, 1858).

CARSON CITY, the capital of Nevada, U.S.A., and the county seat of Ormsby county, about 120 m. N.E. of Sacramento, California. Pop. (1890) 3950; (1900) 2100; (1910) 2466. It is served by the Virginia and Truckee railway, which has repair shops here, and by stage to Lake Tahoe, 12 m. W. of the city. It is picturesquely situated in Eagle valley, near the east base of the Sierra Nevada, at an elevation of 4720 ft. above the sea. Within 1 m. of the city are Shaws Hot Springs. The city is a distributing point for the neighbouring mining region. Among the public buildings are the capitol, the United States government building, a United States mint, and a state orphans' home; in the vicinity are the state prison and a United States government school for Indians. The industrial interests of the city are principally in mining, lumbering and agriculture. It has an excellent supply of mountain spring water. Carson City (named in honour of Christopher Carson) was settled in 1851 as a trading post, was laid out as a town in 1858, was made the capital of the state and the county seat of the newly erected county in 1861, and was chartered as a city in 1875.

CARSTARES (or CARSTAIRS), **WILLIAM** (1649–1715), Scottish clergyman, was born at Cathcart, near Glasgow, on the 11th of February 1649, the son of the Rev. John Carstares, a member of the extreme Covenanting party of Protestors. He was educated at the university of Edinburgh, and then passed over to Utrecht, where he commenced his lifelong friendship with the prince of Orange, and began to take an active part in the politics of his country. The government disliked Carstares for several reasons. He was the intimate of William; he had been the bearer of messages between the disaffected in Scotland and Holland; and he was believed to be concerned with Sir James Steuart (1635–1715) in the authorship of a pamphlet—*An Account of Scotland's Grievances by reason of the D. of Lauderdale's Ministrie, humbly tendered to his Sacred Majesty*. Accordingly, on his return to England, at the close of 1674, he was committed to the Tower; the following year he was transferred to Edinburgh Castle, and it was not till August 1679 that he was released. After this he visited Ireland, and then became pastor to a Nonconformist congregation at Cheshunt. During 1682 he was in Holland, but in the following year he was again in London, and was implicated in the Rye House Plot. On its discovery he was examined before the Scottish Council; though the torture of the thumb-screw was applied, he refused to utter a word till he was assured that his admissions would not be used in evidence, and in the disclosures he then made he displayed great discretion. On his return to Holland he was rewarded by William's still warmer friendship, and the post of court chaplain; and after the Revolution he continued to hold this office, under the title of royal chaplain for Scotland. He was the confidential adviser of the king, especially with regard to Scottish affairs, and rendered important service in promoting the Revolution Settlement. On the accession of Anne, Carstares retained his post as royal chaplain, but resided in Edinburgh, having been elected principal of the university. He was also minister of Greyfriars', and afterwards of St Giles', and was four times chosen moderator of the general assembly. He took an important part in promoting the Union, and was consulted by Harley and other leading Englishmen concerning it. During Anne's reign, the chief object of his policy was to frustrate the measures which were planned by Lord Oxford to strengthen the Episcopalian Jacobites—especially a bill for extending the privileges of the Episcopalians and the bill for replacing in the hands of the old patrons the right of patronage, which by the Revolution Settlement had been vested in the elders and the Protestant heritors. On the accession of George I., Carstares was appointed, with five others, to welcome the new dynasty in the name of the Scottish Church. He was received graciously, and the office of royal chaplain was again conferred upon him. A few months after he was struck with apoplexy, and died on the 28th of December 1715.

See *State-papers and Letters addressed to William Carstares*, to which is prefixed a Life by M'Cormick (1774); Story's *Character and Career of William Carstares* (1874); Andrew Lang's *History of Scotland* (1907).

CARSTENS, ARMUS JACOB (1754–1798), German painter, was born in Schleswig, and in 1776 went to Copenhagen to study. In 1783 he went to Italy, where he was much impressed by the work of Giulio Romano. He then settled in Lübeck as a portrait painter, but was helped to visit Rome again in 1792, and gradually produced some fine subject and historical paintings, *e.g.* "Plato's Symposium" and the "Battle of Rossbach"—which made him famous. He was appointed professor at Berlin, and in 1795 a great exhibition of his works was held in Rome, where he died in 1798. Carstens ranks as the founder of the later school of German historical painting.

CARSULAE, an ancient city of Umbria, on the Via Flaminia, 19 m. N. of Narnia (mod. *Narni*) and 24 m. S.S.W. of Mevania (mod. *Bevagna*). It is little mentioned in ancient literature. The town was a *municipium*. The Via Flaminia is well preserved and enters the north gate of the town, the archway of which still stands. Remains of buildings may also be seen upon the site, and the outline of an amphitheatre is visible. The town of Cesi, 3 m. to the south-east, has polygonal walls, and may perhaps be regarded as an Umbrian city which was destroyed by the Romans, Carsulae being constructed in its stead. The medieval city, as so often happened in Italy, returned to the pre-Roman site.

See G. Gamurrini in *Notizie degli Scavi* (1884), 149; for the tombs, L. Lanzi, in *Notizie degli Scavi* (1902), 592.

CART (A.S. *cræl*, Gaelic *cairt*; connected with "car"), a general term for various kinds of vehicles (see CARRIAGE), in some cases for carrying people, but more particularly for transporting goods, for agricultural or postal purposes, &c., or for carriers. Though constructed in various ways, the simplest type for goods is two-wheeled, topless and springless; but as a general term "cart" is used in combination with some more specific qualification (dog-cart, donkey-cart, road-cart, polo-cart, &c.), when it is employed for pleasure purposes. The "dog-cart," so called because originally used to convey sporting dogs, is a more or less elevated two-wheeled carriage, generally with seats back to back, in front and behind; the "governess-cart" (presumably so called from its use for children), a very low two-wheeled pony-carriage, has two side seats facing inwards; the "tax-cart," a light two-wheeled farmer's cart, was so called because formerly exempted from taxation as under the value of £21.

CARTAGENA, or CARTHAGENA, a city, seaport, and the capital of the department of Bolívar, Colombia, South America, on the Caribbean coast, in 10° 25′ 48″ N., 75° 34′ W. Pop. (1905, official estimate) 14,000. The population of Cartagena is largely composed of blacks and mixed races, which form the predominant type on the lowland plains of northern Colombia. The well-to-do whites of Cartagena usually have country houses on the Turbaco hills, where the temperature is much lower than on the coast. The mean annual temperature in the city is 82°, and the port is classed as very unhealthful, especially for unacclimatized foreigners. The harbour, which is the best on the north coast of South America, is formed by an indentation of the coast-line shut in by two long islands lying parallel to the mainland. It covers an area of about 62·5 sq. m. and affords deep and secure anchorages and ample facilities for loading and unloading large vessels. The city itself has no modern quays, and large vessels do not approach within a mile of its landing-stages, but the railway pier (lengthened 120 ft. in 1898) on the mainland opposite permits the mooring of vessels alongside. There were formerly two entrances to the harbour—the Boca Grande (large mouth) between the low sandy island or peninsula on which the city stands and the island of Tierra Bomba, and the Boca Chica (small mouth) at the south end of the latter island. The Boca Grande was filled with stone after the city had been captured three times, because of the ease with which an enemy's ships could pass through it at any time, and the narrow and more

easily defended Boca Chica, 7 m. farther south, has since been used.

The city occupies a part of the upper island or peninsula facing the northern end of the harbour, and is separated from the mainland on the east by a shallow lagoon-like extension of the bay which is bridged by a causeway passing through the extra-mural suburb of Xiximani on another island. The old city, about ¾ m. long, north and south, and ½ m. wide, is enclosed by a heavy wall, in places 40 ft. thick, and is defended by several formidable-looking forts, which have long been dismantled, but are still in a good state of preservation. At the mainland end of the causeway leading from the city is the fort of San Felipe, about 100 ft. above sea-level, adapted as a distributing reservoir in the city's waterworks; and behind it are verdure-covered hills rising to an elevation of 500 ft., forming a picturesque background to the grey walls and red-tiled roofs of the city. The streets are narrow, irregular and roughly paved, but are lighted by electricity; tramway lines run between the principal points of the city and suburbs. The houses are built with thick walls of stone and brick round open courts, in the Moorish style, and their iron-barred doors and windows give them the appearance of being a part of the fortifications. Among the numerous churches, the largest and most imposing is the Jesuit church of San Juan de Dios, with its double towers and celebrated marble pulpit; an old monastery adjoins. Cartagena is an episcopal see, and its cathedral dates from colonial times. The city was once the headquarters of the Inquisition in South America, and the edifice which it occupied, now private property, is an object of much interest. The water supply of the city was formerly obtained from rainwater tanks on the walls or by carriage from springs a few miles inland. But in 1906 an English company received a concession to bring water by pipes from springs on the Turbaco hills, 300 ft. above the sea.

The commercial importance of Cartagena declined greatly during the period of civil disorders which followed the war for independence, but in later years has revived. In the reign of Philip II. the Spaniards had opened a canal ("El Dique") through some marshes and lagoons into a small western outlet of the Magdalena, which gave access to that river at Calamar, about 81 m. above the bar at its mouth; during Cartagena's decline this was allowed to fill up; it was reopened in 1846 for a short time and then was obstructed again by river floods; but in 1881 it was reopened for steam navigation. Towards the end of the 19th century a railway, 65 m. long, was built between Cartagena and Calamar. Imports consist of cotton, linen and woollen fabrics, hardware, cutlery and machinery, kerosene, glass and earthenware; and the exports of cattle, sugar, tobacco, coffee, coco-nuts and fibre, dividivi and dye-woods, vegetable ivory, rubber, hides and skins, medicinal forest products, gold, silver and platinum. The aggregate value of the exports in 1906 was $3,788,094 U. S. gold.

Cartagena was founded in 1533 by Pedro de Heredia. In 1544 it was captured by pirates, who plundered the town; in 1585 by Sir Francis Drake, who exacted a large ransom; and in 1697 by the French, who obtained from it more than £1,000,000. In 1741 Admiral Vernon unsuccessfully besieged the town. It was taken by Bolívar in 1815, but was surrendered to the royalists in the same year. It was recaptured by the republicans on the 25th of September 1821, and thereafter remained in their possession. It figured prominently in the political agitations and revolutions which followed, and underwent a siege in the civil war of 1885. It was an important naval station under Spanish colonial rule, and is the principal naval station of Colombia.

CARTAGENA, or CARTHAGENA, a seaport of south-eastern Spain, in the province of Murcia; in 37° 36′ N. and 0° 58′ W., at the terminus of a branch railway from the city of Murcia, and on the Mediterranean Sea. Pop. (1900) 99,871. Cartagena is fortified, and possesses an arsenal and naval dockyards. Together with Ferrol and San Fernando near Cadiz, the other great naval stations of Spain, it is governed by an admiral with the title of captain-general. It has also an episcopal see.

The city stands on a hill separated by a little plain from the harbour; towards the north and east it communicates with a fertile valley; on the south and west it is hemmed in by high mountains. Its grey houses have a neglected, almost a dilapidated appearance, from the friable stone of which they are constructed; and there are no buildings of antiquarian interest or striking architectural beauty, except, perhaps, the ruined citadel and the remnants of the town walls. The wide streets are traversed by a system of tramways, which pass through modern suburbs to the mining district about two leagues inland, and on the west a canal enables small vessels to enter the town without using the port. The harbour, the largest in Spain after that of Vigo, and the finest on the east coast, is a spacious bay, deep, except near its centre, where there is a ledge of rock barely 5 ft. under water. It is dominated, on the seaward side, by four hills, and approached by a narrow entrance, with forts on either hand; a breakwater affords shelter on the east, and on the west is the Arsenal Basin, often regarded as the original harbour of the Carthaginians and Romans. The island called La Escombrera, the ancient *Scombraria* (*i.e.* "mackerel fishery"), 2½ m. south, protects Cartagena from the violence of wind and waves.

The mines near the city are very productive, and thousands of men and beasts are employed in transporting lead, iron, copper, zinc and sulphur to the coast. The industrial and commercial progress of Cartagena was much hindered, during the first half of the 19th century, by the prevalence of epidemic diseases, the abandonment of the arsenal, and rivalry with the neighbouring port of Alicante. Its sanitary condition, though still defective, was improved by the drainage of the adjacent Almajar Marsh; and after 1870, when the population had dwindled to about 26,000, Cartagena advanced rapidly in size and wealth. The opening of the railway enabled it to compete successfully with Alicante, and revived the mining and metallurgical industries, while considerable sums were expended on bringing the coast and land defences up to date, and adding new quays, docks and other harbour works. As a naval station, Cartagena suffered severely in 1898 from the maritime disasters of the Spanish-American War; and its commerce was much affected when, at the beginning of the same year, Porman, or Portman, a mining village on a well-sheltered bay about 11 m. east, was declared by royal order an independent port. Vessels go to Porman to land coke and coal, and to load iron ore and lead. From Cartagena the principal exports are metallic ores, esparto grass, wine, cereals and fruit. Esparto grass, which grows freely in the vicinity, is the *spartum*, or Spanish broom, which gave the town its Roman designation of *Carthago Spartaria*. It is still used locally for making shoes, ships' cables, mats and a kind of spun cloth. Timber is largely imported from the United States, Sweden and Russia; coal from Great Britain; dried codfish from Norway and Newfoundland. In 1904, exclusive of coasters and small craft trading with north-west Africa, 562 ships of 604,208 tons entered the port of Cartagena, 259 being British and 150 Spanish; while 90 vessels were accommodated at Porman.

Cartagena was founded about the year 243 B.C. by the Carthaginian Hasdrubal, and was called *Carthago Nova* or New Carthage, to distinguish it from the African city of Carthage. It was conveniently situated opposite to the Carthaginian territory in Africa, and was early noted for its harbour. Its silver and gold mines were the source of great wealth both to the Carthaginians and to the Romans. In 210 B.C. this important place, the headquarters and treasure city of the Punic army, was stormed and taken with great slaughter by P. Scipio. The city continued to flourish under the Romans, who made it a colony, with the name *Colonia Victrix Julia Nova Carthago*. In A.D. 425 it was pillaged and nearly destroyed by the Goths. Cartagena was a bishopric from about 400 to 1289, when the see was removed to Murcia. Under the Moors it became an independent principality, which was destroyed by Ferdinand II. of Castile in 1243, restored by the Moors, and finally conquered by James I. of Aragon in 1276. It was rebuilt by Philip II. of Spain (1527–1598) for the sake of its harbour. In 1585 it was sacked by an English fleet under Sir Francis Drake. In 1706, in the War of the Spanish Succession, it was occupied by Sir John Leake; and in the next

year it was retaken by the duke of Berwick. On the 5th of November 1823 it capitulated to the French. In consequence of the insurrection in Spain, Cartagena was in 1844 again the scene of warfare. On the 23rd of August 1873 it was bombarded by the Spanish fleet under Admiral Lobos; on the 11th of October a battle took place off the town, between the ships of the government and the rebels, and on the 12th of January 1874 Cartagena was occupied by the government troops.

See *Biblioteca histórica de Cartagena*, by G. Vicent y Portillo (Madrid, 1889, &c.); *Fechos y fechas de Cartagena*, by I. Martinez Rito (Cartagena, 1894); and *Serie de los obispos de Cartagena*, by P. Diaz Casson (Madrid, 1895).

CARTAGO, the capital of the province of Cartago, in Costa Rica, Central America; 13 m. E.S.E. of San José by the trans-continental railway. Pop. (1900) 4536. Cartago is built 4930 ft. above sea-level, on the fertile and beautiful plateau of San José, and at the southern base of the volcano Irazú (11,200 ft.). Some of its older buildings, especially the churches, are of considerable interest; but all bear marks of the volcanic disturbances from which the town has suffered on many occasions—notably in 1723, when it was nearly overwhelmed by the bursting of the flooded crater of Irazú, and in 1841, when it was shattered by an earthquake. There are hot mineral springs much frequented by invalids at Bella Vista, a suburb connected with the town by a tramway 3 m. long. The local trade is chiefly in coffee of fine quality, which is readily cultivated in the rich volcanic soil of the neighbourhood. Cartago is said to have been in existence as early as 1522; it was probably named in 1563 by the Spaniard Vazquez de Coronado, to whom its foundation is often ascribed. Though several times plundered by buccaneers, it retained its importance as the capital of Costa Rica until 1823, when it is said by tradition to have contained 30,000 inhabitants. Its prosperity rapidly diminished after the transference of the seat of government to San José, in 1823, but somewhat revived with the development of railways after 1871.

CARTE, THOMAS (1686–1754), English historian, was born at Dusmoon, near Clifton. He was educated at Oxford, and was first brought into notice by his controversy with Dr Henry Chandler regarding the Irish massacre, in which he defended Charles I. His attachment to the Stuarts also caused him to remain a non-juror, and on the discovery of the plot of Atterbury, whose secretary he was, he was forced to flee to France. There he collected materials for an English edition of De Thou and Rigault, which were purchased and published by Dr Mead. Being recalled to England through the influence of Queen Caroline, he published, in 1738, *A General Account of the Necessary Materials for a History of England*. The first volume of his *General History of England*, which is only of value for its vast and careful collection of facts, was published in 1747. By the insertion in it of the statement that the king's evil had been cured by the Pretender, Carte forfeited the favour of most of his patrons. He, however, continued to publish; and the 2nd volume appeared in 1750, the 3rd in 1752, the 4th in 1755. He published also a *Life of James, duke of Ormond*, containing a collection of letters, &c. (3 vols., 1735–1736; new ed., in 6 vols., Oxford, 1851), and a *History of the Revolutions of Portugal*, with letters of Sir R. Southwell during his embassy there (London, 1740). His papers became the property of the university of Oxford, and were deposited in the Bodleian library.

CARTER, ELIZABETH (1717–1806), English poet and translator, daughter of the Rev. Nicholas Carter, was born at Deal, in Kent, on the 16th of December 1717. Dr Carter educated his children, boys and girls, alike; but Elizabeth's slowness tired his patience, and it was only by great perseverance that she conquered her natural incapacity for learning. She studied late at night and early in the morning, taking snuff and chewing green tea to keep herself awake; thus causing severe injury to her health. She learned Greek and Latin, and Dr Johnson said concerning a celebrated scholar that he "understood Greek better than any one whom he had ever known except Elizabeth Carter." She learned also Hebrew, French, German, Italian, Spanish, Portuguese, and lastly some Arabic. She studied astronomy, ancient geography, and ancient and modern history. Edward Cave was a friend of Dr Carter, and in 1734 some of Elizabeth's verses, signed "Eliza," appeared in the *Gentleman's Magazine*, to which she contributed for many years. In 1738 Cave published her *Poems upon Particular Occasions*; in 1739 she translated from the French an attack on Pope's *Essay on Man* by J. P. de Crousaz; and in the same year appeared her translation from the Italian of Algarotti's *Newtonianismo per le Dame*, under the title of *Sir Isaac Newton's Philosophy explained for the use of the Ladies, in six Dialogues on Light and Colour*. Her translation of Epictetus (1758) was undertaken in 1749 to please her friends, Thomas Secker (afterwards archbishop of Canterbury) and his niece, Catherine Talbot, to whom the translation was sent, sheet by sheet, as it was done. In 1762 Miss Carter printed a second collection of *Poems on Several Occasions*. Her letters to Miss Talbot contain an account of a tour on the continent undertaken in 1763 in company with Edward and Elizabeth Montagu and William Pultency, 1st earl of Bath. Dr Carter, from 1762 to his death in 1774, lived with his daughter in a house at Deal, which she had purchased. An annuity was settled on her by Sir William Pulteney and his wife, who had inherited Lord Bath's fortune; and she had another annuity from Mrs Montagu. Among Miss Carter's friends and correspondents were Samuel Johnson, Bishop Butler, Richard Savage, Horace Walpole, Samuel Richardson, Edmund Burke, Hannah More, and Elizabeth Vesey, who was a leader of literary society. She died in Clarges Street, Piccadilly, on the 19th of February 1806.

Her *Memoirs* were published in 1807; her correspondence with Miss Talbot and Mrs Vesey in 1809; and her letters to Mrs Montagu in 1817. See also *A Woman of Wit and Wisdom* (1906), a biography by Alice C. C. Gaussen.

CARTERET, SIR GEORGE (*c.* 1610–1680), English politician, was born between 1609 and 1617 on the island of Jersey, where his family had long been prominent landholders. He was the son of Helier de Carteret of St Ouen, and in his youth was trained to follow the sea. In 1639 he became comptroller of the English navy. During the Civil War he was active in behalf of the king. In 1643 he succeeded by reversion from his uncle, Sir Philip Carteret, to the post of bailiff of Jersey, and in the same year was appointed by the king lieutenant-governor of the island. After subduing the Parliamentary party in the island, he was commissioned (1644) a vice-admiral of Jersey and "the maritime parts adjacent," and by virtue of that office he carried on from there an active privateering campaign in the Royalist cause. Parliament branded him as a pirate and excluded him specifically from future amnesty. His rule in Jersey was severe, but profitable to the island; he developed its resources and made it a refuge for Royalists, among whom in 1646 and again in 1649–1650 was Prince Charles, who created Carteret a knight and baronet. In 1650, in consideration of Carteret's services, Charles granted to him "a certain island and adjacent islets near Virginia, in America," which were to be called New Jersey; but no settlement upon this grant was made. In 1651 Carteret, after a seven weeks' siege, was compelled to surrender Jersey to a Parliamentary force; he then joined the Royalist exiles in France, where for a time he held a command in the French navy. He returned to England at the Restoration, became a privy councillor, sat in parliament for Portsmouth, and also served as vice-chamberlain of the royal household, a position to which he had been appointed in 1647. From 1661 to 1667 he was treasurer of the navy. He rendered valuable service during the Dutch War, but his lax methods of keeping accounts led to his being censured by parliament. In 1667 he became a deputy treasurer of Ireland. He continued nevertheless in the royal favour, and subsequently was appointed one of the commissioners of the admiralty and a member of the board of trade and plantations. He belonged to that group of courtiers interested in the colonization of America, and was one of the eight to whom Charles II. granted the country of the Carolinas by the charters of 1663 and 1665. In 1664 James, duke of York, granted that part of his American territory between the Hudson and Delaware rivers to Sir George Carteret

and John, Lord Berkeley, and in Carteret's honour this tract received the name of New Jersey. Sir George's relative, Philip Carteret (d. 1682), was sent over as governor in 1665, but was temporarily deposed in 1672 by the discontented colonists, who chose James Carteret (perhaps a natural son of Sir George) as "president." Philip Carteret was restored to his office in 1674. In this year Lord Berkeley disposed of his share of the grant, which finally fell under the control of William Penn and his associates. With them Carteret agreed (1676) upon a boundary line which divided the colony into East and West Jersey. He died in January 1680, and two years later his heirs disposed of his New Jersey holdings to Penn and other quakers.

CARTESIANISM,[1] the general name given to the philosophy developed principally in the works of Descartes, Malebranche and Spinoza. It is impossible to exhibit the full meaning of these authors except in connexion, for they are all ruled by one and the same thought in different stages of its evolution. It may be true that Malebranche and Spinoza were prepared, the former by the study of Augustine, the latter by the study of Jewish philosophy, to draw from Cartesian principles consequences which Descartes never anticipated. But the foreign light did not alter the picture on which it was cast, but only let it be seen more clearly. The consequences were legitimately drawn. It may be shown that they lay in the system from the first, and that they were evolved by nothing but its own immanent dialectic. At the same time it is not likely that they would ever have been brought into such clear consciousness, or expressed with such consistency, except by a philosopher whose circumstances and character had completely detached him from all the convictions and prejudices of the age. In Malebranche, Cartesianism found an interpreter whose meditative spirit was fostered by the cloister, but whose speculative boldness was restrained by the traditions of the Catholic church. In Spinoza it found one who was in spirit and position more completely isolated than any monk, who was removed from the influence of the religious as well as the secular world of his time, and who in his solitude seemed scarcely ever to hear any voice but the voice of philosophy. It is because Cartesianism found such a pure organ of expression that its development is, in some sense, complete and typical. Its principles have been carried to their ultimate result, and we have before us all the data necessary to determine their value.

The Philosophy of Descartes.—Descartes was, in the full sense of the word, a partaker of the modern spirit. He was equally moved by the tendencies that produced the Reformation, and the tendencies that produced the revival of letters and science. Like Erasmus and Bacon, he sought to escape from a transcendent and unreal philosophy of the other world, to the knowledge of man and the world he lives in. But like Luther, he found within human experience, among the matters nearest to man, the consciousness of God, and therefore his renunciation of scholasticism did not end either in materialism or in that absolute distinction between faith and reason which inevitably leads to the downfall of faith. What was peculiar to Descartes, however, was the speculative interest which made it impossible for him to rest in mere experience, whether of things spiritual or of things secular, which made him search, both in our consciousness of God and our consciousness of the world, for the links by which they are bound to the consciousness of self. In both cases it is his aim to go back to the beginning, to retrace the unconscious process by which the world of experience was built up, to discover the hidden logic that connects the different parts of the structure of belief, to substitute a reasoned system, all whose elements are interdependent, for an unreasoned congeries of opinions. Hence his first step involves reflection, doubt and abstraction. Turning the eye of reason upon itself, he tries to measure the value of that collection of beliefs of which he finds himself possessed; and the first thing that reflection seems to discover is its accidental and unconnected character. It is a mass of incongruous materials, accumulated without system and untested. Its elements have been put together under all kinds of influences, without any conscious intellectual process, and therefore we can have no assurance of them. In order that we may have such assurance we must unweave the web of experience and thought which we have woven in our sleep, that we may begin again at the beginning and weave it over again with "clear and distinct" consciousness of what we are doing. *De omnibus dubitandum est.* We must free ourselves by one decisive effort from the weight of custom, prejudice and tradition with which our consciousness of the world has been overlaid, that in that consciousness in its simplest and most elementary form we may find the true beginning of knowledge. The method of doubt is at the same time a method of abstraction, by which Descartes rises above the thought of the particular objects of knowledge, in order that he may find the primary truth in which lies the very definition of knowledge, or the reason why anything can be said to be true. First disappears the whole mass of dogmas and opinions as to God and man which are confessedly received on mere authority. Then the supposed evidence of sense is rejected, for external reality is not immediately given in sensation. It is acknowledged by all that the senses often mislead us as to the nature of things without us, and perhaps they may also mislead us as to there being anything without us at all. Nay, by an effort, we can even carry doubt beyond this point; we can doubt even mathematical truth. When, indeed, we have our thoughts directed to the geometrical demonstration, when the steps of the process are immediately before our minds, we cannot but assent to the proposition that the angles of a triangle are equal to two right angles; but when we forget or turn away our thoughts from such demonstration, we can imagine that God or some powerful spirit is playing upon our minds to deceive them, also that even our most certain judgments may be illusory. In this naïve manner does Descartes express the idea that there are necessities of thought prior to, and presupposed in the truth of geometry. He is seeking to strip thought of all the "lendings" that seem to come to it from anything but itself, of all relation to being that can be supposed to be given to it from without, that he may discover the primary unity of thought and being on which all knowledge depends. And this he finds in pure self-consciousness. Whatever I abstract from, I cannot abstract from self, from the "I think" that, as Kant puts it, accompanies all our ideas; for it was in fact the very independence of this universal element on the particulars that made all our previous abstraction possible. Even doubt rests on certitude; alone with self I cannot get rid of this self. By an effort of thought I separate my thinking self from all that I think, but the thinking self remains, and in thinking I am. *Cogito, ergo sum:* "I think, therefore I am." The objective judgment of self-consciousness is bound up with or involved in the very faculty of judging, and therefore remains when we abstract from all other objective judgments. It is an assertion involved in the very process by which we dismiss all other assertions. Have we not then a right to regard it as a primitive unity of thought and being, in which is contained, or out of which may be developed, the very definition of truth?

Principle of doubt.

Certainty of the thinking self.

The sense in which Descartes understood his first principle becomes clearer when we look at his answers to the objections made against it. On the one hand it was challenged by those who asked, like Gassendi, why the argument should be based especially on thought, and why we might not say with as good a right, *ambulo, ergo sum:* "I walk, therefore I am." Descartes explains that it is only as referred to consciousness that walking is an evidence of my existence; but if I say, "I am conscious of walking, therefore I exist," this is equivalent to saying, "I think in one particular way, therefore I exist." But it is not thinking in a particular way, but thinking in general that is coextensive with my existence. I am not always conscious of walking or of any other special state or object, but I am always conscious, for except in consciousness there is no ego or self, and where there is consciousness there is always an ego. "Do I then always think, even in sleep?" asks the objector; and Descartes exposes himself to the criticisms of Locke, by maintaining that it is impossible that there should ever be an interval in the activity of consciousness, and by insisting that as man is essentially a thinking substance, the child thinks, or is self-conscious, even in its mother's womb. The difficulty disappears when we observe that the question as to the conditions under which self-consciousness is developed in

Difficulties of the "cogito, ergo sum."

[1] For biographical details see DESCARTES; MALEBRANCHE; SPINOZA.

the individual human subject does not affect the nature of self-consciousness in itself or in its relation to knowledge. The force of Descartes's argument really lies in this, that the world as an intelligible world exists only for a conscious self, and that therefore the unity of thought and being in self-consciousness is presupposed in all knowledge. Of this self it is true to say that it exists only as it thinks, and that it thinks always. *Cogito, ergo sum* is, as Descartes points out, not a syllogism, but the expression of an identity which is discerned by the simple intuition of the mind.[1] If it were otherwise, the major "*omne quod cogitat existit*" would require to have been known before the minor "*cogito*"; whereas on the contrary it is from the immediate consciousness of being as contained in self-consciousness that that major can alone be derived. Again, when Hobbes and others argued that thinking is or may be a property of a material substance, Descartes answers that the question whether the material and the thinking substance are one does not meet us at the outset, but can only be solved after we have considered what is involved in the conception of these different substances respectively.[2] In other words, to begin by treating thinking as a quality of a material substance, is to go outside of the intelligible world for an explanation of the intelligible world. It is to ask for something prior to that which is first in thought. If it be true that the consciousness of self is that from which we cannot abstract, that which is involved in the knowledge of anything, then to go beyond it and seek for a reason or explanation of it in anything else is to go beyond the beginning of knowledge; it is to ask for a knowledge before knowledge.

Descartes, however, is himself unfaithful to this point of view; for, strictly taken, it would involve the consequence, not only that there is nothing prior to the pure consciousness of self, but that there can be no object which is not in necessary relation to it. Hence there can be no absolute opposition between thought and anything else, no opposition which thought itself does not transcend. But Descartes commits the error of making thought the property of a substance, a *res cogitans*, which as such can immediately or directly apprehend nothing but thoughts or ideas; while, altogether outside of these thoughts and ideas, there is another substance characterized by the property of extension, and with which thought has nothing to do. Matter in space is thus changed, in Kantian language, into a "thing in itself," an object out of all relation to the subject; and on the other hand, mind seems to be shut up in the magic circle of its own ideas, without any capacity of breaking through the circle or apprehending any reality but itself. Between thought and being, in spite of their *subjective* unity in self-consciousness, a great gulf seems still to be fixed, which cannot be crossed unless thought should become extended, or matter think. But to Descartes the dualism is absolute, because it is a presupposition with which he starts. Mind cannot go out of itself, cannot deal with anything but thought, without ceasing to be mind; and matter must cease to be matter ere it can lose its absolute externality, its nature as having *partes extra partes*, and acquire the unity of mind. They are opposed as the divisible and the indivisible, and there is no possible existence of matter in thought except a representative existence. The ideal (or, as Descartes calls it, objective) existence of matter *in* thought and the real (or, as Descartes calls it, formal) existence of matter *out of* thought are absolutely different and independent things.

It was, however, impossible for Descartes to be content with a subjective idealism that confined all knowledge to the tautological expression of self-consciousness "I am I," "What I perceive I perceive." If the individual is to find in his self-consciousness the principle of all knowledge, there must be something in it which transcends the distinction of self and not self, which carries him beyond the limit of his own individuality. What then is the point where the subjective consciousness passes out into the objective, from which it seemed at first absolutely excluded? Descartes answers that it is through the connexion of the consciousness of self with the consciousness of God. It is because we find God in our minds that we find anything else. The proof of God's existence is therefore the hinge on which the whole Cartesian philosophy turns, and it is necessary to examine the nature of it somewhat closely.

Proof of existence of God.

Descartes, in the first place, tries to extract a criterion of truth out of the *cogito, ergo sum*. Why am I assured of my own existence? It is because the conception of existence is at once and immediately involved in the consciousness of self. I can logically distinguish the two elements, but I cannot separate them; whenever I clearly and distinctly conceive the one, I am forced to think the other along with it. But this gives me a rule for all judgments whatever, a principle which is related to the *cogito, ergo sum* as the formal to the material principle of knowledge. Whatever we cannot separate from the clear and distinct conception of anything, necessarily belongs to it in reality; and on the other hand, whatever we can separate from the clear and distinct conception of anything, does not necessarily belong to it in reality. Let us therefore set an object clearly before us, let us sever it in thought so far as is possible from all other objects, and we shall at once be able to determine what properties and relations are essential and what are not essential to it. And if we find empirically that any object manifests a property or relation not involved in the clear and distinct conception of it, we can say with certainty that such property or relation does not belong to it except by arbitrary arrangement, or, in other words, by the external combination of things which in their own nature have no affinity or connexion.

Now, by the application of this principle, we might at once assure ourselves of many mathematical truths; but, as has been already shown, there is a point of view from which we may doubt even these, so long as the idea of a God that deceives us is not excluded. If it is not certain that there is a God that cannot lie, it is not certain that there is an objective matter in space to which mathematical truth applies. But the existence of God may be proved in two ways. In the first place, it may be proved through the principle of causality, which is a self-evident truth. We have in our mind many ideas, and according to the principle of causality, all these ideas must be derived from something that contains a "formal" reality which corresponds to their "objective" reality, *i.e.* which contains at least as much reality in its existence out of thought as they contain in their existence in thought. Now we might derive from ourselves not only the ideas of other minds like ourselves, but possibly also of material objects, since these are lower in the scale of existence than ourselves, and it is conceivable that the idea of them might be got by omitting some of the qualities which distinguish ourselves. But the idea of God, of a being who is eternal and immutable, all-powerful, all-wise, and all-good, cannot be derived from our own limited and imperfect existence. The origin, therefore, must be sought in a being who contains actually in himself all that is contained in our idea of him.

It was objected by some of the critics of Descartes that the idea of God as the infinite Being is merely negative, and that it is derived from the finite simply by abstracting from its conditions. Descartes answers that the case is just the reverse—the infinite is the positive idea, and the finite is the negative, and therefore the former is the presupposition of the latter. As Kant, at a later date, pointed out that space is not a general conception, abstracted from the ideas of particular spaces, and representing the common element in them, but that, on the contrary, the ideas of particular spaces are got by the limitation of the one infinite space that is prior to them, so Descartes maintains in general that the idea of the finite is had only by limitation of the infinite, and not the idea of the infinite by abstraction from the particular determinations of the finite. It is a necessary consequence of this that the self-consciousness of a finite being is bound up with the consciousness of the infinite. Hence the idea of God is not merely one among other ideas which we have, but it is the one idea that is necessary to our very existence as thinking beings, the idea through which alone we can think ourselves, or anything else. "I ought never to suppose," says Descartes, "that my conception of the infinite is a negative idea, got by negation of the finite, just as I conceive repose to be merely negation of movement, and darkness merely the negation of light. On the contrary, I see manifestly that there is more reality in the infinite than in the finite substance, and that therefore I have in me the notion of the infinite, *even in some sense prior to the notion of the finite*, or, in other words, that the notion of myself in some sense presupposes the notion of God; for how could I doubt or desire, how could I be conscious of anything as a want, how could I know that I am not altogether perfect, if I had not in me the idea of a being more perfect than myself, by comparison with whom I recognize the defects of my own existence?"[3] Descartes then goes on in various ways to illustrate the thesis that the consciousness of a defective and growing nature cannot give rise to the idea of infinite perfection, but on the contrary presupposes it. We could not think of a series of approximations unless there were somehow present to us the idea of the completed infinite as the goal we aim at. If we had not the consciousness of ourselves as finite *in relation* to the infinite, either we should not be conscious of

Descartes's metaphysics.

[1] *Resp. ad secundas objectiones*, p. 74,—quoting from the Elzevir edition.

[2] *Resp. ad tertias object.* p. 94.

[3] *Meditatio tertia*, p. 21.

ourselves at all, or we should be conscious of ourselves as infinite. The image of God is so impressed by him upon us, that we "conceive that resemblance wherein the idea of God is contained by the same faculty whereby we are conscious of ourselves." In other words, our consciousness of ourselves is at the same time consciousness of our finitude, and hence of our relation to a being who is infinite.

The principle which underlies the reasoning of Descartes is, that to be conscious of a limit, is to transcend it. We could not feel the limits either upon our thought or upon our existence, we could not doubt or desire, if we did not already apprehend something beyond these limits. Nay, we could not be conscious of our existence as individual selves if we were not conscious of that which is not ourselves, and of a unity in which both self and not-self are included. Our individual life is therefore to us as self-conscious beings a part of a wider universal life. Doubt and aspiration are but the manifestation of this essential division and contradiction of a nature which, as conscious of itself, is at the same time conscious of the whole in which it is a part. And as the existence of a self and its consciousness are one, so we may say that a thinking being is not only an individual, but always in some sense identified with that universal unity of being to which it is essentially related.

If Descartes had followed out this line of thought, he would have been led at once to the pantheism of Spinoza, if not beyond it. As it is, he is on the verge of contradiction with himself when he speaks of the consciousness of God as *in some sense* prior to the consciousness of self. How can anything be prior to the first principle of knowledge? It is no answer to say that the consciousness of God is the *principium essendi*, while the consciousness of self is the *principium cognoscendi*. For, if the idea of God is prior to the idea of self, knowledge must begin where existence begins, with God. The words "in some sense," with which Descartes qualifies his assertion of the priority of the idea of God, only betray his hesitation and his partial consciousness of the contradiction in which he is involved. Some of Descartes's critics presented this difficulty to him in another form, and accused him of reasoning in a circle when he said that it is because God cannot lie that we are certain that our clear and distinct ideas do not deceive us. The very existence of the conscious self, the *cogito, ergo sum*, which is the first of all truths and therefore prior in certitude to the existence of God, is believed only because of the clearness and distinctness with which we apprehend it. How then, they argued, could God's truthfulness be our security for a principle which we must use in order to prove the being of God? The answer of Descartes is somewhat lame. We cannot doubt any self-evident principle, or even any truth based on a self-evident principle, when we are directly contemplating it in all the necessity of its evidence; it is only when we forget or turn away from this evidence, and begin to think of the possibility of a deceitful God, that a doubt arises which cannot be removed except by the conviction that God is true.[1] It can scarcely be said that this is a *dignus vindice nodus*, or that God can fitly appear as a kind of second-best resource to the forgetful spirit that has lost its direct hold on truth and its faith in itself. God, truth, and the human spirit are thus conceived as having merely external and accidental relations with each other. What Descartes, however, is really expressing in this exoteric way is simply that beneath and beyond all particular truths lies the great general truth of the unity of thought and existence. In contemplating particular truth, we may not consciously relate it to this unity, but when we have to defend ourselves against scepticism we are forced to realize this relation. The ultimate answer to any attack upon a special aspect or element of truth must be to show that the fate of truth itself, the very possibility of knowledge, is involved in the rejection of it, and that we cannot doubt it without doubting reason itself. But to doubt reason is, in the language of Descartes, to doubt the truthfulness of God, for, in his view, the idea of God is involved in the very constitution of reason. Taken in this way then, the import of Descartes's answer is, that the consciousness of self, like every other particular truth, is not at first seen to rest on the consciousness of God, but that when we realize what it means we see that it does so rest. But if this be so, then in making the consciousness of self his first principle of knowledge, Descartes has stopped short of the truth. It can only be the first principle if it is understood, not as the consciousness of the individual self, but in a sense in which the consciousness of self is identical with the consciousness of God.

Descartes, however, is far from a clear apprehension of the ultimate unity of thought and being, which nevertheless he strives to find in God. Beginning with an absolute separation of the *res cogitans* from the *res extensa*, he is continually falling back into dualism just when he seemed to have escaped from it. Even in God the absolute unity, idea and reality fall asunder; our idea of God is not God in us, it is only an idea of which God's existence is the cause. But the category of causality, if it forms a bridge between different things, as here between knowing and being, at the same time repels them from each other. It is a category of external relation which may be adequate to express the relation of the finite to the finite, but not the relation of the finite to the infinite. We cannot conceive God as the cause of our idea of him, without making God a purely objective and therefore finite existence. Nor is the case better when we turn to the so-called ontological argument,—that existence is necessarily involved in the idea of God, just as the property of having its angles equal to two right angles is involved in the idea of a triangle. If indeed we understood this as meaning that thought transcends the distinction between itself and existence, and that therefore existence cannot be a thing in itself out of thought, but must be an intelligible world that exists as such only for the thinking being, there is some force in the argument. But this meaning we cannot find in Descartes, or to find it we must make him inconsistent with himself. He was so far from having quelled the phantom "thing in itself," that he treated matter in space as such a thing, and thus confused externality of space with externality to the mind. On this dualistic basis, the ontological argument becomes a manifest paralogism, and lies open to all the objections that Kant brought against it. That the idea of God involves existence, proves only that God, if he exists at all, exists by the necessity of his being. But the link that shall bind thought to existence is still wanting, and, in consistency with the other presuppositions of Descartes, it cannot be supplied.

But again, even if we allow to Descartes that God is the unity of thought and being, we must still ask what kind of unity? Is it a mere generic unity, reached by abstraction, and therefore leaving out all the distinguishing characteristics of the particulars under it? Or is it a concrete unity to which the particular elements are subordinated, but in which they are nevertheless included? To answer this question, we need only look at the relation of the finite to the infinite, as it is expressed in that passage already quoted, and in many others. Descartes always speaks of the infinite as a purely affirmative or positive existence, and of the finite in so far as it is distinguished from the infinite, as purely negative, or in other words as a nonentity. "I am," he says, "a mean between God and nothing, between the Supreme Being and not-being. In so far as I am created by God, there is nothing in me that can deceive me or lead me into error. But on the other hand, if I consider myself as participating in nothingness or not-being, inasmuch as I am not myself the Supreme Being, but in many ways defective, I find myself exposed to an infinity of errors. Thus error as such is not something real that depends on God, but simply a defect; I do not need to explain it by means of any special faculty bestowed on me by God, but merely by the fact that the faculty for discerning truth from error with which he has endowed me, is not infinite."[2] But if we follow out this principle to its logical result, we must say not only that error is a consequence of finitude, but also that the very *existence* of the finite as such is an error or illusion. All finitude, all determination, according to the well-known Spinozistic aphorism, is negation, and negation cannot constitute reality. To know the reality of things, therefore, we have to abstract from their limits, or in other words, the only reality is the infinite. Finite being, *qua* finite, has no existence, and finite self-consciousness, consciousness of a self in opposition to or limited by a not-self, is an illusion. But Descartes does not thus reason. He does not see "anything in the nature of the infinite which should exclude the existence of finite things." "What," he asks, "would become of the power of that imaginary infinite if it could create nothing? Perceiving in ourselves the power of thinking, we can easily conceive that there should be a greater intelligence elsewhere. And even if we should suppose that intelligence increased *ad infinitum*, we need not fear that our own would be lessened. And the same is true of all other attributes which we ascribe to God, even of his power, provided only that we do not suppose that the power in us is not subjected to God's will. In all points, therefore, he is infinite without any exclusion of created things."[3] The truth of this view we need not dispute; the question is as to its consistency with Cartesian principles. It may be a higher idea of God to conceive him as revealing himself in and to finite creatures; but it is a different idea from that which is implied in Descartes's explanations of error. It is an inconsistency that brings Descartes nearer to Christianity, and nearer, it may also be said, to a true metaphysic; but it is not the less an inconsistency with his fundamental principles, which necessarily disappears in their subsequent development. To conceive the finite as constituted not merely by the absence of some of the positive elements of the infinite, but as in necessary unity with the infinite; to conceive the infinite as not merely that which has no limits or determinations, but as that which is self-determined and self-manifesting, which through all finitude and manifestation returns upon itself, may not be erroneous. But it would not be difficult to show that the adoption of such a conception involves the rejection or modification of almost every doctrine of the Cartesian system.

Mind and matter.

In connexion with this inconsistency we may notice the very different relations in which Descartes conceives mind on the one side and matter on the other, to stand towards God, who yet is the cause of both, and must therefore, by the principle of causality, contain in himself all that is in both. Matter and mind are to Descartes absolute opposites. Whatever can be asserted of mind can be denied of matter, whatever can be asserted of matter can be denied of mind. Matter is passive, mind is active; matter is extended, and therefore divisible *ad infinitum*;

[1] *Resp. quartae*, p. 234.

[2] *Meditatio quarta*, p. 26.

[3] *Resp. ad sec. object.* p. 75.

mind is an indivisible unity. In fact, though of this Descartes is not conscious, the determination of the one is mediated by its opposition to the other; the ideas of object and subject, the self and not-self, are terms of a relation distinguishable but inseparable. But in the idea of God we must find a unity which transcends this difference in one way or another, whether by combining the two under a higher notion, or, as it would be more natural to expect on Cartesian principles, by abstracting equally from the particular characteristics of both. Descartes really does neither, or rather he acts partly on the one principle and partly on the other. In his idea of God he abstracts from the properties of matter but not from those of mind. "God," he says, "contains in himself *formaliter* all that is in mind, but only *eminenter* all that is in matter"; [1] or, as he elsewhere expresses it more popularly, he *is* mind, but he is only the creator of matter. And for this he gives as his reason, that matter as being divisible and passive is essentially imperfect. *Ipsa natura corporis multas imperfectiones involvit*, and, therefore, "there is more analogy between sounds and colours than there is between material things and God." But the real imperfection here lies in the abstractness of the Cartesian conception of matter as merely extended, merely passive; and this is balanced by the equal abstractness of the conception of mind or self-consciousness as an absolutely simple activity, a pure intelligence without any object but itself. If matter as absolutely opposed to mind is imperfect, mind as absolutely opposed to matter is equally imperfect. In fact they are the elements or factors of a unity, and lose all meaning when severed from each other, and if we are to seek this unity by abstraction, we must equally abstract from both.

The result of this one-sidedness is seen in the fact that Descartes, who begins by separating mind from matter, ends by finding the essence of mind in pure will, *i.e.* in pure formal self-determination. Hence God's will is conceived as absolutely arbitrary, not determined by any end or law, for all laws, even the necessary truths that constitute reason, spring from God's determination, and do not precede it. "He is the author of the essence of things no less than their existence," and his will has no reason but his will. In man there is an intelligence with eternal laws or truths involved in its structure, which so far limits his will. "He finds the nature of good and truth already determined by God, and his will cannot be moved by anything else." His highest freedom consists in having his will determined by a clear perception of the nature of good and truth, and "he is never indifferent except when he is ignorant of it, or at least does not see it so clearly as to be lifted above the possibility of doubt." [2] Indifference of will is to him "the lowest grade of liberty," yet, on the other hand, in nothing does the image of God in him show itself more clearly than in the fact that his will is not limited by his clear and distinct knowledge, but is "in a manner infinite." For "there is no object of any will, even the infinite will of God, to which our will does not extend." [3] Belief is a free act, for as we can yield our assent to the obscure conceptions presented by sense and the imagination, and thus allow ourselves to be led into error, so on the other hand we can refuse to give this assent, or allow ourselves to be determined by anything but the clear and distinct ideas of intelligence. That which makes it possible for us to err is that also in which the divine image in us is most clearly seen. We cannot have the freedom of God whose will creates the object of his knowledge; but in reserving our assent for the clear and distinct perceptions of intelligence, we, as it were, re-enact for ourselves the divine law, and repeat, so far as is possible to finite beings, the transcendent act of will in which truth and good had their origin.

Reason and will.

The inherent defect of this view is the divorce it makes between the form and the matter of intelligence. It implies that reason or self-consciousness is one thing, and that truth is another and quite different thing, which has been united to it by the arbitrary will of God. The same external conception of the relation of truth to the mind is involved in the doctrine of innate ideas. It is true that Descartes did not hold that doctrine in the coarse form in which it was attributed to him by Locke, but expressly declares that he has "never said or thought at any time that the mind required innate ideas which were separated from the faculty of thinking. He had simply used the word innate to distinguish those ideas which are derived from that faculty, and not from external objects or the determination of the will. Just as when we say generosity is innate in certain families, and in certain others diseases, like the gout or the stone, we do not mean to imply that infants in their mother's womb are affected with these complaints." [4] Yet Descartes, as we have seen, does not hold that these truths are involved in the very nature of intelligence as such, so that we cannot conceive a self-conscious being without them. On the contrary, we are to regard the divine intelligence as by arbitrary act determining that two and two should be four, or that envy should be a vice. We are "*not* to conceive eternal truth flowing from God as rays from the sun." [5] In other words, we are not to conceive all particular truths as different aspects of one truth. It is part of the imperfection of man's finite nature that he "finds truth and good determined for him." It is something given,—given, indeed, along with his very faculty of thinking, but still *given* as an external limit to it. It belongs not to his nature as spirit, but to his finitude as man.

After what has been said, it is obvious that the transition from God to matter must be somewhat arbitrary and external. God's truthfulness is pledged for the reality of that of which we have *clear and distinct ideas*; and we have clear and distinct ideas of the external world so long as we conceive it simply as extended matter, infinitely divisible, and moved entirely from without,—so long, in short, as we conceive it as the direct opposite of mind, and do not attribute to it any one of the properties of mind. "Omnes proprietates, quas in ea clare percipimus, ad hoc unum reducuntur, quod sit partibilis et mobilis, secundum partes." We must, therefore, free ourselves from the obscure and confused modes of thought which arise whenever we attribute any of the secondary qualities, which exist merely in our sensations, to the objects that cause these sensations. The subjective character of such qualities is proved by the constant change which takes place in them, without any change of the object in which they are perceived. A piece of wax cannot lose its extension; but its colour, its hardness, and all the other qualities whereby it is presented to sense, may be easily altered. What is objective in all this is merely an extended substance, and the modes of motion or rest through which it is made to pass. In like manner we must separate from our notion of matter all ideas of *actio in distans*,—*e.g.* we must explain weight not as a tendency to the centre of the earth or an attraction of distant particles of matter, but as a consequence of the pressure of other bodies, immediately surrounding that which is felt to be heavy. [6] For the only conceivable *actio in distans* is that which is mediated by thought, and it is only in so far as we suppose matter to have in it a principle of activity like thought, that we can accept such explanations of its motion. Again, while we must thus keep our conception of matter clear of all elements that do not belong to it, we must also be careful not to take away from it those that *do* belong to it. It is a defect of distinctness in our ideas when we conceive an attribute as existing apart from its substance, or a substance without its attribute; for this is to treat elements that are only separated by a "distinction of reason," as if they were distinct things. The conception of the possibility of a vacuum or empty space arises merely from our confusing the possible separation of any mode or form of matter from matter in general with the impossible separation of matter in general from its own essential attribute. Accordingly, in his physical philosophy, Descartes attempts to explain everything on mechanical principles, starting with the hypothesis that a certain quantity of motion has been impressed on the material universe by God at the first, a quantity which can never be lost or diminished, and that space is an absolute plenum in which motion propagates itself in circles.

Truth of external world.

It is unnecessary to follow Descartes into the detail of the theory of vortices. It is more to the purpose to notice the nature of the reasons by which he is driven to regard such a mechanical explanation of the universe as necessary. A real or substantive existence is, in his view, a *res completa*, a thing that can be conceived as a whole in itself without relations to any other thing. Now matter and mind are, he thinks, such complete existences, so long as we conceive them, as pure intelligence must conceive them, as abstract opposites of each other; and do not permit ourselves to be confused by those mixed modes of thought which are due to sense or imagination. Descartes does not see that in this very abstract opposition there is a bond of union between mind and matter, that they are correlative opposites, and therefore in their separation *res incompletae*. In other words, they are merely elements of reality substantiated by abstract thought into independent realities. He indeed partly retracts his assertion that mind and matter severed from each other are *res completae*, when he declares that neither can be conceived as existing apart from God, and that therefore, strictly speaking, God alone is a substance. But, as we have seen, he avoids the necessary inference that in God the opposition between mind and matter is reconciled or transcended, by conceiving God as abstract self-consciousness or will, and the material world not as his necessary manifestation, but simply as his creation,—as having its origin in an act of bare volition and that only. His God is the God of monotheism and not of Christianity, and therefore the world is to God always a foreign matter which he brings into being, and acts on from without, but in which he is not revealed.

Material universe a mechanism.

It is a natural consequence of this view that nature is essentially *dead matter*, that beyond the motion it has received from God at the beginning, and which it transmits from part to part without increase or diminution, it has no principle of activity in it. Every trace of vitality in it must be explained away as a mere false reflection upon it of the nature of mind. The world is thus "cut in two with a hatchet," and there is no attraction to overcome the mutual repulsion of its severed parts. Nothing can be admitted in the material half that savours of self-determination, all its energy must be communicated, not self-originated; there is no room for gravitation, still less for magnetism or chemical affinity, in this theory. *A fortiori*, animal life must be

Animals automata.

[1] *Resp. ad sec. object.* pp. 72-73.
[2] *Principia*, i. 35.
[3] *Epistolae*, i. 110.
[4] *Resp. Sextae*, 160-163.
[5] *Notae in Programma*, p. 184.
[6] *Resp. Sextae*, pp. 165-166.

completely explained away. The machine may be very complicated, but it is still, and can be nothing but, a machine. If we once admitted that matter could be anything but mechanical, we should be on the way to admit that matter could become mind. When a modern physical philosopher declares that everything, even life and thought, is ultimately reducible to matter, we cannot always be certain that he means what he seems to say. Not seldom the materialist *soi-disant*, when we hear his account of the properties of matter, turns out to be something like a spiritualist in disguise; but when Descartes asserted that everything *but* mind is material, and that the animals are automata, there is no such dubiety of interpretation. He said what he meant, and meant what he said, in the hardest sense his words can bear. *His* matter was not even gravitating, much less living; it had no property except that of retaining and transmitting the motion received from without by pressure and impact. And *his* animals were automata, not merely in the sense of being governed by sensation and instinct, but precisely in the sense that a watch is an automaton. Henry More cries out against the ruthless consequence with which he develops his principles to this result. "In this," he says, "I do not so much admire the penetrative power of your genius as I tremble for the fate of the animals. What I recognize in you is not only subtlety of thought, but a hard and remorseless logic with which you arm yourself as with a sword of steel, to take away life and sensation with one blow, from almost the whole animal kingdom." But Descartes was not the man to be turned from the legitimate result of his principles by a scream. "Nec moror astutias et sagacitates canum et vulpium, nec quaecunque alia propter cibum, venerem, aut metum a brutis fiunt. *Profiteor enim me posse perfacile illa omnia ut a sola membrorum conformatione profecta explicare.*" [1]

Nature of sensation.

The difficulty reaches its height when Descartes attempts to explain the union of the body and spirit in man. Between two substances which, when clearly and distinctly conceived, do not imply each other, there can be none but an artificial unity,—a unity of composition that still leaves them external to each other. Even God cannot make them one in any higher sense.[2] And as it is impossible in the nature of mind to see any reason why it should be embodied, or in the nature of matter to see any reason why it should become the organ of mind, the union of the two must be taken as a mere empirical fact. When we put on the one side all that belongs to intelligence, and on the other all that belongs to matter, there is a residuum in our ideas which we cannot reduce to either head. This residuum consists of our appetites, our passions, and our sensations, including not only the feelings of pain and pleasure, but also the perceptions of colour, smell, taste, of hardness and softness, and all the other qualities apprehended by touch. These must be referred to the union of mind with body. They are subjective in the sense that they give us no information as to the nature either of things or of mind. Their function is only to indicate what things are useful or hurtful to our composite nature as such, or in other words what things tend to confirm or dissolve the unity of mind and body. They indicate that *something* is taking place in our body, or without it, and so stimulate us to some kind of action, but *what* it is that is taking place they do not tell us. There is no resemblance in the sensation of pain produced by great heat to the rending of the fibres of our body that causes it. But we do not need to know the real origin of our sensation to prevent us going too near the fire. Sensation leads us into error only when we are not conscious that its office is merely practical, and when we attempt to make objective judgments by means of its obscure and confused ideas, *e.g.* when we say that there is heat in our hands or in the fire. And the remedy for this error is to be found simply in the clear conviction of the subjectivity of sensation.

Theory of occasional causes.

These views of the nature of sense, however, at once force us to ask how Descartes can consistently admit that a subjective result such as sensation, a result in mind, should be produced by matter, and on the other hand how an objective result, a result in matter, should be effected by mind. Descartes explains at great length, according to his modification of the physiology of the day, that the pineal gland, which is the immediate organ of the soul, is acted on by the nerves through the "animal spirits," and again by reaction upon these spirits produces motions in the body. It is an obvious remark that this explanation either materializes mind, or else puts for the solution the very problem to be solved. It was therefore in the spirit of Descartes, it was only making explicit what is involved in many of his expressions, when Geulincx, one of his earliest followers, formulated the theory of occasional causes. The general approval of the Cartesian school proved that this was a legitimate development of doctrine. Yet it tore away the last veil from the absolute dualism of the system, which had so far stretched the antagonism of mind and matter that no mediation remained possible, or what is the same thing, remained possible only through an inexplicable will of God. The intrusion of such a *Deus ex machina* into philosophy only showed that philosophy by its violent abstraction had destroyed the unity of the known and intelligible world, and was, therefore, forced to seek that unity in the region of the unknown and unintelligible. If our light be darkness, then in our darkness we must seek for light; if reason be contradictory in itself, truth must be found in unreason. The development of the Cartesian school was soon to show what is the necessary and inevitable end of such worship of the unknown.

Ethics.

To the ethical aspect of his philosophy, Descartes, unlike Spinoza, only devoted a subordinate attention. In a short treatise, however, he discussed the relation of reason to the passions. After we have got over the initial difficulty, that matter should give rise to effects in mind, and mind in matter, and have admitted that in man the unity of mind and body turns what in the animals is mere mechanical reception of stimulus from without and reaction upon it into an action and reaction mediated by sensation, emotion and passion, another question presents itself. How can the mere natural movement of passion, the nature of which is fixed by the original constitution of our body, and of the things that act upon it, be altered or modified by pure reason? For while it is obvious that morality consists in the determination of reason by itself, it is not easy to conceive how the same being who is determined by passion from without should also be determined by reason from within. How, in other words, can a spiritual being maintain its character as self-determined, or at least determined only by the clear and distinct ideas of the reason which are its innate forms, in the presence of this foreign element of passion that seems to make it the slave of external impressions? Is reason able to crush this intruder, or to turn it into a servant? Can the passions be annihilated, or can they be spiritualized? Descartes could not properly adopt either alternative; he could not adopt the ethics of asceticism, for the union of body and mind is, in his view, natural; and hence the passions which are the results of that union are in themselves good. They are provisions of nature for the protection of the unity of soul and body, and stimulate us to the acts necessary for that purpose. Yet, on the other hand, he could not admit that these passions are capable of being completely spiritualized; for so long as the unity of body and soul is regarded as merely external and accidental, it is impossible to think that the passions which arise out of this unity can be transformed into the embodiment and expression of reason.

Descartes, indeed, points out that every passion has a lower and a higher form, and while in its lower or primary form it is based on the obscure ideas produced by the motion of the animal spirits, in its higher form it is connected with the clear and distinct judgments of reason regarding good and evil. If, however, the unity of soul and body be a unity of composition, there is an element of obscurity in the judgments of passion which cannot be made clear, an element in desire that cannot be spiritualized. If the mind be external to the passions it can only impose upon them an external rule of moderation. On such a theory no *ideal* morality is possible to man in his present state; for, in order to the attainment of such an ideal morality, it would be necessary that the accidental element obtruded into his life as a spiritual being by his connexion with the body should be expelled. What can be attained under present conditions is only to abstract so far as is possible from external things, and those relations to external things into which passion brings us. Hence the great importance which Descartes attaches to the distinction between things in our power and things not in our power. What is not in our power includes all outward things, and therefore it is our highest wisdom to regard them as determined by an absolute fate, or the eternal decree of God. We cease to wish for the impossible; and therefore to subdue our passions we only need to convince ourselves that no effort of ours can enable us to secure their objects. On the other hand, that which is within our power, and which, therefore, we cannot desire too earnestly, is virtue. But virtue in this abstraction from all objects of desire is simply the harmony of reason with itself, the ἀταραξία of the Stoic under a slight change of aspect. Thus in ethics, as in metaphysics, Descartes ends not with a reconciliation of the opposed elements, but with a dualism, or at best, with a unity which is the result of abstraction.

The Philosophy of Malebranche.—Malebranche was prepared, by the ascetic training of the cloister and the teaching of Augustine, to bring to clear consciousness and expression many of the tendencies that were latent and undeveloped in the philosophy of Descartes. To use a chemical metaphor, the Christian Platonism of the church father was a medium in which Cartesianism could precipitate the product of its elements. Yet the medium was, as we shall see, not a perfect one, and hence the product was not quite pure. Without metaphor, Malebranche, by his previous habits of thought, was well fitted to detect and develop the pantheistic and ascetic elements of his master's philosophy. But he was not well fitted to penetrate through the veil of popular language under which the discordance of that philosophy with orthodox Christianity was hidden. On the contrary, the whole training of the Catholic priest, and especially his practical spirit, with that tendency to compromise which a practical spirit always brings with it, enabled him to conceal from himself as well as from others the logical result of his principles. And we

[1] *Epist.* i. 66, 67. [2] *Princ.* i. 60.

do not wonder even when we find him treating as a "miserable" the philosopher who tore away the veil.

Malebranche saw "*all things in God.*" In other words, he taught that knowledge is possible only in so far as thought is the expression, not of the nature of the individual subject as such, but of a universal life in which he and all other rational beings partake. "No one can feel my individual pain; every one can see the truth which I contemplate—why is it so? The reason is that my pain is a modification of my substance, but truth is the common good of all spirits."[1] This idea is ever present to Malebranche, and is repeated by him in an endless variety of forms of expression. Thus, like Descartes, but with more decision, he tells us that the idea of the infinite is prior to the idea of the finite. "We conceive of the infinite being by the very fact that we conceive of being without thinking whether it be finite or no. But in order that we may think of a finite being, we must necessarily cut off or deduct something from the general notion of being, which consequently we must previously possess. Thus the mind does not apprehend anything whatever, except in and through the idea that it has of the infinite; and so far is it from being the case that this idea is formed by the confused assemblage of all the ideas of particular things as the philosophers maintain, that, on the contrary, all these particular ideas are only participations in the general idea of the infinite, just as God does not derive his being from the creatures, but all the creatures are imperfect participations of the divine Being."[2] Again, he tells us, in the same chapter, that "when we wish to think of any particular thing, we first cast our view upon all being, and then apply it to the consideration of the object in question. We could not desire to see any particular object unless we saw it already in a confused and general way, and as there is nothing which we cannot desire to see, so all objects must be in a manner present to our spirit." Or, as he puts it in another place, "our mind would not be capable of representing to itself the general ideas of genera and species if it did not see all things as contained in one; for every creature being an individual we cannot say that we are apprehending any created thing when we think the general idea of a triangle."

Relation of the Divine mind to human knowledge.

The main idea that is expressed in all these different ways is simply this, that to determine any individual object as such, we must relate it to, and distinguish it from, the whole of which it is a part; and that, therefore, thought could never apprehend anything if it did not bring with itself the idea of the intelligible world as a unity. Descartes had already expressed this truth in his *Meditations*, but he had deprived it of its full significance by making a distinction between the being and the idea of God, the former of which, in his view, was only the cause of the latter. Malebranche detects this error, and denies that there is any idea of the infinite, which is a somewhat crude way of saying that there is no division between the idea of the infinite and its reality. What Reid asserted of the external world, that it is not represented by an idea in our minds, but is actually present to them, Malebranche asserted of God. No individual thing, he tells us—and an idea is but an individual thing—could represent the infinite. On the contrary, all individual things are represented through the infinite Being, who contains them all in his substance "très efficace, et par conséquence très intelligible."[3] We know God by himself, material things only by their ideas in God, for they are "unintelligible in themselves, and we can see them only in the being who contains them in an intelligible manner." And thus, unless we in some way "saw God, we should be able to see nothing else." The vision *of* God or *in* God, therefore, is an "intellectual intuition" in which seer and seen, knower and known, are one. Our knowledge of things is our participation in God's knowledge of them.

When we have gone so far with Malebranche, we are tempted to ask why he does not follow out his thought to its natural conclusion. If the idea of God is not separable from his existence, if it is through the idea of him that all things are known, and through his existence that all things are, then it would seem necessarily to follow that our consciousness of God is but a part of God's consciousness of himself, that our consciousness of self and other things is but God's consciousness of them, and lastly, that there is no existence either of ourselves or other things except in this consciousness. To understand Malebranche is mainly to understand how he stopped short of results that seemed to lie so directly in the line of his thought.

To begin with the last point, it is easy to see that Malebranche only asserts unity of idea and reality in God, to deny it everywhere else, which with him is equivalent to asserting it in general and denying it in particular. To him, as to Descartes, the opposition between mind and matter is absolute. Material things cannot come into our minds nor can our minds go out of themselves "pour se promener dans les cieux."[4] Hence they are in themselves absolutely unknown; they are known only in God, in whom are their ideas, and as these ideas again are quite distinct from the reality, they "might be presented to the mind without anything existing." That they exist *out* of God in another manner than the intelligible manner of their existence *in* God, is explained by a mere act of His will, that is, it is not explained at all. Though we see all things in God, therefore, there is no connexion between his existence and theirs. The "world is not a necessary emanation of divinity; God is perfectly self-sufficient, and the idea of the infinitely perfect Being can be conceived quite apart from any other. The existence of the creatures is due to the free decrees of God."[5] Malebranche, therefore, still treats of external things as "things in themselves," which have an existence apart from thought, even the divine thought, though it is only in and through the divine thought they can be known by us. "To see the material world, or rather to judge that it exists (since in itself it is invisible), it is necessary that God should reveal it to us, for we cannot see the result of his arbitrary will through necessary reason."[6]

But if we know external things only through their idea in God, how do we know ourselves? Is it also through the idea of us in God? Here we come upon a point in which Malebranche diverges very far from his master. We do not, he says, properly *know* ourselves at all as we know God or even external objects. We are conscious of ourselves by inner sense (*sentiment intérieur*), and from this we know *that* we are, but we do not know *what* we are. "We know the existence of our soul more distinctly than of our body, but we have not so perfect a knowledge of our soul as of our body." This is shown by the fact that from our idea of body as extended substance, we can at once see what are its possible modifications. In other words, we only need the idea of extended substance to see that there is an inexhaustible number of figures and motions of which it is capable. The whole of geometry is but a development of what is given already in the conception of extension. But it is not so with our consciousness of self, which does not enable us to say prior to actual experience what sensations or passions are possible to us. We only know what heat, cold, light, colour, hunger, anger and desire are by feeling them. Our knowledge extends as far as our experience and no further. Nay, we have good reason to believe that many of these modifications exist in our soul only by reason of its accidental association with a body, and that if it were freed from that body it would be capable of far other and higher experiences. "We know by feeling that our soul is great, but perhaps we know almost nothing of what it is in itself." The informations of sense have, as Descartes taught, only a practical but no theoretical value; they tell us nothing of the external world, the real nature of which we know not through touch and taste and sight, but only through our idea of extended substances; while of the nature of the soul they do not tell us much more than that it exists and that it is not material. And in this latter case we have no idea, nothing better than sense to raise us above its illusions. It is clear from these statements that by self-consciousness Malebranche means consciousness of desires and feelings, which belong to the individual as such, and not consciousness of self as thinking. He begins, in fact, where Descartes ended, and identifies the consciousness of self as thinking, and so transcending the limits of its own particular being, with the consciousness or idea of God. And between the consciousness of the finite in sense and the consciousness of the infinite in thought, or in other words, between the consciousness of the universal and the consciousness of the individual, he sees no connexion. Malebranche is just one step from the pantheistic conclusion that the consciousness of finite individuality as such is illusory, and that as all bodies are but modes of one infinite extension, so all souls are but modes of one infinite thought. But while he willingly accepts this result in regard to matter, his religious feelings prevent him from accepting it in relation to mind. He is driven, therefore, to the inconsistency of holding that sense and feeling, through which in his view we apprehend the finite as such, give us true though imperfect knowledge of the soul, while the knowledge they give us of body is not only imperfect but false.[7] Thus the finite spirit is still allowed to be a substance, distinct from the infinite, though it holds its substantial existence on a precarious tenure. It is left hanging, we may say, on the verge of the infinite, whose attraction must soon prove too strong for it. Ideas are living things, and often remould the minds that admit them in spite of the greatest resistance of dead custom and traditionary belief. In the grasp of a logic that overpowers him the more easily in that he is unconscious of its tendency, Malebranche is brought within one step of the pantheistic conclusion, and all his Christian feeling and priestly training can do is *just* to save him from denial of the personality of man.

But even this denial is not the last word of pantheism. When the principle that the finite is known only in relation to the infinite, the individual only in relation to the universal, is interpreted as

[1] *Morale*, i. 1, § 2. [2] *Recherche*, iii. pt. ii. ch. vi. [3] *Recherche*, ch. vii. [4] *Recherche*, ch. i. [5] *Entretien*, i. § 5. [6] *Morale*, i. 1, § 5. [7] *Recherche*, iii. pt. ii. ch. vii., § 4.

meaning that the infinite and universal is complete in itself without the finite and individual, when the finite and individual is treated as a mere accidental existence due to the "arbitrary will of God," it ceases to be possible to conceive even God as a spirit. Did Malebranche realize what he was saying when he declared that God was "being in general," but not any particular being? At any rate we can see that the same logic that leads him almost to deny the reality of finite beings, leads him also to seek the divine nature in something more abstract and general even than thought. If we must abstract from all relation to the finite in order to know God as he is, is it not necessary for us also to abstract from self-consciousness, for self-consciousness has a negative element in it that is something definite, and therefore limited? We do not wonder, therefore, when we find Malebranche saying that reason does not tell us that God is a spirit, but only that he is an infinitely perfect being, and that he must be conceived rather as a spirit than as a body simply because spirit is more perfect than body. "When we call God a spirit, it is not so much to show positively what he is, as to signify that he is not material." But as we ought not to give him a bodily form like man's, so we ought not to think of his spirit as similar to our own spirits, although we can conceive nothing more perfect. "It is necessary rather to believe that as he contains in himself the properties of matter without being material, so he comprehends in himself the perfections of created spirits without being a spirit as we alone can conceive spirits, and that his true name is 'He who is,' *i.e.* Being without restriction, Being infinite and universal."[1] Thus the essentially self-revealing God of Christianity gives way to pure spirit, and pure spirit in its turn to the eternal and incomprehensible substance of which we can say nothing but that it is. The divine substance contains in it, indeed, everything that is in creation, but it contains them *eminenter* in some incomprehensible form that is reconcilable with its infinitude. But we have no adequate name by which to call it except Being. The curious metaphysic of theology by which, in his later writings, Malebranche tried to make room for the incarnation by supposing that the finite creation, which *as* finite is unworthy of God, was made worthy by union with Christ, the divine Word, shows that Malebranche had some indistinct sense of the necessity of reconciling his philosophy with his theology; but it shows also the necessarily artificial nature of the combination. The result of the union of such incongruous elements was something which the theologians at once recognized as heterodox and the philosophers as illogical.

There was another doctrine of Malebranche which brought him into trouble with the theologians, and which was the main subject of his long controversy with Arnauld. This was his denial of particular providence. As Leibnitz maintained that this is the best of all possible worlds, and that its evils are to be explained by the negative nature of the finite, so Malebranche, with a slight change of expression, derived evil from the nature of particular or individual existence. It is not conformable to the nature of God to act by any but universal laws, and these universal laws necessarily involve particular evil consequences, though their ultimate result is the highest possible good. The question why there should be any particular existence, any existence but God, seeing such existence necessarily involves evil, remains insoluble so long as the purely pantheistic view of God is maintained; and it is this view which is really at the bottom of the assertion that he can have no particular volitions. To the coarse and anthropomorphic conception of particular providence Malebranche may be right in objecting, but on the other hand, it cannot be doubted that any theory in which the universal is absolutely opposed to the particular, the infinite to the finite, is unchristian as well as unphilosophical. For under this dualistic presupposition, there seem to be only two possible alternatives open to thought: either the particular and finite must be treated as something independent of the universal and infinite, which involves an obvious contradiction, or else it must be regarded as absolute nonentity. We find Malebranche doing the one or the other as occasion requires. Thus he vindicates the freedom of man's will on the ground that the universal will of God does not completely determine the particular volitions of man; and then becoming conscious of the difficulty involved in this conception, he tries, like Descartes, to explain the particular will as something merely negative, a defect, and not a positive existence.

But to understand fully Malebranche's view of freedom and the ethical system connected with it, we must notice an important alteration which he makes in the Cartesian theory of the relation of will and intelligence. To Descartes, as we have seen, the ultimate essence of mind lay in pure abstract self-determination or will, and hence he based even moral and intellectual truth on the arbitrary decrees of God. With Malebranche, on the other hand, abstraction goes a step further; and the absolute is sought not in the subject as opposed to the object, not in pure formal self-determination as opposed to that which is determined, but in a unity that transcends this difference. With him, therefore, will ceases to be regarded as the essence of intelligence, and sinks into a property or separable attribute of it. As we can conceive an extended substance without actual movement, so, he says, we can conceive a thinking substance without actual volition. But "matter or extension without motion would be entirely useless and incapable of that variety of forms for which it is made; and we cannot, therefore, suppose, that an all-wise Being would create it in this way. In like manner, if a spiritual or thinking substance were without will, it is clear that it would be quite useless, for it would not be attracted towards the objects of its perception, and would not love the good for which it is made. We cannot therefore conceive an intelligent being so to fashion it."[2] Now God need not be conceived as creating at all, for he is self-sufficient; but if he be a creator of spirits, he must create them for himself. "God cannot will that there should exist a spirit that does not love him, or that loves him less than any other good."[3] The craving for good in general, for an absolute satisfaction, is a *natural* love of God that is common to all. "The just, the wicked, the blessed, and the damned all alike love God with this love." Out of this love of God arises the love we have to ourselves and to others, which are the *natural inclinations* that belong to all created spirits. For these inclinations are but the elements of the love which is in God, and which therefore he inspires in all his creatures. "Il s'aime, il nous aime, il aime toutes ses créatures; il ne fait donc point d'esprits qu'il ne les porte à l'aimer, à s'aimer, et à aimer toutes les créatures."[4] Stripping this thought of its theological vesture, what is expressed here is simply that as a spiritual being each man is conscious of his own limited and individual existence, as well as of the limited and individual existence of other beings like himself, only in relation to the whole in which they are parts, so he can find his own good only in the good of the whole, and he is in contradiction with himself so long as he rests in any good short of that. His love of happiness, his natural inclinations both selfish and social, may be therefore regarded as an undeveloped form of the love of God; and the ideal state of his inclinations is that in which the love of self and of others are explicitly referred to that higher affection, or in which his love does not proceed from a part to the whole, but from the whole to the parts.

Reason and will.

The question of morals to Malebranche is the question how these *natural inclinations* are related to the particular passions. Sensation and passion arise out of the connexion of body and soul, and their use is only to urge us to attend to the wants of the former. We can scarcely hear without a smile the simple monastic legend which Malebranche weaves together about the original nature of the passions and their alteration by the Fall. "It is visibly a disorder that a spirit capable of knowing and loving God should be obliged to occupy itself with the needs of the body." "A being altogether occupied with what passes in his body and with the infinity of objects that surround it cannot be thinking on the things that are truly good."[6] Hence the necessity of an immediate and instinctive warning from the senses in regard to the relations of things to our organism, and also of pains and pleasures which may induce us to attend to this warning. "Sensible pleasure is the mark that nature has attached to the use of certain things in order that without having the trouble of examining them by reason, we may employ them for the preservation of the body, but not in order that we may love them."[6] Till the Fall the mind was merely united to the body, not subjected to it, and the influence of these pleasures and pains was only such as to make men attend to their bodily wants, but not to occupy the mind, or fill it with sensuous joys and sorrows, or trouble its contemplation of that which is really good. Our moral aim should therefore be to restore this state of things, to weaken our union with the body and strengthen our union with God. And to encourage us in pursuing this aim we have to remember that union with God is natural to the spirit, and that, while even the condition of union with the body is artificial, the condition of subjection to the body is wholly unnatural to it. Our primary tendency is towards the supreme good, and we only love the objects of our passions in so far as we "determine towards particular, and therefore false goods, the love that God gives us for himself." The search for happiness is really the search for God in disguise, and even the levity and inconstancy with which men rush from one finite good to another, is a proof that they were made for the infinite. Furthermore, this natural love of God, or inclination for good in general, "gives us the power of suspending our consent in regard to those particular goods which do not satisfy it."[7] If we refuse to be led by the obscure and confused voice of instinctive feeling, which arises from and always tends to confirm our union with the body, and wait for the light of reason which arises from and always tends to confirm our union with God, we have done all that is in our power, the rest is God's work. "If we only judge precisely of that which we see clearly, we shall never be deceived. For then it will not be we that judge, but the universal reason that judges in us."[8] And as our love, even of particular goods, is a confused love of the supreme good, so the clear vision of God inevitably brings with it the love of him. "We needs must love the highest when we see it." When it is the divine reason that speaks in us it is the divine love that moves us, "the same love wherewith God loves himself and the things he has made."[9]

Ethics.

The general result of the ethics of Malebranche is ascetic. The

[1] *Recherche*, ch. ix.

[2] *Recherche*, i. pt. i. ch. i.
[3] *Recherche*, i. pt. i. ch. iv.
[4] *Recherche*, iv. ch. i.
[5] *Entretien*, iv.
[6] *Recherche*, v. ch. iv.
[7] *Recherche*, iv. ch. i.
[8] *Morale*, pt. i. ch. i. § 9.
[9] *Recherche*, iv. ch. v.

passions, like the senses, have no relation to the higher life of the soul; their value is only in relation to the union of soul and body, a union which is purely accidental or due to the arbitrary will of God, The more silently they discharge their provisional function, and the less they disturb or interfere with the pure activity of spirit, the more nearly they approach to the only perfection that is possible for them. Their ideal state is to remain or become again simple instincts that act mechanically like the circulation of the blood. Universal light of reason casts no ray into the obscurity of sense; its universal love cannot embrace any of the objects of particular passion. It is indeed recognized by Malebranche that sensation in man is mixed with thought, that the passions in him are forms of the love of good in general. But this union of the rational with the sensuous nature is regarded merely as a confusion which is to be cleared up, *not* in a higher unity of the two elements, but simply by the withdrawal of the spirit from contact with that which darkens and defiles it. Of a transformation of sense into thought, of passion into duty—an elevation of the life of sense till it becomes the embodiment and expression of the life of reason—Malebranche has no conception. Hence the life of reason turns with him to mysticism in theory and to asceticism in practice. His universal is abstract and opposed to the particular; instead of explaining it, it explains it away.

A certain tender beauty as of twilight is spread over the world as we view it through the eyes of this cloistered philosopher, and we do not at first see that the softness and ideality of the picture is due to the gathering darkness. Abstraction seems only to be purifying, and not destroying, till it has done its perfect work. Malebranche conceived himself to be presenting to the world only the purest and most refined expression of Christian ethics and theology. But if we obey his own continual advice to think clearly and distinctly, if we divest his system of all the sensuous and imaginative forms in which he has clothed it, and reduce it to the naked simplicity of its central thought, what we find is not a God that reveals himself in the finite, and to the finite, but the absolute substance which has no revelation, and whose existence is the negation of all but itself. Thus to tear away the veil, however, there was needed a stronger, simpler, and freer spirit—a spirit less influenced by opinion, less inclined to practical compromise, and gifted with a stronger "faith in the whispers of the lonely muse" of speculation than Malebranche.

The Philosophy of Spinoza.—It is a remark of Hegel's that Spinoza, as a Jew, first brought into European thought the idea of an absolute unity in which the difference of finite and infinite is lost. Some later writers have gone further, and attempted to show that the main doctrines by which his philosophy is distinguished from that of Descartes were due to the direct influences of Jewish writers like Maimonides, Gersonides, and Hasdai Crescas, rather than to the necessary development of Cartesian ideas. And it is undoubtedly true that many points of similarity with such writers, reaching down even to verbal coincidence, may be detected in the works of Spinoza, although it is not so easy to determine how much he owed to their teaching. His own view of his obligations is sufficiently indicated by the fact, that while in his ethics he carries on a continual polemic against Descartes, and strives at every point to show that his own doctrines are legitimately derived from Cartesian principles, he only once refers to Jewish philosophy as containing an obscure and unreasoned anticipation of these doctrines. "Quod quidam Hebraeorum quasi per nebulam vidisse videntur qui scilicet statuunt Deum Dei intellectum resque ab ipso intellectas unum et idem esse."[1] It may be that the undeveloped pantheism and rationalism of the Jewish philosophers had a deeper influence than he himself was aware of, in emancipating him from the traditions of the synagogue, and giving to his mind its first philosophical bias. In his earlier work there are Neoplatonic ideas and expressions which in the *Ethics* are rejected or remoulded into a form more suitable to the spirit of Cartesianism. But the question, after all, has little more than a biographical interest. In the Spinozistic philosophy there are few differences from Descartes which cannot be traced to the necessary development of Cartesian principles; and the comparison of Malebranche shows that a similar development might take place under the most diverse intellectual conditions. What is most remarkable in Spinoza is just the freedom and security with which these principles are followed out to their last result. His Jewish origin and his breach with Judaism completely isolated him from every influence but that of the thought that possesses him. And no scruple or hesitation, no respect for the institutions or feelings of his time interferes with his speculative consequence. He exhibits to us the almost perfect type of a mind without superstitions, which has freed itself from all but reasoned and intelligent convictions, or, in the Cartesian phrase, "clear and distinct ideas"; and when he fails, it is not by any inconsistency, or arbitrary stopping short of the necessary conclusions of his logic, but by the essential defect of his principles.

[1] *Eth.* ii. schol. 7.

Geometrical method applied to metaphysics.

Spinoza takes his idea of method from mathematics, and after the manner of Euclid, places at the head of each book of his *Ethics* a certain number of definitions, axioms, and postulates which are supposed to be intuitively certain, and to form a sufficient basis for all that follows. Altogether there are twenty-seven definitions, twenty axioms, and eight postulates. If Spinoza is regarded as the most consequent of philosophers it cannot be because he has based his system upon so many fragmentary views of truth; it must be because a deeper unity has been discerned in the system than is visible on the first aspect of it. We must, therefore, to a certain extent distinguish between the form and the matter of his thought, though it is also true that the defective form itself involves a defect in the matter.

What in the first instance recommends the geometrical method to Spinoza is, not only its apparent exactness and the necessity of its sequence, but, so to speak, its disinterestedness. Confusion of thought arises from the fact that we put ourselves, our desires and feelings and interests, into our view of things; that we do not regard them as they are in themselves, in their essential nature, but look for some final cause, that is, some relation to ourselves by which they may be explained. For this reason, he says, "the truth might for ever have remained hid from the human race, if mathematics, which looks not to the final cause of figures, but to their essential nature and the properties involved in it, had not set another type of knowledge before them." To understand things is to see how all that is true of them flows from the clear and distinct idea expressed in their definition, and ultimately, it is to see how all truth flows from the *essentia Dei* as all geometrical truth flows from the idea of quantity. To take a mathematical view of the universe, therefore, is to raise ourselves above all consideration of the end or tendency of things, above the fears and hopes of mortality into the region of truth and necessity. "When I turned my mind to this subject," he says in the beginning of his treatise on politics, "I did not propose to myself any novel or strange aim, but simply to demonstrate by certain and indubitable reason those things which agree best with practice. And in order that I might inquire into the matters of this science with the same freedom of mind with which we are wont to treat lines and surfaces in mathematics, I determined not to laugh or to weep over the actions of men, but simply to understand them; and to contemplate their affections and passions, such as love, hate, anger, envy, arrogance, pity and all other disturbances of soul not as vices of human nature, but as properties pertaining to it in the same way as heat, cold, storm, thunder pertain to the nature of the atmosphere. For these, though troublesome, are yet necessary, and have certain causes through which we may come to understand them, and thus, by contemplating them in their truth, gain for our minds as much joy as by the knowledge of things that are pleasing to the senses." All our errors as to the nature of things arise from our judging them from the point of view of the part and not of the whole, from a point of view determined by their relation to our own individual being, and not from a point of view determined by the nature of the things themselves; or, to put the same thing in another way, from the point of view of sense and imagination, and not from the point of view of intelligence. Mathematics shows us the inadequacy of such knowledge when it takes us out of ourselves into things, and when it presents these things to us as objects of universal intelligence apart from all special relation to our individual feelings. And Spinoza only wishes that the same universality and freedom of thought which belongs to mathematics, because its objects *do not* interest the passions, should be extended to those objects that *do* interest them. Purity from interest is the first condition of the philosopher's being; he must get beyond the illusion of sense and passion that makes our own lives so supremely important and interesting to us simply because they are our own. He must look at the present as it were through an inverted telescope of reason, that will reduce it to its due proportion and place in the sum of things. To the heat of passion and the higher heat of imagination, Spinoza has only one advice—"Acquaint yourself with God and be at peace." Look not to the particular but to the universal, view things not under the form of the finite and temporal, but *sub quadam specie aeternitatis.*

Sense the source of error.

The illusion of the finite—the illusion of sense, imagination and passion, which, in Bacon's language, tends to make men judge of things *ex analogia hominis* and not *ex analogia universi*, which raises the individual life, and even the present moment of the individual life, with its passing feelings, into the standard for measuring the universe—this, in the eyes of Spinoza, is the source of all error and evil to man. On the other hand, his highest good is to live the universal life of reason, or what is the same thing, to view all things from

their centre in God, and to be moved only by the passion for good in general, "the intellectual love of God." In the treatise *De Emendatione Intellectus*, Spinoza takes up this contrast in the first instance from its moral side. "All our felicity or infelicity is founded on the nature of the object to which we are joined by love." To love the things that perish is to be in continual trouble and disturbance of passion; it is to be full of envy and hatred towards others who possess them; it is to be ever striving after that which, when we attain it, does not satisfy us; or lamenting over the loss of that which inevitably passes away from us; only "love to an object that is infinite and eternal feeds the soul with a changeless and unmingled joy." But again our love rests upon our knowledge; if we saw things as they really are we should love only the highest object. It is because sense and imagination give to the finite an independence and substantiality that do not belong to it, that we waste our love upon it as if it were infinite. And as the first step towards truth is to understand our error, so Spinoza proceeds to explain the defects of common sense, or in other words, of that first and unreflected view of the world which he, like Plato, calls opinion. Opinion is a kind of knowledge derived partly from hearsay, and partly from *experientia vaga*. It consists of vague and general conceptions of things, got either from the report of others or from an experience which has not received any special direction from intelligence. The mind that has not got beyond the stage of opinion takes things as they present themselves in its individual experience; and its beliefs grow up by association of whatever happens to have been found together in that experience. And as the combining principle of the elements of opinion is individual and not universal, so its conception of the world is at once fragmentary and accidental. It does not see things in their connexion with the unity of the whole, and hence it cannot see them in their true relation to each other. "I assert expressly," says Spinoza, "that the mind has no adequate conception either of itself or of external things, but only a confused knowledge of them, so long as it perceives them only in the common order of nature, *i.e.* so long as it is *externally determined* to contemplate this or that object by the accidental concourse of things, and so long as it is not *internally* determined by the unity of thought in which it considers a number of things to understand their agreements, differences and contradictions."[1]

Vices of abstraction and imagination.

There are two kinds of errors which are usually supposed to exclude each other, but which Spinoza finds to be united in opinion. These are the errors of abstraction and imagination; the former explains its vice by defect, the latter its vice by excess. On the one hand, opinion is abstract and one-sided; it is defective in knowledge and takes hold of things only at one point. On the other hand, and just because of this abstractness and one-sidedness, it is forced to give an artificial completeness and independence to that which is essentially fragmentary and dependent. The word "abstract" is misleading, in so far as we are wont to associate with abstraction the idea of a mental effort by which parts are separated from a given whole; but it may be applied without violence to any imperfect conception, in which things that are really elements of a greater whole are treated as if they were *res completae*, independent objects, complete in themselves. And in this sense the ordinary consciousness of man is often the victim of abstractions when it supposes itself most of all to be dealing with realities. The essences and substances of the schoolman may delude him, but he cannot think these notions clearly without seeing that they are only abstract elements of reality, and that they have a meaning only in relation to the other elements of it. But common sense remains unconscious of its abstractness because imagination gives a kind of substantiality to the fragmentary and limited, and so makes it possible to conceive it as an independent reality. Pure intelligence seeing the part as it is in itself could never see it but as a part. Thought, when it rises to clearness and distinctness in regard to any finite object, must at once discern its relation to other finite objects and to the whole,—must discern, in Spinozistic language, that it is "modal" and not "real." But though it is not possible to *think* the part as a whole it is possible to picture it as a whole. The limited image that fills the mind's eye seems to need nothing else for its reality. We cannot think a house clearly and distinctly in all the connexion of its parts with each other without seeing its necessary relation to the earth on which it stands, to the pressure of the atmosphere, &c. The very circumstances by which the possibility of such an existence is explained make it impossible to conceive it apart from other things. But nothing hinders me from resting on a house as a complete picture by itself. Imagination represents things in the externality of space and time, and is subjected to no other conditions but those of space and time. Hence it can begin anywhere and stop anywhere. For the same cause it can mingle and confuse together all manner of inconsistent forms—can imagine a man with a horse's head, a candle blazing in vacuo, a speaking tree, a man changed into an animal. There may be elements in the nature of these things that would prevent such combinations; but these elements are not necessarily present to the ordinary consciousness, the abstractness of whose conceptions leaves it absolutely at the mercy of imagination or accidental association. To thought in this stage anything is possible that can be pictured.

[1] *Eth.* i. schol. 29.

On the other hand, as knowledge advances, this freedom of combination becomes limited, "the less the mind understands and the more it perceives the greater is its power of fiction, and the more it understands the narrower is the limitation of that power. For just as in the moment of consciousness we cannot imagine that we do not think, so after we have apprehended the nature of body we cannot conceive of a fly of infinite size, and after we know the nature of a soul we cannot think of it as a square, though we may use the words that express these ideas."[2] Thus, according to Spinoza, the range of possibility narrows as knowledge widens, until to perfected knowledge posibility is lost in necessity.

Insufficiency of the individual.

From these considerations it follows that all thought is imperfect that stops short of the absolute unity of all things. Our first imperfect notion of things as isolated from each other, or connected only by co-existence and succession, is a mere imagination of things. It is a fictitious substantiation of isolated moments in the eternal Being. Knowledge, so far as it deals with the finite, is engaged in a continual process of self-correction which can never be completed, for at every step there is an element of falsity, in so far as the mind rests in the contemplation of a certain number of the elements of the world, as if they constituted a complete whole by themselves, whereas they are only a part, the conception of which has to be modified at the next step of considering its relation to the other parts. Thus we rise from individuals of the first to individuals of the second order, and we cannot stop short of the idea of "all nature as one individual whose parts vary through an infinite number of modes, without change of the whole individual."[3] At first we think of pieces of matter as independent individuals, either because we can picture them separately, or because they preserve a certain proportion or relation of parts through their changes. But on further consideration, these apparent substances sink into modes, each of which is dependent on all the others. All nature is bound together by necessary law, and not an atom could be other than it is without the change of the whole world. Hence it is only in the whole world that there is any true individuality or substance. And the same principle applies to the minds of men. Their individuality is a mere semblance caused by our abstraction from their conditions. Isolate the individual man, and he will not display the character of a thinking being at all. His whole spiritual life is bound up with his relations to other minds, past and present. He has such a life, only in and through that universal life of which he is so infinitesimal a part that his own contribution to it is as good as nothing. "Vis qua homo in existendo perseverat limitata est, et a potentia causarum externarum infinite superatur."[4] What can be called his own? His body is a link in a cyclical chain of movement which involves all the matter of the world, and which as a whole remains without change through all. His mind is a link in a great movement of thought, which makes him the momentary organ and expression of one of its phases. His very consciousness of self is marred by a false abstraction, above which he must rise ere he can know himself as he really is.

"Let us imagine," says Spinoza in his fifteenth letter, "a little worm living in blood which has vision enough to discern the particles of blood, lymph, &c., and reason enough to observe how one particle is repelled by another with which it comes into contact, or communicates a part of its motion to it. Such a worm would live in the blood as we do in this part of the universe, and would regard each particle of it, not as a part, but as a whole, nor could it know how all the parts are influenced by the universal nature of the blood, and are obliged to accommodate themselves to each other as is required by that nature, so that they co-operate together according to a fixed law. For if we suppose that there are no causes outside of the blood which could communicate new motions to it, and no space beyond the blood, nor any other bodies to which its particles could transfer their motion, it is certain that the blood as a whole would always maintain its present state, and its particles would suffer no other variations than those which may be inferred from the given relation of the motion of the blood to lymph, chyle, &c. And thus in that case the blood would require to be considered always as a whole and not as a part. But since there are many other causes which influence the laws of the nature of blood, and are in turn influenced thereby, other motions and other variations must arise in the blood which are not due to the proportion of motion in its constituents but also to the relation between that motion and external causes. And therefore we cannot consider the blood as a whole, but only as a part of a greater whole."

"Now we can think, and indeed ought to think, of all natural bodies in the same manner in which we have thought of this blood, for all bodies are surrounded by other bodies, and reciprocally determine and are determined by them, to exist and operate in a fixed and definite way, so as to preserve the same ratio of motion and rest in the whole universe. Hence it follows that every body, in so far as it exists under a certain definite modification, ought to be considered as merely a part of the whole universe which agrees with its whole, and thereby is in intimate union with all the other parts; and since the nature of the universe is not limited like that of the blood, but absolutely infinite, it is clear that by this nature,

[2] *De Emend.* viii. § 58. [3] *Eth.* ii. lemma, 7 schol. [4] *Eth.* iv. 3.

with its infinite powers, the parts are modified in an infinite number of ways, and compelled to pass through an infinity of variations. Moreover, when I think of the universe as a substance, I conceive of a still closer union of each part with the whole; for, as I have elsewhere shown, it is the nature of substance to be infinite, and therefore every single part belongs to the nature of the corporeal substance, so that apart therefrom it neither can exist nor be conceived. And as to the human mind, I think of it also as of part of nature, for I think of nature as having in it an infinite power of thinking, which, as infinite, contains in itself the idea of all nature, and whose thoughts run parallel with all existence."

From this point of view it is obvious that our knowledge of things cannot be real and adequate, except in so far as it is determined by the idea of the whole, and proceeds from the whole to the parts. A knowledge that proceeds from part to part must always be imperfect; it must remain external to its object, it must deal in abstractions or mere *entia rationis*, which it may easily be led to mistake for realities. Hence Spinoza, like Plato, distinguishes reason whose movement is regressive (from effect to cause, from variety to unity) from *scientia intuitiva*, whose movement is progressive, which "proceeds from the adequate idea of certain of God's attributes to an adequate knowledge of the nature of things."[1] The latter alone deserves to be called science in the highest sense of the term. "For in order that our mind may correspond to the exemplar of nature, it must develop all its ideas from the idea that represents the origin and source of nature, so that that idea may appear as the source of all other ideas."[2] The regressive mode of knowledge has its highest value in preparing for the progressive. The knowledge of the finite, ere it can become perfectly adequate, must be absorbed and lost in the knowledge of the infinite.

The whole dominates the parts.

In a remarkable passage in the *Ethics*, Spinoza declares that the defect of the common consciousness of men lies not so much in their ignorance, either of the infinite or of the finite, as in their incapacity for bringing the two thoughts together, so as to put the latter in its proper relation to the former. All are ready to confess that God is the cause both of the existence and of the nature of things created, but they do not realize what is involved in this confession—and hence they treat created things as if they were substances, that is, as if they were Gods. "Thus while they are contemplating finite things, they think of nothing less than of the divine nature; and again when they turn to consider the divine nature, they think of nothing less than of their former fictions on which they have built up the knowledge of finite things, as if these things could contribute nothing to our understanding of the divine nature. Hence it is not wonderful that they are always contradicting themselves."[3] As Spinoza says elsewhere, it belongs to the very nature of the human mind to know God, for unless we know God we could know nothing else. The idea of the absolute unity is involved in the idea of every particular thing, yet the generality of men, deluded by sense and imagination, are unable to bring this implication into clear consciousness, and hence their knowledge of God does not modify their view of the finite. It is the business of philosophy to correct this defect, to transform our conceptions of the finite by relating it to the infinite, to complement and complete the partial knowledge produced by individual experience by bringing it into connexion with the idea of the whole. And the vital question which Spinoza himself prompts us to ask is how far and in what way this transformation is effected in the Spinozistic philosophy.

Finite things modes of infinite substance.

There are two great steps in the transformation of knowledge by the idea of unity as that idea is conceived by Spinoza. The first step involves a change of the conception of individual finite things by which they lose their individuality, their character as independent substances, and come to be regarded as modes of the infinite. But secondly, this negation of the finite as such is not conceived as implying the negation of the distinction between mind and matter. Mind and matter still retain that absolute opposition which they had in the philosophy of Descartes, even after all limits have been removed. And therefore in order to reach the absolute unity, and transcend the Cartesian dualism, a second step is necessary, by which the independent substantiality of mind and matter is withdrawn, and they are reduced into attributes of the one infinite substance. Let us examine these steps successively.

The method by which the finite is reduced into a mode of the infinite has already been partially explained. Spinoza follows to its legitimate result the metaphysical or logical principles of Descartes and Malebranche. According to the former, as we have seen, the finite presupposes the infinite, and, indeed, so far as it is real, it is identical with the infinite. The infinite is absolute reality, because it is pure affirmation, because it is that which *negationem nullam involvit*. The finite is distinguished from it simply by its limit, *i.e.* by its wanting something which the infinite has. At this point Spinoza takes up the argument. If the infinite be the real, and the finite, so far as it is distinguished therefrom, the unreal, then the supposed substantiality or individuality of finite beings is an illusion. In itself the finite is but an abstraction, to which imagination has given an apparent independence. All limitation or determination is negative, and in order to apprehend positive reality we must abstract from limits. By denying the negative, we reach the affirmative; by annihilating finitude in our thought, and so undoing the illusory work of the imagination, we reach the indeterminate or unconditioned being which alone truly is. All division, distinction and relation are but *entia rationis*. Imagination and abstraction can give to them, as they can give to mere negation and nothingness, "a local habitation and a name," but they have no objective meaning, and in the highest knowledge, in the *scientia intuitiva*, which deals only with reality, they must entirely disappear. Hence to reach the truth as to matter, we must free ourselves from all such ideas as figure or number, measure or time, which imply the separation and relation of parts. Thus in his 50th letter, in answer to some question about figure, Spinoza says, "to prove that figure is negation, and not anything positive, we need only consider that the whole of matter conceived indefinitely, or in its infinity, can have no figure; but that figure has a place only in finite or determinate bodies. He who says that he perceives figure, says only that he has before his mind a limited thing and the manner in which it is limited. But this limitation does not pertain to a thing in its 'esse,' but contrariwise in its 'non-esse' (*i.e.* it signifies, not that some positive quality belongs to the thing, but that something is wanting to it). Since, then, figure is but limitation, and limitation is but negation, we cannot say that figure is anything." The same kind of reasoning is elsewhere (*Epist.* 29) applied to solve the difficulties connected with the divisibility of space or extension. Really, according to Spinoza, extension is indivisible, though modally it is divisible. In other words, parts *ad infinitum* may be taken in space by the abstracting mind, but these parts have no separate existence. You cannot rend space, or take one part of it out of its connexion with other parts. Hence arises the impossibility of asserting either that there is an infinite number of parts in space, or that there is not. The solution of the antinomy is that neither alternative is true. There are many things "quae nullo numero explicari possunt," and to understand these things we must abstract altogether from the idea of number. The contradiction arises entirely from the application of that idea to the infinite. We cannot say that space has a finite number of parts, for every finite space must be conceived as itself included in infinite space. Yet, on the other hand, an infinite number is an absurdity; it is a number which is not a number. We escape the difficulty only when we see that number is a category inapplicable to the infinite, and this to Spinoza means that it is not applicable to reality, that it is merely an abstraction, or *ens imaginationis*.

Application to nature of matter.

The same method which solves the difficulties connected with the nature of matter is applied to mind. Here also we reach the reality, or thing in itself, by abstracting from all determination. All conceptions, therefore, that involve the independence of the finite, all conceptions of good, evil, freedom and responsibility disappear. When W. Blyenburg accuses Spinoza of making God the author of evil, Spinoza answers that evil is an *ens rationis* that has no existence for God. "Evil is not something positive, but a state of privation, and that not in relation to the divine, but simply in relation to the human intelligence. It is a conception that arises from that generalizing tendency of our minds, which leads us to bring all beings that have the external form of man under one and the same definition, and to suppose that they are all equally capable of the highest perfection we can deduce from such a definition. When, therefore, we find an individual whose works are not consistent with this perfection, straightway we judge that he is deprived of it, or that he is diverging from his own nature,—a judgment we should never make if we had not thus referred him to a general definition, and supposed him to be possessed of the nature it defines. But since God does not know things abstractly, or through such general definitions, and since there cannot be more reality in things than the divine intelligence and power bestows upon them, it manifestly follows that the defect which belongs to finite things, cannot be called a privation in relation to the intelligence of God, but only in relation to the intelligence of man."[4] Thus evil and good vanish when we consider things *sub specie aeternitatis*, because they are categories that imply a certain independence in finite beings. For the idea of a moral standard implies a relation of man to the absolute good, a relation of the finite to the infinite, in which the finite is not simply lost and absorbed in the infinite. But Spinoza can admit no such relation. In the presence of the infinite the finite disappears, for it exists only by abstraction and negation; or it *seems* to us to exist, not because of what is present to our thoughts, but because of what is not present to them. As we think ourselves free because we are conscious of our actions but not of their causes, so we think that we have an individual existence only because the infinite intelligence is not wholly but only partially realized in us. But as we cannot really divide space, though we can think of a part of it, so neither can we place any real division in the divine intelligence. In this way we can understand how Spinoza is able to speak of the human mind as part of the infinite thought of God, and of the human body as part of the infinite extension of God, while yet he asserts that the divine substance is simple, and not made up of parts.

Nature of mind.

[1] *Eth.* ii. 40, schol. 2. [2] *De Emend.* vii. § 42. [3] *Eth.* ii. schol. 10.

[4] *Epist.* 32.

So far as they exist, they must be conceived as parts of the divine substance, but when we look directly at that divine substance their separate existence altogether disappears.

Soul and body.

It has, however, been already mentioned that this ascending movement of abstraction does not at once and directly bring Spinoza to the absolute unity of substance. The principle that "determination is negation," and that therefore the absolute reality is to be found only in the indeterminate, would lead us to expect this conclusion; but the Cartesian dualism prevents Spinoza from reaching it. Mind and matter are so absolutely opposed, that even when we take away all limit and determination from both, they still retain their distinctness. Raised to infinity, they still refuse to be identified. We are forced, indeed, to take from them their substantial or substantive existence, for there can be no other substance but God, who includes all reality in himself. But though reduced to attributes of a common substance, the difference of thought and extension is insoluble. The independence of individual finite things disappears whenever we substitute thought for imagination, but even to pure intelligence, extension remains extension, and thought remains thought. Spinoza seems therefore reduced to a dilemma; he cannot surrender either the unity or the duality of things, yet he cannot relate them to each other. The only course left open to him is to conceive each attribute in its turn as the whole substance, and to regard their difference as the difference of expression. As the patriarch was called by the two names of Jacob and Israel, under different aspects, each of which included the whole reality of the man, so our minds apprehend the absolute substance in two ways, each of which expresses its whole nature.[1] In this way the extremes of absolute identity and absolute difference seem to be reconciled. There is a complete parallelism of thought and extension, "ordo et connexio idearum idem est ac ordo et connexio rerum,"[2] yet there is also a complete independence and absence of relation between them, for each is the whole. A thing in one expression cannot be related to itself in another expression. Hence in so far as we look at the substance under the attribute of thought, we must take no account of extension, and in so far as we look at it under the attribute of extension, we must equally refuse to take any account of thought. This parallelism may be best illustrated by Spinoza's account of the relation of the human soul and body. The soul is the idea of the body, and the body is the object of the soul, whatever is in the one really is in the other ideally; yet this relation of object and subject does not imply any connexion. The motions and changes of the body have to be accounted for partly by itself, partly by the influence of other bodies; and the thoughts of the soul in like manner have to be accounted for partly by what God thinks as constituting the individual mind, and partly by what he thinks as constituting the minds of other individuals. But to account for thought by the motions of the body, or for the motions of the body by thought, is to attempt to bridge the impassable gulf between thought and extension. It involves the double absurdity of accounting for a thing by itself, and of accounting for it by that which has nothing in common with it.

Spinoza's refuge from Descartes' dualism.

Spinoza's higher idealism.

In one point of view, this theory of Spinoza deserves the highest praise for that very characteristic which probably excited most odium against it at the time it was first published, namely, its exaltation of matter. It is the mark of an imperfect spiritualism to hide its eyes from outward nature, and to shrink from the material as impure and defiling. But its horror and fear are proofs of weakness; it flies from an enemy it cannot overcome. Spinoza's bold identification of spirit and matter, God and nature, contains in it the germ of a higher idealism than can be found in any philosophy that asserts the claims of the former at the expense of the latter. A system that begins by making nature godless, will inevitably end, as Schelling once said, in making God unnatural. The expedients by which Descartes keeps matter at a distance from God, were intended to maintain his pure spirituality; but their ultimate effect was seen in his reduction of the spiritual nature to mere will. As Christianity has its superiority over other religions in this, that it does not end with the opposition of the human to the divine, the natural to the spiritual, but ultimately reconciles them, so a true idealism must vindicate its claims by absorbing materialism into itself. It was, therefore, a true instinct of philosophy that led Spinoza to raise matter to the co-equal of spirit, and at the same time to protest against the Cartesian conception of matter as mere inert mass, moved only by impulse from without. "What were a God that only impelled the world from without?" says Goethe. "It becomes him to stir it by an inward energy, to involve nature in himself, himself in nature, so that that which lives and moves and has a being in him can never feel the want of his power or his spirit."

While, however, Spinoza thus escapes some of the inconsequences of Descartes, the contradiction that was *implicit* in the Cartesian system between the duality and the unity, the attributes and the substance, in his system becomes *explicit*. When so great emphasis is laid upon the unity of substance, it becomes more difficult to explain the difference of the attributes. The result is, that Spinoza is forced to account for it, not by the nature of substance itself, but by the nature of the intelligence to which it is revealed. "By substance," he says, "I understand that which is in itself, and is conceived through itself. By attribute I understand the same thing, nisi quod attributum dicatur respectu intellectus substantiae certum talem naturam tribuentis."[3] Hence we are naturally led with J. E. Erdmann to think of the intelligence dividing the substance as a kind of prism that breaks the white light into different colours, through each of which the same world is seen, only with a different aspect. But if the intelligence in itself is but a mode of one of the attributes, how can it be itself the source of their distinction?

Logical difficulties in Spinoza's metaphysics.

The key to this difficulty is that Spinoza has really, and almost in spite of his logical principles, two opposite conceptions of substance, between which he alternates without ever bringing them to a unity. On the one hand, in accordance with the principle that determination is negation, substance must be taken as that which is utterly indeterminate, like the Absolute of the Buddhist, which we can characterize only by denying of it everything that we assert of the finite. In this view, no predicate can be applied univocally to God and to the creatures; he differs from them, not only in existence, but in essence.[4] If we follow out this view to its legitimate result, God is withdrawn into his own absolute unity, and no difference of attributes can be ascribed to him, except in respect of something else than himself. It is owing to the defects of our intelligence that he appears under different forms or expressions; in himself he is pure being, without form or expression at all. But, on the other hand, it is to be observed, that while Spinoza really proceeds by abstraction and negation, he does not *mean* to do so. The abstract is to him the unreal and imaginary, and what he means by substance is not simply Being in general, the conception that remains when we omit all that distinguishes the particulars, but the absolute totality of things conceived as a unity in which all particular existence is included and subordinated. Hence at a single stroke the indeterminate passes into the most determinate Being, the Being with no attributes at all into the Being constituted by an infinite number of attributes. And while, under the former conception, the defect of our intelligence seemed to be that it divided the substance, or saw a difference of attributes in its absolute unity, under the second conception its defect lies in its apprehending only two out of the infinite multitude of these attributes.

To do justice to Spinoza, therefore, we must distinguish between the actual effect of his logic and its effect as he conceived it. The actual effect of his logic is to dissolve all in the ultimate abstraction of Being, from which we can find no way back to the concrete. But his intent was simply to relate all the parts to that absolute unity which is the presupposition of all thought and being, and so to arrive at the most concrete and complete idea of the reality of things. He failed to see what is involved in his own principle that determination is negation; for if affirmation is impossible without negation, then the attempt to divorce the two from each other, the attempt to find a purely affirmative being, must necessarily end in the barest of all abstractions being confused with the unity of all things. But even when the infinite substance is defined as the negative of the finite, the idea of the finite becomes an essential element in the conception of the infinite. Even the Pantheist, who says that God is what finite things are not, in spite of himself recognizes that God has a relation to finite things. Finite things may in his eyes have no positive relation to God, yet they have a negative relation; it is through their evanescence and transitoriness, through their nothingness, that the eternal, the infinite reality alone is revealed to him. Spinoza is quite conscious of this process, conscious that he reaches the affirmation of substance by a negation of what he conceives as the purely negative and unreal existence of finite things, but as he regards the assertion of the finite as merely an illusion due to *our* imagination, so he regards the correction of this illusion, the negation of the finite as a movement of reflection which belongs merely to our intelligence, and has nothing to do with the nature of substance in itself. We find the true affirmation by the negation of the negative, but in itself affirmation has no relation to negation. Hence his absolute being is the dead all-absorbing substance and not the self-revealing spirit. It is the being without determination, and not the being that determines itself. There is no reason in the nature of substance why it should have either attributes or modes; neither individual finite things nor the general distinction of mind and matter can be deduced from it. The descending movement of thought is not what Spinoza himself said it should be, an evolution, but simply an external and empirical process by which the elements dropped in the ascending movement of abstraction are taken up again with a merely nominal change. For the sole difference in the conception of mind and matter as well as in the conception of individual minds and bodies which is made by their reference to the idea of God, is that they lose their substantive character and become adjectives. Aristotle objected to Plato that his ideas were merely αἰσθητὰ ἀΐδια, that is, that his idealization of the world was merely superficial, and left the things idealized very much what they were before to the sensuous consciousness; and the same may be

[1] *Epist.* 27. [2] *Eth.* ii. 7. [3] *Epist.* 27. [4] *Eth.* i. schol. 17.

said of Spinoza's negation of finite things. It was an external and imperfect negation, which did not transform the idea of the finite, but merely substituted the names of attributes and modes for the names of general and individual substances.

The same defective logic, by which the movement of thought in determining the substance is regarded as altogether external to the substance itself, is seen again in Spinoza's conceptions of the relations of the attributes to each other. Adopting the Cartesian opposition of mind and matter, he does not see, any more than Descartes, that in their opposition they are correlative. Or if he did see it (as seems possible from a passage in his earliest treatise),[1] he regarded the correlation as merely subjective, merely belonging to our thought. They are to him only the two attributes which we happen to know out of the infinite number belonging to God. There is no necessity that the substance should manifest itself in just these attributes and no others, for abstract substance is equally receptive of all determinations, and equally indifferent to them all. Just because the unity is merely generic, the differences are accidental, and do not form by their union any complete whole. If Spinoza had seen that matter in itself is the correlative opposite of mind in itself, he need not have sought by abstracting from the difference of these elements to reach a unity which is manifested in that very difference, and his absolute would have been not substance but spirit. This idea he never reached, but we find him approximating to it in two ways. On the one hand, he condemns the Cartesian conception of matter as passive and self-external, or infinitely divisible—as, in short, the mere opposite of thought.[2] And sometimes he insists on the parallelism of extension and thought at the expense of their opposition in a way that almost anticipates the assertion by Leibnitz of the essential identity of mind and matter. On the other hand, he recognizes that this parallelism is not complete. Thought is not like a picture; it is conscious, and conscious not only of itself, but of extension. It transcends therefore the absolute distinction between itself and other attributes. It is only because he cannot rid himself of the phantom of an extended matter as a thing in itself, which is entirely different from the idea of it, that Spinoza is prevented from recognizing in mind that unity that transcends all distinctions, even its own distinction from matter. As it is, his main reason for saying that intelligence is not an attribute of God, but merely a mode, seems to be this, that the thought of God must be conceived as producing its own object, *i.e.* as transcending the distinction of subject and object which is necessary to our intelligence.[3] But this argument of itself points to a concrete quite as much as to an abstract unity. It is as consistent with the idea of absolute spirit as with that of absolute substance. Spinoza's deliberate and formal doctrine is undoubtedly the latter; but he constantly employs expressions which imply the former, as when he speaks of God as *causa sui*. The higher idea inspires him, though his consciousness only embraces the lower idea.

Spinoza's ethical system.

The ethical philosophy of Spinoza is determined by the same principles and embarrassed by the same difficulties as his metaphysics. In it also we find the same imperfect conception of the relation of the positive to the negative elements, and, as a consequence, the same confusion of the highest unity of thought, the affirmation that subordinates and transcends all negation with mere abstract affirmation. Or, to put the same thing in ethical language, Spinoza teaches a morality which is in every point the opposite of asceticism, a morality of self-assertion or self-seeking, and not of self-denial. The *conatus sese conservandi* is to him the supreme principle of virtue;[4] yet this self-seeking is supposed, under the guidance of reason, to identify itself with the love of man and the love of God, and to find blessedness not in the reward of virtue, but in virtue itself. It is only confusion of thought and false mysticism that could object to this result on the ground of the element of self still preserved in the *amor Dei intellectualis*. For it is just the power of identifying himself with that which is wider and higher than his individual being that makes morality possible to man. But the difficulty lies in this, that Spinoza will not admit the negative element, the element of mortification or sacrifice, into morality at all, even as a moment of transition. For him there is no dead self, by which we may rise to higher things, no losing of life that we may find it. For the negative is nothing, it is evil in the only sense in which evil exists, and cannot be the source of good. The higher affirmation of our own being, the higher seeking of ourselves which is identical with the love of God, must therefore be regarded as nothing distinct in kind from that first seeking of our natural self which in Spinoza's view belongs to us in common with the animals, and indeed in common with all beings whatever. It must be regarded merely as a direct development and extension of the same thing. The main interest of the Spinozistic ethics therefore lies in observing by what steps he accomplishes this transition, while excluding altogether the idea of a real division of the higher and the lower life, the spirit and flesh, and of a conflict in which the former is developed through the sacrifice of the latter.

Finite creatures exist only as modes of the divine substance, only so far as they partake in the infinite, or what is the same thing with Spinoza, in the purely affirmative or self-affirming nature of God. They therefore must also be self-affirming. They can never limit themselves; their limit lies in this, that they are not identified with the infinite substance which expresses itself also in other modes. In other words, the limit of any finite creature, that which makes it finite, lies without it, and its own existence, so far as it goes, must be pure self-assertion and self-seeking. "Unaquaeque res quantum in se est in suo esse perseverare conatur," and this *conatus* is its very essence or inmost nature.[5] In the animals this *conatus* takes the form of appetite, in man of desire, which is "appetite with the consciousness of it."[6] But this constitutes no essential difference between appetite and desire, for "whether a man be conscious of his appetite or no, the appetite remains one and the same thing."[7] Man therefore, like the animals, is purely self-asserting and self-seeking. He can neither know nor will anything but his own being, or if he knows or wills anything else, it must be something involved in his own being. If he knows other beings, or seeks their good, it must be because their existence and their good are involved in his own. If he loves and knows God it must be because he cannot know himself without knowing God, or find his supreme good anywhere but in God.

What at first makes the language difficult to us is the identification of will and intelligence. Both are represented as affirming their objects. Descartes had prepared the way for this when he treated the will as the faculty of judging or giving assent to certain combinations of ideas, and distinguished it from the purely intellectual faculties by which the ideas are apprehended. By this distinction he had, as he supposed, secured a place for human freedom. Admitting that intelligence is under a law of necessity, he claimed for the will a certain latitude or liberty of indifference, a power of giving or withholding assent in all cases where the relations of ideas were not absolutely clear and distinct. Spinoza points out that there is no ground for such a distinction, that the acts of apprehension and judgment cannot be separated from each other. "In the mind there is no volition, *i.e.* no affirmation or negation which is not immediately involved in the idea it apprehends," and therefore "intellect and will are one and the same thing."[8] If, then, there is no freedom except the liberty of indifference, freedom is impossible. Man, like all other beings and things, is under an absolute law of necessity. All the actions of his will, as well as of his intelligence, are but different forms of the self-assertive tendency to which he cannot but yield, because it is one with his very being, or only ideally distinguishable therefrom. There is, however, another idea of liberty. Liberty as the opposite of necessity is an absurdity—it is impossible for either God or man; but liberty as the opposite of slavery is possible, and it is actually possessed by God. The divine liberty consists in this, that God acts from the necessity of his own nature alone, and is not in any way determined from without. And the great question of ethics is, How far can man partake in this liberty? At first it would seem impossible that he should partake in it. He is a finite being, whose power is infinitely surpassed by the power of other beings to which he is related. His body acts only as it is acted on, and his mind cannot therefore apprehend his body, except as affected by other things. His self-assertion and self-seeking are therefore confused with the asserting and seeking of other things, and are never pure. His thought and activity cannot be understood except through the influence of other things which lie outside of his consciousness, and upon which his will has no influence. He cannot know clearly and distinctly either himself or anything else; how then can he know his own good or determine himself by the idea of it?

The answer is the answer of Descartes, that the apprehension of any finite thing involves the adequate idea of the infinite and eternal nature of God.[9] This is the primary object of intelligence, in which alone is grounded the possibility of knowing either ourselves or anything else. In so far as our knowledge is determined by this idea, or by the ideas of other things, which are referred to this idea and seen in its light, in so far its action flows from an internal and not an external necessity. In so far, on the other hand, as we are determined by the affections of the body, ideas in which the nature of our own body and the nature of other things are confused together, in so far we are determined by an external necessity. Or to put the same thing in what has been shown to be merely another way of expression, in so far as we are determined by pure intelligence we are free, but in so far as we are determined by opinion and imagination we are slaves.

From these premises it is easy to see what form the opposition of reason and passion must necessarily take with Spinoza. The passions belong to our nature as finite; they are grounded on, or rather are but another form of inadequate ideas; but we are free only in so far as our ideas either immediately are, or can be made, adequate. Our idea of God is adequate *ex vi termini*; our ideas of the affections of our body are inadequate, but can be made adequate in so far as they are referred to the idea of God. And as the idea of God is purely affirmative, this reference to the idea of God implies the elimination of the negative element from the ideas of the affections of the body, "for nothing that is positive in a false idea is removed by the presence of truth as such."[10] Brought into

[1] *Tractatus de Deo et homine*, ii. 19.
[2] *Epist.* 29, 70.
[3] *Eth.* i. schol. 17.
[4] *Eth.* iv. schol. 22.
[5] *Eth.* iii. 6, 7.
[6] *Eth.* iii. 9.
[7] *Eth.* iii. Def. Affect. 1.
[8] *Eth.* ii. 49.
[9] *Eth.* ii. 45.
[10] *Eth.* iv. 1.

contact with the idea of God, all ideas become true and adequate, by the removal of the negative or false element in them. The idea of God is, as it were, the touchstone which distinguishes the gold from the dross. It enables us to detect the higher spiritual element in the natural passions, and to sever the element belonging to that pure love of self which is identical with the love of perfection from the elements belonging to that impure love of our own finite individuality as such which is identical with the love of evil.

Implicit difficulties.

The imperfection in Spinoza's development of this principle has already been indicated. It is in fact the same imperfection which runs through his whole system. Just as he supposed that the ideas of finite things were at once made consistent with the idea of the infinite when he had named them modes, so here his conception of the change through which selfish natural desire must pass in order to become spiritual is far too superficial and external. Hence he has no sympathy with asceticism, but treats it, like Bentham, as a *torva et tristis superstitio.* Joy is the "transition from less to greater perfection," and cannot be but good; pain is the "transition from greater to less perfection," and cannot be but evil. The revolt against the medieval opposition of the nature and spirit is visible in many of his sayings. "No Deity who is not envious can delight in my weakness or hurts, or can regard as virtues those fears and sighs and tears which are the signs of the mind's weakness; but contrariwise, the greater is our joy, the greater is our progress to perfection, and our participation in the divine nature."[1] "A free man thinks of nothing less than death, his wisdom is a meditation not of death but of life."[2] The same idea, combining with the idea of necessity, leads him to condemn repentance and pity, as well as pride and humility. Unconsciously, Spinoza reproduces the principle of asceticism, while in words he utterly rejects it. For though he tells us that pure self-complacency is the highest thing we can hope, yet from this self-complacency all regard to the finite individuality of the subject is eliminated. "Qui Deum amat, conari non potest ut Deus ipsum contra amet." In like manner, he absolutely condemns all hatred, envy, rivalry and ambition, as springing out of an over-estimate of those finite things which one only can possess, while the highest good is that which is enjoyed the more easily and fully the greater the number of participants. Yet Spinoza's exaltation of the social life, and of the love that binds it together, is too like the Buddhist's universal charity that embraces all creatures, and all creatures equally. Both are based on an abstraction from all that is individual, only the Buddhist's abstraction goes a step further, and erases even the distinction between man and the animals. Spinoza felt the pressure of this all-levelling logic when he said, "I confess I cannot understand how spirits express God more than the other creatures, for I know that between the finite and the infinite there is no proportion, and that the distinction between God and the most excellent of created things differs not a whit from the distinction between him and the lowest and meanest of them."[3] As Pope said, God is "as full and perfect in a hair as a heart"; in all finite things there is a ray of divinity, and in nothing more than a ray. Yet in another epistle Spinoza contradicts this view, and declares that, while he does not consider it necessary to "know Christ after the flesh, he does think it is necessary to know the eternal Son of God, *i.e.* God's eternal wisdom, which is manifested in all things, but chiefly in the mind of man, and most of all in Christ Jesus."[4] In the *Ethics* the distinction of man and the animals is treated as an absolute distinction, and it is asserted with doubtful consistency that the human soul cannot all be destroyed along with the body, for that there is something of it which is eternal. Yet from this eternity we must, of course, eliminate all notion of the consciousness of the finite self as such. At this point, in short, the two opposite streams of Spinoza's thought, the positive method he *intends* to pursue, and the negative or abstracting method he really *does* pursue, meet in irreconcilable contradiction. The finite must be related to the infinite so as to preserve all that is in it of reality; and therefore its limit or the negative element in it must be abstracted from. But it turns out that, with this abstraction from a negative element involved in the existence of the finite, the positive also disappears, and God is all in all in a sense that absolutely excludes the existence of the finite. "The mind's intellectual love of God," says Spinoza, "is the very love wherewith God loves himself, not in so far as he is infinite, but in so far as he can be expressed by the essence of the human mind, considered under the form of eternity; *i.e.* the mind's intellectual love of God is part of the infinite love wherewith God loves himself."[5] This double "in so far," which returns so frequently in Spinoza, just conceals for a moment the contradiction of two streams of thought, one of which must be swallowed up by the other, if they are once allowed to meet.

We have now reviewed the main points of the system, which was the ultimate result of the principles of Descartes. The importance of this first movement of modern philosophy lies in its assertion and exhibition of the unity of the intelligible world with itself and with the mind of man. In this point of view, it was the philosophical counterpart of Protestantism; but, like Protestantism in its earliest phase, it passed rapidly from the doctrine that God is, without priest or authority, present to man's spirit, to the doctrine that man's spirit is as nothing before God. The object was too powerful for the subject, who effaced himself before God that he might be strong towards men. But in this natural movement of feeling and thought it was forgotten that God who effaced the world and the finite spirit by his presence could not be a living God. Spinoza gives the ultimate expression to this tendency, and at the same time marks its limit, when he says that whatever reality is in the finite is of the infinite. But he is unsuccessful in showing that, on the principles on which he starts, there can be any reality in the finite at all. Yet even if the finite be an illusion, still more if it be better than an illusion, it requires to be accounted for. Spinoza accounts for it neither as illusory nor as real. It was reserved for the following generation of philosophers to assert, in different ways, the reality of the finite, the value of experience and the futility of abstractions. Spinoza had declared that true knowledge consists in seeing things under the form of eternity, but it is impossible that things can be seen under the form of eternity unless they have been first seen under the form of time. The one-sided assertion of individuality and difference in the schools of Locke and Leibnitz was the natural complement of the one-sided assertion of universality and unity in the Cartesian school. But when the individualistic tendency of the 18th century had exhausted itself, and produced its own refutation in the works of Kant, it was inevitable that the minds of men should again turn to the great philosopher, who, with almost perfect insight working through imperfect logic, first formulated the idea of a unity presupposed in and transcending the difference of matter and mind, subject and object.

General importance of the Cartesian school.

See the Histories of Philosophy, especially those by Hegel, Feuerbach, Erdmann and Fischer; F. Bouillier, *Histoire de la philosophie cartésienne* (1854); Ollé-Laprune, *Philosophie de Malebranche*; E. Saisset, *Précurseurs et disciples de Descartes* (1862). The German treatises on Spinoza are too numerous to mention. Jacobi's *Letters on Spinoza*, which were the beginning of a true interpretation of his philosophy, are still worth reading. We may also mention C. Schaarschmidt, *Descartes und Spinoza* (1850); C. Sigwart, *Spinozas neuentdeckter Tractat von Gott, dem Menschen, und dessen Glückseligkeit* (1866). Both these writers have published German translations of the *Tractatus de Deo.* See also Trendelenburg, *Historische Beiträge zur Philosophie* (1867); R. Avenarius, *Über die beiden ersten Phasen des spinozischen Pantheismus* (1868); M. Joël, *Zur Genesis der Lehre Spinozas* (1871); R. Willis, *Benedict de Spinoza: his Ethics, Life and Influence on Modern Religious Thought* (1870); F. Pollock, *Spinoza, his Life and Philosophy* (1880); J. Martineau, *Types of Ethical Theory* (1885); J. Caird, *Spinoza* (in Blackwood's Philosophical Series); H. H. Joachim, *A Study of the Ethics of Spinoza* (1901); R. Adamson, *The Development of Modern Philosophy* (1903); also articles DESCARTES, MALEBRANCHE, and SPINOZA. (E. C.)

CARTHAGE (Phoenician *Kart-hadshat*, "New City"; Gr. Καρχηδών, Lat. *Carthago* or *Carchedon*), one of the most famous cities of antiquity, on the north coast of Africa; it was founded about 822 B.C. by the Phoenicians, destroyed for the first time by the Romans in 146 B.C., rebuilt by the Romans, and finally destroyed by the Arabs in A.D. 698. It was situated in the heart of the Sinus Uticensis (mod. Gulf of Tunis), which is protected on the west by the promontory of Apollo (mod. Ras Ali el Mekki), and on the east by the promontory of Mercury or Cape Bon (mod. Ras Addar). Its position naturally formed a sort of bastion on the inner curve of the bay between the Lake of Tunis on the south and the marshy plain of Utica (Sukhara) on the north. Cape Gamart, the Arab village of Sidi-bu-Saïd and the small harbour of Goletta (La Goulette, Halk el Wad) form a triangle which represents the area of Carthage at its greatest, including its extramural suburbs. Of this area the highest point is Sidi-bu-Saïd, which stands on a lofty cliff about 490 ft. high. On Cape Gamart (Kamart) was the chief cemetery; the citadel, Byrsa, was on the hill on which to-day stand the convent of Les Pères Blancs (White Fathers) and the cathedral of St Louis. The harbours lay about three-fifths of a mile south of Byrsa, near the modern hospital of the Khram, at

[1] *Eth.* iv. schol. 45. [2] *Eth.* iv. 67. [3] *Epist.* 57.
[4] *Epist.* 21. [5] *Eth.* v. 36.

Cartagenna. The tongue of land, which runs from the harbours as far as Goletta, to the mouth of the Catadas which connects the Lake of Tunis with the sea, was known as *taenia* (ribbon, band) or *ligula* (diminutive of *lingua*, tongue). The isthmus connecting the peninsula of Carthage with the mainland was roughly estimated by Polybius as 25 stades (about 15,000 ft.); the peninsula itself, according to Strabo, had a circumference of 360 stades (41 m.). The distance between Gamart and Goletta is about 6 m.

From Byrsa, which is only 195 ft. above the sea, there is a fine view; thence it is possible to see how Carthage was able at once to dominate the sea and the gently undulating plains which stretch westward as far as Tunis and the line of the river Bagradas (mod. Mejerda). On the horizon, on the other side of the Gulf of Tunis, rise the chief heights of the mountain-chain which was the scene of so many fierce struggles between Carthage and Rome, between Rome and the Vandals:—the Bu-Kornaïn ("Two-Horned Mountain"), crowned by the ruins of the temple of Saturn Balcaranensis; Jebel Ressas, behind which lie the ruins of Neferis; Zaghwan, the highest point in Zeugitana; Hammam-Lif, Rades (Ghades, Gades, the ancient Maxula) on the coast, and 10 m. to the south-west the "white" Tunis (Λευκὸς Τύνης of Diodorus) and the fertile hills of Ariana. All round Byrsa, alike on the plain and on the slopes, are fields of barley, vineyards and patches of cactus, interrupted only by huge heaps of rubbish and excavation-mounds, the haunts of green lizards, and by houses and villages built of materials drawn for many a century from the ancient ruins.

The ancient harbours were distinguished as the military and the commercial. The remains of the latter are to be seen in a partially ruined artificial lagoon which originally, according to Beulé, had an area of nearly 60 acres; there were, however, in addition a large quay for unloading freight along the shore, and huge basins or outer harbours protected by jetties, the remains of which are still visible at the water-level. The military harbour, known as Cothon, communicated with the commercial by means of a canal now partially ruined; it was circular in shape, surrounded by large docks 16½ ft. wide, and capable of holding 220 vessels, though its area was only some 22 acres. In the centre was an islet from which the admiral could inspect the whole fleet.[1]

Among the other ruins which have been identified are the circus or hippodrome, traversed by the railway at the north of the village of Duar-es-Shat; the forum, between Cothon and Byrsa, where stood the Curia, the regular place of assembly of the senate, and near which were the moneychangers' shops, the tribunal, the temple of Apollo, and in the Byzantine period the baths of Theodora. Three main streets led from the forum to Byrsa.

The hill of St Louis, the ancient citadel of Byrsa, has a circuit of 4525 ft. It appears to have been surrounded at least at certain points by several lines of fortifications. It was, however, dismantled by P. Scipio Africanus the younger, in 146 B.C., and was only refortified by Theodosius II. in A.D. 424; subsequently its walls were again renewed by Belisarius in 553. On the plateau of Byrsa have been found the most ancient of the Punic tombs, huge cisterns in the eastern part, and near the chapel of St Louis the foundations of the famous temple of Eshmun (see below), and the palace of the Roman proconsul.

About 325 ft. from the railway station of La Malga are the still imposing ruins of the amphitheatre. Near by, at the spot called Bir el Jebana, Père Delattre has discovered four cemeteries, one of which contains the tombs of state officials or servants of the imperial government. Rather more than half a mile north-west of Byrsa are the huge cisterns of La Malga, which, at the time of the Arab geographer, Idrīsī, still comprised twenty-four parallel covered reservoirs, 325 ft. by 71½ ft.; of these fourteen only remain.

[1] The whole question of these harbours has been fully discussed by Cecil Torr, Otto Meltzer, R. Öhler, S. Gsell, M. de Roquefeuil; see Aug. Audollent, *Carthage romaine*, pp. 198 seq.; *Revue archéol.* 3rd series, xxiv.; *Jahrbüch f. class. Philologie*, vols. cxlvii., cxlix.; also *Classical Review*, vols. v., vii., viii.

On the hill of the Petit Séminaire, which is separated from Byrsa by a valley, Père Delattre has discovered a Christian basilica, the baths of Gargilius, large graves with several levels of tombs, and much débris of sculpture, which, however, is insufficient to enable us to say that this is the site of the temple of Tanit or Juno Caelestis. The quarter of Dermèche, near the sea, whose name recalls the Latin *Thermis* or *Thermas*, is remarkable for the imposing remains of the baths (*thermae*) of Antoninus. In one place called Douimés was the Ceramicus where excavation has discovered a graceful basilica, proto-Punic tombs, potters' ovens with numerous terra-cotta moulds which were abandoned after the siege in 146 B.C., and finally a Roman palace with superb marble statues. Farther on are huge reservoirs of Borj-Jedid which are sufficiently well-preserved to be used again.

Behind the small fort of Borj-Jedid is the plateau of the Odeum where the theatre and fine marble statues of the Roman period have been laid bare; beyond is the great Christian basilica of Damus-el-Karita (perhaps a corruption of *Domus Caritatis*); in the direction of Sidi-bu-Saïd is the *platea nova*, the huge stairway of which, like so many other Carthaginian buildings, has of late years been destroyed by the Arabs for use as building material; on the coast near St Monica is the necropolis of Rabs where Delattre dug up fine anthropoid sarcophagi of the Punic period.

In the quarter of Megara (Magaria, mod. La Marsa) it would seem that there never were more than isolated buildings, villas in the midst of gardens. At Jebel Khaui (Cape Kamart) there is a great necropolis, the sepulchral chambers of which were long ago rifled by Arabs and Vandals. This cemetery had a Jewish quarter.

We must mention finally the gigantic remains in the western plain of the Roman aqueduct which carried water from Jebel Zaghwan (*Mons Zeugitanus*) and Juggar (Zucchara) to the cisterns of La Malga. From the *nymphaeum* of Zaghwan to Carthage this aqueduct is 61 Roman miles (about 56 English miles) long; in the plain of Manuba its arches are nearly 49 ft. high.

Though several famous travellers visited and described the ruins of Carthage during the first thirty years of the 19th century, such as Major Humbert, Chateaubriand, Estrup, no scientific investigations took place till 1833. In that year Captain Falbe, Danish consul at Tunis, made a plan of the ruins so far as they were visible. In 1837 there was formed in Paris, on the initiative of Dureau de la Malle, a *Société pour les fouilles de Carthage*; under the auspices of this body Falbe and Sir Grenville Temple undertook researches, and a little later Sir Thomas Read, English consul, following the example of the Genoese and the Pisans, carried away to England the mosaics, columns and statues of the baths of Antoninus. The Abbé Bourgade, chaplain of the church of St Louis erected in 1841, collected together Punic stelae and other antiquities from the surrounding plain; these formed the nucleus of the magnificent museum subsequently formed by Père Delattre at the instigation of Cardinal Lavigerie. Between 1856 and 1858 Nathan Davis made excavations on the supposed site of the Odeum, and in 1859 Beulé undertook his celebrated investigations on Byrsa. Among other explorers were A. Daux in 1866; von Maltzan in 1870; E. de Sainte-Marie in 1874; Ch. d'Hérisson in 1883; E. Babelon and S. Reinach in 1884; Vernaz in 1885; Gauckler in 1903. Of these the majority were sent officially by the French government. But their attempts were partial, disjointed and without any systematic plan; they were entirely superseded by the brilliant and persevering work of R. P. Delattre. The Musée Lavigerie, the result of his labours, contains a vast archaeological treasure, the interest of which is doubled by the fact that it stands in the very midst of the ancient site. Unfortunately Delattre's work suffered too often from the absence of a cordial understanding with the directors of the antiquities department, La Blanchère and P. Gauckler, who, having themselves undertaken excavations, transported their finds to the Bardo museum, by the help of the public funds at their disposal.

The main authority for the topography and the history of the excavations is Aug. Audollent's *Carthage romaine* (Paris, 1901). A topographical and archaeological map of the site was published under the direction of Colonel Dolot and with the assistance of Delattre and Gauckler by the Ministère de l'Instruction Publique in 1907.

History.—The history of Carthage falls into four periods: (1) from the foundation to the beginning of the wars with the Sicilian Greeks in 550 B.C.; (2) from 550 to 265, the first year of the Punic Wars; (3) the Punic Wars to the fall of Carthage in

146 B.C.; (4) the periods of Roman and Byzantine rule down to the destruction of the city by the Arabs in A.D. 698.

(1) *Foundation to* 550 B.C.—From an extremely remote period Phoenician sailors had visited the African coast and had had commercial relations with the Libyan tribes who inhabited the district which forms the modern Tunis. In the 16th century B.C. the Sidonians already had trading stations on the coast; with the object of competing with the Tyrian colony at Utica they established a trading station called Cambē or Caccabē on the very site afterwards occupied by Carthage. Near Borj-Jedid unmistakable traces of this early settlement have been found, though nothing is known of its history. According to the classical tradition Carthage was founded about 850 B.C. by Tyrian emigrants led by Elissa or Elissar, the daughter of the Tyrian king Mutton I., fleeing from the tyranny of her brother Pygmalion. According to the story, Elissa subsequently received the name of Dido, *i.e.* "the fugitive." Cambē welcomed the new arrivals, who bought from the mixed Libyo-Phoenician peoples of the neighbourhood, tributaries of the Libyan king Japon, a piece of land on which to build a "new city," *Kart-hadshat*, whence the Greek and Roman forms of the name. The story goes that Dido, having obtained "as much land as could be contained by the skin of an ox," proceeded to cut the skin of a slain ox into strips narrow enough to extend round the whole of the hill, which afterwards from this episode gained the name of *Byrsa*. This last detail obviously arose from a mere play on words by which Βύρσα "hide," "skin," is confused with the Phoenician *bosra*, *borsa*, "citadel," "fortress." In memory of its Tyrian origin, Carthage paid an annual tribute to the temple of Melkarth at Tyr, and under the Roman empire coins were struck showing Dido fleeing in a galley, or presiding over the building of Byrsa. On the Vatican *Virgil* there is a representation in miniature of workmen shaping marble blocks and columns for Dido's palace.

The early history of Carthage is very obscure. It is only in the 6th century that real history begins. By this time the city is unquestionably a considerable capital with a domain divided into the three districts of Zeugitana (the environs of Carthage and the peninsula of C. Bon), Byzacium (the shore of the Syrtes), and the third comprising the emporia which stretch in the form of a crescent to the centre of the Great Syrtis as far as Cyrenaica. The first contest against the Greeks arose from a boundary question between the settlements of Carthage and those of the Greeks of Cyrene. The limits were eventually fixed and marked by a monument known as the "Altar of Philenae." The destruction of Tyre by Nebuchadrezzar (*q.v.*), in the first half of the 6th century, enabled Carthage to take its place as mistress of the Mediterranean. The Phoenician colonies founded by Tyre and Sidon in Sicily and Spain, threatened by the Greeks, sought help from Carthage, and from this period dates the Punic[1] supremacy in the western Mediterranean. The Greek colonization of Sicily was checked, while Carthage established herself on all the Sicilian coast and the neighbouring islands as far as the Balearic Islands and the coast of Spain. The inevitable conflict between Greece and Carthage broke out about 550.

(2) *Wars with the Greeks.*—In 550, the Carthaginians, led by the suffetes Malchus, conquered almost all Sicily and expelled the Greeks. In 536 they defeated the Phocaeans and the Massaliotes before Alalia on the Corsican coast. But Malchus, having failed in Sardinia, was banished by the stern Carthaginian senate and swore to avenge himself. He laid siege to Carthage itself, and, after having sacrificed his son Carthalo to his lust for vengeance, entered the city as a victor. He ruled until he was put to death by the party which had supported him. Mago, son of Hanno, succeeded Malchus, as suffetes and general-in-chief. He was the true founder of the Carthaginian military power. He conquered Sardinia and the Balearic Islands, where he founded Port Mahon (Portus Magonis), and so increased the power of Carthage that he was able to force commercial treaties upon the Etruscans, and the Greeks of both Sicily and Italy. The first agreement between Carthage and Rome was made in 509, one year after the expulsion of the Tarquins, in the consulship of Junius Brutus and Marcus Horatius. The text is preserved by Polybius (*Hist.* iii. 22–23). It assigned Italy to the Romans and the African waters to Carthage, but left Sicily as a dangerous neutral zone.

Mago was succeeded as commander-in-chief by his elder son Hasdrubal (*c.* 500), who was thrice chosen suffetes; he died in Sardinia about 485. His brother Hamilcar, having collected a fleet of 200 galleys for the conquest of Sicily, was defeated by the combined forces of Gelo of Syracuse and Theron of Agrigentum under the walls of Himera in 480, the year in which the Persian fleet was defeated at Salamis (some say the two battles were simultaneous); it is said that 150,000 Carthaginians were taken prisoners. The victory is celebrated by Pindar (*Pyth.* i.).

These two leaders of the powerful house of the Barcidae each left three sons. Those of Hasdrubal were Hannibal, Hasdrubal and Sapho; those of Hamilcar, Himilco, Hanno and Gisco. All, under various titles, succeeded to the authority which it had already enjoyed. About 460 Hanno,[2] passing beyond the Pillars of Hercules (Straits of Gibraltar), founded settlements along the West African coast in the modern Senegal and Guinea, and even in Madeira and the Canary Islands.

In Sicily the war lasted for a century with varying success. In 406 Hannibal and Himilco destroyed Agrigentum and threatened Gela, but the Carthaginians were forced back on their strongholds in the south-west by Dionysius the Elder, Dionysius the Younger, Timoleon and Agathocles successively, whose cause was aided by a terrible plague and civil troubles in Carthage itself. A certain Hanno, unquestionably of the Barcide house, attempted to seize the supreme power, but his partisans were overwhelmed and he himself suffered the most cruel punishment. Profiting by these troubles, Timoleon defeated the Carthaginians at Crimissus in 340, and compelled them to sue for peace. This peace was not of long duration; Agathocles crossed to Africa and besieged Carthage, which was then handicapped by the conspiracy of Bomilcar. Bomilcar was crucified, and Agathocles having been obliged to return to Sicily, his general Eumarcus was compelled to carry his army out of Africa, where it had maintained itself for three years (August 310 to October 307). After the death of Agathocles, the Carthaginians re-established their supremacy in Sicily, and Mago even offered assistance to Rome against the invasion of Pyrrhus (280). Pyrrhus crossed to Sicily in 277, and was preparing to emulate Agathocles by sailing to Africa when he was compelled to return to Italy (see SICILY: *History*).

Delivered from these dangers and more arrogant than before, Carthage claimed the monopoly of Mediterranean waters, and seized every foreign ship found between Sardinia and the Pillars of Hercules. "At Carthage," said Polybius, "no one is blamed, however he may have acquired his wealth." The sailors took the utmost care to conceal the routes which they followed; there is a story that a Carthaginian ship, pursued by a Roman galley as far as the Atlantic, preferred to be driven out of her course and sunk rather than reveal the course to the Cassiterides, whither she was bound in quest of tin. The owner being saved, the senate made good his losses from the public treasury (Strabo, iii. 5. 11).

(3) *Wars with Rome.*[3]—The first Punic War lasted twenty-seven years (268–241); it was fought by Carthage for the defence of her Sicilian possessions and her supremacy in the Tyrrhenian Sea. The Romans, victorious at the naval battles of Mylae (Melazzo) and Ecnomus (260 and 256), sent M. Atilius Regulus with an army to Africa. But the Carthaginians, by the help of the Spartan Xanthippus, were successful, and Regulus was captured. The fighting was then transferred to Sicily, where Hasdrubal was defeated at Panormus (250); subsequently the Romans failed before Lilybaeum and were defeated at Drepanum, but their victory at the Aegates Islands ended the war (241).

[1] *i.e.* "of the Poeni (Phoenicians)."

[2] The identification of this Hanno with the son of Hamilcar is conjectural; see HANNO.

[3] For the military side of these wars see PUNIC WARS; HANNIBAL; HASDRUBAL.

Carthage now desired to disband her forces, but the mercenaries claimed their arrears of pay, and on being refused revolted under Spendius and Matho, pillaged the suburbs of Carthage and laid siege to the city itself. Only the genius of Hamilcar Barca raised the siege; the mercenaries were caught in the defile of the Axe, where they were cut down without mercy. This war, which all but ruined Carthage, is known to the Roman historians as the *bellum inexpiabile*.

This peril averted, Carthage undertook the conquest of Spain. It was the work of Hamilcar, and lasted nine years up to the day of Hamilcar's death, sword in hand, in 228. His son-in-law, Hasdrubal Pulcher, built Carthagena in 227 and concluded with Rome a treaty by which the Ebro was adopted as the boundary of the Carthaginian sphere. On his death the soldiers chose for themselves as leader Hannibal, son of Hamilcar. At this period Carthage, with a population of perhaps 1,000,000, was in the enjoyment of extraordinary prosperity alike in its internal industries and in its foreign trade. The manufacture of woven goods, especially, was a flourishing industry; the Greek writer Polemo records a special treaty dealing with Carthaginian fabrics which were a recognized luxury throughout the ancient world. In Sicily, Italy and Greece the Carthaginians sold especially black slaves, ivory, metals, precious stones and all the products of Central Africa, which came thence by caravan. In Spain they sought copper and silver, and it was by them that the modern mines of Huelva, as also those of Osca and Carthagena, were first exploited. The district round Carthage, with its amazing fertility, was the granary of the city, as it was later that of Rome. Mago had drawn up a treaty dealing with agriculture and rural economy generally, which was subsequently brought to Rome and translated into Latin by Decimus Silanus by order of the senate (J. P. Mahaffy, "The Work of Mago," in *Hermathena*, xv. pp. 29-35).

In the midst of this prosperity the Second War with Rome broke out. At this time the genius of Carthage is incarnate in Hannibal; his campaigns in Spain, Italy and Africa have won the admiration of military experts of all periods. The war became inevitable in 219 when Hannibal captured Saguntum, which was in alliance with Rome. Passing through Spain and Gaul, Hannibal resolved to carry the war into the heart of Italy (218–217). The battles of the Ticinus, Trebia and Trasimene Lake are but stages in the wonderful progress which culminated in the battle of Cannae (August 2, 216). The road to Rome was now open to him, but he did not profit by his advantage, while the Carthaginian senate, to its shame, withheld all further support. His brother Hasdrubal with his relieving army was defeated at the Metaurus in 207; the Romans recovered their hold in Spain, and, seeing that Hannibal was unable to move in Italy, carried the war back to Africa. Hearing that Scipio had taken Utica (203) and defeated Hasdrubal and Syphax, king of Numidia, Hannibal returned from Italy, but with a hastily levied army was defeated at Zama (October 19, 202). The subsequent peace was disastrous to Carthage, which lost its fleet and all save its African possessions.

After the Second War Carthage soon revived. The population is said still to have numbered 700,000, and despite its humiliation, the city never ceased to inspire alarm at Rome. The Numidian prince Massinissa, rival of Syphax and a Roman protégé, took advantage of a clause in the treaty of 202, which forbade Carthage to make war without the consent of the Roman senate, to extend his possessions at the expense of Carthage. In response to a protest from Carthage an embassy including M. Porcius Cato the Elder was sent to inquire into the matter, and Cato was so impressed with the city as a whole that on returning to Rome he never made a speech without concluding with the warning "Delenda est Carthago."

At this time there were three political parties in Carthage: (1) that which upheld the Roman alliance, (2) that which advocated the Numidian alliance, and (3) the popular party. These three were led respectively by Hanno, Hannibal Passer, Hasdrubal and Carthalo. The popular faction, which was turbulent and exasperated by the bad faith of the Romans, expelled the Numidian party and declared war in 149 on Massinissa, who was victorious at Oroscope. Rome then intervened, determined finally to destroy her now enfeebled rival. War was declared on the pretext that Carthage had engaged in war with Massinissa without the sanction of Rome. The third Punic War lasted three years, and after a heroic resistance the city fell in 146. The last champions of liberty entrenched themselves under Hasdrubal in the temple of Eshmun, the site of which is now occupied by the chapel of St Louis. The Roman troops were let loose to plunder and burn. The thick bed of cinders, blackened stones, broken glass, fragments of metal twisted by fire, half-calcined bones, which is found to-day at a depth of 13 to 16 ft. under the remains of Roman Carthage between Byrsa and the harbours, bears grim witness, in accord with the accounts of Polybius and Appian, to the terrible fate which overtook this part of the city. Before long a commission arrived from Rome to decide the fate of the province of Carthage. In the city itself, temples, houses and fortifications were levelled to the ground, the site was dedicated with solemn imprecations to the infernal gods, and all human habitation throughout the vast ruined area was expressly forbidden.

Constitutional History.—The narrative must here be interrupted by an account of the political and religious development of Phoenician Carthage. Carthage was an aristocratic republic based on wealth rather than on birth. Indeed, the popular party, which included certain noble families such as the Barcidae, was always powerful, and thus government by demagogues was not infrequent. So Aristotle, writing about 330, emphasizes the importance of great wealth in Carthaginian politics. The government was in fact a plutocracy. The aristocratic party was represented by the two suffetes and the senate; the democratic by the popular assembly. The suffetes (*Sofetim*) presided in the senate and controlled the civil administration; the office was annual, but there was no limit to re-election. Hannibal was elected for twenty-two years. The senate, which, like that of Tyre, was composed of 300 members, exercised ultimate control over all public affairs, decided on peace and war, nominated the Commission of Ten, which was charged with aiding and controlling the suffetes. This commission was subsequently replaced by a council of one hundred, called by the Greeks *gerousia*. This tribunal, which maintained law and order and called the generals to account, gradually became a tyrannical inquisition. Frequently it met at night in the Temple of Eshmun on Byrsa, in secret sessions described by Aristotle as *συσσιτια τῶν ἑταιριῶν*.

The popular assembly was composed, not of all the citizens, but of the *timuchi* (Gr. *τιμή, ἔχειν*), *i.e.* those who possessed a certain property-qualification. The election of the suffetes had to be ratified by this assembly. The two bodies were almost always in opposition, and this was one of the chief causes of the ruin of Carthage.

The army was recruited externally by senators who were sent to the great *emporia* or trade-centres, even to the most remote, to contract with local princes for men and officers. The payments, agreed upon in this way, were frequently in arrears; hence the terrible revolts such as that of the "bellum inexpiabile." It was not till the 3rd century that Carthage, in imitation of the kings of Syria and Egypt, began to make use of elephants in war. The elephant used was the African type (*elephas capensis*), which was smaller than the Asiatic (*elephas indicus*), though with longer ears. In addition to the mercenaries, the army contained a legion composed of young men belonging to the best families in the state; this force was important as a nursery of officers.

Religion.—The religion of Carthage was that of the Phoenicians. Over an army of minor deities (*alonim* and *baalim*) towered the trinity of great gods composed of Baal-Ammon or Moloch (identified by the Romans with Cronus or Saturn); Tanit, the virgin goddess of the heavens and the moon, the Phoenician Astarte, and known as Juno Caelestis in the Roman period; Eshmun, the protecting deity and protector of the acropolis, generally identified with Aesculapius. There were also special cults: of Iolaus or Tammuz-Adonis, whom the Romans identified to some extent with Mercury; of the god Patechus or Pygmaeus, a deformed and repulsive monster like the Egyptian Ptah, whose images were placed on the prows of ships to frighten the enemy; and lastly of the Tyrian Melkarth, whose functions were analogous to those of Hercules. The statue of this god was carried to Rome after the siege of 146 (Pliny, *Nat. Hist.* xxxvi. 12. 39). From inscriptions we know the names of other minor deities, which are perhaps only other names of the same gods, *e.g.* Rabbat Umma, "the great mother"; Baalat haedrat, "mistress of the sanctuary"; Ashtoreth (Astarte), Illat, Sakon, Tsaphon, Sid, Aris (? Ares).

From the close of the 4th century B.C. the intimate relations between the Carthaginians and the Sicilian Greeks began to introduce Hellenic elements into this religion. In the forum of Carthage was a temple to Apollo containing a colossal statue, which was transported

to Rome. The Carthaginians once at least sent offerings to Delphi, and Tanit approximated to some extent to Demeter; hence on the coins we find the head of Tanit or the Punic Astarte crowned with ears of corn, in imitation of the coins of the Greek Sicilian colonies. The symbol of Tanit is the crescent moon; in her temple at Carthage was preserved a famous veil or *peplus* which was venerated as the city's palladium. On the innumerable votive stelae which have been unearthed, we find invocations to Tanit and Baal-Ammon, as two associate deities (*θεοὶ πάρεδροι*). The usual formula in these inscriptions is, "To the great lady Tanit, the manifestation [reflex, face] of Baal (*Tanit-Penē-Baal*) and to our lord Baal-Ammon, the vow of Bomilcar, son of Mago, son of Bomilcar, because they have heard his prayer" (*Corp. inscr. semit.* vol. i. pp. 276 f.; Audollent, *Carth. Rom.* p. 369).

Baal-Ammon or Moloch, the great god of all Libya, is represented as an old man with ram's horns on his forehead; the ram is frequently found with his statues. He appears also with a scythe in his hand ("*falcem ferens senex pingitur*," St Cyprian, *De idol. vanit*, 11). At Carthage children were sacrificed to him, and in his temple there was a colossal bronze statue in the arms of which were placed the children who were to be sacrificed (Diod. Sic. xx. 14; Justin xviii. 6, xix. 1; Plut. *De superstit.* 13, *De sera num. vindic.* 6.). The children slipped one by one from the arms into a furnace amid the plaudits of fanatical worshippers. These sacrifices persisted even under Roman rule; Tertullian states that even in his time they took place in secret (*Apolog.* cix.; cf. Delattre, "Inscript, de Carth.," in *Bulletin épigraphique*, iv. p. 317; Audollent, *op. cit.* p. 398).

(4) *Roman Period.*—In 122 B.C., twenty-four years after the destruction of the city by Scipio Aemilianus, the Roman senate, on the proposal of Rubrius, decided to plant a Latin colony on the site. C. Gracchus and Fulvius Flaccus were entrusted with the foundation of the new city, which was christened *Colonia Junonia*, and placed under the protection of Juno Caelestis, the new name for the Punic Tanit. But its prosperity was obstructed both by unpropitious omens and by the very recollection of the ancient feud, and fifty years later Marius, proscribed by Sulla, found the ruins practically deserted. In the neighbourhood were the scattered remnants of the old Punic population, who, according to Athenaeus (*Deipnosoph.* v. 50), had actually had the assurance to send ambassadors to Mithradates the Great assuring him of their support against Rome. Ultimately M. Minucius Rufus passed a law abrogating that of 122 and suppressing the *Colonia Junonia*.

Julius Caesar, pursuing the lost supporters of Pompey, encamped on the ruins of the city, and there, according to tradition, had a dream which induced him to re-establish the abandoned colony. Returning to Rome, he despatched thither the poor citizens who were demanding land from him. Later on Augustus sent new colonists, and, henceforward, the machinery of administration was regularly centred there (Appian viii. 136; Dio Cass. lxxx. 1; Audollent, *op. cit.* p. 46). The proconsuls of the African province had hitherto lived at Utica; in 14–13 B.C. C. Sentius Saturninus transferred his headquarters to Carthage, which was henceforth known as *Colonia Julia Carthago*. Several inscriptions use this name, as also the bronze coins which bear the heads of Augustus and Tiberius, and were struck at first in the name of the *suffeles*, afterwards in that of *duumviri*.

Pomponius Mela and Strabo already describe Carthage as among the greatest and most wealthy cities of the empire. Herodian puts it second to Rome, and such is the force of tradition that the Roman citizens resident in Carthage boasted of its Punic past, and loved to recall its glory. Virgil in the *Aeneid* celebrated the misfortunes of Dido, whom the colonists ultimately identified with Tanit-Astarte; a public Dido-cult grew up, and the citizens even pretended to have discovered the very house from which she had watched the departure of Aeneas. The religious character of these legends, coupled with the city's resumption of its old rôle as mistress of Africa, and its independent spirit, reawakened the old distrust, and even up to the invasions of the Vandals the jealous rivalry of Rome forbade the reconstruction of the city walls.

The revolt of L. Clodius Macer, legate of Numidia, in A.D. 68 was warmly supported by Carthage, and one of the coins of this short-lived power bears the symbol of Carthage personified. At the moment of the accession of Vitellius, Piso, governor of the province of Africa, was in his turn proclaimed emperor at Carthage. A little later, under Antoninus Pius, we read of a fire which devastated the quarter of the forum; about the same time, *i.e.* under Hadrian and Antoninus, there was built the famous Zaghwan aqueduct, which poured more than seven million gallons of water a day into the reservoirs of the Mapalia (La Malga); the cost of this gigantic work was defrayed by a special tax which pressed heavily on the inhabitants as late as the reign of Septimius Severus; allusions to it are made on the coin-types of this emperor (E. Babelon, *Rivista italiana di numismatica*, 1903, p. 157).

In the early history of Christianity Carthage played an auspicious part, in virtue of the number of its disciples, the energy and learning of their leaders, the courage and eloquence of its teachers, the persecutions of which it was the scene, the number of its councils and the heresies of which it witnessed the birth, propagation or extinction (see CARTHAGE, SYNODS OF). The labours of Delattre have filled the St Louis museum at Carthage with memorials of the early Church. From the end of the 2nd century there was a bishop of Carthage; the first was Agrippinus, the second Optatus. At the head of the apologists, whom the persecutions inspired, stands Tertullian. In 202 or 203, in the amphitheatre, where Cardinal Lavigerie erected a cross in commemoration, occurred the martyrdom of Perpetua and Felicitas. Tertullian was succeeded (248) by a no less famous bishop Cyprian. About this time the proconsul Gordian had himself proclaimed (239) emperor at Thysdrus (El Jem). Shortly afterwards Sabinianus, aspiring to the same dignity, was besieged by the procurator of Mauretania; the inhabitants gave him up and thus obtained a disgraceful pardon (R. Cagnat, *L'armée romaine d'Afrique*, p. 52; Audollent, *op. cit.* p. 73). Peace being restored, the persecution of the Christians was renewed by an edict of the emperor Decius (250). Cyprian escaped by hiding, and subsequently caused the heresy of Novatian to be condemned in the council of 251. In 257, in a new persecution under Valerian, Cyprian was beheaded by the proconsul Galerius Maximus.

About 264 or 265 a certain Celsus proclaimed himself emperor at Carthage, but was quickly slain. Probus, like Hadrian and Severus, visited the city, and Maximian had new baths constructed. Under Constantius Chlorus, Maxentius proclaimed himself emperor in Africa; this caused great excitement in Carthage, and the garrison, which was hostile to the pretender, compelled L. Domitius Alexander to assume the purple. Domitius was, however, captured by Maxentius and strangled at Carthage. About 311 there arose the famous Donatist heresy, supported by 270 African bishops (see DONATISTS and CONSTANTINE I.). At the synod of Carthage in 411 this heresy was condemned owing to the eloquence of Augustine. Two years later the Carthaginian sectaries even ventured upon a political rebellion under the leadership of Heraclianus, who proclaimed himself emperor and actually dared to make a descent on Italy itself, leaving his son-in-law Sabinus in command at Carthage. Being defeated he fled precipitately to Carthage, where he was put to death (413). Donatism was followed by Pelagianism (see PELAGIUS), also of Carthaginian origin, and these religious troubles were not settled when in May 429 the Vandals, on the appeal of Count Boniface, governor of Africa, crossed the Straits of Gibraltar and invaded Mauretania. Genseric, who was hailed with one accord by all the different sectaries as the champion of their several views, appeared in 439 before the walls of Carthage, which had been hastily rebuilt after five hundred years by the order of Theodosius II. The priest Salvianus has left a splendid picture of Carthage at this moment (*de Gubern.* vii. 16). It had 500,000 inhabitants, and 22 basilicas (several of which have been discovered by Delattre). Genseric entered almost without a blow (October 19, 439), and gave over the city to plunder before departing for his attack on Italy. From this time Carthage became, in the hands of the Vandals, a mere pirate stronghold, such as Tunis and Algiers were subsequently to become. Once, in 470, the fleet of the Eastern empire under the orders of Basiliscus appeared in the Bay of Carthage, but Genseric succeeded in setting fire to the attacking ships and from Byrsa watched their entire annihilation.

Byzantine Rule.—Under Genseric's successors (see VANDALS), Carthage was still the scene of many displays of savage brutality, though Thrasamund built new baths and a basilica. Ultimately Gelimer, the last Vandal king, was defeated at Ad Decimum by the Byzantine army under Belisarius, who entered Carthage unopposed (September 14, 533). The restored city now received the name of Colonia Justiniana Carthago; Belisarius rebuilt the walls and entrusted the government to Solomon. New basilicas and other monuments were erected, and Byzantine Carthage recovered for a century the prosperity of the Roman city.

At length the Arabs, having conquered Cyrenaica and Tripolitana (647), and founded Kairawan (670), arrived before Carthage. In 697 Hasan ibn en-Noman, the Gassanid governor of Egypt, captured the city almost without resistance. But the garrison left by the Arabs was quite unable to defend itself against the patrician Joannes, who retook the city and hastily put it in a state of defence. Hasan returned furious with anger, defeated the Byzantines again, and decreed the entire destruction of the city. His orders were fulfilled; and in 698 Carthage finally disappears from history. Once again only does the name appear in the middle ages, when the French king, Louis IX., at the head of the eighth crusade, disembarked there on the 17th of July 1270. He died, however, of the plague on the 25th of August without having recovered northern Africa for civilization.

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CARTHAGE, a city and the county-seat of Jasper county, Missouri, U.S.A., on the Spring river, about 950 ft. above sea-level, and about 150 m. S. by E. of Kansas City. Pop. (1890) 7981; (1900) 9416, of whom 539 were negroes; (1906, estimate) 10,280. It is served by the St Louis & San Francisco, the Missouri Pacific, and the St Louis, Iron Mountain & Southern railways, and is connected with Webb City and Joplin, Mo., and Galena, Kan., by the electric line of the Southwest Missouri railway. The town is built on high ground underlain by solid limestone, and has much natural and architectural beauty. It is the seat of the Carthage Collegiate Institute (Presbyterian). A Chautauqua assembly and a county fair are held annually. In the vicinity there are valuable lead, zinc and coal mines, and quarries of Carthage "marble," with which the county court house is built. Carthage is a jobbing centre for a fruit and grain producing region; live-stock (especially harness horses) is raised in the vicinity; and among the city's manufactures are lime, flour, canned fruits, furniture, bed springs and mattresses, mining and quarrying machinery, ploughs and woollen goods. In 1905 the factory products were valued at $1,179,661. Natural gas for domestic use and for factories is piped from the Kansas gas fields. The municipality owns and operates the electric-lighting plant. Carthage, founded in 1833, was laid out as a town and became the county-seat in 1842, was incorporated as a town in 1868, was chartered as a city in 1873, and in 1890 became a city of the third class under the general (state) law. On the 5th of July 1861 about 3500 Confederates under General James E. Rains and M. M. Parsons, accompanied by Governor Claiborne Fox Jackson (1807–1862), and 1500 Union troops under Colonel Franz Sigel, were engaged about 7 m. north of the city in an indecisive skirmish which has been named the battle of Carthage.

CARTHAGE, SYNODS OF. During the 3rd, 4th, and 5th centuries the town of Carthage (*q.v.*) in Africa served as the meeting-place of a large number of church synods, of which, however, only the most important can be treated here.

1. In May 251 a synod, assembled under the presidency of Cyprian to consider the treatment of the *lapsi* (those who had fallen away from the faith during persecution), excommunicated Felicissimus and five other Novatian bishops (Rigorists), and declared that the *lapsi* should be dealt with, not with indiscriminate severity, but according to the degree of individual guilt. These decisions were confirmed by a synod of Rome in the autumn of the same year. Other Carthaginian synods concerning the *lapsi* were held in 252 and 254.

See Hefele, 2nd ed., i. pp. 111 sqq. (English translation, i. pp. 93 sqq.); Mansi, i. pp. 863 sqq., 905 sqq.; Hardouin, i. pp. 133 sqq., 147 sqq.; Cyprian, *Epp.* 52, 54, 55, 68.

2. Two synods, in 255 and 256, held under Cyprian, pronounced against the validity of heretical baptism, thus taking direct issue with Stephen, bishop of Rome, who promptly repudiated them, and separated himself from the African Church. A third synod, September 256, unanimously reaffirmed the position of the other two. Stephen's pretensions to authority as "bishop of bishops" were sharply resented, and for some time the relations of the Roman and African Churches were severely strained.

See Hefele, 2nd ed., i. pp. 117-119 (English translation, i. pp. 99 sqq.); Mansi, i. pp. 921 sqq., 951 sqq.; Hardouin, i. pp. 153 sqq.; Cyprian, *Epp.* 69-75.

3. The Donatist schism (see DONATISTS) occasioned a number of important synods. About 348 a synod of Catholic bishops, who had met to record their gratitude for the effective official repression of the "Circumcelliones" (Donatist terrorists), declared against the rebaptism of any one who had been baptized in the name of the Trinity, and adopted twelve canons of clerical discipline.

See Hefele, 2nd. ed., i. pp. 632-633 (English translation, ii. pp. 184-186); Mansi, iii. pp. 143 sqq.; Hardouin, i. pp. 683 sqq.

4. The "Conference of Carthage" (see DONATISTS), held by imperial command in 411 with a view to terminating the Donatist schism, while not strictly a synod, was nevertheless one of the most important assemblies in the history of the African church, and, indeed of the whole Christian church.

See Hefele, 2nd ed., ii. pp. 103-104 (English translation, ii. pp. 445-446); Mansi, iv. pp. 7-283; Hardouin, i. pp. 1043-1190.

5. On the 1st of May 418 a great synod ("A Council of Africa," St Augustine calls it), which assembled under the presidency of Aurelius, bishop of Carthage, to take action concerning the errors of Caelestius, a disciple of Pelagius (*q.v.*), denounced the Pelagian doctrines of human nature, original sin, grace and perfectibility, and fully approved the contraryviews of Augustine. Prompted by the reinstatement by the bishop of Rome of a deposed African priest, the synod enacted that "whoever appeals to a court on the other side of the sea (meaning Rome) may not again be received into communion by any one in Africa" (canon 17).

See Hefele, 2nd ed., ii. pp. 116 sqq. (English translation, ii. pp. 458 sqq.); Mansi, iii. pp. 810 sqq., iv. pp. 377 sqq., 451 sqq.; Hardouin, i. pp. 926 sqq.

6. The question of appeals to Rome occasioned two synods, one in 419, the other in 424. The latter addressed a letter to

the bishop of Rome, Celestine, protesting against his claim to appellate jurisdiction, and urgently requesting the immediate recall of his legate, and advising him to send no more judges to Africa.

See Hefele, 2nd ed., ii. pp. 120 sqq., 137 sqq. (English translation, ii. pp. 462 sqq., 480 sqq.); Mansi, iii. pp. 835 sqq., iv. pp. 401 sqq., 477 sqq.; Hardouin, i. pp. 943 sqq., 1241 sqq. (T. F. C.)

CARTHUSIANS, an order of monks founded by St Bruno (*q.v.*). In 1084 Bruno and his six companions presented themselves before the bishop of Grenoble and explained to him their desire to lead an ascetical life in a solitary place. He pointed out to them a desolate spot named Chartreuse, on the mountains near Grenoble, rocky and precipitous, and snow-covered during a great portion of the year, and told them they might there carry out their design. They built themselves three huts and an oratory, and gave themselves up to a life of prayer and silence and extreme austerity. After a few years Bruno was summoned to Rome by Urban II., as an adviser in the government of the Church, *c.* 1090; but after a year or so he obtained permission to withdraw from Rome, and was able to found in the forests of Calabria near Squillace a second, and later on a third and a fourth monastery, on the same lines as the Chartreuse. On one of these south Italian foundations Bruno died in 1101. On leaving the Chartreuse he had appointed a successor as superior, and the institute steadily took more settled shape and further development. Peter the Venerable, abbot of Cluny, writing about forty years later, speaks thus of the mode of life of the earliest Carthusians:—

"Warned by the negligence and lukewarmness of many of the older monks, they adopted for themselves and for their followers greater precaution against the artifices of the Evil One. As remedy against pride and vain-glory they chose a dress more poor and contemptible than that of any other religious body; so that it is horrible to look on these garments, so short, scanty, coarse and dirty are they. In order to cut up avarice by the roots, they enclosed around their cells a certain quantity of land, more or less, according to the fertility of the district; and they would not accept a foot of land beyond that limit if you were to offer them the whole world. For the same motive they limit the quantity of their cattle, oxen, asses, sheep and goats. And in order that they might have no motive for augmenting their possessions, either of land or animals, they ordained that in every one of their monasteries there should be no more than twelve monks, with their prior the thirteenth, eighteen lay brothers and a few paid servants. To mortify the flesh they always wear hair shirts of the severest kind, and their fasting is wellnigh continuous. They always eat bread of unbolted meal, and take so much water with their wine that it has hardly any flavour of wine left. They never eat meat, whether in health or ill. They never buy fish, but they accept it if it is given to them for charity. They may eat cheese and eggs only on Sundays and Thursdays. On Tuesdays and Saturdays they eat cooked vegetables. On Mondays, Wednesdays and Fridays they take only bread and water. They eat once a day only, save during the octaves of Christmas, Easter, Pentecost, Epiphany and other solemnities. They live in separate little houses like the ancient monks of Egypt, and they occupy themselves continually with reading, prayer and the labour of their hands, especially the writing of books. They recite the prayers for minor canonical hours in their own dwellings, when warned by the bell of the church; but they all assemble in church for matins and vespers. On feast days they eat twice, and sing all the offices in the church, and eat in the refectory. They do not say mass save on festivals and Sundays. They boil the vegetables served out to them in their own dwellings, and never drink wine save with their food." (Migne, *Patrol. Lat.* clxxxix. 943.)

In its broad outlines this description of primitive Carthusian life has remained true, even to the present day: the regulations as to food are not quite so stringent, and the habit is now an ordinary religious habit of white serge. It was not until 1170 that the Carthusians were formally constituted a separate religious order by papal act. Owing to its very nature, the institute never had any great expansion: at the middle of the 13th century there were some 50 Charterhouses; at the beginning of the 18th there were 170, 75 being in France.

There was no written rule before 1130, when Guigo, the fifth prior of the Grande Chartreuse, reduced to writing the body of customs that had been the basis of Carthusian life (Migne, *Patrol. Lat.* cliii. 631); enlargements and modifications of this code were made in 1259, 1367, 1509 and 1681: this last form of the statutes is the present Carthusian rule.

The life is very nearly eremitical: except on Sundays and feasts, the Carthusians meet only three times a day in the church—for the Midnight Office, for Mass and for Vespers; once a week, on Sundays (and feasts) they have their meal in the refectory, and once a week they have recreation together and a walk outside enclosure. All the rest of their time is passed in solitude in their hermitages, which are built quite separate from one another. Each hermitage is a house, containing living-room, bedroom and oratory, workshop and store-room, and has a small garden attached. The monks are supplied with such tools as they wish to employ in workshop and garden, and with such books as they need from the library. The Carthusian goes to bed every evening at 7 and is called about 11, when he says in his private oratory the *Officium B. Mariae Virginis*. Towards midnight all repair to the church for Matins and Lauds, which are celebrated with extraordinary solemnity and prolixity, so as to last from 2 to 3 hours, according to the office. They then return to bed until 5, when they again go to the church for the daily High Mass, still celebrated according to the phase of liturgical and ritual development of the 11th century. The private Masses are then said, and the monks betake themselves to work or study. At 10 in summer, 11 in winter, 12 on feast days, they have their dinner, alone except on Sundays and feasts; the dinner is supplied from the common kitchen through a small window. On many days of the year there is but one meal; meat is never eaten, even in sickness—this has always been an absolute rule among the Carthusians. In the afternoon they again assemble in the church for Vespers; the lesser portions of the canonical office, as well as the Office of the Blessed Virgin and the Office of the Dead, are said privately in the oratories.

This manner of life has been kept up almost without variation for eight centuries: among the Carthusians there have never been any of those revivals and reforms that are so striking a feature in the history of other orders—"never reformed, because never deformed." The Carthusians have always lived thus wholly cut off from the outer world, each one in almost entire isolation. They introduced and have kept up in western Europe a life resembling that of the early Egyptian monks, as under St Anthony's guidance monasticism passed from the utter individualism of the first hermits to the half eremitical, half cenobitical life of the Lauras (see MONASTICISM). Owing to certain resemblances in external matters to the Benedictine rule and practice, the Carthusians have sometimes been regarded as one of the offshoots from the Benedictines; but this view is not tenable, the whole Carthusian conception, idea and spirit being quite different from the Benedictine.

The superiors of the Charterhouses are priors, not abbots, and the prior of the Grande Chartreuse is the superior general of the order. A general chapter of the priors is held annually at the Grande Chartreuse. The Carthusians have always flourished most in France, but they had houses all over western Europe; some of the Italian *Certose*, as those at Pavia, Florence and Naples, are renowned for their wonderful beauty.

The first English Charterhouse was established in 1178 at Witham by Selwood Forest, and at the Dissolution there were nine, the most celebrated being those at Sheen in Surrey and at Smithfield in London (for list see *Catholic Dictionary*, art. "Carthusians"). The Carthusians were the only order that made any corporate resistance to the ecclesiastical policy of Henry VIII. The community of the London Charterhouse stood firm, and the prior and several of the monks were put to death in 1535 under circumstances of barbarous cruelty. In Mary's reign a community was reassembled at Sheen, and on her death it emigrated, fifteen in number, to Flanders, and finally settled in Nieuport; it maintained itself as an English community for a considerable time, but gradually dwindled, and the last of the old English Carthusian stock died in 1831. There is now one Charterhouse in England established at Parkminster in Sussex in 1883; the community numbers 50 choir-monks, but it is almost wholly made up of foreigners, including many of those recently expelled from France.

At the French Revolution the monks were driven from the

Grande Chartreuse, but they returned in 1816; they were again driven out under the Association Laws of 1901, and the community of the Grande Chartreuse is now settled in an old Certosa near Lucca. Of late years the community at the Grande Chartreuse had consisted of some 40 choir-monks and 20 lay brothers. Before the recent expulsions from France there were in all some 20 Charterhouses.

There have been since the middle of the 13th century a very few convents of Carthusian nuns, not more than ten; in recent times there have been but two or three, one situated a few miles from the Grande Chartreuse. The rule resembles that of the monks, but the isolation, solitude and silence are much less stringent. The habit of the Carthusians, both monks and nuns, is white.

A word may be added as to the famous liqueur, known as Chartreuse, made by the monks. At the Revolution the property of the Carthusians was confiscated, and on their restoration they recovered only the barren desert in which the monastery stood, and for it they had to pay rent. Thus they were for some years in want even of the needful means of subsistence. Then the liqueur was invented as a means of supplying the wants of the community; it became a great commercial success and produces a large yearly income. This income the monks have not spent on themselves, nor does it accumulate. The first charge is the maintenance of the Grande Chartreuse and the other Charterhouses, and out of it have been built and established the new monasteries of the order, as at Düsseldorf, Parkminster and elsewhere; but by far the largest portion has been spent on religious and charitable purposes in France and all over the world, —churches, schools, hospitals, almshouses, foreign missions. One thing is certain: the profits made no difference at all to the secluded and austere life of the monks of the Grande Chartreuse.

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CARTIER, SIR GEORGES ÉTIENNE, Bart. (1814–1873), Canadian statesman, was born in the province of Quebec on the 6th of September 1814. Called to the bar in 1835, he soon gained a large practice. He took part in the rebellion of 1837, and was forced for a time to fly the country. In 1848 he was elected to the Canadian parliament. His youthful ebullition of 1837 was soon repented of, and he became a loyal subject of the British crown. So greatly had he changed that in 1854 he became a leading member of the reconstructed Liberal-Conservative party. In 1855 he was appointed provincial secretary, and in 1857 attorney-general for Lower Canada. From 1858 to 1862 he and Sir John Macdonald were joint prime ministers of Canada, and their alliance lasted till the death of Cartier. He took the chief part in promoting many useful measures, such as the abolition of seigneurial tenure in Lower Canada (see QUEBEC), and the codification of the civil law of that province (1857–1864). Above all he favoured the construction of railways, and to his energy and fearless optimism are largely due the eventual success of the Grand Trunk railway, and the resolve to construct the Canadian Pacific. In the face of great opposition, he carried his native province into federation (1864–1867), which would have been impossible without his aid. In the first cabinet of Sir John Macdonald he sat as minister of militia and defence, and carried in 1868 an important act establishing the land forces of Canada on a sound basis. Though a devout Catholic, he became involved in a political quarrel with his church, and was defeated by clerical influence at the general election of 1872. Another seat was found for him, but his health failed and he died on the 20th of May 1873.

The *Life*, by Alfred O. De Celles (Toronto, 1904), may be supplemented by the sketch in Dent's *Canadian Portrait Gallery* (Toronto, 1880). (W. L. G.)

CARTIER, JACQUES (1491–1557), French navigator, discoverer of the Canadian river St Lawrence, was born at St Malo in Brittany. Of his early life nothing is known. On the suppression by Admiral Chabot of the trade to Brazil, an expedition consisting of two ships and sixty-one men was despatched from St Malo under Cartier on the 20th of April 1534, to look for a north-west passage to the East. Cartier reached Newfoundland on the 10th of May, and at once entered the strait of Belle Isle, then known to the fishermen as the bay of Castles. While the ships renewed their supply of wood and water in Belles Amours harbour on the north side of the strait, the long-boats discovered that the coast farther west was barren, rocky and uninviting. In view of this Cartier set sail on Monday, the 15th of June, for the south side of the strait, by following which he was led down almost the whole west coast of Newfoundland. Off St George's Bay a storm drove the ships out into the gulf, but on resuming his course Cartier fell in with the Bird Rocks. The island south of these he named Brion Island, after Chabot. Cartier mistook our Magdalen and Prince Edward Islands for the main shore on the south side of this inland sea. Following the coast of New Brunswick northward he was greatly disappointed to discover Chaleur Bay was not a strait. During a ten days' stay in Gaspé Harbour Cartier made friends with a tribe of Huron-Iroquois Indians from Quebec, two of whom he carried off with him. A mirage deceived him into thinking the passage up the river south of Anticosti was a bay, whereupon he proceeded to coast the southern, eastern and northern shores of Anticosti. On discovering the passage between this island and the Quebec shore a council was held, at which it was decided to postpone the exploration of this strait until the following year. Heading eastward along the Quebec shore, Cartier soon regained the Strait of Belle Isle and, entering the Atlantic on the 15th of August, reached St Malo in safety on the 5th of September.

Cartier set sail again from St Malo with three vessels on the 16th of May 1536, and passing through the strait of Belle Isle anchored on the 9th of August in Pillage Bay, opposite Anticosti. The next day he named this the bay of St Lawrence. In course of time the name spread to the gulf and finally to the river. Proceeding through the passage north of Anticosti, Cartier anchored on the 1st of September at the mouth of the Saguenay, which the two Indians who had passed the winter in France informed him was the name of a kingdom "rich and wealthy in precious stones." Again on reaching the island of Orleans, so named after the third son of Francis I., they told Cartier he was now in the kingdom of Canada, in reality the Huron-Iroquois word for village. Leaving his two larger vessels in the St Charles, which there enters the St Lawrence, Cartier set off westward with the bark and the long-boats. The former grounded in Lake St Peter, but in the latter he reached, on the 2nd of October, the Huron-Iroquois village of Hochelaga on the site of the city of Montreal. Further progress was checked by the Lachine Rapid. From the top of Mount Royal, a name still in use, Cartier beheld the St Lawrence and the Ottawa stretching away to the west. On his return to the St Charles, where during the winter twenty-five men died of scurvy, Cartier sought further information about the rich country called Saguenay, which he was informed could be reached more easily by way of the Ottawa. In order to give Francis I. authentic information of this northern Mexico, Cartier seized the chief and eleven of the headmen of the village and carried them off to France. This time he passed south of Anticosti and, entering the Atlantic through Cabot Strait, reached St Malo on the 16th of July 1537.

Francis I. was unable to do anything further until the spring of 1541, when Cartier set sail with five vessels and took up

his quarters at Cap Rouge, 9 m. above Quebec. A soldier, the seigneur de Roberval, had been chosen to lead the men to the conquest of Saguenay; but when he did not arrive, Cartier made a fresh examination of the rapid of Lachine, preparatory to sending the men up the river Ottawa. Roberval at length set sail in April 1542, but on reaching St John's, Newfoundland, met Cartier on his way back to France. In the summer of 1543, Cartier was sent out to bring home Roberval, whose attempt to make his way up the Ottawa to this mythical Saguenay had proved futile. From 1544 until his death at St Malo, on the 1st of September 1557, Cartier appears to have done little else than give technical advice in nautical matters and act as Portuguese interpreter.

A critical edition of Cartier's *Brief Récit de la navigation faicte ès isles de Canada* (1545), from the MSS., has been published by the university of Toronto. The best English version is that by James Phinney Baxter, published at Portland, Maine, in 1906. (H. P. B.)

CARTILAGE (Lat. *cartilago*, gristle), the firm elastic and gristly connective tissue in vertebrates. (See CONNECTIVE TISSUES and JOINTS.)

CARTOON (Ital. *cartone*, pasteboard), a term used in pictorial art in two senses. (1) In painting, a cartoon is used as a model for a large picture in fresco, oil or tapestry, or for statuary. It was also formerly employed in glass and mosaic work. When cartoons are used in fresco-painting, the back of the design is covered with black-lead or other colouring matter; and, this side of the picture being applied to the wall, the artist passes over the lines of the design with a point, and thus obtains an impression. According to another method the outlines of the figures are pricked with a needle, and the cartoon, being placed against the wall, is "pounced," *i.e.* a bag of black colouring-matter is drawn over the perforations, and the outlines are thus transferred to the wall. In fresco-painting, the portions of the cartoon containing figures were formerly cut out and fixed (generally in successive sections) upon the moist plaster. Their contour was then traced with a pointed instrument, and the outlines appeared lightly incised upon the plaster after the portion of the cartoon was withdrawn. In the manufacture of tapestries upon which it is wished to give a representation of the figures of cartoons, these figures are sometimes cut out, and laid behind or under the woof, to guide the operations of the artist. In this case the cartoons are coloured.

Cartoons have been executed by some of the most distinguished masters; the greatest extant performances in this line of art are those of Raphael. They are seven in number, coloured in distemper; and at present they adorn the Victoria and Albert Museum, in South Kensington, having been removed thither from their former home, the palace of Hampton Court. With respect to their merits, they count among the best of Raphael's productions; Lanzi even pronounces them to be in beauty superior to anything else the world has ever seen. Not that they all present features of perfect loveliness, and limbs of faultless symmetry,—this is far from being the case; but in harmony of design, in the universal adaptation of means to one great end, and in the grasp of soul which they display, they stand among the foremost works of the designing art. The history of these cartoons is curious. Leo X. employed Raphael in designing (in 1515–1516) a series of Scriptural subjects, which were first to be finished in cartoons, and then to be imitated in tapestry by Flemish artists, and used for the decoration of the Sistine Chapel. Two principal sets of tapestries were accordingly executed at Arras in Flanders; but it is supposed that neither Leo nor Raphael lived to see them. The set which went to Rome was twice carried away by invaders, first in 1527 and afterwards in 1798. In the first instance they were restored in a perfect state; but after their return in 1814 one was wanting—the cupidity of a Genoese having induced him to destroy it for the sake of the precious metal which it contained. Authorities differ as to the original number of cartoons, but there appear to have been twenty-five,—some by Raphael himself, assisted by Gianfrancesco Penni, others by the surviving pupils of Raphael. The cartoons after which the tapestries were woven were not, it would seem, restored to Rome, but remained as lumber about the manufactory in Arras till after the revolution of the Low Countries, when seven of them which had escaped destruction were purchased by Charles I., on the recommendation of Rubens. They were found much injured, "holes being pricked in them for the weavers to pounce the outlines, and in other parts they were almost cut through by tracing." It has never been ascertained what became of the other cartoons. Three tapestries, the cartoons of which by Raphael no longer exist, are in the Vatican,—representing the stoning of St Stephen, the conversion of St Paul, and St Paul in prison at Philippi.

Besides the cartoons of Raphael, two, to which an extraordinary celebrity in art-history attaches, were those executed in competition by Leonardo da Vinci and by Michelangelo—the former named the Battle of the Standard, and the latter the Cartoon of Pisa—soldiers bathing, surprised by the approach of the enemy. Both these great works have perished, but the general design of them has been preserved. In recent times some of the most eminent designers of cartoons have been masters of the German school,—Cornelius, Kaulbach, Steinle, Fuhrich, &c.; indeed, as a general rule, these artists appear to greater advantage in their cartoons than in the completed paintings of the same compositions. In England cartoon-work developed considerably in 1843 and 1844, when a competition was held for the decoration of the new Houses of Parliament. Dyce and Maclise left examples of uncommon mark in this line. The cartoon by Fred. Walker, A.R.A., made to advertise the dramatic version of Wilkie Collins's *Woman in White*, is now at the Tate Gallery; and cartoons by Ford Madox Brown are in the Victoria and Albert Museum, South Kensington. (W. M. R.)

(2) "Cartoon" is also a term now applied to the large political drawings in the humorous or satirical papers of the day. At an earlier period satirical prints were styled "caricatures," and were issued separately. Gillray, Rowlandson, the three Cruikshanks, Heath and others were popular favourites in this class of design. Even the insignificant little cuts by Robert Seymour in *Figaro in London*, the *diableries* in *The Fly*, and the vulgar and rancorous political skits identified with the flood of scurrilous little papers of the time, were dignified by the same term. The long series of *Political Sketches* by "H. B." (John Doyle) were the first examples of unexaggerated statement, and fair and decorous satire. With the advent of *Punch* and its various rivals (*The Peep-Show*, *The Great Gun*, *Diogenes* and the like), the general tone was elevated. *Punch* at first adopted the word "pencilling" to describe the "big cut," which dealt variously with political and social topics. But when in 1843 there was held in Westminster Hall the great exhibition of "cartoons" from which selection was to be made of designs for the decoration in fresco of the new Houses of Parliament, *Punch* jocularly professed to range himself alongside the great artists of the day; so that the "mad designe" of the reign of Charles I. became the "cartoon" of that of Queen Victoria. John Leech's drawing in No. 105 of that journal was the first caricature to be called a cartoon: it was entitled "Substance and Shadow: the Poor ask for Bread, and the Philanthropy of the State accords—an Exhibition." Later, *Punch* dropped the word for a while, but the public took it up. Yet the *New English Dictionary* curiously attributes the first use of it to Miss Braddon in 1863.

In England the cartoon, no longer a weapon of venomous attack, has come to be regarded as a humorous or sarcastic comment upon the topic uppermost in the nation's mind, a witty or saturnine illustration of views already formed, rather than as an instrument for the manufacture of public opinion. It has almost wholly lost its rancour; it has totally lost its ferocity—the evolutionary result of peace and contentment, for satire in its more violent and more spontaneous form is but the outcome of the dissatisfaction or the rage of the multitude. The cartoon, it is agreed, must be suggestive; it must present a clear idea lucidly and, if possible, laughably worked out; and, however reserved or restrained it may be, or even, when occasion demands (as in the case of Sir John Tenniel and some of his imitators), however epic in intuition, it must always figure, so to say, as a leading

article transformed into a picture. (See CARICATURE and ILLUSTRATION.) (M. H. S.)

CARTOUCHE (a French word adapted from the Ital. *cartoccio*, a roll of paper, Med Lat. *carta*, for *charta*, paper), originally a roll of paper, parchment or other material, containing the charge of powder and shot for a firearm, a cartridge (*q.v.*), which itself is a corruption of cartouche. The term was applied in architecture to various forms of ornamentation taking the shape of a scroll, such as the volute of an Ionian capital. It was particularly used of a sculptured tablet in the shape of a partly unrolled scroll on which could be placed an inscription or device. Such "cartouches" are used for titles, &c., on engravings of maps, plans, and the like. The arms of the popes and ecclesiastics of high birth were borne on an oval cartouche; and it is thus particularly applied, in Egyptian archaeology, for the oblong device with oval ends, enclosing the names of royal personages on the monuments. It is properly an oval formed by a rope knotted at one end. An amulet of similar shape, as the symbol of the "name," was worn by men and women as a protection against the blotting out of the name after death.

CARTRIDGE (corruption of Fr. *cartouche*), a case, of brass or other metal, cardboard, silk, flannel, &c., containing an explosive charge, and usually the projectile also, for small arms and ordnance (see AMMUNITION).

CARTWRIGHT, EDMUND (1743–1823), English inventor, younger brother of Major John Cartwright (*q.v.*), was born at Marnham, Nottinghamshire, on the 24th of April 1743, and educated at Wakefield grammar school. He began his academical studies at University College, Oxford, and in 1764 he was elected to a fellowship at Magdalen. In 1770 he published *Armine and Elvira*, a legendary poem, which was followed in 1779 by *The Prince of Peace*. In 1779 he was presented to the rectory of Goadby Marwood, Leicestershire, to which in 1786 was added a prebend in the cathedral of Lincoln. He took the degree of D.D. at Oxford in 1806. He would probably have passed an obscure life as a country clergyman had not his attention been accidentally turned in 1784 to the possibility of applying machinery to weaving. The result was that he invented a power-loom, for which he took out a patent in 1785; it was a rude contrivance, though it was improved by subsequent patents in 1786 and 1787, and gradually developed into the modern power-loom. Removing to Doncaster in 1785, he started a weaving and spinning factory; it did not, however, prove a financial success, and in 1793 he had to surrender it to his creditors. A mill at Manchester, in which a number of his machines were installed, was wilfully destroyed by fire in 1791. In 1789 he patented a wool-combing machine, for which he took out further patents in 1790 and 1792; it effected large economies in the cost of manufacture, but its financial results were not more satisfactory to its inventor than those of the power-loom, even though in 1801 parliament extended the patent for fourteen years. In 1807 a memorial was presented to the government urging the benefits that had been conferred on the country by the power-loom, and the House of Commons voted him £10,000 in 1809. He then purchased a small farm at Hollander, near Sevenoaks, Kent, where he spent the rest of his life. He died at Hastings on the 30th of October 1823. Other inventions of Cartwright's included a cordelier or machine for making rope (1792), and an engine working with alcohol (1797), together with various agricultural implements.

CARTWRIGHT, JOHN (1740–1824), English parliamentary reformer, was born at Marnham in Nottinghamshire on the 17th of September 1740, being the elder brother of Edmund Cartwright, inventor of the power-loom. He was educated at Newark grammar school and Heath Academy in Yorkshire, and at the age of eighteen entered the navy. He was present, in his first year of service, at the capture of Cherbourg, and served in the following year in the action between Sir Edward Hawke and Admiral Conflans. Engaged afterwards under Sir Hugh Palliser and Admiral Byron on the Newfoundland station, he was appointed to act as chief magistrate of the settlement; and the duties of this post he discharged for five years (1765–1770). Ill-health necessitated his retirement from active service for a time in 1771. When the disputes with the American colonies began, he saw clearly that the colonists had right on their side, and warmly supported their cause. At the beginning of the war he was offered the appointment of first lieutenant to the duke of Cumberland, which would have put him on the path of certain promotion. But he declined to fight against the cause which he felt to be just. In 1774 he published his first plea on behalf of the colonists, entitled *American Independence the Glory and Interest of Great Britain*. In the following year, when the Nottinghamshire Militia was first raised, he was appointed major, and in this capacity he served for seventeen years. He was at last illegally superseded, because of his political opinions. In 1776 appeared his first work on reform in parliament, which, with the exception of Earl Stanhope's pamphlets (1774), appears to have been the earliest publication on the subject. It was entitled, *Take your Choice*—a second edition appearing under the new title of *The Legislative Rights of the Commonalty vindicated*. The task of his life was thenceforth chiefly the attainment of universal suffrage and annual parliaments. In 1778 he conceived the project of a political association, which took shape in 1780 as the "Society for Constitutional Information," including among its members some of the most distinguished men of the day. From this society sprang the more famous "Corresponding Society." Major Cartwright worked unweariedly for the promotion of reform. He was one of the witnesses on the trial of his friends, Horne Tooke, John Thelwall and Thomas Hardy, in 1794, and was himself indicted for conspiracy in 1819. He was found guilty in the following year, and was condemned to pay a fine of £100. He died in London on the 23rd of September 1824. He had married in 1780, but had no children. In 1831 a monument from a design by Macdowell was erected to him in Burton Crescent where he had lived.

The Life and Correspondence of Major Cartwright, edited by his niece F. D. Cartwright, was published in 1826.

CARTWRIGHT, PETER (1785–1872), American Methodist Episcopal preacher, was born on the 1st of September 1785 in Amherst county, Virginia. His father, a veteran of the War of Independence, took his family to Kentucky in 1790, and lived near Lancaster until 1793, and then until 1802 in Logan county near the Tennessee line. Peter received little education, and was a gambler at cards and horse-racing until 1801, when he heard John Page preach. In June he was received into the church; in May 1802 was licensed as a regular exhorter, becoming known as the "Kentucky Boy"; in the autumn of 1802 was licensed to form the Livingston circuit around the mouth of the Cumberland river; in 1806 was ordained deacon by Bishop Asbury, and in 1808 presiding elder by Bishop McKendree, under whose direction he had studied theology. He was presiding elder of the Wabash district in 1812, and of Green river district in 1813–1816, and, after four years on circuit in Kentucky and two as presiding elder of the Cumberland district, was transferred in 1823 to the Illinois conference, in which he was presiding elder of various districts until 1869. Up to 1856 he preached some 14,600 times, received some 10,000 persons into the church, and baptized some 12,000 persons. He died near Pleasant Plains, Sangamon county, Illinois, on the 25th of September 1872. He was a typical backwoods preacher, an able, vigorous speaker, and a racy writer.

See the *Autobiography of Peter Cartwright, the Backwoods Preacher*, edited by W. P. Strickland (New York, 1856).

CARTWRIGHT, SIR RICHARD JOHN (1835–), Canadian statesman, was born in Kingston, Canada, on the 4th of December 1835, son of the Rev. R. D. Cartwright, chaplain to H.M. Forces. In 1863 he entered the Canadian parliament as a Conservative, but soon after federation in 1867 quarrelled with his party on the question of their financial policy, which he considered extravagant. By 1870 the breach was complete, and in 1873 he became finance minister of the Liberal ministry of the Hon. Alexander Mackenzie. His honesty and economy were undoubted, but the latter quality was sometimes pushed to extremes. From 1878 to 1896 he was the chief financial critic on the side of the Liberal opposition, and on the accession of Sir

Wilfrid Laurier to power in 1896 he became minister of trade and commerce. In 1898–1899 he represented Canada on the Anglo-American joint high commission at Quebec. In 1904 failing health led to his retirement to the senate. He acted in Sir Wilfrid Laurier's absence at the Imperial Conference 1907 as acting premier.

CARTWRIGHT, THOMAS (*c.* 1535–1603), English Puritan divine, was born in Hertfordshire. He studied divinity at St John's College, Cambridge, but on Mary's accession had to leave the university, and found occupation as clerk to a counsellor-at-law. On the accession of Elizabeth, he resumed his theological studies, and was soon afterwards elected fellow of St John's and later of Trinity College. In 1564 he opposed John Preston in a theological disputation held on the occasion of Elizabeth's state visit, and in the following year helped to bring to a head the Puritan attitude on church ceremonial and organization. He was popular in Ireland as chaplain to the archbishop of Armagh (1565–1567), and in 1569 he was appointed Lady Margaret professor of divinity at Cambridge; but John Whitgift, on becoming vice-chancellor, deprived him of the post in December 1570, and—as master of Trinity—of his fellowship in September 1571. This was a natural consequence of the use which he made of his position; he inveighed bitterly against the hierarchy and constitution of the Anglican Church, which he compared unfavourably with the primitive Christian organization. So keen was the struggle between him and Whitgift that the chancellor, William Cecil, had to intervene. After his deprivation by Whitgift, Cartwright visited Beza at Geneva. He returned to England in 1572, and might have become professor of Hebrew at Cambridge but for his expressed sympathy with the notorious "Admonition to the Parliament" by John Field and Thomas Wilcox. To escape arrest he again went abroad, and officiated as clergyman to the English residents at Antwerp and then at Middelburg. In 1576 he visited and organized the Huguenot churches of the Channel Islands, and after revising the Rhenish version of the New Testament, again settled as pastor at Antwerp, declining the offer of a chair at St Andrews. In 1585 he returned without permission to London, was imprisoned for a short time, and became master of the earl of Leicester's hospital at Warwick. In 1590 he was summoned before the court of high commission and imprisoned, and in 1591 he was once more committed to the Fleet. But he was not treated harshly, and powerful influence soon secured his liberation. He visited Guernsey (1595–1598), and spent his closing years in honour and prosperity at Warwick, where he died on the 27th of December 1603. Cartwright was a man of much culture and originality, but exceedingly impulsive. His views were distinctly Presbyterian, and he stoutly opposed the Brownists or Independents. He never conceived of a separation between church and state, and would probably have refused to tolerate any Nonconformity with his reformed national Presbyterian church. To him, however, the Puritanism of his day owed its systematization and much of its force.

CARTWRIGHT, WILLIAM (1611–1643), English dramatist and divine, the son of a country gentleman who had been reduced to keeping an inn, was born at Northway, Gloucestershire, in 1611. Anthony à Wood, whose notice of Cartwright is in the nature of a panegyric, gives this account of his origin, which is probably correct, although it is contradicted by statements made in David Lloyd's *Memoirs*. He was educated at the free school of Cirencester, at Westminster school, and at Christ Church, Oxford, where he took his M.A. degree in 1635. He became, says Wood, "the most florid and seraphical preacher in the university," and appears to have been no less admired as a reader in metaphysics. In 1642 he was made succentor of Salisbury cathedral, and in 1643 he was chosen junior proctor of the university. He died on the 29th of November of the same year. Cartwright was a "son" of Ben Jonson and an especial favourite with his contemporaries. The collected edition of his poems (1651) contains commendatory verses by Henry Lawes, who set some of his songs to music, by Izaak Walton, Alexander Brome, Henry Vaughan and others, and the king wore mourning on the day of his funeral. His plays are, with the exception of *The Ordinary*, extremely fantastic in plot, and stilted and artificial in treatment. They are: *The Royal Slave* (1636), produced by the students of Christ Church before the king and queen, with music by Henry Lawes; *The Lady Errant* (acted, 1635–1636; printed, 1651); *The Siege, or Love's Convert* (printed 1651). In *The Ordinary* (1635?) he produced a comedy of real life, in imitation of Jonson, representing pot-house society. It is reprinted in Dodsley's *Old Plays* (ed. Hazlitt, vol. xii.).

CARUCATE, or CARRUCATE (from the Med. Lat. *carrucata*, from *carruca*, a wheeled plough), a measure of land, based probably on the area that could be ploughed by a team of oxen in a year; hence "carucage" means a tax levied on each "carucate" of land (see HIDE).

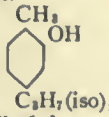
CARÚPANO, a town and port of the state of Bermúdez, Venezuela, 65 m. N.E. of the city of Cumaná. Pop. (1908, estimate) 8600. Carúpano is situated on the Caribbean coast at the opening of two valleys, and is a port of call for several regular steamship lines. Its mean annual temperature is 81° F., but the climate is healthy, because of its open situation on the coast. The country immediately behind the town is rough, but there is a considerable export of cacáo, coffee, sugar, cotton, timber and rum.

CARUS, KARL GUSTAV (1789–1869), German physiologist and psychologist, distinguished also as an art critic and a landscape painter, was born and educated at Leipzig. After a course in chemistry, he began the systematic study of medicine and in 1811 became a *Privat docent*. On the subject which he selected (comparative anatomy) no lectures had previously been given at Leipzig, and Carus soon established a reputation as a medical teacher. In the war of 1813 he was director of the military hospital at Pfaffendorf, near Leipzig, and in 1814 professor to the new medical college at Dresden, where he spent the remainder of his life. He was made royal physician in 1827, and a privy councillor in 1862. He died on the 28th of July 1869. In philosophy Carus belonged to the school of Schelling, and his works are thoroughly impregnated with the spirit of that system. He regarded inherited tendency as a proof that the cell has a certain psychic life, and pointed out that individual differences are less marked in the lower than in the higher organisms. Of his many works the most important are:—*Grundzüge der vergleichenden Anatomie und Physiologie* (Dresden, 1828); *System der Physiologie* (2nd ed., 1847–1849); *Psyche: zur Entwickelungsgeschichte der Seele* (1846, 3rd ed. Stuttgart, 1860); *Physis, zur Geschichte des leiblichen Lebens* (Stuttgart, 1851); *Natur und Idee* (Vienna, 1861); *Symbolik des menschlichen Gestalts* (Leipz., 1853, 2nd ed., 1857); *Atlas der Kranioskopie* (2nd ed. Leipz., 1864); *Vergleichende Psychologie* (Vienna, 1866).

See his autobiography, *Lebenserinnerungen und Denkwürdigkeiten* (4 vols., 1865-1866); K. von Reichenbach, *Odische Erwiederungen an die Herren Professoren Fortlage . . . und Hofrath Carus* (1856). His *England und Schottland im Jahre 1844* was translated by S. C. Davison (1846).

CARUS, MARCUS AURELIUS, Roman emperor A.D. 282–283, was born probably at Narbona (more correctly, Narona) in Illyria, but was educated at Rome. He was a senator, and had filled various civil and military posts before he was appointed prefect of the praetorian guards by the emperor Probus, after whose murder at Sirmium he was proclaimed emperor by the soldiers. Although Carus severely avenged the death of Probus, he was himself suspected of having been an accessory to the deed. He does not seem to have returned to Rome after his accession, but contented himself with an announcement of the fact to the senate. Bestowing the title of Caesar upon his sons Carinus and Numerianus, he left Carinus in charge of the western portion of the empire, and took Numerianus with him on the expedition against the Persians which had been contemplated by Probus. Having defeated the Quadi and Sarmatians on the Danube, Carus proceeded through Thrace and Asia Minor, conquered Mesopotamia, pressed on to Seleucia and Ctesiphon, and carried his arms beyond the Tigris. But his hopes of further conquest were cut short by his death. One day, after a violent storm, it was announced that he was dead. His death was variously attributed to disease, the effects of lightning, or a wound

received in a campaign against the Huns; but it seems more probable that he was murdered by the soldiers, who were averse from further campaigns against Persia, at the instigation of Arrius Aper, prefect of the praetorian guard. Carus seems to have belied the hopes entertained of him on his accession, and to have developed into a morose and suspicious tyrant.

CARVACROL, or CYMOPHENOL, $C_{10}H_{13}OH$, or 

a constituent of the ethereal oil of *Origanum hirtum*, oil of thyme, oil obtained from pepperwort, and wild bergamot. It may be synthetically prepared by the fusion of cymol sulphonic acid with caustic potash; by the action of nitrous acid on 1-methyl-2-amino-4-propyl benzene; by prolonged heating of 5 parts of camphor with 1 part of iodine; or by heating carvol with glacial phosphoric acid. It is extracted from Origanum oil by means of a 10% potash solution. It is a thick oil which sets at −20° C. to a mass of crystals of melting point 0°C, and boiling point 236-237°C. Oxidation with ferric chloride converts it into dicarvacrol, whilst phosphorus pentachloride transforms it into chlorcymol.

CARVAJAL, ANTONIO FERNANDEZ (d. 1659), a Portuguese Marano (*q.v.*) or Crypto-Jew, who came to England in the reign of Charles I. He was the first "endenizened" Jew in England, and by his extensive trade with the West Indies rendered considerable services to the Commonwealth. Besides his commercial value to Cromwell, Carvajal was politically useful also, for he acted as "intelligencer." When Manasseh ben Israel in 1655 petitioned for the return of the Jews who had been expelled by Edward I., Carvajal took part in the agitation and boldly avowed his Judaism. Carvajal may be termed the founder of the Anglo-Jewish community. He died in 1659.

See Lucien Wolf, "The First English Jew," *Trans. Jewish Historical Society*, ii. 14.

CARVAJAL, LUISA DE (1568–1614), Spanish missionary in England, was born at Jaraicejo in Estremadura on the 2nd of January 1568. Her father, Don Francisco de Carvajal, was the head of an old and wealthy family which produced many men of note. Her mother, Doña Maria, belonged to the powerful house of Mendoza. Both were people of pious character. The mother died in 1572 from a fever contracted while visiting the poor, and the father took the disease from his wife, and died of it. Luisa and a brother were left to the care of their grand-aunt Maria Chacon, governess of the young children of Philip II. On her death they passed to the care of their maternal uncle, Francisco Hurtado de Mendoza, count of Almazan. The count, who was named viceroy of Navarre by Philip II., was an able public servant in whom religious zeal was carried to the point of inhuman asceticism. His niece attracted his favour by her manifest disposition to the religious life; she sent her own share of dinner to the poor, ate broken meats, wore a chain next her skin, and invited humiliation; and at the age of seventeen she was instructed by the count to make a surrender of her will to two female servants whom he set over her, and by whom she was repeatedly scourged while naked, trampled upon and otherwise ill-treated. But when Luisa came of age she refused to enter a religious house, and decided to devote herself to the conversion of England. The execution of the Jesuit emissary priest, Henry Walpole, in 1596 had moved her deeply, and she prepared herself by learning English and by the study of divinity. A lawsuit with her brother caused temporary delay, but she secured her share of the family fortune, which she devoted to founding a college for English Jesuits at Louvain; it was transferred to Watten near Saint Omer in 1612, and lasted till the suppression of the Order. In 1605 she was allowed to go to England. She established herself under the protection of the Spanish ambassador, whose house was in the Barbican. From this place of safety she carried on an active and successful propaganda. She made herself conspicuous by her attentions to the Gunpowder Plot prisoners, and won converts, partly by persuasion, partly by helping women of the very poorest class in childbirth, and taking charge of the children. Her activity attracted the attention of the authorities, and she was arrested in 1608. But the protection of the Spanish ambassador Zuñiga, and the desire of King James I. to stand well with Spain, secured her release. In 1613, while staying at a house in Spitalfields, where she had in fact set up a disguised nunnery, she was arrested with all the inmates by the pursuivants of Abbot, archbishop of Canterbury, who had been on the watch for some time. Her release was again secured by the new Spanish ambassador Gondomar, who played with effect on the weakness of King James. By this time, however, the Spanish authorities had begun to discover that she was a political danger to them, and recalled her. Luisa, who had hoped for the crown of martyrdom, was bitterly disappointed, and resisted the order. Before she could be forced to obey she died in the Spanish ambassador's house on her birthday, the 2nd of January 1614. Her body remained as an object of admiration for months till it was carried back to Spain.

The original authority for the life of Luisa de Carvajal is *La Vida y Virtudes de la Venerable Virgen Doña Luisa de Carvajal y Mendoza* (Madrid, 1632), by the Licentiate Lorenzo Muñoz. It is founded on her own papers collected by her English confessor Michael Walpole. It is largely autobiographical, and contains some examples of her verse. The *Vida y Virtudes* is summarized by Southey in his *Letters from Spain and Portugal* (1808). A life was written by Lady Georgiana Fullerton (1873), in which much that is shocking to modern sentiment is concealed. See also *Quatre Portraits de femmes*, by La Comtesse R. de Courson (Paris, 1895). There are several references to Luisa de Carvajal in the *Records of the English Province of the Society of Jesus*, by Henry Foley (1877–1883). (D. H.)

CARVER, JOHN (1575?–1621), one of the "Pilgrim Fathers," first governor of the Plymouth colony in America, was born, probably in Nottinghamshire, England, about 1575. Owing to religious persecution at home he took refuge in Holland about 1607, and eventually became a deacon in the church at Leiden of which John Robinson was the pastor. In 1620 he emigrated to America in the "Mayflower," and founded the Plymouth colony. Before leaving England he had probably been elected governor; after the signing of the famous "Compact" this election was confirmed; and on the 23rd of March 1620 (1621 N.S.) Carver was re-elected for the ensuing year. Early in April, however, he died from the effects of sunstroke.

CARVER, JONATHAN (*c.* 1725–1780), American traveller, was born probably in Canterbury, Connecticut. The date usually given for his birth, 1732, is now considered too late, since he was apparently married in 1746. In early life he followed the trade of a shoemaker and subsequently served with the provincial forces in the French and Indian wars. According to his "Journal" he conceived the idea, after the peace of 1763, of exploring Great Britain's newly acquired territory in the north-west. He is said to have set out in 1766, journeyed westward by way of the Straits of Mackinac and the Fox and Wisconsin rivers to the Mississippi, viewed the Falls of St Anthony, lived for some time among the Indians, and received from them a grant of 100 sq. m. of territory between the Mississippi and St Croix rivers. Returning east in 1768 by way of the north shore of Lake Superior he proceeded in 1769 to England, where he presented a letter of introduction to Benjamin Franklin, and made vain efforts to interest the board of trade in his investigations. In 1778 there was published in London what purported to be his own narrative of his explorations under the title of *Travels through the Interior Parts of North America in the Years 1766, 1767 and 1768*. It had an immediate success, was translated into French, German and Dutch, and was long generally accepted as a truthful narrative of his travels and observations, and as one of the highest authorities on the manners, customs and language of the Indians of the northern Mississippi valley. Carver died in London on the 31st of January 1780, having married a second time in England although his first wife was still living in America.

Soon after his death a new edition of the *Travels* was brought out by the well-known Quaker physician and author, Dr John Coakley Lettsom (1744–1815), who "edited" the work and furnished a biographical introduction. Some doubt seems to have been early entertained as to the real authorship of the

work, Oliver Wolcott in 1792 writing to Jedediah Morse, the geographer, that Carver was too unlettered to have written it, and that in his belief the book was the work of some literary hack. Careful investigation of Indian life and north-western history, notably by H. R. Schoolcraft in 1823, William H. Keating in his narrative of Major Long's Expedition (1824), and Robert Greenhow in his *History of Oregon* (1844), showed a remarkable similarity between the *Travels* and the accounts of several French authorities, but these criticisms were scarcely noticed by later writers. Finally Professor E. G. Bourne, in a paper contributed to the *American Historical Review* for January 1906, proved beyond dispute that the bulk of Carver's alleged narrative was merely a close paraphrase of Charlevoix's *Journal*, La Hontan's *New Voyages to North America*, and James Adair's *History of the American Indians*. Professor Bourne's theory is that the entire book was probably the work of the facile Dr Lettsom, whose personal relations with Carver are known to have been intimate, the "journal" alone, which constituted an inconsiderable part of the whole, having been, in part, founded on Carver's random notes and recollections.

See also J. G. Godfrey, *Jonathan Carver; His Travels in the North-west, 1766–1768* (No. 5 of the Parkman Club Publications, Milwaukee, Wis., 1896), and Daniel S. Durrie, "Captain Jonathan Carver and the Carver Grant," in vol. vi. of the Wisconsin Historical Society's *Collections* (1872).

CARVING. To carve (A.S. *ceorfan*: connected with Gr. *γράφειν*) is to cut, whatever the material; but apart from the domestic sense of carving meat, the word is more particularly associated with the art of sculpture. The name of sculptor (see SCULPTURE) is commonly reserved for the great masters of the art, especially in stone and marble, while that of carver is given to the artists or workmen who execute the subordinate decorations of architecture. The word is also specially applied to sculpture in ivory (*q.v.*) and its substitutes, and in wood (see WOOD-CARVING) and other soft materials (see also GEM.)

CARVING AND GILDING, two allied operations which formerly were the most prominent features in the important industry of frame-making. The craftsmen who pursued the occupation were known as "carvers and gilders," and the terms still continue to be the recognized trade-name of frame-making, although very little of the ornamentation of frame-work is now accomplished by carving, and much of the so-called gilt ornament is produced without the use of gold. The trade has to do primarily with the frames of pictures, engravings and mirrors, but many of the light decorative fittings of houses, finished in "composition" and gilt work, are also entrusted to the carver and gilder. Fashion in picture frames, like all fashions, fluctuates greatly. Mouldings of the prevailing sizes and patterns are generally manufactured in special factories, and supplied in lengths to carvers and gilders ready for use. A large proportion of such mouldings, especially those of a cheaper and inferior quality, are made in Germany. What is distinctively known as a "German" moulding is a cheap imitation of gilt work made by lacquering over the surface of a white metallic foil. German artisans are also very successful in the preparation of imitation of veneers of rosewood, mahogany, walnut and other ornamental woods. The more expensive mouldings are either in wood (such as oak or mahogany), in veneers of any expensive ornamental wood, or real gilt.

A brief outline of the method of making a gilt frame, enriched with composition ornaments, may be taken as a characteristic example of the operations of the frame-maker. The foundation of such a frame is soft pine wood, in which a moulding of the required size and section is roughly run. To prevent warping the moulding is, or ought to be, made from two or more pieces of wood glued together. The moulding is "whitened up," or prepared for gilding by covering it with repeated coatings of a mixture of finely powdered whiting and size. When a sufficient thickness of the whitening mixture has been applied, the whole surface is carefully smoothed off with pumice-stone and glass-paper, care being taken to keep the angles and curves clear and sharp. Were a plain gilt moulding only desired, it would now be ready for gilding; but when the frame is to be enriched it first receives the composition ornaments. Composition, or "compo," is a mixture of fine glue, white resin, and linseed oil well boiled together, with as much rolled and sifted whiting added as makes the whole into a doughy mass while hot. This composition is worked in a hot state into moulds of boxwood, and so pressed in as to take up every ornamental detail. On its removal from the mould all superfluous matter is trimmed away, and the ornament, while yet soft and plastic, is laid on the moulding, and fitting into all the curves, &c., is fixed with glue. The ornamental surface so prepared quickly sets and becomes very hard and brittle. When very large bold ornaments are wanted for frames of unusual size they are moulded in *papier mâché*. Two methods of laying on gold—oil-gilding and water-gilding—are practised, the former being used for frames broken up with enrichments. For oil-gilding the moulding is prepared with two coats of fine thin size to fill the pores of the wood, and afterwards it receives a coat of oil gold-size, which consists of a mixture of boiled linseed oil and ochre. When this gold-size is in a "tacky" or "sticky" condition, gold-leaf is laid on and carefully pressed over and into all parts of the surface; and when covered with a coat of finish-size the gilding is complete. Water-gilding is applied to plain mouldings and all considerable unbroken surfaces, and is finished either "matt" or burnished. For these styles of work the mouldings are properly sized, and after the size (which for "matt" is red in colour and for burnish blue) is dry the gold is laid on with water. Matt-work is protected with one or two coats of finish-size; but burnished gold is finished only by polishing with an agate burnisher—no size or water being allowed to touch such surfaces. The mitring up of frames, the mounting and fitting up of paintings, engravings, &c., involve too many minor operations to be noticed here in detail; but these, with the cutting and fitting of glass, cleaning and repairing pictures and prints, and similar operations, all occupy the attention of the carver and gilder.

CARY, ALICE (1820–1871), and **PHOEBE** (1824–1871), American poets, were born at Mount Healthy, near Cincinnati, Ohio, respectively on the 26th of April 1820 and the 4th of September 1824. Their education was largely self-acquired, and their work in literature was always done in unbroken companionship. Their poems were first collected in a volume entitled *Poems of Alice and Phoebe Carey* [*sic*] (1850). In 1850–1851 they removed to New York, where the two sisters, befriended by Rufus W. Griswold (1815–1857), the *quasi*-dictator of American verse, and Horace Greeley, occupied a prominent position in literary circles. In 1868-1869 Alice Cary served for a short time as the first president of Sorosis, the first woman's club organized in New York. Alice, who was much the more voluminous writer of the two, wrote prose sketches and novels, now almost forgotten, and various volumes of verse, notably *The Lover's Diary* (1868). Her lyrical poem, *Pictures of Memory*, was much admired by Edgar Allan Poe. Phoebe published two volumes of poems (1854 and 1868), but is best known as the author of the hymn "Nearer Home," beginning "One sweetly solemn thought," written in 1852, Alice died in New York City on the 12th of February 1871, and Phoebe in Newport, Rhode Island, on the 31st of July of the same year. The collected *Poetical Works of Alice and Phoebe Cary* were published in Boston in 1886.

See Mrs Mary Clemmer Ames's *Memorial of Alice and Phoebe Carey* (New York, 1873).

CARY, ANNIE LOUISE (1842–), American singer, was born in Wayne, Maine, on the 22nd of October 1842. She studied in Milan, and made her début as an operatic contralto in Copenhagen in 1868. She had a successful European career for several years, singing in Stockholm, Paris and London, and made her New York first appearance in 1870. She only once returned to Europe for a brilliant Russian tour, and until she retired in 1882, on her marriage to Charles M. Raymond, she was the most popular singer in America.

CARY, HENRY FRANCIS (1772–1844), English author and translator, was born at Gibraltar on the 6th of December 1772, the son of a captain in the army. He was educated at the grammar schools of Rugby, Sutton Coldfield and Birmingham,

and at Christ Church, Oxford, which he entered in 1790. He took holy orders, and was presented in 1797 to the vicarage of Abbott's Bromley in Staffordshire. This benefice he held till his death. In 1800 he was also presented to the vicarage of Kingsbury in Warwickshire. While still at school he had become a regular contributor to the *Gentleman's Magazine*, and had published a volume of *Sonnets and Odes*. At Christ Church he devoted much time to the study of French and Italian literature; and the fruits of these studies appeared in the notes to his classic translation of Dante. The version of the *Inferno* was published in 1805, together with the original text. Soon afterwards Cary moved to London, where he became reader at Berkeley chapel, and subsequently lecturer at Chiswick and curate of the Savoy. His version of the whole *Divina Commedia* did not appear till 1814. It was published at Cary's own expense, as the publisher refused to undertake the risk, owing to the failure incurred over the *Inferno*. The translation was brought to the notice of Samuel Rogers by Thomas Moore. Rogers made some additions to an article on it by Ugo Foscolo in the *Edinburgh Review*. This article, and praise bestowed on the work by Coleridge in a lecture at the Royal Institution, led to a general acknowledgment of its merit. Cary's *Dante* thus gradually took its place among standard works, passing through four editions in the translator's lifetime. It has the great merits of accuracy, idiomatic vigour and readableness; it preserves the sincerity and vividness of the original; and, although many rivals have since appeared in the field, it still holds an honourable place. Its blank verse, however, cannot represent the close woven texture and the stately music of the *terza rima* of the original. In 1824 Cary published a translation of *The Birds* of Aristophanes, and, about 1834, of the *Odes* of Pindar. In 1826 he was appointed assistant-librarian in the British Museum, a post which he held for about eleven years. He resigned because the appointment of keeper of the printed books, which should have been his in the ordinary course of promotion, was refused him when it fell vacant. In 1841 a crown pension of £200 a year, obtained through the efforts of Samuel Rogers, was conferred on him. Cary's *Lives of the early French Poets*, and *Lives of English Poets* (from Johnson to Henry Kirke White), intended as a continuation of Johnson's *Lives of the Poets*, were published in a collected form in 1846. He died in London on the 14th of August 1844, and was buried in Westminster Abbey.

A memoir was published by his son, Henry Cary, in 1847.

CARYATIDES (Latinized from the Greek; the plural of Caryatis, *i.e.* a woman of Caryae in Laconia), in architecture, the term given to the draped female figures used for piers or supports, as found in the porticos of the Erechtheum and of the Treasury of Cnidus at Delphi (see GREEK ART, fig. 17).

CARYL, JOSEPH (1602–1673), English Nonconformist divine, was born in London in 1602. He graduated at Exeter College, Oxford, and became preacher at Lincoln's Inn. He frequently preached before the Long Parliament, and was a member of the Westminster Assembly in 1643. By order of the parliament he attended Charles I. in Holmby House, and in 1650 he was sent with John Owen to accompany Cromwell to Scotland. In 1662 he was ejected from his church of St Magnus near London Bridge, but continued to minister to an Independent congregation in London till his death in March 1673, when John Owen succeeded him. His piety and learning are displayed in his ponderous commentary on Job (12 vols., 4to., 1651–1666; 2nd ed., 2 vols., fol. 1676–1677).

CARYOPHYLLACEAE, a botanical order of dicotyledonous plants, containing about 60 genera with 1300 species, and widely distributed, especially in temperate, alpine and arctic regions. The plants are herbs, sometimes becoming shrubby at the base, with opposite, simple, generally uncut leaves and swollen nodes. The main axis ends in a flower (definite inflorescence), and flower-bearing branches are borne one on each side by which the branching is often continued (known technically as a dichasial cyme). The flowers are regular, with four or five sepals which are free or joined to form a tube in their lower portion, the same number of petals, free and springing from below the ovary, twice as many stamens, inserted with the petals, and a pistil of two to five carpels joined to form an ovary containing a large number of ovules on a central placenta and bearing

FIG. 1.—Stitchwort (*Stellaria Holostea*) nat. size. 1, Flower cut vertically; 2, seed; 3, same cut vertically; 4, same cut horizontally.

two to five styles; the ovary is one-celled or incompletely partitioned at the base into three to five cells; honey is secreted at the base of the stamens. The fruit is a capsule containing a large number of small seeds and opening by apical teeth; the seed contains a floury endosperm and a curved embryo.

The order is divided into two well-defined tribes which are

FIG. 2.—1, Flowering shoot of Pink (*Dianthus*); 2, horizontal plan of flower; 3, flower in vertical section.

distinguished by the character of the flower and the arrangements for ensuring pollination.

Tribe I. *Alsineae*: the sepals are free and the flowers are open, with spreading petals, and the honey which is secreted at the base of the stamens is exposed to the visits of short-tongued

insects, such as flies and small bees; the petals are white in colour. It includes several British genera, *Cerastium* (mouse-ear chickweed), *Stellaria* (fig. 1) (stitchwort and chickweed), *Arenaria* (sandwort), *Sagina* (pearlwort), *Spergula* (spurrey) and *Spergularia* (sandwort spurrey).

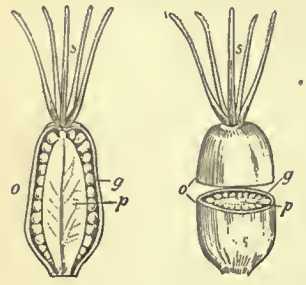


FIG. 3.

a, Pistil of *Cerastium hirsutum* cut vertically; *o*, unilocular or monothecal ovary; *p*, free central placenta; *g*, ovules; *s*, styles.

b, The same cut horizontally, and the halves separated so as to show the interior of the cavity of the ovary *o*, with the free central placenta *p*, covered with ovules *g*.

Tribe II. *Sileneae*: the sepals are joined below to form a narrow tube, in which stand the long claws of the petals and the stamens, partly closing the tube and rendering the honey inaccessible to all but long-tongued insects such as the larger bees and Lepidoptera. The flowers are often red. It includes several British genera:—*Dianthus* (pink) fig. 2, *Silene* (catchfly, bladder campion), *Lychnis* (campion, *L. Flos-Cuculi* is ragged robin), and *Githago* or *Agrostemma* (corn cockle). Several, such as *Lychnis vespertina*, *Silene nutans* and others, are night-flowering, opening their flowers and becoming scented in the evening or at night, when they are visited by night-flying moths.

The plants of this order are of little or no economic value, soap-wort, *Saponaria officinalis*, forming a lather in water was formerly officinal. *Dianthus* (carnation and pink) *Gypsophila*, *Lychnis* and others, are garden plants.

CASABIANCA, RAPHAEL, COMTE DE (1738–1825), French general, was descended from a noble Corsican family. In 1769 he took the side of France against Genoa, then mistress of the island. In 1793, having entered the service of the revolutionary government, he was appointed lieutenant-general in Corsica in place of Pascale Paoli, who was outlawed for intrigues with England. For his defence of Calvi against the English he was appointed general of division, and he served in Italy from 1794 to 1798. After the 18th of Brumaire he entered the senate and was made count of the empire in 1806. In 1814 he joined the party of Louis XVIII., rejoined Napoleon during the Hundred Days, and in 1819 succeeded again in entering the chamber of peers.

His nephew, LOUIS DE CASABIANCA (1752–1798), entered the French navy, served in the convoy of the French troops sent to aid the revolted American colonies, and took part in various naval actions off the North American coast. He became captain in 1790, represented Corsica in the Convention, and then received command of the *Orient*, which at the battle of the Nile bore the flag of Admiral Brueys. When the latter was killed, Casabianca took command, and rather than surrender blew up his ship after the crew had been saved. His son, Giacomo Jocante, a boy of ten years of age, refused to leave the ship and died with his father. This heroic act was the theme of poems by Ecouchard Lebrun and André Chénier, as well as by Mrs Hemans.

CASABLANCA (*Dar el Baida*, "the white house"), a seaport on the Atlantic coast of Morocco, in 33° 27′ N., 7° 46′ W. It is a wool and grain port for central Morocco, chiefly for the provinces of Tadla and Shawia. Third in importance of the towns on the Moorish coast, unimpeded by bar or serious rocks, the roadstead is exposed to the north-west winds. There is anchorage for steamers in 5 to 6 fathoms. Vessels were loaded and discharged by lighters from the beach. In May 1907 the construction began of harbour works which afford sheltered accommodation for ships at all states of the tide. The value of the foreign trade of the port for the period 1897–1907 was about £750,000 a year. A railway to Ber Reshid, the first section of a line intended to tap the rich agricultural region of which Casablanca is the port, was opened in September 1908, being the first railway built in Morocco. The population, about 20,000, includes numerous foreign merchants, Franciscan and Protestant missions, and a consular corps. Built by the Portuguese upon the site of the once prosperous town of Anfā, which they had destroyed in 1468, Casablanca was held by them for some time, till trouble with the natives compelled them to abandon it. In August 1907, in consequence of the murder of a number of French and Spanish workmen engaged on the harbour works, the town was bombarded and occupied by the French (see MOROCCO: *History*).

CASALE MONFERRATO, a town and episcopal see of Piedmont, Italy, in the province of Alessandria, 21 m. N.N.W. by rail from the town of Alessandria. Pop. (1901) 18,874 (town); 31,370 (commune). It lies in the plain on the right bank of the Po, 377 ft. above sea-level, and is a junction for Mortara, Vercelli, Chivasso and Asti; it is also connected by steam tramways with Alessandria, Vercelli and Montemagno. The fine Lombard Romanesque cathedral, originally founded in 742, was rebuilt in the early 12th century and consecrated in 1106; it suffered from restoration in 1706, but has been brought back to its original form. It contains some good pictures. The church of S. Domenico is a good Renaissance edifice, and there are some fine palaces. The church of S. Ilario is said to occupy the site of a pagan temple, but the name of the ancient town (if any) which occupied this site is not known. About 10 m. distant is the Sacro Monte di Crea, with eighteen chapels on its slopes containing terra-cotta groups of statues, resembling those at Varallo. Casale Monferrato was given by Charlemagne to the church of Vercelli, but obtained its liberty from Frederick I. (Barbarossa). It was sacked by the troops of Vercelli, Alessandria and Milan in 1215, but rebuilt and fortified in 1220. It fell under the power of its marquises in 1292, and became the chief town of a small state. In 1536 it passed to the Gonzagas of Mantua, who fortified it very strongly. It has since been of considerable importance as a fortress: it successfully resisted the Austrians in 1849, and was strengthened in 1852. There is a large Portland cement factory here.

CASAMARI, a Cistercian abbey in the province of Rome, 6 m. E.S.E. of Veroli. It marks the site of Cereatae, the birthplace of Marius, afterwards known, as inscriptions attest, as Cereatae Marianae, having been separated perhaps by the triumvirs, from the territory of Arpinum. We find it under the early empire as an independent community. The abbey is a fine example of Burgundian early-Gothic (1203–1217), paralleled in Italy by Fossanuova alone (which is almost contemporary with it), and is very well preserved.

See C. Enlart, "Origines françaises de l'architecture gothique en Italie" (*Bibliothèque des écoles françaises d'Athènes et de Rome*, fasc. 66), (Paris, 1894).

CASANOVA DE SEINGALT, GIOVANNI JACOPO (1725–1798), Italian adventurer, was born at Venice in 1725. His father belonged to an ancient and even noble family, but alienated his friends by embracing the dramatic profession early in life. He made a runaway marriage with Zanetta Farusi, the beautiful daughter of a Venetian shoemaker; and Giovanni was their eldest child. When he was but a year old, his parents, taking a journey to London, left him in charge of his grandmother, who, perceiving his precocious and lively intellect, had him educated far above her means. At sixteen he passed his examination and entered the seminary of St Cyprian in Venice, from which he was expelled a short time afterwards for some scandalous and immoral conduct, which would have cost him his liberty, had not his mother managed somehow to procure him a situation in the household of the Cardinal Acquaviva. He made but a short stay, however, in that prelate's establishment, all restraint being irksome to his wayward disposition, and took to travelling. Then began that existence of adventure and intrigue which only ended with his death. He visited Rome, Naples, Corfu and Constantinople. By turns journalist, preacher, abbé, diplomatist, he was nothing very long, except *homme à bonnes fortunes*, which profession he cultivated till the end of his days. In 1755, having returned to Venice, he was denounced as a spy and imprisoned. On the 1st of November 1756 he

succeeded in escaping, and made his way to Paris. Here he was made director of the state lotteries, gained much financial reputation and a considerable fortune, and frequented the society of the most notable French men and women of the day. In 1759 he set out again on his travels. He visited in turn the Netherlands, South Germany, Switzerland—where he made the acquaintance of Voltaire,—Savoy, southern France, Florence—whence he was expelled,—and Rome, where the pope gave him the order of the Golden Spur. In 1761 he returned to Paris, and for the next four or five years lived partly here, partly in England, South Germany and Italy. In 1764 he was in Berlin, where he refused the offer of a post made him by Frederick II. He then travelled by way of Riga and St Petersburg to Warsaw, where he was favourably received by King Stanislaus Poniatowski. A scandal, followed by a duel, forced him to flee, and he returned by a devious route to Paris, only to find a *lettre de cachet* awaiting him, which drove him to seek refuge in Spain. Expelled from Madrid in 1769, he went by way of Aix—where he met Cagliostro—to Italy once more. From 1774, with which year his memoirs close, he was a police spy in the service of the Venetian inquisitors of state; but in 1782, in consequence of a satirical libel on one of his patrician patrons, he had once more to go into exile. In 1785 he was appointed by Count Waldstein, an old Paris acquaintance, his librarian at the château of Dux in Bohemia. Here he lived until his death, which probably occurred on the 4th of June 1798.

The main authority for Casanova's life is his *Mémoires* (12 vols., Leipzig, 1826–1838; later ed. in 8 vols., Paris, 1885), which were written at Dux. They are clever, well written and, above all, cynical, and interesting as a trustworthy picture of the morals and manners of the times. Among Casanova's other works may be mentioned *Confutazione della storia del governo Veneto d'Amelot de la Houssaye* (Amsterdam, 1769), an attempt to ingratiate himself with the Venetian government; and the *Histoire* of his escape from prison (Leipzig, 1788; reprinted Bordeaux, 1884; Eng. trans. by P. Villars, 1892). Ottmann's *Jacob Casanova* (Stuttgart, 1900) contains a bibliography.

CASAS GRANDES ("Great Houses"), a small village of Mexico, in the state of Chihuahua, situated on the Casas Grandes or San Miguel river, about 35 m. S. of Llanos and 150 m. N.W. of the city of Chihuahua. The railway from Ciudad Juárez to Terrazas passes through the town. It is celebrated for the ruins of early aboriginal buildings still extant, about half a mile from its present site. They are built of "sun-dried blocks of mud and gravel, about 22 in. thick, and of irregular length, generally about 3 ft., probably formed and dried *in situ*." The walls are in some places about 5 ft. thick, and they seem to have been plastered both inside and outside. The principal edifice extends 800 ft. from north to south, and 250 ft. east to west; its general outline is rectangular, and it appears to have consisted of three separate piles united by galleries or lines of lower buildings. The exact plan of the whole is obscure, but the apartments evidently varied in size from mere closets to extensive courts. The walls still stand at many of the angles with a height of from 40 to 50 ft., and indicate an original elevation of several storeys, perhaps six or seven. At a distance of about 450 ft. from the main building are the substructions of a smaller edifice, consisting of a series of rooms ranged round a square court, so that there are seven to each side besides a larger apartment at each corner. The age of these buildings is unknown, as they were already in ruins at the time of the Spanish Conquest. The whole district of Casas Grandes is further studded with artificial mounds, from which are excavated from time to time large numbers of stone axes, metates or corn-grinders, and earthern vessels of various kinds. These last have a white or reddish ground, with ornamentation in blue, red, brown or black, and are of much better manufacture than the modern pottery of the country. Similar ruins to those of Casas Grandes exist near the Gila, the Salinas, and the Colorado and it is probable that they are all the erections of one people. Bancroft is disposed to assign them to the Moquis.

See vol. iv. of H. H. Bancroft's *The Native Races of the Pacific States of North America*, of which the principal authorities are the *Noticias del Estado de Chihuahua* of Escudero, who visited the ruins in 1819; an article in the first volume of the *Album Mexicano*, the author of which was at Casas Grandes in 1842; and the *Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora and Chihuahua* (1854), by John Russell Bartlett, who explored the locality in 1851.

CASAUBON, FLORENCE ESTIENNE MÉRIC (1599–1671), English classical scholar, son of Isaac Casaubon, was born at Geneva on the 14th of August 1599. At an early age he joined his father in England, and completed his education at Eton and Oxford (B.A. 1618). His defence of his father against the attacks of certain Catholics (*Pietas contra maledicos patrii Nominis et Religionis Hostes*, 1621), secured him the notice and favour of James I., who conferred upon him a prebendal stall in Canterbury cathedral. He also vindicated his father's literary reputation against certain impostors who had published, under his name, a work on *The Origin of Idolatry* (*Vindicatio Patris adversus Impostores*, 1624). During the Civil War he lived a retired life, and after its conclusion refused to acknowledge the authority of Cromwell, who, notwithstanding, requested him to write an "impartial" history of the events of the period. In spite of the tempting inducements held out, he declined, and also refused the post of inspector of the Swedish universities offered him by Queen Christina. After the Restoration, he was reinstated in his benefice, and devoted the rest of his life to literary work. He died at Canterbury on the 14th of July 1671. Méric Casaubon's reputation was overshadowed by that of his father; but his editions of numerous classical authors, and especially of the *Meditations* of Marcus Aurelius (also English translation, new ed. by W. H. D. Rouse, 1900), were highly valued. Among his other works may be mentioned: *De Quatuor Linguis Commentatio* (1650), *Of the Necessity of Reformation* (1664), *On Credulity and Incredulity in Things natural, civil and divine* (1668).

CASAUBON, ISAAC (1559–1614), French (naturalized English) classical scholar, was born at Geneva, on the 18th of February 1559, of French refugee parents. On the publication of the edict of January 1562, the family returned to France and settled at Crest in Dauphiné, where Arnaud Casaubon, Isaac's father, became minister of a Huguenot congregation. Till he was nineteen, Isaac had no other instruction than what could be given him by his father during the years of civil war. Arnaud was away from home whole years together in the Calvinist camp, or the family were flying to the hills to hide from the fanatical bands of armed Catholics who patrolled the country. Thus it was in a cave in the mountains of Dauphiné, after the massacre of St Bartholomew, that Isaac received his first lesson in Greek, the text-book being Isocrates *ad Demonicum*.

At nineteen Isaac was sent to the Academy of Geneva, where he read Greek under Francis Portus, a native of Crete. Portus died in 1581, having recommended Casaubon, then only twenty-two, as his successor. At Geneva he remained as professor of Greek till 1596. Here he married twice, his second wife being Florence, daughter of the scholar-printer, Henri Estienne. Here, without the stimulus of example or encouragement, with few books and no assistance, in a city peopled with religious refugees, and struggling for life against the troops of the Catholic dukes of Savoy, Casaubon made himself a consummate Greek scholar and master of ancient learning. His great wants at Geneva were books and the sympathy of learned associates. He spent all he could save out of his small salary in buying books, and in having copies made of such classics as were not then in print. Henri Estienne, Théodore de Beza (rector of the university and professor of theology), and Jacques Lect (Lectius), were indeed men of superior learning. But Henri, in those last years of his life, was no longer the Estienne of the *Thesaurus*; he was never at home, and would not suffer his son-in-law to enter his library. "He guards his books," writes Casaubon, "as the griffins in India do their gold!" Beza was engrossed by the cares of administration, and retained, at most, an interest for theological reading, while Lect, a lawyer and diplomatist, had left classics for the active business of the council. The sympathy and help which Casaubon's native city could not afford him, he endeavoured to supply by cultivating the acquaintance of the learned of other countries. Geneva, as the

metropolis of Calvinism, received a constant succession of visitors. The continental tour of the young Englishman of birth was not complete without a visit to Geneva. It was there that Casaubon made the acquaintance of young Henry Wotton, the poet and diplomatist, who lodged in his house and borrowed his money. Of more consequence to Isaac Casaubon was the acquaintance of Richard Thomson (" Dutch " Thomson), fellow of Clare College, Cambridge; for it was through Thomson that the attention of Joseph Scaliger, settled in 1593 at Leiden, was directed to Casaubon. Scaliger and Casaubon first exchanged letters in 1594. Their intercourse, which was wholly by letter, for they never met, passes through the stages of civility, admiration, esteem, regard and culminates in a tone of the tenderest affection and mutual confidence. Influential French men of letters, the Protestant Jacques Bongars, the Catholic Jacques de Thou, and the Catholic convert Philippe Canaye, sieur du Fresne, aided him by presents of books and encouragement, and endeavoured to get him invited, in some capacity, to France.

This was effected in 1596, in which year Casaubon accepted an invitation to the university of Montpellier, with the title of *conseiller du roi* and *professeur stipendié aux langues et bonnes lettres*. In Montpellier he never took root. He held the professorship there only three years, with several prolonged absences. The hopes raised by his brilliant reception were disappointed; he was badly treated by the authorities, by whom his salary was only paid very irregularly, and, finally, not at all. He was not, at any time, insensible to the attractions of teaching, and his lectures at Montpellier were followed not only by the students, but by men of mature age and position. But the love of knowledge was gradually growing upon him, and he began to perceive that editing Greek books was an employment more congenial to his peculiar powers than teaching. At Geneva he had first tried his hand on some notes on Diogenes Laërtius, on Theocritus and the New Testament, the last undertaken at his father's request. His début as an editor had been a complete Strabo (1587), of which he was so ashamed afterwards that he apologized for its crudity to Scaliger, calling it " a miscarriage." This was followed by the text of Polyaenus, an *editio princeps*, 1589; a text of Aristotle, 1590; and a few notes contributed to Estienne's editions of Dionysius of Halicarnassus and Pliny's *Epistolae*. It is not till we come to his edition of Theophrastus's *Characteres* (1592), that we have a specimen of that peculiar style of illustrative commentary, at once apposite and profuse, which distinguishes Casaubon among annotators. At the time of his removal to Montpellier he was engaged upon what is the capital work of his life, his edition of, and commentary on, Athenaeus.

In 1598 we find Casaubon at Lyons, superintending the passage of his Athenaeus through the press, for which he had been unable to find facilities at Montpellier. Here he lived in the house of Méric de Vicq, *surintendant de la justice*, a Catholic, but a man of acquirements, whose connexions were with the circle of liberal Catholics in Paris. In the suite of De Vicq Casaubon made a flying visit to Paris, and was presented to Henry IV. The king was very gracious, and said something about employing Casaubon's services in the " restoration " of the fallen university of Paris. Full of hope he returned to Montpellier. In January 1599, he received a summons to repair to Paris. But the terms of the letter missive were so vague that, though it bore the sign manual, Casaubon hesitated to act upon it. However, he resigned his chair at Montpellier, but instead of hastening to Paris, he lingered more than a year at Lyons, in De Vicq's house, where he hoped to meet the king, who was expected to visit the south. Nothing more was heard about the professorship, but instead he was summoned by De Vicq, who was then in Paris, to come to him in all haste on an affair of importance. The business proved to be the Fontainebleau Conference. Casaubon allowed himself to be persuaded to sit as one of the referees who were to adjudicate on the challenge sent to Du Plessis Mornay by Cardinal Duperron. By so doing he placed himself in a false position, as Scaliger said: " Non debebat Casaubon interesse colloquio Plessiaeano; erat asinus inter simias, doctus inter imperitos " (*Scaligerana* 2[a]). The issue was so contrived that the Protestant party could not but be pronounced to be in the wrong. By concurring in the decision, which was unfavourable to Du Plessis Mornay, Casaubon lent the prestige of his name to a court whose verdict would without him have been worthless, and confirmed the suspicions already current among the Reformed churches that, like his friend and patron, Canaye du Fresne, he was meditating abjuration. From this time forward he became the object of the hopes and fears of the two religious parties; the Catholics lavishing promises, and plying him with arguments; the Reformed ministers insinuating that he was preparing to forsake a losing cause, and only higgling about his price. We now know enough of Casaubon's mental history to know how erroneous were these computations of his motives. But, at the time, it was not possible for the immediate parties to the bitter controversy to understand the intermediate position between Genevan Calvinism and Ultramontanism to which Casaubon's reading of the fathers had conducted him.

Meantime the efforts of De Thou and the liberal Catholics to retain him in Paris were successful. The king repeated his invitation to Casaubon to settle in the capital, and assigned him a pension. No more was said about the university. The recent reform of the university of Paris had closed its doors to all but Catholics; and though the chairs of the Collège de France were not governed by the statutes of the university, public opinion ran so violently against heresy, that Henry IV. dared not appoint a Calvinist to a chair, even if he had desired to do so. But it was designed that Casaubon should succeed to the post of sub-librarian of the royal library when it should become vacant, and a patent of the reversion was made out in his favour. In November 1604, Jean Gosselin died in extreme old age; and Casaubon succeeded him as sub-librarian, with a salary of 400 livres in addition to his pension.

In Paris Casaubon remained till 1610. These ten years were the brightest period of his life. He had attained the reputation of being, after Scaliger, the most learned man of the age,—an age in which learning formed the sole standard of literary merit. He was placed above penury, though not in easy circumstances. He had such facilities for religious worship as a Huguenot could have, though he had to go out of the city to Hablon, and afterwards to Charenton, for them. He enjoyed the society of men of learning, or of men who took an interest in learned publications. He had the best opportunities of seeing men of letters from foreign countries as they passed through Paris. Above all, he had ample facilities for using Greek books, both printed and in MS., the want of which he had felt painfully at Geneva and Montpellier, and which no other place but Paris could at that period have supplied.

In spite of all these advantages we find Casaubon restless, and ever framing schemes for leaving Paris, and settling elsewhere. It was known that he was open to offers, and offers came to him from various quarters,—from Nîmes, from Heidelberg, from Sedan. His friends Lect and Giovanni Diodati wished, rather than hoped, to get him back to Geneva. The causes of Casaubon's discomfort in Paris were various, but the principal source of uneasiness lay in his religion. The life of any Huguenot in Paris was hardly secure at that time, for it was doubtful if the police of the city was strong enough to protect them against any sudden uprising of the fanatical mob, always ready to re-enact the St Bartholomew. But Casaubon was exposed to persecution of another sort. Ever since the Fontainebleau Conference an impression prevailed that he was wavering. It was known that he rejected the *outré* anti-popery opinions current in the Reformed churches; that he read the fathers, and wished for a church after the pattern of the primitive ages. He was given to understand that he could have a professorship only by recantation. When it was found that he could not be bought, he was plied by controversy. Henry IV., who liked Casaubon personally, made a point of getting him to follow his own example. By the king's orders Duperron was untiring in his efforts to convert him. Casaubon's knowledge of the fathers was that of a scholar, Duperron's that of an adroit polemist; and the

scholar was driven to admit that the polemist was often too hard for him. These encounters mostly took place in the king's library, over which the cardinal, in his capacity of aumonier, exercised some kind of authority; and it was therefore impossible for Casaubon to avoid them. On the other hand, the Huguenot theologians, and especially Pierre du Moulin, chief pastor of the church of Paris, accused him of conceding too much, and of having departed already from the lines of strict Calvinistic orthodoxy.

When the assassination of Henry IV. gave full rein to the Ultramontane party at court, the obsessions of Duperron became more importunate, and even menacing. It was now that Casaubon began to listen to overtures which had been faintly made before, from the bishops and the court of England. In October 1610 he came to England in the suite of the ambassador, Lord Wotton of Marley (brother of Casaubon's early friend), an official invitation having been sent him by Richard Bancroft, archbishop of Canterbury. He had the most flattering reception from James I., who was perpetually sending for him to discuss theological matters. The English bishops were equally delighted to find that the great French scholar was an Anglican ready made, who had arrived, by independent study of the Fathers, at the very *via media* between Puritanism and Romanism, which was becoming the fashion in the English Church. Casaubon, though a layman, was collated to a prebendal stall in Canterbury, and a pension of £300 a year was assigned him from the exchequer. Nor were these merely paper figures. When Sir Julius Caesar made a difficulty about payment, James sent a note in his own hand: "Chanceler of my excheker, I will have Mr Casaubon paid before me, my wife, and my barnes." He still retained his appointments in France, and his office as librarian. He had obtained leave of absence for a visit to England, where his permanent settlement was not contemplated. In order to retain their hold upon him, the government of the queen regent refused to allow his library to be sent over. It required a special request from James himself to get leave for Madame Casaubon to bring him a part of his most necessary books. Casaubon continued to speak of himself as the servant of the regent, and to declare his readiness to return when summoned to do so.

Meanwhile his situation in London gradually developed unforeseen sources of discomfort. Not that he had any reason to complain of his patrons, the king and the bishops. James continued to the last to delight in his company, and to be as liberal as the state of his finances allowed. John Overall had received him and his whole family into the deanery of St Paul's, and entertained him there for a year. Overall and Lancelot Andrewes, then bishop of Ely, were the most learned men of a generation in which extensive reading was more general among the higher clergy than it has ever been since. These two were attracted to Casaubon by congenial studies and opinions. With the witty and learned bishop of Ely in particular Casaubon was always happy to spend such hours as he had to spare from the labours of the study. Andrewes took him to Cambridge, where he met with a most gratifying reception from the notabilities of the university. They went on together to Downham, where Casaubon spent six weeks of the summer of 1611, in which year he became naturalized. In 1613 he was taken to Oxford by Sir Henry Savile, where, amid the homage and feasting of which he was the object, his principal interest was for the MSS. treasures of the Bodleian. The honorary degree which was offered him he declined.

But these distinctions were far from compensating the serious inconveniences of his position. Having been taken up by the king and the bishops, he had to share in their rising unpopularity. The courtiers looked with a jealous eye on a pensioner who enjoyed frequent opportunities of taking James I. on his weak side—his love of book talk—opportunities which they would have known how to use. Casaubon was especially mortified by Sir Henry Wotton's persistent avoidance of him, so inconsistent with their former intimacy. His windows were broken by the roughs at night, his children pelted in the streets by day. On one occasion he himself appeared at Theobalds with a black eye, having received a blow from some ruffian's fist in the street. The historian Hallam thinks that he had "become personally unpopular"; but these outrages from the vulgar seem to have arisen solely from the cockney's antipathy to the Frenchman. Casaubon, though he could make shift to read an English book, could not speak English, any more than Mme Casaubon. This deficiency not only exposed him to insult and fraud, but restricted his social intercourse. It excluded him altogether from the circle of the "wits"; either this or some other cause prevented him from being acceptable in the circle of the lay learned—the "antiquaries." William Camden, the antiquary and historian, he saw but once or twice. Casaubon had been imprudent enough to correct Camden's Greek, and it is possible that the ex-headmaster of Westminster kept himself aloof in silent resentment of Casaubon's superior learning. With Robert Cotton and Henry Spelman he was slightly acquainted. Of John Selden we find no mention. Though Sir Henry Savile ostensibly patronized him, yet Casaubon could not help suspecting that it was Savile who secretly prompted an attempt by Richard Montagu to forestall Casaubon's book on Baronius. Besides the jealousy of the natives, Casaubon had now to suffer the open attacks of the Jesuit pamphleteers. They had spared him as long as there were hopes of getting him over. The prohibition was taken off, now that he was committed to Anglicanism. Not only Joannes Eudaemon, Heribert Rosweyd and Scioppius (Gaspar Schoppe),[1] but a respectable writer, friendly to Casaubon, Andreas Schott of Antwerp, gave currency to the insinuation that Casaubon had sold his conscience for English gold.

But the most serious cause of discomfort in his English residence was that his time was no longer his own. He was perpetually being summoned out of town to one or other of James's hunting residences that the king might enjoy his talk. He had come over from Paris in search of leisure, and found that a new claim on his time was established. The king and the bishops wanted to employ his pen in their literary warfare against Rome. They compelled him to write first one, then a second, pamphlet on the subject of the day,—the royal supremacy. At last, ashamed of thus misappropriating Casaubon's stores of learning, they set him upon a refutation of the *Annals* of Baronius, then in the full tide of its credit and success. Upon this task Casaubon spent his remaining strength and life. He died in great suffering on the 1st of July 1614. His complaint was an organic and congenital malformation of the bladder; but his end was hastened by an unhealthy life of over-study, and latterly by his anxiety to acquit himself creditably in his criticism on Baronius. He was buried in Westminster Abbey. The monument by which his name is there commemorated was erected in 1632 by his friend Thomas Morton when bishop of Durham.

Besides the editions of ancient authors which have been mentioned, Casaubon published with commentaries Persius, Suetonius, the *Scriptores Historiae Augustae*. The edition of Polybius, on which he had spent vast labour, he left unfinished. His most ambitious work was his revision of the text of the *Deipnosophistae* of Athenaeus, with commentary. The Theophrastus perhaps exhibits his most characteristic excellences as a commentator. The *Exercitationes in Baronium* are but a fragment of the massive criticism which he contemplated; it failed in bringing before the reader the uncritical character of Baronius's history, and had only a moderate success, even among the Protestants. His correspondence (in Latin) was finally collected by Van Almeloveen (Rotterdam, 1709), who prefixed to the letters a careful life of Isaac Casaubon. But this learned Dutch editor was acquainted with Casaubon's diary only in extract. This diary, *Ephemerides*, of which the MS. is preserved in the chapter library of Canterbury, was printed in 1850 by the Clarendon Press. It forms the most valuable record we possess of the daily life of a scholar, or man of letters, of the 16th century. (M. P.)

A few minor changes have been made in the above article, compared with its form in the 9th edition. The most complete account

[1] Eudaemon was a Cretan, Rosweyd a Dutch, Jesuit; Schoppe, a German philologist and critic.

of Casaubon is the full biography by Mark Pattison (1875), of which a second and revised edition, by H. Nettleship, was published in 1892; the most recent work on the subject is *Isaac Casaubon, sa vie et son temps*, by L. J. Nazelle (1897); there is a monograph on the Fontainebleau conference by J. A. Lalot (1889). Casaubon is the subject of one of St Beuve's *Causeries*, the 30th of July 1860 (a notice of the Oxford edition of the *Ephemerides*). See also the article in E. Haag's *La France Protestante* (1882), and J. E. Sandys, *Hist. of Class. Schol.* vol. ii. (ed. 1908), pp. 204 foll.

CASCADE MOUNTAINS, a continuation northward of the Sierra Nevada, some 500 m. across the states of Oregon and Washington, U.S.A., into British Columbia. In American territory the range lies from 100 to 150 m. from the coast. The Cascades are separated on the S. from the Sierras by deep valleys near Mt. Shasta in California, while on the N., somewhat below the international boundary of 49° N., they approach the northern Rockies, mingling with these in inextricable confusion, although their name is given also to the much-broken, river-dissected, central mountain plateau that crosses British Columbia from S.E. to N.W. Geologically the Sierras and Cascades are very different, though their exact relations are not yet clearly determined; topographically they are also different. The Cascades are in general a comparatively low, broad mass surmounted by a number of imposing peaks in Oregon and Washington. Especially north of the Columbia river, the range widens out into a plateau. There are no notable elevations in British Columbia. Evidences of volcanic activity in comparatively recent geologic time are abundant throughout the length of the range, and all the highest summits are volcanic cones, covered with snow fields and, in a number of instances, with glaciers. The grandest peaks are Shasta (14,380 ft.) at the southern end, and Rainier (or Tacoma, 14,363 ft.) in Washington, two of the most magnificent mountains of America. Other notable summits are Mt. Pitt (9760), Mt. Scott (9122), Diamond Peak (8807), Mt. Thielsen (9250), Mt. Jefferson (10,200) and Mt. Hood (11,225), in Oregon; and Stuart (9470), St Helens (10,000), Baker (10,827) and Adams (12,470), in Washington. The Fraser river in the far north, the Columbia at the middle, and the Klamath in the south cut athwart the range to the Pacific, and many minor streams descend the range to swell their waters, while some drain directly from the flanks of the mountains into Puget Sound and Gray's Harbor. The Columbia has cut almost to the sea-level through the great mountain mass, the Dalles being only about 100 ft. above the sea. It is to the Cascades of the tremendous rapids at this point that the mountains owe their name. The slopes of the Cascades, particularly on the west, which has a very much moister climate than the eastern slope, are clothed with magnificent forests, chiefly of coniferous evergreens: firs, pine, tamarack and cedar. The Douglas fir, the "Oregon pine" of commerce, often attaining a height of 250 ft., is one of the most beautiful trees in the world. There are also a variety of deciduous trees, but in the aggregate they are unimportant. In 1910 the mountain forests were largely included in ten national forest reserves, with a total area of nearly 16,000,000 acres, extending from the northern boundary of Washington to the southern boundary of Oregon. The magnificent forest cloak, splendid peaks, great open mountain plateau pastures, and exquisite lakes embosomed in mountain fastnesses and forest gloom, give variety to the scenery, which is often grand, and throughout the range indescribably beautiful, though perhaps not equal to the Sierra Nevada in splended light and colour. Large game—deer, bears, mountain sheep and goats, wolves and panthers—still abound. Two great railway systems, the Great Northern and the Northern Pacific, cross the Cascades through noteworthy tunnels; that on the former line is 2½ m. long, that on the latter a little less than 2 m.

See OREGON and WASHINGTON; also G. O. Smith and F. C. Calkins, *A Geological Reconnaissance across the Cascade Range near the Forty-Ninth Parallel* (Washington, D.C., 1904), being U.S. Geological Survey Bulletin 253.

CASE, JOHN (d. 1600), English Aristotelian scholar and physician, was born at Woodstock. He was educated at Oxford, and elected to a fellowship at St John's College, which he was obliged to resign in consequence of his Roman Catholic sympathies. He subsequently opened a philosophical school in Oxford, which was largely attended. He enjoyed a great reputation as a logician and dialectician, and was in addition an authority on music and a distinguished physician. He is described as "a man of an innocent, meek, religious and studious life," an agreeable conversationalist, an enthusiastic teacher, and a great favourite with his pupils. Most of his works were commentaries on various treatises of Aristotle (*Organon*, *Ethics*, *Politics*, *Oeconomics*, *Physics*) under curious titles; they enjoyed a large circulation during his time, and were frequently reprinted. He was also the author of *The Praise of Musicke* (1586), dedicated to Sir Walter Raleigh.

CASE. (1) (From Lat. *casus*, that which falls or happens; *cadere*, to fall), a word used in various senses traceable to the derivation. In grammar, the "cases" are the various forms in the declension of a noun, adjective or pronoun, the Latin word being a translation of the Greek πτῶσις, falling, applied by Aristotle to the variations from the simple form of the word, whether noun, verb or adjective (of which the adverb would be a πτῶσις). Later grammarians confined the term to nouns, and included the nominative. In law, "case" is the common term for a cause or suit brought before a court of justice. Certain particular legal usages may also be noted. *Action on the case* means an action for the recovery of damages for an injury to the person or property, where the act done was not immediately injurious (see CONTRACT; TORT). A *case stated* is a statement of facts drawn up by one court for the opinion of another on a point of law. A *special case* is a statement of facts agreed to on behalf of two or more litigant parties, and submitted for the opinion of a court of justice as to the law bearing upon the facts so stated. A *leading case* is a decision which settles some point of importance. In the legal systems of the United Kingdom and of the United States decided cases are considered authoritative for courts of at least equal jurisdiction with those in which the judgments were given, but on the continent of Europe the rule is, following that of the Roman law, that they are instructive but not authoritative.

(2) (O. Fr. *casse*, mod. *châsse*, Lat. *capsa*, from *capere*, to hold; cf. "cash"), a box, sheath or covering. The term is applied to the natural protective covering of seed-vessels, and of a pupa or chrysalis. It is also used of a box containing instruments, pistols, swords, &c., and sometimes of the contents. In building, a "case" is the facing where the backing may be of inferior material; the framework in which a window or door is hung; or the wall surrounding a stair, "staircase" properly signifying the whole structure of walls and stairs. In bookbinding, a "case" means the boards and back in which the books are bound; and in typography, the tray, divided into partitions, containing the type ready for the compositor's use.

CASEMATE (Ital. *casa*, a house, and *matta*, dull or dim), an armoured vault or chamber, or in field fortification, a bomb-proof shelter; in architecture, a hollow moulding, chiefly employed in cornices.

CASEMENT (from a Lat. form *casamentum*), in architecture, a frame in wood or metal, which holds the glass of a window, and is hung by hinges either at the top, bottom or sides.

CASERTA, a town and episcopal see of Campania, Italy, the capital of the province of Caserta, situated 21 m. N. by E. of Naples by rail via Accerra, and 23 m. via Aversa. Pop. (1901) town, 19,180; commune, 33,373. The modern town (229 ft.) was a mere village belonging to the Caetani family of Sermoneta, who were counts of Caserta, until its purchase from them by Charles IV. of Naples, and the erection of the royal palace, begun by Luigi Vanvitelli (van Wittel) in 1752, but not completed until 1774 for Charles's son Ferdinand IV. It forms a rectangle, the south front being 830 ft. long and 134 ft. high, with 37 windows in each storey. The interior is richly decorated with marbles, almost all of which, except the white Carrara marble, are Neapolitan or Sicilian. The staircase, the chapel

and the theatre are especially sumptuous. The extensive gardens which occupy the hillside behind the palace are adorned with fountains and cascades; the botanical garden contains many trees from northern climates. Two miles north is S. Leucio, a village founded by Ferdinand IV. in 1789, with a royal casino, and large silk factories which are still active. The old town (Caserta Vecchia) lies high (1310 ft.) about 3 m. to the north-east. It was founded in the 9th century by the Lombards of Capua. The cathedral has not suffered from restoration. It was completed in 1153. It is a copy of that of Sessa Aurunca, and preserves the type of the Latin basilica. The campanile, Sicilian in style, was completed in 1234, while the dome, which betrays similar motives, is even later. Its pulpit is decorated with the richest polychrome mosaic that can be found anywhere in Sicily or south Italy, and is quite Moslem in its brilliance. It is indeed remarkable to find these motives in a church so far inland (Bertaux, *L'Art dans l'Italie méridionale*, Paris, 1904, i. 353, &c.). There are also the ruins of the old walls.

CASE-SHOT, a projectile used in ordnance for fighting at close quarters. It consists of a thin metal case containing a large number of bullets or other small projectiles (see AMMUNITION). Case-shot was formerly called "canister," though the term now used occurs as early as 1625.

CASH. (1) (From O. Fr. *casse*, mod. *caisse*, a box or chest; cf. "case"), a term which, originally meaning a box in which money is kept, is now commonly applied to ready money or coin. In commercial and banking usage "cash" is sometimes confined to specie; it is also, in opposition to bills, drafts or securities, applied to bank-notes. Hence "to cash" means to convert cheques and other negotiable instruments into coin. In book-keeping, in such expressions as "petty cash," "cash-book," and the like, it has the same significance, and so also in "cash-payment" or ready-money payment as opposed to "credit," however the payment may be made, by coin, notes or cheque.

The "cash on delivery" or "collect on delivery" system, known as C.O.D., is one whereby a tradesman can, through a delivery agency, send goods to a customer, and have the money due to him collected on the delivery of the same, with a guarantee from the carrier that, if no money be collected, the goods shall be returned. The function of such an agency is performed in the United States of America by the express companies (see EXPRESS). In most countries of the continent of Europe the post office acts as such an agent, as in Germany (where the system is known as *Post-Nachnahme*) and in France (*contre remboursement*). It is also in use in India, where it is known as "value payable," and was introduced in 1877 in Australia. The advantages of the system are obvious, from the point of view both of the customer, who can, by post or telegram, order and obtain speedy delivery from large towns, and of the tradesman, whose area of trade is indefinitely extended. The system does away with credit or the delay and inconvenience of paying in advance. The success of the large "catalogue" houses in America has been mainly due to the system as operated by the express companies. At various times, notably in 1904, it has been proposed that the General Post Office of the United Kingdom should adopt the system. The consistent opposition of the retail traders in large urban centres other than the large stores, and of the country shopkeeper generally, has been sufficient to secure the refusal of the postmaster-general to the proposed scheme, but a commencement was made in 1908 for orders not exceeding £20 between the United Kingdom and Egypt, Cyprus and Malta, and certain British post offices in Turkey and Tangier.

(2) (From Tamil *kasu*, Sinhalese *kasi*, a small coin, adopted by Portuguese as *caixa*, a box, and similarly assimilated in English to "cash" above), a name given by English residents in the East to native coins of small value, and particularly to the copper coinage of China, the native name for which is *tsien*. This, the only coin minted by the government, should bear a fixed ratio of 1000 cash to one *tael* of silver, but in practice there is no such fixed value. It is the universal medium of exchange throughout China for all retail transactions. The *tsien* is a round disk of copper alloy, with a square hole punched through the centre for stringing. A "string of cash" amounts to 500 or 1000 cash, strung in divisions of 50 or 100.

CASHEL, a city of Co. Tipperary, Ireland, in the east parliamentary division, 5 m. S.E. of Goold's Cross and Cashel station on the main line of the Great Southern & Western railway, 96 m. S.W. from Dublin. Pop. of urban district (1901) 2938. The town, which lies at the base of the Rock of Cashel, is of somewhat poor appearance, but contains several public buildings. There are also the cathedral church of St John the Baptist (*c.* 1780), the deanery house (once the bishop's palace), and a Roman Catholic church. Cashel gives name to a Roman Catholic archdiocese.

The Rock of Cashel is the object of chief interest in the place. This elevation of limestone formation rises abruptly from the plain to a height of about 300 ft. and is a commanding object for many miles around. Its summit is occupied by one of the most interesting assemblages of ruins in Ireland, consisting of the remains of St Patrick's cathedral, a round tower, Cormac's chapel, and an ancient cross. The chapel, which is said to have been erected by King Cormac M'Carthy in the 12th century, combines the ancient form of high stone roof, having chambers between the pitch and the vault, with the richest Norman decoration; the chancel arch being of especial magnificence. The cathedral, of the 13th century, is cruciform in design, with lancet windows and pointed arches, and contains many interesting sculptures and tombs. In the adjoining cemetery there stands, on a rude pedestal, whereon the kings of Munster were crowned, the "Cross of Cashel," with an effigy of St Patrick and a portrayal of the Crucifixion sculptured on its sides. The round tower, situated at the north-east angle of the cathedral, is 80 ft. high with a circumference of 50 ft., and unlike the neighbouring ruins is built, not of the limestone of the "Rock," but of freestone. Of the defences of the Rock a massive guard-tower and portions of the wall remain. At the base of the Rock is Hore Abbey, a Cistercian foundation (1272), exhibiting a similar style of architecture to that of the cathedral on the Rock; and within the town is a Dominican priory (1243), of which the east window is a beautiful example of the style of the period. From the Rock itself an extensive prospect is commanded over the rich Golden Vale backed by the Galtee Mountains, the Devil's Bit, and other ranges; the clustering roofs of the city providing a picturesque foreground.

The history of Cashel belongs to the early period of Irish chronology. Legend states that the vision of an angel blessing the Rock, seen by two swineherds early in the 5th century, led Core Mac Luighdheach, king of Munster, to establish a stronghold here. It became one of the principal seats of the kings of Munster, but in 1101 it was given over to the church by King Murkertagh O'Brien. It afterwards became noteworthy as the place where Henry II. received the homage of O'Brien, king of Limerick, and still later, where Edward Bruce held his Irish parliament. The cathedral was burnt in 1495 by the earl of Kildare. Cashel was taken by storm during the wars of 1647. It was reduced from an archbishopric to a bishopric in 1839, and was disfranchised, on account of corrupt practice, in 1870, having previously returned one member to parliament.

CASHEW NUT, the fruit of the cashew, cadju or acajou tree, *Anacardium occidentale* (nat. ord. Anacardiaceae), a native of the West Indian Islands. The fruit is kidney-shaped, about an inch in length, and the kernel is enclosed in two coverings, the outer of which is smooth, grey and leathery. Inside this external rind is a dark-coloured layer, containing an excessively acrid juice. The kernels have a bland, oily, pleasant taste. They are much eaten, both raw and roasted, in the tropical regions in which the tree is cultivated, and they yield a light-coloured, sweet-tasted oil, said to be equal to olive oil for culinary purposes. The fruit-stalk, immediately under the fruit, is swollen and fleshy, and assumes a pear-like shape. This swollen portion of the stalk has a pleasant acid taste, and is eaten under

Anacardium occidentale, Cashew Nut plant, belonging to the nat. ord. Anacardiaceae.

1. Branch (*reduced*), bearing flowers and fruit. The fruit-stalks are enlarged in a pear-like form, bearing the nut (the true fruit) at their apex.
2. Flower expanded.
3. Stamen and pistil, with the calyx; one fertile stamen longer than the others.
4. Stamen separated.
5. Nut constituting the fruit.
6. Nut opened longitudinally.
7. Seed separated from the nut.
8. Cotyledons opened to show the radicle *a*, and the plumule. Two-thirds scale of nature.

the name of cashew apple. By fermentation it yields an alcoholic beverage, from which a spirit for drinking is distilled in the West Indies and Brazil. The stem of the tree yields a gum analogous to gum arabic.

CASHIBO, or CARAPACHE (" bat "), a tribe of South American Indians of Pannoan stock, living in scanty numbers on the west side of the Ucayali, Peru. They are a wild, savage people who have always been foremost in attacks on the Jesuits. They joined Juan Santos in 1744 in the destruction of missions.

CASHIER. (1) (Adapted from the Fr. *caissier*, one in charge of the *caisse*, or money-box), one who has charge of the payment or receiving of money in a business house. The " cashier " may be a high executive official of a banking or mercantile house —thus the name of chief cashier of the Bank of England appears on all notes issued during his occupation of the post—or he may be merely a clerk, who receives payment for goods sold, and has the right to give receipts for the same.

(2) (In origin ultimately the same as " quash," to annul, from Lat. *quassare*, to dash or break to pieces, a frequentative of *quatere*, to shake, but also connected in form and meaning with *cassare*, to make, *cassus*, empty or void), a military term, meaning originally to disband, and probably adopted from the Dutch in the 16th century. The word in various forms is used in the same sense in most European languages. It is now used in English for the dismissal of a commissioned officer from the army and navy for particularly serious offences, in the words of the Army Act, 1881, s. 16, for " behaving in a scandalous manner unbecoming an officer and a gentleman." " Cashiering " involves not merely the loss of the commission, but also a permanent disqualification from serving the state in any capacity.

CASH REGISTER, a species of calculating machine adapted for use in connexion with the cash-tills of shops, in order to provide a record of the money received. Such machines are made in great variety and widely used. Sometimes the records are constituted by holes punched in a roll of paper; in other cases they are shown on dials by the aid of adding mechanism. A common form has a number of keys, each representing a particular sum and each attached to a counting mechanism which records how many times it has been used. By pressing appropriate combinations of these keys the amount of any purchase can be registered, and the combined records of all the counting mechanism give the total that has been passed through the machine in any selected period. Each key when pressed also raises an indicator which informs the customer how much he has to pay. In their more elaborate forms these cash registers may have a separate money-drawer for each assistant employed in the shop, thus enabling the proprietor to ascertain how many customers each man has served and how much money he has taken, and also to fix responsibility for mistakes, bad money, &c. The machines are also made to deliver a printed receipt for each purchase, showing the amount, date and assistant concerned, and they may be arranged to keep separate records of credit sales, money received on account, and money paid out.

CASILINUM (mod. *Capua*), an ancient city of Campania, Italy, 3 m. N.W. of the ancient Capua. Its position at the point of junction of the Via Appia and Via Latina, and at their crossing of the river Volturnus by a three-arched bridge, which still exists, gave it considerable importance under the Roman republic; and while the original pre-Roman town, which was doubtless dependent on the neighbouring Capua, stood entirely on the left (S.) bank, surrounded on three sides by the river, the Roman city extended to the right bank also; remains of it have been found at some 25 ft. below the modern ground-level, the river-bed having risen considerably. In the Second Punic War it was occupied by Fabius Cunctator in 217 B.C., taken by Hannibal after a gallant defence by troops from Praeneste and Perusia in the winter of 216–215, but recaptured in the following year, serving the Romans as their base of operations against Capua. It lost its independence and became a *praefectura*. Caesar conducted a colony thither in 59 B.C., which was renewed by Antony in 44 B.C. The veterans took Octavian's side after Caesar's death, but it seems to have been united with Capua before the time of Vespasian, and it does not occur in the list of independent communities given by Pliny, who indeed (*Hist. Nat.* iii. 70) speaks of the *morientis Casilini reliquiae*, and only its position at the junction of the roads redeemed it from utter insignificance. (T. As.)

CASIMIR III., called " THE GREAT," king of Poland (1310–1370), the son of Wladislaus Lokietek, king of Poland, and Jadwiga, princess of Kalisch, was born at Kowal in Kujavia in 1310. Casimir belongs to that remarkable group of late medieval sovereigns who may be called the fathers of modern diplomacy, inasmuch as they relegated warfare to its proper place as the instrument of politics, and preferred the council-chamber to the battle-field. He was educated at the court of Charles Robert of Hungary, who had married Casimir's beautiful sister Elizabeth, and who gave his brother-in-law an excellent education under Italian masters. In his youth Casimir was considered frivolous and licentious; while his sudden flight from the field of Plowce, the scene of his father's great victory over the Teutonic knights, argued but poorly for his personal courage. When, therefore, he ascended the Polish throne in 1333, the future of his country, which then consisted of little more than the lately reunited provinces of Great and Little Poland, seemed dark indeed; especially as she was still at war with the Teutonic Order and with John of Luxemburg, king of Bohemia, who claimed the crown of Poland also. Fortunately Casimir was a man of penetrating genius. His father had been a hero who

trusted entirely to his sword, yet the heroic struggle of a lifetime had barely sufficed to keep at bay the numerous and potent foes with which Poland was environed. Casimir recognized from the first that further fighting against tremendous odds was unprofitable. A careful, calculating dynastic policy, which aimed at the establishment of an equilibrium by means of prudent compromises and defensive alliances, was, he rightly judged, the best guarantee for the future safety and glory of Poland. Casimir began by tying the hands of the Teutonic Order by the truce of Thorn; he induced the king of Bohemia to relinquish his claims to the Polish throne by consenting to leave him a free hand in Silesia (conference of Trencsén, early in 1335); and subsequently he attended the celebrated congress of Visegrád (November 12-December 3, 1335), where Charles Robert entertained him and the king of Bohemia magnificently. At this congress the differences between Casimir and John of Bohemia were finally adjusted; peace was made between the king of Poland and the Teutonic Order on the basis of the cession of Pomerania, Kulm, and Michalow to the knights, who retroceded Kujavia and Dobrzyn; and the kings of Hungary and Poland further agreed to assist each other in the acquisition of the south-eastern border province of Halicz, or Red Russia (very nearly corresponding to the modern Galicia), in case the necessity for intervention should arise. The Holy See, jealous of the growing power of the house of Luxemburg, attempted to set aside the decrees of the congress of Visegrád, by urging Casimir to take up arms against the knights once more; but Casimir prudently refrained from hostilities, and ultimately compensated himself in the south-east for his losses in the north. To guarantee still further the integrity of Poland, Casimir, who had no male issue, concluded a compact with Charles Robert whereby he recognized Louis, Charles Robert's son, as the successor to the Polish crown; Louis on his part contracting to confirm the privileges of the Polish gentry and clergy, and to rule Poland through natives only.

In 1340 the death of George II. of Halicz, and the ravaging of that fruitful border principality by the Tatars, induced Casimir and Charles Robert to establish their joint influence there, and in 1344 the Red Russian boyar, Demetrius Detko, was appointed *starosta*, or governor, in the names of the two kings. Nine years later Lubart of Lithuania, who also had claims upon Red Russia, disputed the sway of Poland in that principality. Hungary coming to the assistance of Poland, Lubart was defeated and taken prisoner; but Casimir, anxious to avoid a bloody war with Lithuania's Tatar allies, came to a compromise with Lubart whereby Poland retained Halicz with Lemberg, while Vladimir, Belz, and Brzesc fell to the share of Lithuania. With the Teutonic knights, still Poland's most dangerous foe, Casimir preserved peaceful relations throughout his reign. He kept them within due bounds by using the influence of the Luxemburgers against them at the papal court; but the disputes between Poland and the order were ultimately settled by the peace of Kalisz (July 23, 1343), when the knights engaged for the first time to pay tribute to the Polish crown. John of Bohemia was also a constant thorn in the side of Casimir. Silesia, now split up into seventeen principalities, was the bone of contention between them; and when Casimir suddenly invaded that country, took Wschowa, and made Prince Charles of Bohemia a prisoner, war between the two kingdoms actually broke out and Casimir was besieged in Cracow by the Czechs. But his Hungarian allies hastened to his assistance, and the mediation of the Holy See restored peace in 1346. The death of the adventurous John at Crécy, and the election of his son as emperor, still further improved the situation. Charles IV., a cautious sovereign with many cares, was as anxious for the maintenance of peace as Casimir himself. Thus the relations between them were never very seriously disturbed.

Throughout his reign Casimir never neglected the great work of domestic reform, greatly aided by Jaroslaw Skotowicki, archbishop of Gnesen, formerly a professor at Bologna. The first result of their joint labours was the much-needed codification of the laws of Great and Little Poland in 1347. This was followed by the establishment of a supreme court of appeal in 1357. Towards everything like disorder, tyranny, or aristocratic oppression, Casimir was always inexorably severe; all disturbers of the peace were remorselessly put to death as the worst enemies of their country and he enjoyed in consequence the honourable title of "the Peasants' King." The lawlessness of the nobility was most noticeable in the province of Great Poland, where outrageous acts of violence were of everyday occurrence. To remedy the evil, Casimir drew up and promulgated the severe statute of Great Poland, which went to the very root of the matter and greatly strengthened the hands of the king's justices. Casimir also did much for education. Stimulated by the example of Charles IV., who had founded the university of Prague in 1348, Casimir on the 12th of May 1364 established and richly endowed the first university of Cracow, which had five professors of Roman law, three of Canon law, two of physics, and one master of arts. The security of the kingdom was sensibly promoted by the erection of a cordon of fortresses on its north-eastern borders, and a blow was given to foreign interference when Casimir succeeded in gaining dominant influence over the independent Polish principality of Masovia, which had hitherto gravitated between Bohemia and the Teutonic Order.

Casimir's last political act was the conclusion of a fresh alliance with Louis of Hungary against Charles IV. at Buda in 1369. He died on the 5th of November 1370 from the effects of an injury received while hunting. Though married three times Casimir left no sons; but he had the satisfaction of knowing that his domains would pass into the hands of a nephew every whit as capable and sagacious as himself.

See Jan Leniek, *The Congress of Visegrád* (Pol.), (Lemberg, 1884); J. K. Kochanowski, *Casimir the Great* (Pol.), (Warsaw, 1900); Kazimierz J. Gorzycki, *The Annexation of Red Russia by Casimir the Great* (Pol.), (Lemberg, 1889); Stanislaw Kryzanowski, *The Embassy of Casimir the Great to Avignon* (Pol.), (Cracow, 1900). (R. N. B.)

CASIMIR IV., king of Poland (1427–1492), second son of Wladislaus II. Jagiello, was appointed while still a lad grand-duke of Lithuania by his father, and crowned king of Poland at Cracow in June 1447, three years after the death of his elder brother, Wladislaus III., at the battle of Varna. The cause of this long interregnum was the disinclination of the Lithuanians to part with their prince till their outstanding differences with Poland, relating chiefly to the delimitation of the frontiers of the two states, had been settled. Casimir's reign of forty-five years was epoch-making for Poland. He was without doubt one of the greatest statesmen of his age, concealing beneath a simple exterior and homely habits a profound political sagacity and an unerring common-sense, and possessing in a high degree those useful qualities of patience, moderation, and tenacity, which characterized nearly all the princes of the house of Jagiello. Throughout life he steadily followed two guiding principles—the preservation of the political union between Poland and Lithuania at whatever cost, and the recovery of the lost lands of old Poland. It was due entirely to his steadfast adherence to these principles that Poland in the course of the 15th century rose to the rank of a great power; but by a singular irony of fate, Casimir, in consequence of his unswerving efforts to make his country glorious and prosperous, entirely forfeited the popularity of his Polish subjects, whose true interests he understood far better than they did themselves. Thus his refusal to sacrifice Polish to Lithuanian or Lithuanian to Polish interests caused both Poles and Lithuanians to accuse the far-seeing monarch of partiality and favouritism; while his anti-German policy, on which the future safety of the dual state depended, could only be carried through by the most humiliating concessions to patrician pride and greed. His difficulties were moreover considerably enhanced by the fact that he was not of an essentially martial temperament, and could not therefore appeal to the heroic side of the Polish character.

The great triumph of Casimir's reign was the final subjugation of the Teutonic Order, a triumph only accomplished after a harassing and desultory thirteen years' war, during which Casimir's own subjects gave him more trouble than all his enemies. The pretext of the rupture was the attempt of the

knights to crush the Prussian diet, which, bearing as it did most of the burdens, claimed fairly enough a proportionate share in the government of the Prussian provinces. Excommunicated by the pope and placed under the ban of the Empire, the Prussian cities and gentry naturally turned to their nearest neighbour, Poland, for protection. In October 1453 they placed themselves beneath the overlordship of Casimir; on the 4th of February 1454 formally renounced their ancient allegiance to the Order; and some weeks later captured no fewer than fifty-seven towns and castles. On the 6th of March 1454 Casimir issued a manifesto directing the incorporation of the Prussian provinces with Poland, but granting them at the same time freedom from taxation and full autonomy. But except in the border province of Great Poland, the acquisition of this new territory excited little interest and no enthusiasm in Poland generally. The local diets granted subsidies with a niggard hand, and for the conduct of the war the king soon had to depend almost entirely on Hussite mercenaries, who frequently turned against him when their wages were not paid. The Polish gentry on the other hand exhibited far less energy in the field than in the council chamber; they were defeated again and again by the knights, and showed themselves utterly incapable of taking fortresses. No wonder then if in the earlier years of the war the Order recovered its lost ground, and the king, irritated beyond endurance by the suicidal parsimony of the estates, threatened to retire to the forests of Lithuania. But manlier counsels prevailed, the struggle was resumed, and after the bloody victory of Puck (September 17, 1462) the scales of fortune inclined decisively to the side of Poland. Finally the Holy See intervened, and by the second peace of Thorn (October 14, 1466) all West Prussia, as it is now called, was ceded to Poland, while East Prussia was left in the hands of the knights, who held it as a fief of the Polish crown.

The intervention of the Curia, which hitherto had been hostile to Casimir because of his steady and patriotic resistance to papal aggression, was due to the permutations of European politics. The pope was anxious to get rid of the Hussite king of Bohemia, George Poděbrad, as the first step towards the formation of a league against the Turk. Casimir was to be a leading factor in this combination, and he took advantage of it to procure the election of his son Wladislaus as king of Bohemia. But he would not commit himself too far, and his ulterior plans were frustrated by the rivalry of Matthias Corvinus, king of Hungary, who even went so far as to stimulate the Teutonic Order to rise against Casimir. The death of Matthias in 1490 was a great relief to Poland, and Casimir employed the two remaining years of his reign in consolidating his position still further. He expired rather suddenly while hunting at Troki in Lithuania in June 1492.

The feature of Casimir's character which most impressed his contemporaries was his extraordinary simplicity and sobriety. He, one of the greatest monarchs in Europe, habitually wore plain Cracow cloth, drank nothing but water, and kept the most austere of tables. His one passion was the chase. Yet his liberality to his ministers and servants was proverbial, and his vanquished enemies he always treated with magnificent generosity. Casimir's married life was singularly happy. His consort, Elizabeth of Austria, "the mother of the Jagiellos," bore him six sons and seven daughters, and by her affection and good counsel materially relieved the constant anxieties and grievous burdens of his long and arduous reign.

See Jan Dlugosz, *Opera* (Cracow, 1887); August Sokolowski, *Illustrated History of Poland* (Pol.), vol. ii. (Vienna, 1904). (R. N. B.)

CASIMIR-PÉRIER, JEAN PAUL PIERRE (1847–1907), fifth president of the French Republic, was born in Paris on the 8th of November 1847, being the grandson of Casimir Pierre Périer (*q.v.*) the famous premier of Louis Philippe. He entered public life as secretary to his father, A. V. L. C. Périer, who was minister of the interior under the presidency of Thiers. In 1874 he was elected general councillor of the Aube, and was sent by the same department to the chamber of deputies in the general elections of 1876, and he was always re-elected until his presidency. In spite of the traditions of his family, Casimir-Périer joined the group of Republicans on the Left, and was one of the 363 on the *Seize-Mai* (1877). If he refused to vote the expulsion of the princes in 1883, and resigned as deputy upon the enactment of the law, it was only owing to personal connexions with the family of Orleans. On the 17th of August 1883 he became under-secretary of state for war, and retained that position until the 7th of January 1885. From 1890 to 1892 he was vice-president of the chamber, then in 1893 president. On the 3rd of December he became prime-minister, holding the department of foreign affairs, resigned in May 1894, and was re-elected president of the chamber. On the 24th of June 1894, after the assassination of President Carnot, he was elected president of the republic by 451 votes against 195 for Henri Brisson and 97 for Charles Dupuy. His presidency lasted only six months. The resignation of the Dupuy ministry on the 14th of January 1895 was followed the next day by that of the president. Casimir-Périer explained his action by the fact that he found himself ignored by the ministers, who did not consult him before taking decisions, and did not keep him informed upon political events, especially in foreign affairs. From that time he definitely and absolutely abandoned politics, and devoted himself to business—especially mining. At the trial of Dreyfus at Rennes, Casimir-Périer's evidence, as opposed to that of General Mercier, was of great value to the cause of Dreyfus. He died on the 11th of March 1907.

CASINO (diminutive of *casa*, a house), the Italian name for a pleasure-house in a garden, which has been extended to a place of public amusement at pleasure resorts, in which concerts, theatrical performances and public balls are given, and which usually contains a *café-restaurant* and gaming saloons. "Casino" as an architectural term is still employed in France, and the subject is given in competitive programmes in the French schools of design. In the 18th century in England many Italian examples were built in the parks of country mansions, and Sir William Chambers in his treatise on civil architecture publishes plates of the casinos he had built at Marino, near Dublin, Wilton near Salisbury, and Birdshall, Yorkshire.

Casino or *Cassino* is also the name given to a game of cards of obscure origin, played with a full whist-pack. The object is to take as many cards as possible, particularly such as have special value. It may be played by two, three or four persons, partners sitting opposite one another. The player at the dealer's right is called the pony (*pone*), the one at his left the eldest hand. The dealer (selected by the cut of the lowest card) deals four cards to each player by twos and also, just before dealing to himself, four to the table, face upwards. The eldest hand begins the game by playing a card in one of three ways. Either he may take one of the exposed cards on the table by matching it with one from his own hand; or he may put one of his cards upon one of the table hand and call the sum of the pips (called *building*); or thirdly, failing to do either of these things, he must *trail*, *i.e.* lay a card face upwards on the table beside the exposed cards, and the player at his left then plays in his turn. When each player has played out all four of his cards the dealer deals four more all round, and the game proceeds until the pack is exhausted. The game either (1) ends at this juncture, the player having secured the most points winning; or (2) the side or player first securing 21 points wins; or (3) the points secured in a given number of deals may determine the winner. The points and their respective values are as follows:—*Big* (or Great) *Casino* (ten of diamonds), 2; *Little Casino* (deuce of spades), 1; *Cards* (greatest number), 3; *Spades* (greatest number), 1; *Aces*, 1 each or 4 together; *Sweeps*, 1 each. Thus, without *sweeps*, the maximum points in one deal are 11. A sweep is a play that clears the table of all exposed cards. The game then proceeds by the next player placing a card on the table face upwards.

"Building," referred to above, is done as follows. Should a 3 lie exposed on the table, a player may place a 4 upon it, saying, "I build a 7," and, if it is not disturbed before his next turn, he may then take the two cards with another 7 from his hand. It follows that no combination may be built unless the builder holds the proper card in his hand. But a build may be increased. Thus, in the case cited above, another player may put a 2 upon the two cards which make 7 and say, "I build 9," in which case the original

builder loses control of the build unless he also holds a 9 in his hand or can himself increase the build again; for instance, adding an ace and calling 10. In the old way of playing the ace counted 1, the deuce 2, and so on as at whist, excepting that all court cards counted 10. But in the popular variation called *Royal Casino*, now almost universally played, the ace counts either 1 or 14, the king 13, the queen 12 and the knave 11. In this manner the opportunities for simple and increased building are greatly multiplied, resulting in a much livelier game.

If a player has made a build he must take it in on his next play, unless he can take some other card. He cannot have two builds on the table at the same time, nor increase another build if he already has one of his own. *Double Builds* cannot be increased, *e.g.* if a player combines a 3 and 4 lying on the table and places a 7 from his hand upon them, saying, "I build sevens," this build can be taken only with a 7, and cannot be built upon further. Of course in the case cited the builder must still have another 7 in his hand. In playing partners each may take in the other's builds, or may build to a card that has been declared by his partner; *e.g.* if his partner has built an 8 that has been captured by an opponent, he may build another 8 with a card from his own hand to the 8 that he knows to be in his partner's hand, even though he has no 8 himself. In *trailing*, *i.e.* laying down a card without matching or building, one usually plays small cards, avoiding aces and (if Big and Little Casino have not yet been played) tens and deuces, as well as any cards one has reason to think will be of service to the enemy. High cards are usually played last, as they are stronger in taking combinations. Such rules are, however, quite general, each situation calling for special treatment. In the last round all cards remaining on the table become the property of the player taking the last trick. A good memory and keen powers of observation are essential in playing this game.

In *Twenty-One-Point Casino* nothing is scored until the end of the deal. A second or third deal is usually necessary before one side scores the requisite 21. In the final deal each side keeps a mental count of the points made, and as soon as 21 are scored the game is claimed and the points shown. But if, when added to those already scored in previous deals, they make more or less than 21, the claimant loses the game. In counting out *cards* count first, followed by *spades*, *Big Casino*, *Little Casino*, *aces* and *sweeps*, in that order.

Spade Casino is a variation in which the usual 11 points count as in the regular game, and, in addition, each spade counts 1, excepting the knave of spades, which counts 2, making 24 points in all. These are scored on a cribbage-board, each point being marked as it is made. The game is for 61 points, or once round the board and into the game-hole.

CASINUM, an ancient town of Italy, probably of Volscian origin. Varro states that the name was Sabine, and meant *forum vetus*, and also that the town itself was Samnite, but he is probably wrong. When it came under Roman supremacy is not known, but it probably received the citizenship in 188 B.C. It was the most south-easterly town in *Latium adjectum*, situated on the Via Latina about 40 m. N.W. of Capua. It appears occasionally in the history of the Hannibalic War. Varro possessed a villa near it, in which later on Mark Antony held his orgies. Towards the end of the republic it was a *praefectura*, and under the empire it appears as a colony (perhaps founded by the triumvirs), though in two (not local) inscriptions it is called *municipium*. Strabo speaks of it as an important town; Varro mentions the olive-oil of its district as especially good. The older Volscian Casinum must have stood on the hill (1715 ft.) above the Roman town (148 ft.), where considerable remains of fortifications in Cyclopean masonry, of finely cut blocks of limestone, still exist. The site is now occupied by the Benedictine monastery of Monte Cassino (*q.v.*) founded by St Benedict himself in 529. A number of Roman inscriptions from Casinum are preserved there. The wall which runs south-west and west starting from the west side of the monastery, for a total length of about 300 yds., is not so clearly traceable on the other side of the hill, though there is one fragment under the east side of the monastery; but it seems to have defended the summit and was perhaps the original acropolis. The Roman town lay at the foot of the mountain, close to the Via Latina. The amphitheatre, erected by Ummidia Quadratilla (whose passion for actors is mentioned by Pliny, *Epist.* vii. 24, on the occasion of her death at the age of about eighty), is still existing: it is built of *opus reticulatum* and the five entrances are by arches of larger blocks of stone; it is approximately circular in plan. The external walls are 59 ft. high. The seats in the interior have disappeared. Above it on the hillside is a theatre of *opus reticulatum*, less well preserved. Close by is a building converted into the Cappella del Crocefisso, originally perhaps a tomb in the Via Latina; it is a chamber in the form of a Greek cross, constructed of large masses of travertine, with a domed roof of the same material. On the opposite bank of the Rapido are the ruins called Monticelli, attributed to the villa of Varro, a part of which was frequently drawn by the architects of the 16th century (T. Ashby in *Papers of the British School at Rome*, ii. 19). The medieval town of S. Germano, which resumed the name Cassino in 1871, lies a little to the north. The cathedral was founded in the 8th century, but the present building was constructed in the 17th century. The church of S. Maria delle Cinque Torri contains twelve ancient marble columns; above the town is a picturesque medieval castle. (T. As.)

CASIRI, MIGUEL (1710–1791), a learned Maronite, was born at Tripoli (Syria) in 1710. He studied at Rome, where he lectured on Arabic, Syriac, Chaldee, philosophy and theology. In 1748 he went to Spain, and was employed in the royal library at Madrid. He was successively appointed a member of the Royal Academy of History, interpreter of oriental languages to the king, and joint-librarian at the Escorial. In 1763 he became principal librarian, a post which he appears to have held till his death in 1791. Casiri published a work entitled *Bibliotheca Arabico-Hispana Escurialensis* (2 vols., Madrid, 1760-1770). It is a catalogue of above 1800 Arabic MSS., which he found in the library of the Escorial; it also contains a number of quotations from Arabic works on history. The MSS. are classified according to subjects; the second volume gives an account of a large collection of geographical and historical MSS., which contain valuable information regarding the wars between the Moors and the Christians in Spain. Casiri's work is not yet obsolete, but a more scientific system is adopted in Hartwig Derenbourg's incomplete treatise, *Les Manuscrits arabes de l'Escorial* (Paris, 1884).

CASKET, a small box or coffer, commonly used for jewels, money, papers, or other objects of value. The etymology is doubtful. It is possibly a diminutive of "cask," a barrel for wine or other liquor. The Spanish *casco* meant also a skull, helmet, or rind of an onion, and is probably connected with *cascar*, to break open, Latin *quassare*, French *casser*, to break, shake. The French *casque*, *casquet*, of the same origin is only used of a helmet, and the sense of "small chest" is not found in languages other than English. Skeat suggests that the word is a corruption of French *cassette*, diminutive of *casse*, box, Latin *capsa*, from *capere*, to hold, contain, cf. English "case." History and literature are full of references to the often disconcerting contents of these famous receptacles. The "Casket Letters" (*q.v.*) are one of the mysteries of history. Harpagnon's casket plays an important part in Molière's *L'Avare*; Bluebeard gives his too-curious wife the keys of his caskets filled with precious stones; the contents of Sainte-Croix's casket brought about the trial and condemnation of the marquise de Brinvilliers, the poisoner. This very ancient piece of furniture was no doubt derived from the chest, which was the original wardrobe. It was often an object of great value, covered with ivory, enamel, or stamped leather, enriched with precious metals, or encrusted with jewels. One which belonged to St Louis and is preserved in the Louvre is covered with enamelled shields of arms and other decorations. In the 16th and 17th centuries secret hiding-places were sometimes in the thickness of the lid or in a false bottom. The word is now little used—the natural result of the desuetude of the object; but auctioneers occasionally announce that they will sell a "casket of jewels," and undertakers, especially in the United States, frequently use it as a grandiose synonym for "coffin."

CASKET LETTERS. This is the name generally given to eight letters, and a sequence of irregular sonnets, all described as originally in French, and said to have been addressed by Mary, queen of Scots, to the earl of Bothwell, between January and April 1566–1567. The nature of these documents—authentic, forged, or partly forged, partly genuine—has been the theme of much discussion. If authentic throughout, they afford perfect proof of Mary's complicity in the murder of her husband, Henry, Lord Darnley. The topic is so perplexing, and possibilities

are so delicately balanced, that inquirers may change their views, and modify or reverse their opinions, on the appearance of each fresh document that is brought to light; or even upon a new consideration of existing evidence. Controversy centres round a very long and singular undated epistle called "The Glasgow Letter" or "Letter II." If Mary wrote all of this, or even wrote some compromising parts of it, she was certainly guilty. But two questions remain to be settled—(1) did her accusers at one time possess another version of this letter which if it existed was beyond doubt a forgery? and (2) is not part of Letter II. a forged interpolation, based on another document, not by Mary?

The whole affair has been obscured and almost inextricably entangled, as we shall see, by the behaviour of Mary's accusers. Of these Maitland of Lethington was consenting to Darnley's murder; the earl of Morton had, at least, guilty foreknowledge; the regent Moray (Mary's natural brother) had "looked through his fingers" at the crime, and for months remained on intimate terms with the criminals. He also perjured himself when putting before Elizabeth's commission of inquiry at Westminster (December 1568) a copy of the confession of Hepburn of Bowton (Cotton MSS. British Museum. Caligula C.I. fol. 325). This is attested as a "true copy," but Moray, who had been present when Bowton was examined (December 8, 1567), knew that the copy presented at Westminster (December 1568) had been mutilated because the excised passages were damning to Lethington and the earl of Morton, accomplices in the crime of Darnley's murder, and accomplices of Moray in his prosecution of his sister. (See in Cambridge University Library, MS. Oo. 47, fol. 5 et seq. Compare the MS. copy of the confession in the British Museum, Cotton MSS. Caligula, C.I. fol. 325, printed in Anderson's *Collections*, vol. ii. pp. 183-188.)

If Moray the righteous could act thus, much more might the murderer Morton perjure himself in his averment that there had been no tampering with the Casket Letters in his custody. We cannot, in short, believe Mary's accusers on their oaths. When they all went, in October-December 1568, to York and London to accuse their queen—and before that, in their proclamations—they contradicted themselves freely and frequently; they put in a list of dates which made Mary's authorship of Letter II. impossible; and they rang the changes on Scots translations of the alleged French originals, and on the French itself. For example, when Moray, after Mary was in Elizabeth's power (May 16, 1568), wished Elizabeth to have the matter tried, he in May-June 1568 sent John Wood to England with Scots translations of the letters. Wood was to ask, "if the French originals are found to tally with the Scots translations, will that be reckoned good evidence?" It was as easy to send copies of the French, and thus give no ground for the suspicion that the Scots letters were altered on the basis of information acquired between May and October 1568, and that the French versions were made to fit the new form of the Scots copies. Another source of confusion, now removed, was the later publication in France of the letters in French. This French did not correspond with French copies of some of the originals recently discovered in Cecil's MSS. and elsewhere. But that is no ground of suspicion, for the published French letters were not copies of the alleged originals, but translations of Latin translations of them, from the Scots (see T. F. Henderson, *The Casket Letters*, 1890). German historians have not made matters more clear by treating the Letters on the principle of "the higher criticism" of Homer and the Bible. They find that the documents are of composite origin, partly notes from Mary to Darnley, partly a diary of Mary's, and so on; all combined and edited by some one who played the part of the legendary editorial committee of Peisistratus (see HOMER), which compiled the *Iliad* and *Odyssey* out of fragmentary lays! From all these causes, and others, arise confusion and suspicion.

So much information unknown to older disputants such as Goodall, the elder Tytler, Chalmers, and Malcolm Laing, and in certain cases unknown even to Froude and Skelton, has accrued, that the question can now best be studied in *The Casket Letters*, by T. F. Henderson (1889; second issue, 1890, being the more accurate); in *The Mystery of Mary Stuart*, by Andrew Lang (4th edition, 1904), and in Henderson's criticism of that book, in his *Mary, Queen of Scots* (1905) (Appendix A). The conclusion arrived at here is that of Henderson, but it is reached independently.

The history of the letters must be given in summary. Henderson, in *The Casket Letters* (1889), was the first to publish and use as evidence a document of which the existence was made known in the fifth report of the royal commission on historical manuscripts. It is a sworn statement of the earl of Morton, written in 1568. A silver casket (originally Mary's property, but then in the possession of Bothwell) was placed in his hands on the 20th of June, and was inspected by several nobles and gentlemen on the 21st of June 1567. Morton denies that the contents, the letters, sonnets, and some other papers, had been in any way tampered with. But if Moray could knowingly submit garbled evidence, Morton's oath is of no value if uncorroborated.

Mary was, on the 21st of June 1567, a prisoner in Loch Leven Castle. A messenger was at once sent from Edinburgh to London with a letter from Lethington and a verbal message. By the 12th of July, de Silva, the Spanish ambassador, reports on the authority of the French ambassador that du Croc, French envoy to Scotland, avers that Mary's Scottish enemies have autograph letters of hers proving her guilt, and himself possesses copies. Of these copies no more is heard, and they cannot be found. According to de Silva, Elizabeth said that she did not believe in the Letters, and that Lethington, who wrote to Cecil on the 21st of June, and sent a verbal message by the bearer, "had behaved badly in the matter,"—whether that of the letters, or in general. On what evidence she based that opinion, if she really held it, is unknown. In December 1567 the Scottish parliament was informed that the letters were *signed* by Mary (they are unsigned), but the phrase is not used in the subsequent act of parliament. The letters were exhibited and apparently were read, probably read aloud. Mary's party in September 1568 declared that they were garbled, and that the handwriting was not hers. In the end of July 1567 the earl of Moray, Mary's brother, passing through London from France, told de Silva, as de Silva reported to his government, that there was proof of Mary's guilt in a letter of three double sheets of paper *signed* by her.

According to Moray's version of the letter, Mary was to try to poison Darnley in a house on the way between Glasgow and Edinburgh where he and she were to stop. Clearly Lord Livingstone's house, Callendar, where they did rest on their journey, is intended. If this failed, Mary would put Darnley "in the house where the explosion was arranged for the night upon which one of the servants was to be married." No such arrangement had been made, as the confessions of the murderers, at which Moray was present, clearly prove. It may be said that de Silva means "the house in which the explosion was *afterwards* arranged." But the earl of Lennox, Darnley's father, understood Moray to mean that as early as January 21-22, 1567, the house of Kirk o' Field, where Darnley was slain, had already been mined. Moray's version of the letter made Mary tell Bothwell to poison or put away his wife. No such matters occur in Letter II.; Moray spoke, he said, on the authority of "a man who had read the letter." A similar account of this letter is given in a document of Darnley's father, the earl of Lennox (Cambridge University Library MSS. Oo. 7. 47; f. 17 b.). Can we suppose that "the man who had read the letter" invented much of its contents, and told them to Moray, who told de Silva, and told Darnley's father, Lennox, then in or near London?

At this point comes in the evidence—unknown to Froude, Skelton, Hosack, and Henderson in his book *The Casket Letters*—of a number of documents, notes of information, and indictments of Mary, written for or by the earl of Lennox. These MSS are in the University Library of Cambridge, and were transcribed by Father Stevenson. His transcripts were brought to light by Father Pollen, S. J., who lent them, with his own notes on them,

to Andrew Lang for use in his book, *The Mystery of Mary Stuart* (1900–1904).

Not one of the Lennox documents is dated; all but one are endorsed in an English hand of the period. It may be conjectured that they were selected by Lennox from his papers, and lent by him to some one who was writing against Mary. Among them (Cambridge University MSS. Oo. 7. 47. fol. 17 b.) is a long indictment of Mary, in which Lennox describes a wicked letter of hers. As has been said, he closely follows Moray's version reported by de Silva in July 1567. Lennox also gives several stories of cruel words of Mary spoken to Darnley in the hearing of her servants.

Now, on the 11th of June 1568, Lennox was in the company of John Wood, a creature of Moray's, and Wood, as we saw, brought copies of the Scots renderings of the Letters into England in May–June 1568. It was argued by Andrew Lang that Wood was likely to show these letters to Lennox; and that as Lennox follows Moray's version of Mary's long and murderous letter, and does *not* follow Letter II., the murderous letter (a forgery) was then part of the *dossier* of Mary's accusers. Again, as Lennox's indictment of Mary (Cambridge Oo. 7. 47. fol. 17 b.) is rife in " reports and sayings of Mary's servants " about her cruel words to Darnley, and as Lennox had not these reports on the 11th of June 1568, for on that day he wrote to Scotland asking his friends to discover them and send them to him, the indictment (Oo. 7. 47) must have been composed long after the 11th of June. This must be so, for Lennox's letters of the 11th of June were intercepted by his foes, the Hamiltons, and were found in the Hamilton Muniment Room. Thus answers to his inquiries were delayed. (The letters of Lennox were published in *Miscellany of the Maitland Club*, vol. iv.)

Henderson, on the other side, believes that Wood " indubitably " showed to Lennox the Scots copies of the Casket Letters about the 11th of June 1568. But Lennox, he says, could not quote Letter II. in his indictment against Mary, and had to rest on Moray's version of July 1567, because Lennox's indictment was completed, and even laid before Elizabeth, as early as the 28th of May 1568. Henderson seeks to prove that this is so by quoting from Chalmers's *Mary Queen of Scots* (vol. ii. p. 289) the statement that Lennox and his wife on that day presented to Elizabeth a " Bill of Supplication "; and (though he submits that the indictment [Oo. 7. 47] is a *draft* for the Bill) he strengthens his case by heading the indictment, which he publishes, *Bill of Supplication*. The document, in fact, is unendorsed, and without a title, and there is not a word of " supplication " in it. It is a self-contradictory history of the relations between Mary and Darnley.

Henderson's contention therefore seems erroneous. Lennox could not begin to prepare an English indictment against Mary till she was in England and in Elizabeth's power. He could not hear of this fact—Mary's arrival in England (May 16, 1568)—before, say, the 19th of May; and between the 19th of May and the 28th of May he could not write for and receive from Scotland " the reports and sayings of her servants." He did not possess them on the 11th of June, when he asked for them; he did not get them at once, for his letters were intercepted; the indictment (Oo. 7. 47) is rich in them; therefore that paper is not the " Bill of Supplication" of the 28th of May.

Thus the question remains, why, if Wood about the 11th of June showed to Lennox Letter II. in Scots, did Lennox follow Moray's erroneous version of July 1567? Because in June 1568 that version, forged, was in the Scots collection of the Casket Letters? If so, there was time for Lennox to lend to the accusers certain notes which a retainer of his, Thomas Crawford of Jordan Hill, swore (December 9, 1568) that he had made for Lennox (about January 22, 1567) of secret conversations between Darnley and Mary. Lennox (June 11, 1568) asked Crawford for his reminiscences, *not* of Darnley's reports of his talks with Mary, but of Crawford's own interview with her as she entered Glasgow to visit Darnley, probably on the 21st of January 1567. It follows that Lennox possessed Crawford's written notes of the Darnley and Mary conversations. If he had not possessed them on the 11th of June 1568, he must have asked Crawford for his reminiscences of these talks. But he did not ask.

Crawford's evidence was all-important, because it corroborated Mary's own account of her interviews with Darnley in Letter II. That part of the letter then, it is argued by many, is a forged interpolation based on Crawford's notes and memories. The force of this contention lies in the close verbal identities between Crawford's account of the Darnley-Mary interviews (see Crawford's Declaration of December 9, 1568, in Lang's *Mystery of Mary Stuart*, pp. 428-431; from *State Papers Scotland*, Elizabeth vol. xiii. No. 14. Record Office) and the corresponding passages in Letter II. (*Mystery of Mary Stuart*, pp. 396-398). The verbal identities can only be explained in one of the following ways. Either Letter II. is here based on Crawford; or Crawford has copied Letter II. by way of corroborating it (a fatal step, if the case came before a modern English court of justice); or Darnley's memory of his conversation with Mary was so fresh, when he dictated his recollection of it to Crawford on 21st-22nd January 1567, that he reported speeches in almost the very same words as Mary used in writing Letter II. Henderson prefers the hypothesis that Lennox had lost Crawford's notes; and that the identities are explained by the " remarkably good memories of Crawford and Mary, or by the more likely supposition that Crawford, before preparing his declaration for the conference " (at Westminster, December 1568) " refreshed his memory by the letter." (Letter II., *Mary Queen of Scots*, p. 650.)

Mary did not need a particularly good memory; if she wrote, she wrote unchecked her recollections of the day's talk. But no human memory of a conversation reported on the 22nd of January 1567, could be so nearly " word perfect " as Crawford's must have been two years later. If Crawford " refreshed his memory by the letter," he exposed himself, and the entire case, by copying whole passages, often with few verbal changes. If he had access to his original notes of the 21st and 22nd of January 1567, then he was safe—that is, if Darnley's memory of the conversations tallied so exactly with Mary's. Whether that could be, Darnley dictating while still hot from the exciting interchange of words which he meant to report, is a question for psychologists. Experiments made by a person who possesses a good memory seem to show that the thing is very possible, especially if Darnley revised Crawford's notes.

Thus the probabilities are delicately balanced. But if any one compares Crawford's whole declaration with Letter II. in Scots, he will find that Crawford has sources of information not yielded by Letter II.; while Letter II. abounds in matter spoken by Mary and Darnley which could not be borrowed by the hypothetical forger from Crawford's Declaration, for it does not contain the facts. These facts, again, in Letter II., are worthless to a forger, because they concern matters never alluded to in any of the records; never employed in any indictment (though Lennox's are copious in private talk between Darnley and Mary, " reports of her servants "), and totally useless for the purposes of the accusers. Here is one of several examples. Letter II. has, and Crawford has not, the statement that Darnley " showed me, amongst other talk, that he knew well enough that my brother had revealed to me what he (Darnley) had spoken at Stirling. Of this he (Darnley) denies half, and above all that he (the brother?) ever came to his (Darnley's) chamber."

Nothing is known about this matter. The Lennox papers are full of reports of bitter words that passed between Darnley and Mary at Stirling (December 1566), where Darnley was sulking apart while the festivities of the baptism of his son (later James VI.) were being held. But nothing is said in the Lennox papers of words spoken by Darnley to Mary's brother (probably Lord Robert of Holyrood) and revealed by Lord Robert to Mary. Lord Robert was the only friend of Darnley in Mary's entourage; and he even, according to the accusers, warned him of his danger in Kirk o' Field, to which they said that a Casket Letter (III.) referred. The reference is only to be seen by willing eyes.

Is it credible that a forger, using Crawford's Declaration, which is silent as to Mary's brother at Stirling, should have superfluously added what is not to any purpose? Could he have combined

with Crawford's matter the passage " he (Darnley) showed me almost all that is in name of the Bishop and Sutherland, and yet I have never touched a word of what you (Bothwell) showed me . . . and by complaining of the Bishop, I have drawn it all out of him."

Who but Mary herself could have written about this unknown affair of the Bishop, and what had the supposed forger to gain by inventing and adding these references to affairs unconnected with the case?

There remains what looks like absolute proof that, in essence, Crawford's Declaration and Letter II. are independent documents. We are not aware that this crucial point has been noticed by the earlier critics of the Letters. In Letter II. (paragraph 7, p. 398, in Lang's *Mystery of Mary Stuart*, 1901) Mary writes, " I asked why he (Darnley) would pass away in the English ship. He denies it, and swears thereunto; but he grants that he spoke unto the men." Here Crawford's declaration has, " She asked him why he would pass away in the English ship. He answered that he had spoken with the Englishman, but not of mind to go away with him. And, if he had, it had not been without cause, considering how he was used. For he had neither [means] to sustain himself nor his servants, and need not make further rehearsal thereof, seeing she knew it as well as he." (*Mystery of Mary Stuart*, p. 429.)

It may seem to the reader doubtful whether these complaints are words of Darnley's, or an indignant addition by his friend Crawford. But Mary, in Letter II., shows that the complaints and the self-defence are Darnley's own. It was in paragraph 7 that she wrote about the English ship; she did not then give Darnley's remonstrances, as Crawford does. But in paragraph 18 (*Mystery*, p. 406) Mary returns to the subject, and writes, " He (Darnley) spoke very bravely at the beginning, as the bearer will show you, upon the subject of the Englishmen, and of his departing; but in the end he returned to his humility."

Thus it is certain that Darnley had reported to Crawford his brave words and reproaches of Mary, which Crawford gives in the proper place. But Letter II. omits them in that place (paragraph 7); and only on her second day of writing, in paragraph 18, does Mary's mind recur to Darnley's first brave words—" he spoke very bravely at the beginning," about his wrongs, " but in the end he returned again to his humility."

Here is proof positive that Crawford does not copy Letter II., but gives Darnley's words as reported to him by Darnley—words that Darnley was proud of,—while Mary, returning on the second day of writing to the topic, does not quote Darnley's brave words, but merely contrasts his speaking " very bravely at the beginning" with his pitiful and craven later submission; " he has ever the tear in his eye," with what follows. (*Mystery*, paragraph 12, p. 402.)

When we add to these and other proofs the strange lists of memoranda in the middle of the pages of the letter, and the breach in internal chronology which was apparently caused by Mary's writing, on her second day, on the clean verso of a page on the other side of which she had written some lines during her first night in Glasgow; when we add the dramatic changes of her mood, and the heart-breaking evidence of a remorse not stifled by lawless love, we seem compelled to believe that she wrote the whole of Letter II.; that none of it is forged.

In *The Mystery of Mary Stuart* the evidence for an early forged letter was presented with confidence; the interpolation of forgeries based on Crawford's declaration was more dubiously suggested. That position the writer now abandons. It may be asked why, after being with Wood on the 11th of June, did Lennox still rely on Moray's version of Mary's letter? The reply may be that the Scots versions were regarded as a great secret; that Lennox was a married man; and that though Lennox in June knew about Mary's letters, doubtless from Wood, or from common report (Bishop Jewell in a letter of August 1567 mentions that he had heard of them), yet Wood did not show to him the Scots copies. Lennox quotes Letter II. later, in an indictment to be read to the commission sitting at York (October 1568). But, on the other hand, as Lennox after meeting Wood wrote to Crawford for his reminiscences of his own interview with Mary (January 21, 1567), and as these reminiscences were only useful as corroborative of Mary's account in Letter II., it seems that Wood had either shown Lennox the letters or had spoken of their contents. In that case, when Lennox later quotes Moray's version, not Letter II. itself, he is only acting with the self-contradictory stupidity which pervades his whole indictment (Oo. 7. 47. fol. 17 b.).

The letters are not known to have been seen by any man—they or the silver casket—after the death of the earl of Gowrie (who possessed them). In May 1584 Bowes, the English ambassador to Holyrood, had endeavoured to procure them for Elizabeth, " for the secrecy and benefit of the cause." Conceivably the letters fell into the hands of James VI. and were destroyed by his orders. (A. L.)

CASLON, the name of a famous family of English typefounders. William Caslon (1692–1766), the first of the name, was born at Cradley, Worcestershire, and in 1716 started business in London as an engraver of gun locks and barrels, and as a bookbinder's tool-cutter. Being thus brought into contact with printers, he was induced to fit up a type foundry, largely through the encouragement of William Bowyer. The distinction and legibility of his type secured him the patronage of the leading printers of the day in England and on the continent. The use of Caslon types, discontinued about the beginning of the 19th century, was revived about 1845 at the suggestion of Sir Henry Cole, and used for printing the *Diary of Lady Willoughby* (a pseudo-17th-century story) by the Chiswick Press. The headline on this page is " Caslon Old Face." He died on the 23rd of January 1766. His son, William Caslon (1720–1778), who had been partner with his father for some years, continued the business.

CASPARI, KARL PAUL (1814–1892), German Lutheran theologian and orientalist, was born of Jewish parents at Dessau, Anhalt, on the 8th of February 1814. He studied at Leipzig and Berlin, became a Christian in 1838, and in 1857 was appointed professor of theology at Christiania, having declined invitations to Rostock and Erlangen. He died at Christiania on the 11th of April 1892. Caspari is best known as the author of an Arabic grammar (*Grammatica Arabica*, 2 vols., 1844–1848; new edition, *Arabische Grammatik*, edited by A. Müller; 5th ed. 1887). He also wrote commentaries on the prophetical books of the Old Testament, dogmatic and historical works on baptism, and from 1857 helped to edit the *Theologisk Tidskrift for den evangelisk-lutherske Kirke i Norge*. His writings include: *Beiträge zur Einleitung in Jesaja* (1848), and *Alte und neue Quellen zur Geschichte des Taufsymbols und der Glaubensregel* (1879).

CASPIAN SEA (anc. *Mare Caspium* or *Mare Hyrcanium*; Russian, *Kaspiyskoe More*, formerly *Hvalynskoe More*; Persian, *Darya-i-Khyzyr* or *Gurzem*; Tatar, *Ak-denghiz*; the *Sikim* and *Jurjan* of the ancient Eastern geographers), an inland sea between Europe and Asia, extending from 36° 40′ to 47° 20′ N. lat., and from 46° 50′ to 55° 10′ E. long. Its length is 760 m. from N. to S., and its breadth 100 to 280 m., and its area reaches 169,330 sq. m., of which 865 sq. m. belong to its islands. It fills the deepest part of a vast depression, sometimes known as the Aralo-Caspian depression, once an inland sea, the Eurasian Mediterranean or Sarmatian Ocean. At the present time its surface lies 86 ft. below the level of the ocean, or 96·7 ft. according to the Aral-Caspian levelling[1] and 242·7 ft. below the level of the Aral.

Hydrography and Shores.—The hydrography of the Caspian Sea has been studied by von Baer, by N. Ivashintsev (1819–1871) in 1862–1870, by O. Grimm, N. I. Andrusov (1895), and by J. B. Spindler (1897), N. von Seidlitz and N. Knipovich (1904) since the last quoted date. Its basin is divided naturally into three sections—(1) A northern, forming in the east the Gulf of Mortvyi Kultuk or Tsarevich Bay. This is the shallowest part, barely reaching a depth of 20 fathoms. It is being gradually

[1] By the triangulation of 1840 its level was found to be 84 ft. below the level of the Black Sea. The Caucasus triangulation of 1860–1870 gave 89 ft.

silted up by the sedimentary deposits brought down by the rivers Volga, Ural and Terek. The western shore, from the delta of the Volga to the mouth of the Kuma, a distance of 170 m., is gashed by thousands of narrow channels or lagoons, termed *limans*, from 12 to 30 m. in length, and separated in some cases by chains of hillocks, called *bugors*, in others by sandbanks. These channels are filled, sometimes with sea-water, sometimes with overflow water from the Volga and the Kuma. The coast-line of the Gulf of Mortvyi Kultuk on the north-east is, on the other hand, formed by a range of low calcareous hills, constituting the rampart of the Ust-Urt plateau, which intervenes between the Caspian and the Sea of Aral. On the south this gulf is backed by the conjoined peninsulas of Busachi and Manghishlak, into which penetrates the long, narrow, curving bay or fjord of Kaidak or Kara-su. (2) South of the line joining the Bay of Kuma with the Manghishlak peninsula, in 44° 10′ N. lat., the western shore is higher and the water deepens considerably, being over one-half of the area 50 fathoms, while the maximum depth (between 41° and 42° N. lat.) reaches 437 fathoms. This, the middle section of the Caspian, which extends as far as the Apsheron peninsula, receives the Terek and several smaller streams (*e.g.* Sulak, Samur), that drain the northern slopes of the Caucasus. At Derbent, just north of 42° lat., a spur of the Caucasus approaches so close to the sea as to leave room for only a narrow passage, the *Caspiae Pylae* or *Albanae Portae*, which has been fortified for centuries. The eastern shore of this section of the sea is also formed by the Ust-Urt plateau, which rises 550 ft. to 750 ft. above the level of the Caspian; but in 42° N. lat. the Ust-Urt recedes from the Caspian and circles round the Gulf of Kara-boghaz or Kara-bugaz (also called Aji-darya and Kuli-darya). This subsidiary basin is separated from the Caspian by a narrow sandbar, pierced by a strait 1½ m. long and only 115 to 170 yds. wide, through which a current flows continuously into the gulf at the rate of 1½ to 5 m. an hour, the mean velocity at the surface being 3 m. an hour. To this there exists no compensating outflow current at a greater depth, as is usually the case in similar situations. The area of this lateral basin being about 7100 sq. m., and its depth but comparatively slight (3½ to 36 ft.), the evaporation is very appreciable (amounting to 3·2 ft. per annum), and sufficient, according to von Baer, to account for the perpetual inflow from the Caspian. South of the Kara-Boghaz Bay the coast rises again in another peninsula, formed by an extension of the Balkhan Mountains. This marks (40° N. lat.) the southern boundary of the middle section of the Caspian. This basin may be, on the whole, considered as a continuation of the synclinal depression of the Manych, which stretches along the northern foot of the Caucasus from the Sea of Azov. It is separated from (3), the southern and deepest section of the Caspian, by a submarine ridge (30 to 150 fathoms of water), which links the main range of the Caucasus on the west with the Kopet-dagh in the Transcaspian region on the east. This section of the sea washes on the south the base of the Elburz range in Persia, sweeping round from the mouth of the Kura, a little north of the Bay of Kizil-agach, to Astarabad at an average distance of 40 m. from the foot of the mountains. A little east of the Gulf of Enzeli, which resembles the Kara-boghaz, though on a much smaller scale, the Sefid-rud pours into the Caspian the drainage of the western end of the Elburz range, and several smaller streams bring down the precipitation that falls on the northern face of the same range farther to the east. Near its south-east corner the Caspian is entered by the Atrek, which drains the mountain ranges of the Turkoman (N.E.) frontier of Persia. Farther north, on the east coast, opposite to the Bay of Kizil-agach, comes the Balkhan or Krasnovodsk Bay. In the summer of 1894 a subterranean volcano was observed in this basin of the Caspian, in 38° 10′ N. lat. and 52° 37′ E. long. The depth in this section ranges from 300 to 500 fathoms, with a maximum of 602 fathoms.

Drainage Area and Former Extent.—The catchment area from which the Caspian is fed extends to a very much greater distance on the west and north than it does on the south and east. From the former it is entered by the Volga, which is estimated to drain an area of 560,000 sq. m., the Ural 96,000 sq. m., the Terek 59,000 sq. m., the Sulak 7000 sq. m., the Samur 4250 sq. m.; as compared with these, there comes from the south and east the Kura and Aras, draining the south side of the Caucasus over 87,250 sq. m., and the Sefid-rud and the Atrek, both relatively short. Altogether it is estimated (by von Dingelstedt) that the total discharge of all the rivers emptying into the Caspian amounts annually to a volume equal to 174·5 cub. m. Were there no evaporation, this would raise the surface of the sea 5½ ft. annually. In point of fact, however, the entire volume of fresh water poured into the Caspian is only just sufficient to compensate for the loss by evaporation. Indeed in recent times the level appears to have undergone several oscillations. From the researches of Philippov it appears that during the period 1851–1888 the level reached a maximum on three separate occasions, namely in 1868–1869, 1882 and 1885, while in 1853 and 1873 it stood at a minimum; the range of these oscillations did not, however, exceed 3 ft. 6½ in. The Russian expedition which investigated the Kara-boghaz in 1896 concluded that there is no permanent subsidence in the level of the sea. In addition to these periodical fluctuations, there are also seasonal oscillations, the level being lowest in January and highest in the summer.

The level of the Caspian, however, was formerly about the same as the existing level of the Black Sea, although now some 86 ft. below it. This is shown by the evidences of erosion on the face of the rocks which formed the original shore-line of its southern basin, those evidences existing at the height of 65 to 80 ft. above the present level. That a rapid subsidence did take place from the higher level is indicated by the fact that between it and the present level there is an absence of indications of erosive energy. There can be no real doubt that formerly the area of the Caspian was considerably greater than it is at the present time. Nearly one hundred and fifty years ago Pallas had his attention arrested by the existence of the salt lakes and dry saline deposits on the steppes to the east of the Caspian, and at great distances from its shores, and by the presence in the same localities of shells of the same marine fauna as that which now inhabits that sea, and he suggested the obvious explanation that those regions must formerly have been covered by the waters of the sea. And it is indeed the fact that large portions of the vast region comprised between the lower Volga, the Aral-Irtysh water-divide, the Dzungarian Ala-tau, and the outliers of the Tian-shan and Hindu-kush systems are actually covered with Aralo-Caspian deposits, nearly always a yellowish-grey clay, though occasionally they assume the character of a more or less compact sandstone of the same colour. These deposits attain their maximum thickness of 90 ft. east of the Caspian, and have in many parts been excavated and washed away by the rivers (which have frequently changed their beds) or been transported by the winds, which sweep with unmitigated violence across those wide unsheltered expanses. The typical fossils unearthed in these deposits are shells of species now living in both the Caspian and the Aral, though in the shallow parts of both seas only, namely (according to Ivan V. Mushketov [1850–1902]) *Cardium edule*, *Dreissena polymorpha*, *Neritina liturata*, *Adacna vitrea*, *Hydrobia stagnalis*, in the Kara-kum desert, and *Lithoglyphus caspius*, *Hydrobia stagnalis*, *Anodonta ponderosa* and the sponge *Metchnikovia tuberculata*, in the Kizil-kum desert. The exact limits of the ancient Aralo-Caspian sea are not yet settled, except in the north-west, where the Ergeni Hills of Astrakhan constitute an unmistakable barrier. Northwards these marine deposits are known to exist 80 m. away from Lake Aral, though they do not cross the Aral-Irtysh water-divide, so that this sea will not probably have been at that time connected with the Arctic, as some have supposed. The eastern limits of these deposits lie about 100 m. from Lake Aral, though Severtsov maintained that they penetrate into the basin of Lake Balkash. Southwards they have been observed without a break for 160 m. from Lake Aral, namely in the Sary-kamysh depression (the surface of which lies below the level of the Caspian) and up

the Uzboi trench for 100 m. from the latter sea. How far they reach up the present courses of the Oxus (Amu-darya) and Jaxartes (Syr-darya) is not known. Hence, it is plain that in late Tertiary, and probably also in Post-Tertiary, times the Aralo-Caspian Sea covered a vast expanse of territory and embraced very large islands (*e.g.* Ust-Urt), which divided it into an eastern and a western portion, communicating by one or two narrow straits only, such as on the south the Sary-kamysh depression, and on the norththe line of the lakes of Chumyshty and Asmantai. More than this, the Caspian was also, it is pretty certain, at the same epoch, and later, in direct communication with the Sea of Azov, no doubt by way of the Manych depression; for in the *limans* or lagoons of the Black Sea many faunal species exist which are not only identical with species that are found in the Caspian, but also many which, though not exactly identical, are closely allied. As examples of the former may be named—*Archaeobdella*, *Clessinia variabilis*, *Neritina liturata*, *Gmelina*, *Gammarus moeoticus*, *Pseudocuma pectinata*, *Paramysis Baeri*, *Mesomysis Kowalevskyi* and *M. intermedia*, *Limnomysis Benedeni* and *L. Brandti*, and species of the ichthyological fauna *Gobius*, *Clupea* and *Acipenser*; while as illustrating the latter class the Black Sea contains *Dreissenia bugensis* (allied to *D. rostriformis* and *D. Grimmi*), *Cardium ponticum* (to *C. caspium*), *C. coloratum* (to *Monodacna edentula*), *Amphicteis antiqua* (to *A. Kowalevskyi*) and *Bythotrephes azovicus* (to *B. socialis*).

In the opinion of Russian geologists the separation of the Caspian from the great ocean must have taken place at a comparatively recent geological epoch. During the early Tertiary age it belonged to the Sarmatian Ocean, which reached from the middle Danube eastwards through Rumania, South Russia, and along both flanks of the Caucasus to the Aralo-Caspian region, and westwards had open communication with the great ocean, as indeed the ancient geographers Eratosthenes, Strabo and Pliny believed it still had in their day. This communication began to fail, or close up presumably in the Miocene period; and before the dawn of Pliocene times the Sarmatian Ocean was broken up or divided into sections, one of which was the Aralo-Caspian sea already discussed. During the subsequent Ice Age the Caspian flowed over the steppes that stretch away to the north, and was probably still connected with the Black Sea (itself as yet unconnected with the Mediterranean), while northwards it sent a narrow gulf or inlet far up the Volga valley, for Aralo-Caspian deposits have been observed along the lower Kama in 56° N. lat. Eastwards it penetrated up the Uzboi depression between the Great and Little Balkhan ranges, so that that depression, which is strewn (as mentioned above) with Post-Tertiary marine deposits, was not (as is sometimes supposed) an old bed of the Oxus, but a gulf of the Caspian. After the great ice cap had thawed and a period of general desiccation set in, the Caspian began to shrink in area, and simultaneously its connexions with the Black Sea and the Sea of Aral were severed.

Fauna.—The fauna of this sea has been studied by Eichwald, Kowalevsky, Grimm, Dybowski, Kessler and Sars. At the present time it represents an intermingling of marine and fresh-water forms. To the former belongs the herring (*Clupea*), and to the latter, species of *Cyprinus*, *Perca* and *Silurus*, also a lobster. Other marine forms are Rhizopoda (*Rotalia* and *Textillaria*), the sponge *Amorphina*, the *Amphicteis* worm, the molluscs *Cardium edule* and other *Cardidae*, and some Amphipods (*Cumacea* and *Mysidae*,), but they are forms which either tolerate variations in salinity or are especially characteristic of brackish waters. But there are many species inhabiting the waters of the Caspian which are not found elsewhere. These include Protozoa, three sponges, Vermes, twenty-five Molluscs, numerous Amphipods, fishes of the genera *Gobius*, *Benthophilus* and *Cobitis*, and one mammal (*Phoca caspia*). This last, together with some of the *Mysidae* and the species *Glyptonotus entomon*, exhibits Arctic characteristics, which has suggested the idea of a geologically recent connexion between the Caspian and the Arctic, an idea of which no real proofs have been as yet discovered. The Knipovich expedition in 1904 found no traces of organic life below the depth of 220 fathoms except micro-organisms and a single Oligochaete; but above that level there exist abundant evidences of rich pelagic life, more particularly from the surface down to a depth of 80 fathoms.

Fisheries.—No other inland sea is so richly stocked with fish as the Caspian, especially off the mouths of the large rivers, the Volga, Ural, Terek and Kura. The fish of greatest economic value are sturgeon (four species), which yield great quantities of caviare and isinglass, the herring, the salmon and the lobster. The annual catch of the entire sea is valued at an average of one million sterling. Some 50,000 persons are engaged in this industry off the mouth of the Volga alone. Seals are hunted in Krasnovodsk Bay.

Salinity.—The proportion of salt in the water of the Caspian, though varying in different parts and at different seasons, is generally much less than the proportion in oceanic water, and even less than the proportion in the water of the Black Sea. In fact the salinity of the Caspian is only three-eights of that of the ocean. In the northern section, which receives the copious volumes brought down by the Volga, Ural and Terek, the salinity is so slight (only 0·0075% in the surface layers) that the water is quite drinkable, its specific gravity being not higher than 1·0016. In the middle section the salinity of the surface layers increases to 0·015%, though it is of course greater along the shores. The concentration of the saline ingredients proceeds with the greatest degree of intensity in the large bays on the east side of the sea, and more especially in that of Kara-boghaz, where it reaches 16·3% (Spindler expedition). The bottom of this almost isolated basin is covered for an area of 1300 sq. m. with a deposit of Epsom salts (sulphate of magnesia), 7 ft. thick, amounting to an estimated total of 1,000,000,000 tons. While the proportion of common salt to sulphate of magnesia is as 11 to 1 in the water of the Black Sea and as 2 to 1 in the Caspian water generally, it is as 12·8 to 5·03 in the Kara-boghaz. The salinity of the surface water of the southern section of the Caspian averages 1·5%.

Climate.—The temperature of the air over the Caspian basin is remarkable for its wide range both geographically and seasonally. The January isotherm of 15° F. skirts its northern shore; that of 40° crosses its southern border. But the winter extremes go far below this range: during the prevalence of north-east winds the thermometer drops to -20°, or even lower, on the surrounding steppes, while on the Ust-Urt plateau a temperature of -30° is not uncommon. Again, the July isotherm of 75° crosses the middle section of the Caspian, nearly coinciding with the January isotherm of 25°, while that of 80° skirts the southern shore of the sea, nearly coinciding with the January curve of 40°, so that the mean annual range over the northern section of the sea is 60° and over the southern section 40°. The former section, which is too shallow to store up any large amount of heat during the summer, freezes for three or four months along the shores, effectually stopping navigation on the lower Volga, but out in the middle ice appears only when driven there by northerly winds.

The prevalent winds of the Caspian blow from the south-east, usually between October and March, and from the north and north-west, commonly between July and September. They sometimes continue for days together with great violence, rendering navigation dangerous and driving the sea-water up over the shores. They also, by heaping up the water at the one end of the sea or the other, raise the level temporarily and locally to the extent of 4 to 8 ft. The currents of the Caspian were investigated by the Knipovich expedition; it detected two of special prominence, a south-going current along the west shore and a north-going current along the east shore. As a consequence of this the temperature of the water is higher on the Asiatic than on the European side. The lowest temperature obtained was 35°·24 on the bottom in shallow water, the highest 70°·7 on the surface. But in March the temperature, as also the salinity, was tolerably uniform throughout all the layers of water. Another interesting fact ascertained by the same expedition is that the amount of oxygen contained in the water decreases rapidly with the depth: off Derbent in the middle section of the sea the amount diminished from 5·6 cc. per litre at a depth of 100 metres

(330 ft.) to 0·32 cc. per litre at a depth of 700 metres (say 2300 ft.). At the same spot samples of water drawn from the bottom were found to contain 0·3 cc. of sulphuretted hydrogen per litre. In the southern section of the sea the decrease is not so rapid. In this latter section Spindler ascertained in July 1897 that the temperature of the surface water 60 m. from Baku was 72·9°, but that below 10 fathoms it sank rapidly, and at 200 fathoms and below it was constant at 21·2°.

Navigation.—The development of the petroleum industry in the Apeshron peninsula (Baku) and the opening (1886) of the Transcaspian railway have greatly increased the traffic across the Caspian Sea. A considerable quantity of raw cotton is brought from Ferghana by the latter route and shipped at Krasnovodsk for the mills in the south and centre of Russia, as well as for countries farther west. And Russia draws her own supplies of petroleum, both for lighting and for use as liquid fuel, by the sea route from Baku. Other ports in addition to those just mentioned are Astrakhan, on the Volga; Petrovsk, Derbent and Lenkoran, on the west shore; Enzeli or Resht, and Astarabad, on the Persian coast; and Mikhailovsk, on the east coast. The Russians keep a small naval flotilla on the Caspian, all other nations being debarred from doing so by the treaty of Turkmanchai (1828).

At various times and by various persons, but more particularly by Peter the Great, the project has been mooted of cutting a canal between the Volga and the Don, and so establishing unrestricted water communication between the Caspian and the Black Sea; but so far none of these schemes has taken practical shape. In 1900 the Hydrotechnical Congress of Russia discussed the plan of constructing a canal to connect the Caspian more directly with the Black Sea by cutting an artificial waterway about 22 ft. deep and 180 ft. wide from Astrakhan to Taganrog on the Sea of Azov.

See works quoted under ARAL; also von Baer, "Kaspische Studien," in *Bull. Sci. St-Pétersbourg* (1855–1859), and in Erman's *Archiv russ.* (1855–1856); Radde, *Fauna und Flora des südwestlichen Kaspigebietes* (1886); J. V. Mushketov, *Turkestan* (St Petersburg, 1886), with bibliographical references; Ivashintsev, *Hydrographic Exploration of the Caspian Sea* (in Russian), with atlas (2 vols., 1866); Philippov, *Marine Geography of the Caspian Basin* (in Russian, 1877); *Memoirs of the Aral-Caspian Expedition of* 1876–1877 (2 vols., in Russian), edited by the St Petersburg Society of Naturalists; Andrusov, "A Sketch of the Development of the Caspian Sea and its Inhabitants," in *Zapiski of Russ. Geog. Soc.: General Geog.* vol. xxiv.; Eichwald, *Fauna Caspio-Caucasica* (1841); Seidlitz, "Das Karabugas Meerbusen," in *Globus*, with map, vol. lxxvi. (1899); Knipovich, "Hydrobiologische Untersuchungen des Kaspischen Meeres," in *Petermanns Mitteilungen*, vol. l. (1904); and Spindler, in *Izvestia of Russ. Geog. Soc.* vol. xxxiv.

(P. A. K.; J. T. BE.)

CASS, LEWIS (1782–1866), American general and statesman, was born at Exeter, New Hampshire, on the 9th of October 1782. He was educated at Phillips Exeter Academy, joined his father at Marietta, Ohio, about 1799, studied law there in the office of Return Jonathan Meigs (1765–1825), and was admitted to the bar at the age of twenty. Four years later he became a member of the Ohio legislature. During the War of 1812 he served under General William Hull, whose surrender at Detroit he strongly condemned, and under General W. H. Harrison, and rose from the rank of colonel of volunteers to be major-general of Ohio militia and finally to be a brigadier-general in the regular United States army. In 1813 he was appointed governor of the territory of Michigan, the area of which was much larger than that of the present state. This position gave him the chief control of Indian affairs for the territory, which was then occupied almost entirely by natives, there being only 6000 white settlers. During the eighteen years in which he held this post he rendered valuable services to the territory and to the nation; he extinguished the Indian title to large tracts of land, instituted surveys, constructed roads, and explored the lakes and sources of the Mississippi river. His relations with the British authorities in Canada after the War of 1812 were at times very trying, as these officials persisted in searching American vessels on the Great Lakes and in arousing the hostility of the Indians of the territory against the American government. To those experiences was largely due the antipathy for Great Britain manifested by him in his later career. Upon the reorganization of President Jackson's cabinet in 1831 he became secretary of war, and held this office until 1836. It fell to him, therefore, to direct the conduct of the Black Hawk and Seminole wars. He sided with the president in his nullification controversy with South Carolina and in his removal of the Indians from Georgia, but not in his withdrawal of the government deposits from the United States Bank.

In 1836 General Cass was appointed minister to France, and became very popular with the French government and people. In 1842, when the Quintuple Treaty was negotiated by representatives of England, France, Prussia, Russia and Austria for the suppression of the slave trade by the exercise of the right of search, Cass attacked it in a pamphlet entitled "An Examination of the Questions now in Discussion between the American and British Government Concerning the Right of Search," and presented to the French government a formal memorial which was probably instrumental in preventing the ratification of the treaty by France. In this same year the Webster-Ashburton treaty between Great Britain and the United States was concluded, and, as England did not thereby relinquish her claim of the right to search American vessels, Cass, after having taken such a decided stand in this controversy, felt himself in an awkward position, and resigned his post. His attitude on this question made him very popular in America, and he was a strong, but unsuccessful, candidate for the Democratic nomination for the presidency in 1844. From 1845 to 1848 and from 1849 to 1857 he was a member of the United States Senate, and in 1846 was a leader of those demanding the "re-annexation" of all the Oregon country south of 54° 40′ or war with England, and was one of the fourteen who voted against the ratification of the compromise with England at the 49th parallel. He loyally supported Polk's administration during the Mexican War, opposed the Wilmot Proviso, and advocated the Compromise Measures of 1850 and the Kansas-Nebraska Bill of 1854. In his famous "Nicholson letter" of December 1847 he made what was probably the earliest enunciation of the doctrine of "popular sovereignty," namely, that the people of the territories should decide for themselves whether or not they should have slavery.

In 1848 he received the Demo ratic nomination for the presidency, but owing to the defection of the so-called "Barnburners" (see FREE-SOIL PARTY) he did not receive the united support of his party, and was defeated by the Whig candidate, Zachary Taylor. His name was again prominent before the Democratic convention of 1852, which, however, finally nominated Franklin Pierce. On account of his eminently conservative attitude on all questions concerning slavery, General Cass has been accused of pandering to the southern Democrats in order to further his political aspirations. His ideas of popular sovereignty, however, were not inconsistent with the vigorous Democratic spirit of the west, of which he was a typical representative, and it is not clear that he believed that the application of this principle would result in the extension of slavery. As the west became more radically opposed to slavery after the troubles in Kansas, Cass was soon out of sympathy with his section, and when the Republicans secured control of the legislature in 1857 they refused to return him to the Senate. President Buchanan soon afterward made him secretary of state, and in this position he at last had the satisfaction of obtaining from the British government an acknowledgment of the correctness of the American attitude with regard to the right of search (or "visitation," as Great Britain euphemistically termed it). In December 1860 he retired from the cabinet when the president refused to take a firmer attitude against secession by reinforcing Fort Sumter, and he remained in retirement until his death at Detroit, Michigan, on the 17th of June 1866. He wrote for the *North American* and the *American Quarterly* Reviews, and published *Inquiries Concerning the History, Traditions and Languages of Indians Living Within the United States* (1823), and *France: Its King, Court and Government* (1840).

See W. T. Young, *Life and Public Services of General Lewis Cass* (Detroit, 1852); W. L. G. Smith, *Life and Times of Lewis Cass*

(New York, 1856). The best biography is by A. G. McLaughlin, *Lewis Cass* (revised edition, Boston, 1899), in the "American Statesmen" series.

CASSABA, a town of Asia Minor, in the sanjak of Manisa, 63 m. E. of Smyrna, with which it is connected by rail. Pop. estimated at 23,000, of which two-thirds are Mussulman; but the estimate is probably excessive. It has considerable local trade, and exports the products of the surrounding district. Cotton is the most important article, and there are ginning factories in the town; the silkworm is largely raised and exported; and the "melons of Cassaba" are sent not only to Smyrna but to Constantinople. There are fragments of marbles built into the houses, but the modern town does not seem to occupy any ancient site of importance.

CASSAGNAC, BERNARD ADOLPHE GRANIER DE (1806–1880), French journalist, was born at Avéron-Bergelle in the department of Gers on the 11th of August 1806. In 1832 he began his career as a Parisian journalist, contributing ardent defences of Romanticism and Conservatism to the *Revue de Paris*, the *Journal des Débats*, and to *La Presse*. Then he founded a political journal, *L'Époque* (1845–1848), in which his violent polemics in support of Guizot brought him notoriety and not a few duels. In 1851, in the *Constitutionnel*, he declared himself openly an imperialist; and in 1852 was elected as "official candidate" by the department of Gers. As journalist and deputy he actively supported an absolutist policy. He demanded the restoration of religion, opposed the laws in favour of the press, and was a member of the club of the rue de l'Arcade. In March 1868 he accused the Liberal deputies of having received money from the king of Prussia for opposing the emperor, and when called upon for proof, submitted only false or trivial documents. After the proclamation of the republic (4th of September 1870) he fled to Belgium. He returned to France for the elections of 1876, and was elected deputy. He continued to combat all the republican reforms, but with no advantage to his party. He died on the 31st of January 1880. In addition to his journalistic articles he published various historical works, now unimportant.

His son, PAUL ADOLPHE MARIE PROSPER GRANIER DE CASSAGNAC (1843–1904), while still young was associated with his father in both politics and journalism. In 1866 he became editor of the Conservative paper *Le Pays*, and figured in a long series of political duels. On the declaration of war in 1870 he volunteered for service and was taken prisoner at Sédan. On his return from prison in a fortress in Silesia he continued to defend the Bonapartist cause in *Le Pays*, against both Republicans and Royalists. Elected deputy for the department of Gers in 1876, he adopted in the chamber a policy of obstruction "to discredit the republican régime." In 1877 he openly encouraged MacMahon to attempt a Bonapartist *coup d'état*, but the marshal's refusal and the death of the prince imperial foiled his hopes. He now played but a secondary rôle in the chamber, and occupied himself mostly with the direction of the journal *L'Autorité*, which he had founded. He was not re-elected in 1902, and died in November 1904. His sons took over *L'Autorité* and the belligerent traditions of the family.

CASSANA, NICCOLÒ (1659–1714), often called NICOLETTO, Italian painter, was born at Venice, and became a disciple of his father, Giovanni Francesco Cassana, a Genoese, who had been taught the art of painting by Bernardino Strozzi ("il Prete Genovese"). Having painted portraits of the Florentine court, and also of some of the English nobility, Nicoletto was invited to England, and introduced to Queen Anne, who sat to him for her likeness, and conferred on him many marks of favour. He died in London in 1714, having given way to drinking in his later years. Cassana was a man of the most vehement temper, and would wallow on the ground if provoked with his work. One of his principal paintings is the "Conspiracy of Catiline," now in Florence.

CASSANDER (*c.* 350–297 B.C.), king of Macedonia, eldest son of Antipater, first appears at the court of Alexander at Babylon, where he defended his father against the accusations of his enemies. Having been passed over by his father in favour of Polyperchon as his successor in the regency of Macedonia, Cassander allied himself with Ptolemy Soter and Antigonus, and declared war against the regent. Most of the Greek states went over to him, and Athens also surrendered. He further effected an alliance with Eurydice, the ambitious wife of King Philip Arrhidaeus of Macedon. Both she and her husband, however, together with Cassander's brother, Nicanor, were soon after slain by Olympias. Cassander at once marched against Olympias, and, having forced her to surrender in Pydna, put her to death (316). In 310 or 309 he also murdered Roxana and Alexander, the wife and son of Alexander the Great, whose natural son Heracles he bribed Polyperchon to poison. He had already connected himself with the royal family by marriage with Thessalonica, Alexander the Great's half-sister, and, having formed an alliance with Seleucus, Ptolemy and Lysimachus, against Antigonus, he became, on the defeat and death of Antigonus in 301, undisputed sovereign of Macedonia. He died of dropsy in 297. Cassander was a man of literary taste, but violent and ambitious. He restored Thebes after its destruction by Alexander the Great, transformed Therma into Thessalonica, and built the new city of Cassandreia upon the ruins of Potidaea.

See Diod. Sic. xviii., xix., xx.; Plutarch, *Demetrius*, 18. 31, *Phocion*, 31; also MACEDONIAN EMPIRE.

CASSANDER (or CASSANT), **GEORGE** (1513–1566), Flemish theologian, born at Pitthem near Bruges, went at an early age to Louvain and was teaching theology and literature in 1541 at Bruges and shortly afterwards at Ghent. About 1549 he removed to Cologne, where, after a profound study of the points of difference between the Catholic and reformed churches, he devoted himself to the project of reunion, thus anticipating the efforts of Leibnitz. In 1561 he published anonymously *De Officiis pii ac publicae tranquillitatis vere amantis viri in hoc dissidio religionis* (Basel), in which, while holding that no one, on account of abuses, has a right utterly to subvert the Church, he does not disguise his dislike of those who exaggerated the papal claims. He takes his standpoint on Scripture explained by tradition and the fathers of the first six centuries. At a time when controversy drowned the voice of reason, such a book pleased neither party; but as some of the German princes thought that he could heal the breach, the emperor Ferdinand asked him to publish his *Consultatio de Articulis Fidei inter Catholicos et Protestantes Controversis* (1565), in which, like Newman at a later date, he tried to put a Catholic interpretation upon Protestant formularies. While never attacking dogma, and even favouring the Roman church on the ground of authority, he criticizes the papal power and makes reflections on practices. The work, attacked violently by the Louvain theologians on one side, and by Calvin and Beza on the other, was put on the Roman Index in 1617. He died at Cologne on the 3rd of February 1566. The collected edition of his works was published in 1616 at Paris. (E. TN.)

CASSANDRA, in Greek legend, daughter of Priam and Hecuba. She was beloved of Apollo, who promised to bestow on her the spirit of prophecy if she would comply with his desires. Cassandra accepted the proposal; but no sooner had she obtained the gift than she laughed at the tempter, and refused to fulfil her promise. Apollo revenged himself by ordaining that her predictions should be discredited (Apollodorus iii. 12. 5); and hence it was in vain that on the arrival of Helen she prophesied the ruin of Troy. On the capture of that city she was ravished by Ajax, the son of Oïleus, in the temple of Minerva (Strabo vi. p. 264). In the distribution of the booty, Cassandra fell to the lot of Agamemnon; but again her foresight was useless, for he would not believe her prediction that he should perish in his own country. The prophecy was fulfilled, for both were slain through the intrigues of Clytaemnestra (*Odyssey*, xi. 421 ff.). It is to be noticed that there is no mention in Homer of her prophetic gifts. Together with Apollo, she was worshipped under the name of Alexandra.

CASSANO ALL' IONIO, a town of Calabria, Italy, in the province of Cosenza; its railway station (6 m. S. of the town) is 37 m. N. by E. from the town of Cosenza, while it is 6 m. W. of Sibari, on the line between Metaponto and Reggio. Pop. 6842. It is very finely situated, 820 ft. above sea-level: the rock above it is crowned by a medieval castle commanding beautiful views: a tower is still pointed out as that from which the stone was thrown which killed Milo, but this rests on an erroneous identification of Cassano with the ancient Compsa (*q.v.*). There are warm sulphurous springs here which are used for baths.

CASSAVA, the name given to the farinaceous root of two species of Euphorbiaceous plants, the bitter cassava, *Manihot utilissima*, and the sweet cassava, *M. Aipi*, both highly important sources of food starches; Manihot is given as the native Brazilian name in Spanish writings of the 16th century. They are herbaceous or semi-shrubby perennials with very large fleshy, cylindrical, tapering roots as much as 3 ft. long and 6 to 9 in. in diameter, and filled with milky juice. The slender stems,

Cassava or Manioc (*Manihot utilissima*), less than half nat. size.

1, An inflorescence showing at *a* a fruit which will presently separate into five one-seeded parts, about ⅓ nat. size.
2, Pistil of female flower.
3, Stamens and fleshy disc of male flower.
4, Seed with its appendage (strophiole or caruncle).

5 to 9 ft. high, bear large spreading long-stalked leaves, with the blade divided nearly to the base into three to seven long narrow segments. The plants are probably natives of South America, but the bitter cassava, which is the more important of the two in an economic sense, has been introduced into most tropical regions, and is extensively cultivated in west tropical Africa and the Malay Archipelago, from which, as well as from Brazil and other South American states, its starch in the form of tapioca is a staple article of export. The sap of the bitter cassava root contains hydrocyanic acid, and the root, being therefore highly poisonous, cannot be eaten in a fresh condition; while on the other hand the sweet cassava is perfectly innocuous, and is employed as a table vegetable. Exposure to heat dissipates the poisonous principle, and the concentrated juice is in that state used as the basis of cassareep and other sauces. From the bitter cassava roots many different food preparations are made in Brazil. The roots are preserved for use by being simply cleaned, sliced and dried; from such dried slices manioc or cassava meal, used for cassava cakes, &c., is prepared by rasping. The starch also is separated and used for food under the name of Brazilian arrowroot; and this, when agglomerated into pellets on hot plates, forms the tapioca (*q.v.*) of commerce. Cassava starch has a stellate hilum, which readily distinguishes it under the microscope from other starches.

CASSEL, a town of northern France in the department of Nord, 34 m. N.W. of Lille by rail. Pop. (1906) 1844. It stands on an isolated hill (515 ft.) from which portions of France, Belgium and England can be seen, with 32 towns and 100 villages, including St Omer, Dunkirk, Ypres and Ostend. The former hôtel de ville (1634), the hôtel de la Noble Cour, once the seat of the jurisdiction of maritime Flanders, now the town-hall, and the hôtel des ducs d'Halluin are the historic buildings of the town. Cassel has a communal college. Its industrial establishments include tanneries, oil-mills, salt refineries and breweries, and there is trade in cattle and butter.

The town, supposed to occupy the site of *Castellum Menapiorum*, was a Roman station, as numerous remains of the Gallo-Roman period attest, and an important centre of roads. It is frequently mentioned in the wars of the middle ages, and was the scene of important battles in 1071, when Robert, count of Flanders, vanquished his rival Arnulf; 1328, when Philip of Valois defeated the Flemish; and 1677, when William of Orange was defeated by Philip, duke of Orleans, brother of Louis XIV. General D. R. Vandamme (1770–1830) was born in the town.

CASSEL, or KASSEL, a city of Germany, capital of the former electorate of Hesse-Cassel, and, since its annexation by Prussia in 1866, capital of the province of Hesse-Nassau. Pop. (1885) 64,083; (1905) 120,446. It is pleasantly situated, in a hilly and well-wooded country, on both sides of the river Fulda, over which a stone bridge leads to the lower new town, 124 m. by rail N.N.E. from Frankfort-on-Main. The river is navigable for barges, and railways connect the town with all parts of Germany. The streets of the old town are narrow and crooked, and contain many picturesque gabled houses, generally of the 17th century, but those of the upper and lower new town, and the three suburbs, are not surpassed by any in Germany. The principal streets are the Königs-strasse (5100 ft. long and 60 broad), the Schöne Aussicht, and the Stände-platz (180 ft. broad with four rows of linden trees). The large Friedrichs-platz is 1000 by 450 ft. in area. In it stands a marble statue of the landgrave Frederick II. There is a fine view from the open side. The former residence of the electors (*Residenzschloss*) fronts this square, as well as the Museum Fridericianum, with a *façade* of Roman-Ionic columns. The museum contains various valuable collections of curiosities, interesting mosaics, coins, casts, a library of 230,000 volumes, and valuable manuscripts. In the cabinet of curiosities there is a complete collection of clocks and watches from the earliest to the present time. Among these is the so-called Egg of Nuremberg, a watch made about 1500 by Peter Henlein. Among other public places and buildings worthy of notice are the Roman Catholic church, with a splendid interior; the Königs-platz, with a remarkable echo; the Karls-platz, with the statue of the landgrave Charles; and the Martins-platz, with a large church—St Martin's—with twin towers, containing the burial-vaults of the Hessian princes. The gallery of paintings, housed in a handsome building erected in 1880 on the Schöne Aussicht, contains one of the finest small collections in Europe, especially rich in the works of Rembrandt, Frans Hals and Van Dyck.

The town contains numerous educational institutions, including a technical college, a school of painting, a celebrated classical school, which the emperor William II. attended, and a military academy. The descendants of the French refugees who founded the upper new town have a church and hospital of their own. There are three Roman Catholic churches, an English church, and two synagogues. Music is much cultivated, and there is an opera with a first-rate orchestra, of which Ludwig Spohr was at one time conductor. The opera-house or theatre was built

by Jerome Napoleon, but in 1906 money was voted for a new building on the Auetor. A new Rathaus (town-hall) has been erected. There are also the Bose Museum, containing collections of pictures and antiquities of Hessian origin, museums of natural history and ethnography, an industrial exhibition hall, and an industrial art school. A handsome Gothic Lutheran church was erected in 1892–1897, a post office (Renaissance) in 1881, and new administrative offices and law courts in 1876–1880. The municipal (or Murhard) library, in the Hanau park, contains 118,000 volumes. The most noticeable of the modern public monuments are those to the emperor William I. (1898), to the musician Spohr (1883), and the Löwenbrunnen (1881). In the Karlsaue, a favourite public promenade lying just below the Schöne Aussicht, are the Orangerie and the marble baths. Cassel is the headquarters of the XI. German army corps, and has a large garrison. It is a favourite residence for foreigners and retired officers and government officials. The industries embrace engine-building, the manufacture of railway carriages and plant, scientific instruments, porcelain, tobacco and cigars, lithography, jute-spinning, iron-founding, brewing and gardening.

On a slope of the Habichtswald Mountains, 3 m. W. of Cassel, and approached by an avenue, is the summer palace of Wilhelmshöhe, erected in 1787–1794. Napoleon III. resided here, as a prisoner of war, after the battle of Sedan. The surrounding gardens are adorned with fountains, cascades, lakes and grottos, the principal fountain sending up a jet of water 180 ft. high and 12 ft. in diameter. Here also is an interesting building called the Löwenburg, erected in 1793–1796 in the style of a fortified castle, and containing among other things portraits of Tudors and Stuarts. The principal curiosity is the Karlsburg cascade, which is placed in a broad ravine, thickly wooded on both sides. A staircase of 900 steps leads to the top. On one of the landings is a huge rudely-carved stone figure of the giant Enceladus, and at the top is an octagon building called the Riesenschloss, surmounted by a colossal copper figure of the Farnese Hercules, 31 ft. high, whose club alone is sufficiently capacious to accommodate from eight to ten persons. In different parts of the park, and especially from the Octagon, charming views are obtained. The park was first formed by the landgrave Frederick II., the husband of Mary, daughter of George II. of England, and was finished by his successor the landgrave William, after whom it was named.

The earliest mention of Cassel is in 913, when it is referred to as Cassala. The town passed from the landgraves of Thuringia to the landgraves of Hesse in the 13th century, becoming one of the principal residences of the latter house in the 15th century. The burghers accepted the reformed doctrines in 1527. The fortifications of the town were restored by the landgrave Philip the Magnanimous and his son William IV. during the 16th century, and it was greatly improved by the landgrave Charles (1654–1730), who welcomed many Huguenots who founded the upper new town. In 1762 Cassel was captured by the Germans from the French; after this the fortifications were dismantled and New Cassel was laid out by the landgrave Frederick II. In 1807 it became the capital of the kingdom of Westphalia; in 1813 it was bombarded and captured by the Russian general Chernichev; in 1830, 1831 and 1848 it was the scene of violent commotions; from 1850 to 1851 it was occupied by the Prussians, the Bavarians and the Austrians; in 1866 it was occupied by the Prussians, and in 1867 was made the capital of the newly formed Prussian province of Hesse-Nassau.

See Piderit, *Geschichte der Haupt- und Residenzstadt Kassel* (Kassel, 1882); Fr. Müller, *Kassel seit 70 Jahren* (2 vols., 2nd ed., Kassel, 1893); and Hessler, *Die Residenzstadt Kassel und ihre Umgebung* (Kassel, 1902),

CASSELL, JOHN (1817–1865), British publisher, was born in Manchester on the 23rd of January 1817. His father was the landlord of a public-house, and John was apprenticed to a joiner. He was self-educated, gaining by his own efforts a considerable acquaintance with English literature and a knowledge of French. He came to London in 1836 to work at his trade, but his energies at this time were chiefly centred in the cause of temperance, for which he was an active worker. In 1847 he established himself as a tea and coffee merchant, and soon after started a publishing business with the aim of supplying good literature to the working classes. From the offices of the firm, which became in 1859 Messrs. Cassell, Petter, Galpin & Co., were issued the *Popular Educator* (1852–1855), the *Technical Educator* (1870–1872), the *Magazine of Art* (1878–1903), *Cassell's Magazine* (from 1852), and numerous editions of standard works. A special feature of Cassell's popular books was the illustration. At the time of the Crimean War he procured from Paris the cuts used in *L'Illustration*, and by printing them in his *Family Paper* (begun in 1853) secured a large circulation for it. The firm was converted in 1883 into a limited liability company, under the name of Cassell & Company, Limited. John Cassell died in London on the 2nd of April 1865.

CASSIA (Lat. *cassia*, Gr. *κασία*), the aromatic bark derived from *Cinnamomum cassia*. The greater part of the supply coming from China, it is sometimes termed Chinese cinnamon. The bark is much thicker than that of true cinnamon; the taste is more pungent and the flavour less delicate, though somewhat similar to that of cinnamon. The properties of cassia bark depend on the presence of a volatile oil—the oil of cassia, which is imported in a fairly pure state as an article of commerce from Canton. Cassia bark is in much more extensive demand on the continent of Europe than in Great Britain, being preferred to cinnamon by southern nations. The chief use of both the oil and bark is for flavouring liqueurs and chocolate, and in cooking generally. When ground as a spice it is difficult to distinguish cassia from cinnamon (*q.v.*), and it is a common practice to substitute the cheap common spice for the more valuable article. *Cassia Buds*, which have a pleasing cinnamon flavour, are believed to be the immature fruits of the tree which yields Chinese cinnamon. They are brought in considerable quantities from Canton, and used as a spice and in confectionery. *Cassia pulp*, used as a laxative, is obtained from the pods of *Cassia fistula*, or pudding pipe tree, a native of Africa which is cultivated in both the East and West Indies. Some confusion occasionally arises from the fact that *Cassia* is the generic name of an extensive genus of leguminous plants, which, in addition to various other medicinal products, is the source of the senna leaves which form an important article of materia medica.

CASSIA, VIA, an ancient high-road of Italy, leading from Rome through Etruria to Florentia (Florence); at the 11th mile the Via Clodia (see CLODIA, VIA) diverged north-north-west, while the Via Cassia ran to the east of the Lacus Sabatinus and then through the place now called Sette Vene, where a road, probably the Via Annia, branched off to Falerii, through Sutrium (where the Via Ciminia, running along the east edge of the Lacus Ciminius, diverged from it, to rejoin it at Aquae Passeris, north of the modern Viterbo[1]), Forum Cassii, Volsinii, Clusium and Arretium, its line being closely followed by the modern high-road from Rome to Florence. The date of its construction is uncertain: it cannot have been earlier than 187 B.C.,[2] when the consul C. Flaminius constructed a road from Bononia to Arretium (which must have coincided with the portion of the later Via Cassia). It is not, it is true, mentioned by any ancient authorities before the time of Cicero, who in 45 B.C. speaks of the existence of three roads from Rome to Mutina, the Flaminia, the Aurelia and the Cassia. A milestone of A.D. 124 mentions repairs to the road made by Hadrian from the boundary of the territory of Clusium to Florence, a distance of 86 m.

See Ch. Hülsen in Pauly-Wissowa, *Realencyclopädie*, iii. 1669.
(T. As.)

CASSIANUS, JOANNES EREMITA, or JOANNES MASSILIENSIS (?360–?435), a celebrated recluse, one of the first founders of monastic institutions in western Europe, was probably born in

[1] The Via Traiana Nova, or the (*viae*) tres Traianae, mentioned in inscriptions with the Cassia and Clodia as under the same *curator*, are not certainly identifiable.

[2] Having regard to the military importance of Arretium during the Punic wars, it is difficult to believe that no direct road existed to this point before 187 B.C.

Provence about 360, but he spent the early part of his life in the monastery of Bethlehem with his friend Germanus, and his affinities were always Eastern rather than Western. In company with Germanus he visited Egypt, and dwelt for several years among the ascetics of the desert near the banks of the Nile. In 403 he repaired to Constantinople, where he received ordination as deacon at the hands of Chrysostom. At Marseilles (after 410) he founded two religious societies—a convent for nuns, and the abbey of St Victor, which during his time is said to have contained 5000 inmates. In later times his regulations enjoyed a high reputation, and were adopted by the monks and nuns of Port Royal. He was eventually canonized; and a festival in his honour long continued to be celebrated at Marseilles on the 25th of July. Cassianus was one of the first and most prominent of the Semi-Pelagians, maintaining that while man is by nature sinful, he yet has some good remaining in him, and that, while the immediate gift of God's grace is necessary to salvation, conversion may also be begun by the exercise of man's will. He further asserted that God is always willing to bestow his grace on all who seek it, though, at the same time, it is true that he sometimes bestows it without its being sought. These views have been held by a very large part of the church from his time, and embrace much of the essence of Arminianism. The style of Cassianus is slovenly, and shows no literary polish, but its direct simplicity is far superior to the rhetorical affectations which disfigure most of the writings of that age. At the request of Castor, bishop of Apt, he wrote two monumental and influential treatises on the monastic life. The *De Institutione Coenobiorum* (twelve books) describes the dress, the food, the devotional exercises, the discipline and the special spiritual dangers of monastic life in the East (gluttony, unchastity, avarice, anger, gloom, apathy, vanity and pride). The *Collationes Patrum*, a series of dialogues with the pious fathers of Egypt, deal with the way in which these dangers (and others, *e.g.* demons) may be avoided or overcome. At the desire of Leo (then archdeacon of Rome) he wrote against Nestorius his *De Incarnatione Domini* in seven books.

EDITIONS.—Douay (1616) by Alardus Gazäus, with excellent notes; Migne's *Patrol. Lat.* vols. xlix. and l.; M. Petschenig in the Vienna *Corpus Script. Eccles. Lat.* (2 vols., 1886–1888). See A. Harnack, *History of Dogma*, v. 246 ff., 253 ff.; A. Hoch, *Die Lehre d. Joh. Cassian von Natur und Gnade* (Freiburg, 1895); W. Moeller, *History of the Chr. Church*, i. 368-370.

CASSINI, the name of an Italian family of astronomers, four generations of whom succeeded each other in official charge of the observatory at Paris.

GIOVANNI DOMENICO CASSINI (1625–1712), the first of these, was born at Perinaldo near Nice on the 8th of June 1625. Educated by the Jesuits at Genoa, he was nominated in 1650 professor of astronomy in the university of Bologna; he observed and wrote a treatise on the comet of 1652; was employed by the senate of Bologna as hydraulic engineer; and appointed by Pope Alexander VII. inspector of fortifications in 1657, and subsequently director of waterways in the papal states. His determinations of the rotation-periods of Jupiter, Mars and Venus in 1665–1667 enhanced his fame; and Louis XIV. applied for his services in 1669 at the stately observatory then in course of erection at Paris. The pope (Clement IX.) reluctantly assented, on the understanding that the appointment was to be temporary; but it proved to be irrevocable. Cassini was naturalized as a French subject in 1673, having begun work at the observatory in September 1671. Between 1671 and 1684 he discovered four Saturnian satellites, and in 1675 the division in Saturn's ring (see SATURN); made the earliest sustained observations of the zodiacal light, and published, in *Les Éléments de l'astronomie vérifiés* (1684), an account of Jean Richer's (1630–1696) geodetical operations in Cayenne. Certain oval curves which he proposed to substitute for Kepler's ellipses as the paths of the planets were named after him "Cassinians." He died at the Paris observatory on the 11th of September 1712.

A partial autobiography left by Giovanni Domenico Cassini was published by his great-grandson, Count Cassini, in his *Mémoires pour servir à l'histoire des sciences* (1810). See also C. Wolf, *Histoire de l'observatoire de Paris* (1902); Max. Marie, *Histoire des sciences*, t. iv. p. 234; R. Wolf, *Geschichte der Astronomie*, p. 450, &c.

JACQUES CASSINI (1677–1756), son of Domenico Cassini, was born at the Paris observatory on the 8th of February 1677. Admitted at the age of seventeen to membership of the French Academy of Sciences, he was elected in 1696 a fellow of the Royal Society of London, and became *maître des comptes* in 1706. Having succeeded to his father's position at the observatory in 1712, he measured in 1713 the arc of the meridian from Dunkirk to Perpignan, and published the results in a volume entitled *De la grandeur et de la figure de la terre* (1720) (see GEODESY). He wrote besides *Élémens d'astronomie* (1740), and died on the 18th of April 1756 at Thury, near Clermont. The first tables of the satellites of Saturn were supplied by him in 1716.

See C. Wolf, *Histoire de l'observatoire de Paris*; Max. Marie, *Histoire des sciences*, vii. 214; R. Wolf, *Geschichte der Astronomie*, p. 451; J. C. Houzeau, *Bibl. astronomique*; J. Delambre, *Histoire de l'astronomie au XVIIIe siècle*, pp. 250-275 (unfairly depreciatory); J. F. Montucla, *Hist. des mathématiques*, iv. 145, 248.

CÉSAR FRANÇOIS CASSINI, or CASSINI DE THURY (1714–1784), son of Jacques Cassini, was born at the observatory of Paris on the 17th of June 1714. He succeeded to his father's official employments, continued the hereditary surveying operations, and began in 1744 the construction of a great topographical map of France. The post of director of the Paris observatory was created for his benefit in 1771, when the establishment ceased to be a dependency of the Academy of Sciences. Cassini de Thury died at Thury on the 4th of September 1784. His chief works are:—*Méridienne de l'observatoire de Paris* (1744), *Description géométrique de la terre* (1775), and *Description géométrique de la France* (1784).

See C. Wolf, *Histoire de l'observatoire de Paris*, p. 287; Max. Marie, *Histoire des sciences*, viii. 158; J. Delambre, *Histoire de l'astronomie au XVIIIe siècle*, pp. 275-309; R. Wolf, *Geschichte der Astronomie*, p. 451; J. J. de Lalande, *Bibliographie astronomique*.

JACQUES DOMINIQUE CASSINI, Count (1748–1845), son of César François Cassini, was born at the observatory of Paris on the 30th of June 1748. He succeeded in 1784 to the directorate of the observatory; but his plans for its restoration and re-equipment were wrecked in 1793 by the animosity of the National Assembly. His position having become intolerable, he resigned on the 6th of September, and was thrown into prison in 1794, but released after seven months. He then withdrew to Thury, where he died, aged ninety-seven, on the 18th of October 1845. He published in 1770 an account of a voyage to America in 1768, undertaken as the commissary of the Academy of Sciences with a view to testing Pierre Leroy's watches at sea. A memoir in which he described the operations superintended by him in 1787 for connecting the observatories of Paris and Greenwich by longitude-determinations appeared in 1791. He visited England for the purposes of the work, and saw William Herschel at Slough. He completed his father's map of France, which was published by the Academy of Sciences in 1793. It served as the basis for the *Atlas National* (1791), showing France in departments. Count Cassini's *Mémoires pour servir à l'histoire de l'observatoire de Paris* (1810) embodied portions of an extensive work, the prospectus of which he had submitted to the Academy of Sciences in 1774. The volume included his *Éloges* of several academicians, and the autobiography of his great-grandfather, the first Cassini.

See J. F. S. Devic, *Histoire de la vie et des travaux de J. D. Cassini* (1851); J. Delambre, *Histoire de l'astronomie au XVIIIe siècle*, pp. 309-313; *Phil. Mag.* 3rd series, vol. xxviii. p. 412; C. Wolf, *Histoire de l'observatoire de Paris* (1902), p. 234 et passim. (A. M. C.)

CASSIODORUS (not *Cassiodorius*), the name of a Syrian family settled at Scyllacium (Squillace) in Bruttii, where it held an influential position in the 5th century A.D. Its most important member was FLAVIUS MAGNUS AURELIUS CASSIODORUS SENATOR (*c.* 490–585), historian, statesman, and monk. "Senator" (not a title) is the name used by himself in his official correspondence. His father held the offices of *comes privatarum* and *sacrarum largitionum* (controller of the emperor's private revenue and the public exchequer) under Odoacer, and subsequently

attached himself to Theodoric, by whom he was appointed *corrector* (governor) of Bruttii and Lucania, and *praefectus praetorio*. The son at an early age became *consiliarius* (legal assessor) to his father, and (probably in 507) *quaestor*, an official whose chief duty at that time consisted in acting as the mouthpiece of the ruler, and drafting his despatches. In 514 he was ordinary consul, and at a later date possibly *corrector* of his native province. At the death of Theodoric (526) he held the office of *magister officiorum* (chief of the civil service). Under Athalaric he was *praefectus praetorio*, a post which he retained till about 540, after the triumphal entry of Belisarius into Ravenna, when he retired from public life. With the object of providing for the transmission of divine and human knowledge to later ages, and of securing it against the tide of barbarism which threatened to sweep it away, he founded two monasteries—Vivarium and Castellum—in his ancestral domains at Squillace (others identify the two monasteries). The special duty which he enjoined upon the inmates was the acquisition of knowledge, both sacred and profane, the latter, however, being subordinated to the former. He also collected and emended valuable MSS., which his monks were instructed to copy, and superintended the translation of various Greek works into Latin. He further amused himself with making scientific toys, such as sun-dials and water-clocks. As he is stated to have written one of his treatises at the age of ninety-three, he must have lived till after 580. Whether he belonged to the Benedictine order is uncertain.

The writings of Cassiodorus evince great erudition, ingenuity and labour, but are disfigured by incorrectness and an affected artificiality, and his Latin partakes much of the corruptions of the age. His works are (1) historical and political, (2) theological and grammatical.

1. (*a*) *Variae*, the most important of all his writings, in twelve books, published in 537. They contain the decrees of Theodoric and his successors Amalasuntha, Theodahad and Witigis; the regulations of the chief offices of state; the edicts published by Cassiodorus himself when *praefectus praetorio*. It is the best source of our knowledge of the Ostrogothic kingdom in Italy (ed. T. Mommsen in *Monumenta Germaniae Historica: Auctores Antiquissimi*, xii., 1894; condensed English translation by T. Hodgkin, 1886).

(*b*) *Chronica*, written at the request of Theodoric's son-in-law Eutharic, during whose consulship (519) it was published. It is a dry and inaccurate compilation from various sources, unduly partial to the Goths (ed. T. Mommsen in *Mon. Germ. Hist.: Auct. Ant.* xi. pt. i., 1893).

(*c*) Panegyrics on Gothic kings and queens (fragments ed. L. Traube in *Mon. Germ. Hist.: Auct. Ant.* xii.).

2. (*a*) *De Anima*, a discussion on the nature of the soul, at the conclusion of which the author deplores the quarrel between two such great peoples as the Goths and Romans. It seems to have been published with the last part of the *Variae*.

(*b*) *Institutiones divinarun et humanarum litterarum*, an encyclopaedia of sacred and profane literature for the monks, and a sketch of the seven liberal arts. It further contains instructions for using the library, and precepts for daily life.

(*c*) A commentary on the Psalms and short notes (*complexiones*) on the Pauline epistles, the Acts, and the Apocalypse.

(*d*) *De Orthographia*, a compilation made by the author in his ninety-third year from the works of twelve grammarians, ending with his contemporary Priscian (ed. H. Keil, *Grammatici Latini*, vii.).

The Latin translations of the *Antiquities* of Josephus and of the ecclesiastical histories of Theodoret, Sozomen and Socrates, under the title of *Historia Tripartita* (embracing the years 306–439), were carried out under his supervision.

Of his lost works the most important was the *Historia Gothorum*, written with the object of glorifying the Gothic royal house and proving that the Goths and Romans had long been connected by ties of friendship. It was published during the reign of Athalaric, and appears to have brought the history down to the death of Theodoric. His chief authority for Gothic history and legend was Ablavius (Ablabius). The work is only known to us in the meagre abridgment of Jordanes (ed. T. Mommsen, 1882).

COMPLETE WORKS.— *Editio princeps*, by G. Fornerius (Paris, 1579); J. Garet (Rouen, 1679; Venice, 1729), reprinted in J. P. Migne, *Patrologia Latina*, lxix., lxx. On Cassiodorus generally, see *Anecdoton Holderi*, excerpts from a treatise of Cassiodorus, edited by H. Usener (Bonn, 1877), which throws light on questions connected with his biography; T. Mommsen, preface to his edition of the *Variae*; monographs by A. Thorbecke (Heidelberg, 1867) and A. Franz (Breslau, 1872); T. Hodgkin, *Italy and her Invaders*, iii. p. 280, iv. p. 348; A. Ebert, *Allgemeine Geschichte der Litteratur des Mittelalters*, i.; Teuffel-Schwabe, *Hist. of Roman Literature* (Eng. trans.), § 483; G. A. Simcox, *Hist. of Latin Literature* (1884); W. Ramsay in Smith's *Dictionary of Greek and Roman Biography*; J. B. Bury's edition of Gibbon's *Decline and Fall*, iv. 180, 522; R. W. Church in the *Church Quarterly Review*, x. (1880); J. E. Sandys in *Hist. of Classical Scholarship* (2nd ed., 1906); A. Olleris, *Cassiodore, conservateur des livres de l'antiquité latine* (Paris, 1891); G. Minasi, *M. A. Cassiodoro . . . ricerche storico-critiche* (Naples, 1895); and C. Cipolla in *Memorie della r. Accademia delle scienze di Torino* (2nd ser. xliii. pt. 2, 1893); L. M. Hartmann in Pauly-Wissowa's *Realencyclopädie*, iii. pt. 2 (1899), with note on the musical section of Cassiodorus' *Institutiones* by C. von Jan.

CASSIOPEIA, in Greek mythology, the wife of Cepheus, and mother of Andromeda; in astronomy, a constellation of the northern hemisphere, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.). Ptolemy catalogued 13 stars in this constellation, Tycho Brahe 46, and Hevelius 37. Its most interesting stars are:—*Nova Cassiopeiae*, a "new" star, which burst out with extraordinary brilliancy in 1572, when it was observed by Tycho Brahe, but gradually diminished in brightness, ultimately vanishing in about eighteen months; *α-Cassiopeiae* and *R-Cassiopeiae* are variable stars, the former irregular, the latter having a long period; *η-Cassiopeiae*, a binary star, having components of magnitudes $3\frac{1}{2}$ and $7\frac{1}{2}$; *σ-Cassiopeiae*, a double star, one being white and of magnitude 5, the other blue and of magnitude $7\frac{1}{2}$.

CASSITERIDES (from the Gr. *κασσίτερος*, tin, *i.e.* "Tin-islands"), in ancient geography the name of islands regarded as being situated somewhere near the west coasts of Europe. Herodotus (430 B.C.) had dimly heard of them. Later writers, Posidonius, Diodorus, Strabo and others, call them smallish islands off (Strabo says, some way off) the north-west coast of Spain, which contained tin mines, or, as Strabo says, tin and lead mines—though a passage in Diodorus derives the name rather from their nearness to the tin districts of north-west Spain. While geographical knowledge of the west was still scanty and the secrets of the tin-trade were still successfully guarded by the seamen of Gades and others who dealt in the metal, the Greeks knew only that tin came to them by sea from the far west, and the idea of tin-producing islands easily arose. Later, when the west was better explored, it was found that tin actually came from two regions, north-west Spain and Cornwall. Neither of these could be called "small islands" or described as off the north-west coast of Spain, and so the Cassiterides were not identified with either by the Greek and Roman geographers. Instead, they became a third, ill-understood source of tin, conceived of as distinct from Spain or Britain. Modern writers have perpetuated the error that the Cassiterides were definite spots, and have made many attempts to identify them. Small islands off the coast of north-west Spain, the headlands of that same coast, the Scillies, Cornwall, the British Isles as a whole, have all in turn been suggested. But none suits the conditions. Neither the Spanish islands nor the Scillies contain tin, at least in serious quantities. Neither Britain nor Spain can be called "small islands off the north-west of Spain." It seems most probable, therefore, that the name Cassiterides represents the first vague knowledge of the Greeks that tin was found overseas somewhere in or off western Europe.

AUTHORITIES.—Herodotus iii. 115; Diodorus v. 21, 22, 38; Strabo ii. 5, iii. 2, 5, v. 11; Pliny, *Nat. Hist.* iv. 119, vii. 197, xxxiv. 156-158, are the chief references in ancient literature. T. R. Holmes, *Ancient Britain* (1907), appendix, identifies the Cassiterides with the British Isles. (F. J. H.)

CASSITERITE (from the Gr. *κασσίτερος*, tin), the mineralogical name for tin-stone, the common ore of tin. It consists of tin dioxide, or stannic oxide (SnO_2), and crystallizes in the tetragonal system. The crystals are usually 4-sided or 8-sided prisms, striated vertically, and terminated by pyramids (fig. 1). Twins, with characteristic re-entrant angles, such as figs. 2 and 3, are common. Certain slender prismatic crystals, with an acute 8-sided pyramid, are known in Cornwall as "sparable tin," in allusion to their resemblance to sparable nails, whilst very slender crystals are termed needle-tin. Occasionally the mineral occurs in fibrous forms, which pass under the name of

"wood-tin," and these, though not unknown in the matrix, are generally found as rolled pebbles. By the disintegration of tin-bearing rocks and vein-stones, the cassiterite passes into the beds of streams as rolled fragments and grains, or even sand, and is then known as stream tin or alluvial tin. This detrital tin-ore was probably used as a source of the metal before the primitive miners had learnt to attack the solid tin-bearing rocks.

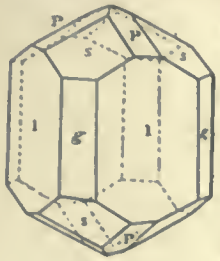


FIG. 1.

Pure cassiterite may be colourless, or white, as seen in certain specimens from the Malay Peninsula; but usually the mineral is brown or even black, the colour being referred to the presence of ferric oxide or other impurity. Occasionally the tin-stone is red. In microscopic sections the colour is often seen to be disposed in zones, following the contour of the crystal. A brown variety, with rather resinous lustre, is termed "rosin tin." The usual lustre of crystals of cassiterite is remarkably splendent, even adamantine. The mineral has a high refractive index, and strong bi-refringence. Certain transparent yellow and brown specimens, cut as gem-stones, exhibit considerable brilliancy.

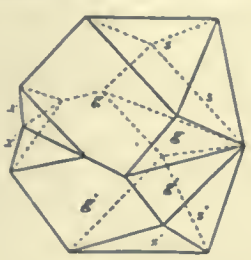


FIG. 2.

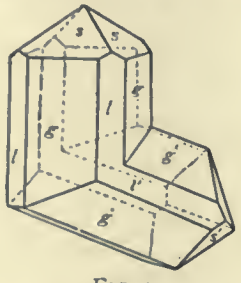


FIG. 3.

The hardness of cassiterite is 6·5, so that it cannot be scratched with a knife, and is nearly as hard as quartz. Its specific gravity is about 7; and in consequence of this high density, the tin-stone is readily separated during the process of dressing, from all the associated minerals, except wolframite, which may, however, be removed by magnetic separators.

Cassiterite usually occurs as veins or impregnations in granitic rocks, and is especially associated with the quartz-mica rock called greisen. The usual associates of the tin-stone are quartz, tourmaline, apatite, topaz, beryl, fluorite, lithia-mica, wolframite, chalcopyrite, &c. The presence of fluorine in many of these minerals has led to the opinion that the tin has been derived in many cases from an acid or granitic magma by the action of fluorine-bearing vapours, and that cassiterite may have been formed by the interaction of tin fluoride and water vapour. Cassiterite occurs as a pseudomorph after orthoclase felspar in some of the altered granite of Cornwall, and it has occasionally been found as a cementing material in certain brecciated lodes.

Among the localities yielding cassiterite may be mentioned Cornwall, Saxony, Bohemia, Brittany, Galicia in Spain; the Malay peninsula, and the islands of Banca and Billiton; New South Wales, Queensland and Tasmania. Fine examples of wood-tin, occurring with topaz, are found in Durango in Mexico. Deposits of cassiterite under rather exceptional conditions are worked on a large scale in Bolivia; and it is notable that cassiterite is found in Liassic limestone near Campiglia Marittima in Tuscany. Cassiterite has been worked in the York region, Alaska. (F. W. R.*)

CASSIUS, the name of a distinguished ancient Roman family, originally patrician. Its most important members are the following.

1. SPURIUS CASSIUS, surnamed *Vecellinus* (*Vicellinus, Viscellinus*), Roman soldier and statesman, three times consul, and author of the first agrarian law. In his first consulate (502 B.C.) he defeated the Sabines; in his second (493) he renewed the league with the Latins, and dedicated the temple of Ceres in the Circus; in his third (486) he made a treaty with the conquered Hernici. The account of his agrarian law is confused and contradictory; it is clear, however, that it was intended to benefit the needy plebeians (see AGRARIAN LAWS). As such it was violently opposed both by the patricians and by the wealthy plebeians. Cassius was condemned by the people as aiming at kingly power, and hurled from the Tarpeian rock. Another account says he was tried by the family council and put to death by his own father, who considered his proposal prejudicial to the patrician interest. According to Livy, his proposal to bestow a share of the land upon the Latins was regarded with great suspicion. According to Mommsen (*Römische Forschungen*, ii.), the whole story is an invention of a later age, founded upon the proposals of the Gracchi and M. Livius Drusus, to which period belongs the idea of sharing public land with the Latins.

See Livy ii. 33, 41; Dion Halic. v. 49, viii. 69-80; Cicero, *Pro Balbo*, 23 (53), *De Republica*, ii. 27 (49), 35 (60); Val. Max. v. 8. 2.

The following Cassii are all plebeians. It is suggested that the sons of Spurius Cassius either were expelled from, or voluntarily left, the patrician order, in consequence of their father's execution.

2. GAIUS CASSIUS LONGINUS, consul 73 B.C. With his colleague, Terentius Varro Lucullus, he passed a law (*lex Terentia Cassia*), the object of which was to give authority for the purchase of corn at the public expense, to be retailed at a fixed price at Rome. It is doubtful whether this Cassius (who is often called by the additional name Varus) is identical with the Varus who was proscribed by the triumvirs, and put to death at Minturnae (43). According to Orosius he was killed at the battle of Mutina.

See Cicero, *In Verrem*, iii. 70, 75, v. 21; Livy, *Epit.* 96; Appian, *Bell. Civ.* iv. 28; Orosius v. 24.

3. GAIUS CASSIUS LONGINUS, prime mover in the conspiracy against Julius Caesar. Little is known of his early life. In 53 B.C. he served in the Parthian campaign under M. Licinius Crassus, saved the remnants of the army after the defeat at Carrhae, and for two years successfully repelled the enemy. In 49 B.C. he became tribune of the plebs. The outbreak of the civil war saved him from being brought to trial for extortion in Syria. He at first sided with Pompey, and as commander of part of his fleet rendered considerable service in the Mediterranean. After Pharsalus he became reconciled to Caesar, who made him one of his legates. In 44 B.C. he became *praetor peregrinus* with the promise of the Syrian province for the ensuing year. The appointment of his junior, M. Junius Brutus, as *praetor urbanus* deeply offended him, and he was one of the busiest conspirators against Caesar, taking an active part in the actual assassination. He then left Italy for Syria, raised a considerable army, and defeated P. Cornelius Dolabella, to whom the province had been assigned by the senate. On the formation of the triumvirate, Brutus and he, with their combined armies, crossed the Hellespont, marched through Thrace, and encamped near Philippi in Macedonia. Their intention was to starve out the enemy, but they were forced into an engagement. Brutus was successful against Octavian, but Cassius, defeated by M. Antonius (Mark Antony), gave up all for lost, and ordered his freedman to slay him. He was lamented by Brutus as "the last of the Romans," and buried at Thasos. A man of considerable ability, he was a good soldier, and took an interest in literature, but in politics he was actuated by vanity and ambition. His portrait in Shakespeare's *Julius Caesar*, though vivid, is scarcely historical.

See Plutarch, *Brutus*, passim, *Crassus*, 27, 29, *Caesar*, 62, 69; Dio Cassius xl. 28, xlii. 13, xliv. 14, xlvii. 20; Vell. Pat. ii. 46, 56, 58, 69, 70, 87; Cicero, *Philippics*, xi. 13, 14, *ad Att.* v. 21, xiv. 21, *ad Fam.* xi. 3, 15, 16; Appian, *Bell. Civ.* ii. 111, 113, iii. 2, 8, iv. 60-62, 87, 90, 111-113, 132; Caesar, *Bell Civ.* iii. 101.

4. QUINTUS CASSIUS LONGINUS, the brother or cousin of the murderer of Caesar, quaestor of Pompey in Further Spain in 54 B.C. In 49, as tribune of the people, he strongly supported the cause of Caesar, by whom he was made governor of Further Spain. He treated the provincials with great cruelty, and his

appointment (48) to take the field against Juba, king of Numidia, gave him an excuse for fresh oppression. The result was an unsuccessful insurrection at Corduba. Cassius punished the leaders with merciless severity, and made the lot of the provincials harder than ever. At last some of his troops revolted under the quaestor M. Marcellus, who was proclaimed governor of the province. Cassius was surrounded by Marcellus in Ulia. Bogud, king of Mauretania, and M. Lepidus, proconsul of Hither Spain, to whom Cassius had applied for assistance, negotiated an arrangement with Marcellus whereby Cassius was to be allowed to go free with the legions that remained loyal to him. Cassius sent his troops into winter quarters, hastened on board ship at Malaca with his ill-gotten gains, but was wrecked in a storm at the mouth of the Iberus (Ebro). His tyrannical government of Spain had greatly injured the cause of Caesar.

See Dio Cassius xli. 15, 24, xlii. 15, 16, xliii. 29; Livy, *Epit.* 111; Appian, *B.C.* ii. 33, 43; *Bellum Alexandrinum*, 48-64.

5. Gaius Cassius Longinus (1st century A.D.), Roman jurist, consul in 30, proconsul of Asia 40–41, and governor of Syria under Claudius 45–50. On his return to Rome his wealth and high character secured him considerable influence. He was banished by Nero (65) to Sardinia, because among the images of his ancestors he had preserved that of the murderer of Caesar. He was recalled by Vespasian, and died at an advanced age. As he was consul in 30, he must have been born at the latest in the year 3 B.C. Cassius was a pupil of Masurius Sabinus, with whom he founded a legal school, the followers of which were called Cassiani. His chief work was the *Libri Juris Civilis* in ten books, which was used by the compilers of the *Digest* of Justinian.

See Tacitus, *Annals*, xvi. 7-9; Suetonius, *Nero*, 37; Dio Cassius lix. 29; Teuffel-Schwabe, *Hist. of Roman Literature*, § 298, 3.

CASSIUS, AVIDIUS (d. A.D. 175), Roman general, a Syrian by birth, lived during the reign of Marcus Aurelius. He especially distinguished himself during the Parthian War (A.D. 162–165), at the conclusion of which he was apparently appointed military governor of Asia, though the actual extent of his jurisdiction is doubtful. In 172 he was sent to Egypt, where he put down a dangerous rising of the Bucolici, the robber herdsmen of the delta of the Nile, after which he returned to Syria. In 175 the emperor Aurelius fell ill, and his wife Faustina, to secure her position in case of his death, offered her hand and the throne to the successful general. A rumour of Aurelius's death having reached Syria, Cassius, without waiting for confirmation, proclaimed himself emperor; when the report proved false, it was too late for him to draw back, and he accordingly prepared for war. The senate declared him a public enemy, although Aurelius even then expressed the hope that he might have the opportunity of pardoning him. Deploring the necessity for taking up arms against his trusted officer, Aurelius set out for the east. While in Illyria, he received the news that Cassius had been slain by his own officers. The murderers offered his head to Aurelius, who refused to admit them, and ordered its immediate burial.

See Dio Cassius lxxi. 2-4, 17, 22-28, 30, 31; Fronto, *Letters*, i. 6; Lives of Marcus Aurelius, Verus and Commodus in the *Scriptores Historiae Augustae*, and the special biography of Avidius Cassius in the same by Vulcacius Gallicanus. The various letters and documents in the last-named are generally considered spurious, and the portions of the narrative founded on them consequently untrustworthy. See also article in Pauly-Wissowa's *Realencyclopädie*, ii. pt. 2 (1896).

CASSIUS, GAIUS, Latin poet, general and politician, called Parmensis from his birthplace Parma, was one of the murderers of Julius Caesar, and after his death joined the party of Brutus and his namesake Cassius the conspirator. In 43 B.C. he was in command of the fleet on the coast of Asia, but after the battle of Philippi joined Sextus Pompeius in Sicily. When Pompeius, having been defeated in a naval engagement at Naulochus by the fleet of Octavian under Agrippa, fled to Asia, Cassius went over to Antony, and took part in the battle of Actium (31). He afterwards fled to Athens, where he was soon put to death by Octavian, whom he had offended by writing an abusive letter (Suetonius, *Augustus*, 4). Cassius is credited with satires, elegies, epigrams and tragedies. Some hexameters with the title *Cassii Orpheus* are by Antonius Thylesius, an Italian of the 17th century. Horace appears to have thought well of Cassius as a poet, for he asks Tibullus whether he intends to compete with the *opuscula* (probably the elegies) of Cassius (*Epistles*, i. 4. 3). The story in the Horace scholia, that L. Varius Rufus published his famous tragedy *Thyestes* from an MS. which he found amongst the papers of Cassius after his death, is due to a confusion of Cassius's murderer, Q. Attius Varus, with the tragedian (Appian, *B.C.* v. 2, 139; Cicero, *ad Fam.* xii. 13; Vell. Pat. ii. 87; Orosius, vi. 19; see also the diffuse treatise of A. Weichert, *De L. Varii et Cassii Parmensis Vita et Carminibus*, 1836). Cassius Parmensis must not be confused with Cassius Etruscus (Horace, *Satires*, i. 10. 60), an improviser, who is said to have used enough paper to furnish his funeral pyre.

CASSIVELAUNUS, or Cassivellaunus, a British chieftain, ruler of the country north of the Thames, who led the native tribes against Julius Caesar on his second expedition (54 B.C.) (see Britain). After several indecisive engagements, Caesar took the camp of Cassivelaunus, who was obliged to make peace on condition of paying tribute and giving hostages. But these promises were not meant to be kept, and it appears certain that the tribute was never paid. According to Bede (*Hist. Eccles.* i. 2), the remains of Cassivelaunus's entrenchment were visible seven or eight centuries later.

See Caesar, *B.G.* v. 11-22; Dio Cassius xl. 2, 3; Orosius vi. 9. 6; Eutropius vi. 17; Polyaenus, *Strategemata*, viii. 23. For the etymology of the name (which is Celtic in origin, and appears later as Caswallon) see J. Rhys, *Celtic Britain*, pp. 289-290 (1904); C. I. Elton, *Origins of English History* (1890); and Stock's edition of Caesar, *De Bello Gallico* (1898).

CASSOCK (Fr. *casaque*, a military cloak), a long-sleeved, close-fitting robe worn by the clergy and others engaged in ecclesiastical functions. The name was originally specially applied to the dress worn by soldiers and horsemen, and later to the long garment worn in civil life by both men and women. As an ecclesiastical term the word "cassock" came into use somewhat late (as a translation of the old names of *subtanea*, *vestis talaris*, *toga talaris*, or *tunica talaris*), being mentioned in canon 74 of 1604; and it is in this sense alone that it now survives. The origin of the word has been the subject of much speculation. It is derived through the French from the Italian *casacca*, which Florio (*Q. Anna's New World of Words*, 1611) translates as "a frock, a horseman's cote, a long cote; also a habitation or dwelling," and it is usually held that this in turn is derived from *casa*, a house (cf. the derivation of "chasuble," *q.v.*). This, however, though possible is uncertain. A Slav origin for the word has been suggested (Hatzfeld and Darmesteter, *Dic. gén. de la langue française*), and the Cossack horseman may have given to the West both the garment and the name. Or again, it may be derived from *casequin* (Ital. *casecchino*), rather than vice versa, and this in turn from an Arabic *kazāyand* (Pers. *kashāyand*), a padded jerkin; the word *kasagân* occurring in Mid. High Ger. for a riding-cloak, and *gasygan* in O. Fr. for a padded jerkin (Lagarde in *Gött. gelehrte Anzeiger*, April 15, 1887, p. 238).

The cassock, though part of the canonical costume of the clergy, is not a liturgical vestment. It was originally the out-of-doors and domestic dress of lay-people as well as clergy, and its survival among the latter when the secular fashions had changed is merely the outcome of ecclesiastical conservatism. In mild weather it was the outer garment; in cold weather it was worn under the tabard or chimere (*q.v.*); sometimes in the middle ages the name "chimere" was given to it as well as to the sleeveless upper robe. In winter the cassock was often lined with furs varying in costliness with the rank of the wearer, and its colour also varied in the middle ages with his ecclesiastical or academic status. In the Roman Catholic Church the *subtanea* (Fr. *soutane*, Ital. *sottana*) must be worn by the clergy whenever they appear, both in ordinary life (except in Protestant countries) and under their vestments in church. It varies in colour with the wearer's rank: white for the pope, red (or black edged with red) for cardinals, purple for bishops, black for the lesser ranks; members of religious orders, however,

whatever their rank, wear the colour of their religious habit. In the Church of England the cassock, which with the gown is prescribed by the above-mentioned canon of 1604 as the canonical dress of the clergy, has been continuously, though not universally, worn by the clergy since the Reformation. It has long ceased, however, to be their every-day walking dress and is now usually only worn in church, at home, or more rarely by clergy within the precincts of their own parishes. The custom of wearing the cassock under the vestments is traceable in England to about the year 1400.

The old form of English cassock was a double-breasted robe fastened at the shoulder and probably girdled. The continental, single-breasted cassock, with a long row of small buttons from neck to hem, is said to have been first introduced into England by Bishop Harris of Llandaff (1729–1738). The shortened form of cassock which survives in the bishop's "apron" was formerly widely used also by the continental clergy. Its use was forbidden in Roman Catholic countries by Pope Pius IX., but it is still worn by Roman Catholic dignitaries as part of their out-of-door dress in certain Protestant countries.

See the *Report* of the sub-committee of Convocation *on the Ornaments of the Church and its Ministers* (London, 1908), and authorities there cited.

CASSONE, in furniture, the Italian name for a marriage coffer. The ancient and once almost universal European custom of providing a bride with a chest or coffer to contain the household linen, which often formed the major part of her dowry, produced in Italy a special type of chest of monumental size and artistic magnificence. The cassoni of the people, although always large in size, were simple as regards ornament; but those of the nobles and the well-to-do mercantile classes were usually imposing as regards size, and adorned with extreme richness. The cassone was almost invariably much longer than the English chest, and even at a relatively early period it assumed an artistic finish such as was never reached by the chests of northern Europe, except in the case of a few of the royal *corbeilles de mariage* made by such artists as Boulle for members of the house of France. Many of the earlier examples were carved in panels of geometrical tracery, but their characteristic ornament was either *intarsia* or *gesso*, or a mixture of the two. Bold and massive feet, usually shaped as claws, lioncels, or other animals are also exceedingly characteristic of cassoni, most of which are of massive and sarcophagus-like proportions with moulded lids, while many of them are adorned at their corners with figures sculptured in high relief. The scroll-work inlay is commonly simple and graceful, consisting of floral or geometrical motives, or arabesques. The examples coated with gilded *gesso* or blazoned with paintings are, however, the most magnificent. They were often made of chestnut, and decorated with flowers and foliage in a relief which, low at first, became after the Renaissance very high and sharp. The panels of the painted cassoni frequently bore representations of scriptural and mythological subjects, or incidents derived from the legends of chivalry. Nor was heraldry forgotten, the arms of the family for which the chest was made being perhaps emblazoned upon the front. These chests rarely bear dates or initials, but it is often possible to determine their history from their armorial bearings.

CASSOWARY (*Casuarius*), a genus of struthious birds, only inferior in size to the emeu and ostrich, and, according to Sir R. Owen, approximating more closely than any other living birds to the extinct moas of New Zealand. The species are all characterized by short rudimentary wings, bearing four or five barbless shafts, a few inches long, and apparently useless for purposes of flight, of running, or of defence; and by loosely webbed feathers, short on the neck, but of great length on the rump and back, whence they descend over the body forming a thick hair-like covering. They possess stout limbs, with which they kick in front, and have the inner toe armed with a long powerful claw. The common cassowary (*Casuarius galeatus*) stands 5 ft. high, and has a horny, helmet-like protuberance on the crown of its head; the front of the neck is naked and provided with two brightly-coloured wattles. It is a native of the Island of Ceram, where it is said to live in pairs, feeding on fruits and herbs, and occasionally on small animals. The mooruk, or Bennett's cassowary (*Casuarius Bennettii*), is a shorter and more robust bird, approaching in the thickness of its legs to the moas. It differs further from the preceding species in having its head crowned with a horny plate instead of a helmet. It has only been found in New Britain, where the natives are said to regard it with some degree of veneration. When captured by them shortly after being hatched, and reared by the hand, it soon becomes tame and familiar; all the specimens which have reached Europe alive have been thus domesticated by the natives. The adult bird in the wild state is exceedingly shy and difficult of approach, and, owing to its great fleetness and strength, is rarely if ever caught. It eats voraciously, and, like the ostrich, will swallow whatever comes in its way. (See EMEU.)

CAST (from the verb meaning "to throw"; the word is Scand. in origin, cf. Dan. *kaste*, and Swed. *kasta*; "cast" in Middle Eng. took the place of the A.S. *weorpan*, cf. Ger. *werfen*), a throw, or that which is thrown, or that into which something is thrown. From these three meanings come the main uses of the word; for the throwing of dice, with the figurative sense of a chance or opportunity, as in "at the last cast"; for the throwing of a fisherman's line in fly-fishing; for hounds spreading out in search of a lost scent; or, with the further meaning of a twisted throw or turn, for a slight squint in the eye. "Cast" is applied to a measure of herrings or other fish, being the amount taken in two hands to be thrown into a vessel, and similarly to a potter's measure for a certain quantity of clay; in fishing, to the casting line of gut with fly attached; to the hard refuse thrown out of the crop of a bird of prey, and to the coils of earth thrown up by earth-worms. From the old method, in making calculations, of using counters, which were thus "thrown" up into a heap, is probably derived the meaning of "cast" for the "casting up" of figures in an account. Further, the word is found for a mould for the casting of metals, and more particularly for the copy of an original statue or relief taken from a mould; similarly, of fossils, for the mineral filling of the empty mould left by the organism. Special uses of the word are also found in the theatrical term for the assignment of particular parts to the actors and actresses in a play, and in the many figurative senses of a type or stamp, as of features or characters.

CASTAGNO, ANDREA DEL (1390–1457), Italian painter of the Florentine school, was born in 1390, probably at Castagno, in the district of Mugello, and died in August 1457. He imitated Masaccio and the naturalists of his time in boldness of attitude, but was deficient in grace and colouring. His name was for about four centuries burdened with the heinous charge of murder; it was said that he treacherously assassinated his colleague, Domenico Veneziano, in order to monopolize the then recent secret of oil painting as practised in Flanders by the Van Eycks. This charge has, however, been proved to be an untruth; Domenico died four years after Andrea. The latter is commonly called "Andrea (or Andreino) degl' Impiccati" (of the Hanged Men); this was in consequence of his being commissioned in 1435 to paint, in the Palazzo del Podestà in Florence, the fallen leaders of the Peruzzi and Albizzi—not (as currently said) the men of the Pazzi conspiracy, an event which did not occur until 1478, long after this painter's death. One of his principal works now extant (most of them have perished) is the equestrian figure of Nicola di Tolentino, in the cathedral of Florence.

CASTALIA, or FONS CASTALIUS, a celebrated fountain in Greece, now called the Fountain of St John, which rises in a chasm of Mount Parnassus, in the neighbourhood of Delphi. It was sacred to Apollo and the Muses, and its water was used in the religious purifications of the "Pythian Pilgrims." From its connexion with the Muses it is sometimes referred to by late Greek writers (*e.g.* Lucian, *Jup. Trag.* 30) and Latin poets (*e.g.* Ovid, *Am.* i. 15. 36) as a source of inspiration, and this has passed into a commonplace of modern literature. According to some authorities the nymph Castalia was the daughter of Achelous; according to others the water of the spring was derived from the Boeotian Cephissus.

CASTANETS (Fr. *castagnettes*, Ger. *Kastagnetten*, Span. *castañuelas*), instruments of percussion, introduced through the Moors by way of Spain into Europe from the East, used for marking the rhythm in dancing. Castanets, always used in pairs, one in each hand, consist of two pear or mussel-shaped bowls of hard wood, hinged together by a silk cord, the loop being passed over the thumb and first finger. The two halves are then struck against each other by the other fingers in single, double or triple beats, giving out series of hollow clicks of indefinite musical pitch. When intended for use in the orchestra the pair of castanets is mounted one at each end of a wooden stick about 8 in. long, which facilitates the playing. Castanets are also sometimes used in military bands and are then specially constructed. The two halves are kept open by a slight spring fixed to a frame attached to the hoop of a side drum, and the instrument is worked by the drummer with an ordinary drumstick. An instance of the use of castanets in opera occurs in the Habanera in *Carmen*. A quaint description of *castinatts* is given in Harleian MS. 2034 (f. 208) at the British Museum (before 1688) with a pencil sketch which tallies very well with the above. The MS. is by Randle Holme and forms part of the *Academy of Armoury*. Castanets (κρόταλα) were used by the ancient Greeks, and also by the Romans (Lat. *crotalum*, *crotala*) to accompany the dances in the Dionysiac and Bacchanalian rites.

CASTE (through the Fr. from Span. and Port. *casta*, lineage, Lat. *castus*, pure). There are not many forms of social organization on a large scale to which the name "caste" has not been applied in a good or in a bad sense. Its Portuguese origin simply suggests the idea of family; but before the word came to be extensively used in modern European languages, it had been for some time identified with the Brahmanic division of Hindu society into classes. The corresponding Hindu word is *varna*, or colour, and the words *gati*, *kula*, *gotra*, *pravara* and *karana* are also used with different shades of meaning. Wherever, therefore, a writer has seen something which reminds him of any part of the extremely indeterminate notion, Indian caste, he has used the word, without regard to any particular age, race, locality or set of social institutions. Thus Palgrave[1] maintains that the colleges of operatives, which inscriptions prove to have existed in Britain during the Roman period, were practically castes, because by the Theodosian code the son was compelled to follow the father's employment, and marriage into a family involved adoption of the family employment. But these *collegia opificum* seem to be just the forerunners of the voluntary associations for the regulation of industry and trade, the frith-gilds, and craft-gilds of later times, in which, no doubt, sons had great advantages as apprentices, but which admitted qualified strangers, and for which intermarriage was a matter of social feeling. The history of the formation of gilds shows, in fact, that they were really protests against the authoritative regulation of life from without and above. In the Saxon period, at any rate, there was nothing resembling caste in the strict sense. "The ceorl who had thriven so well as to have five hides of land rose to the rank of a thegn; his wergild became 1200 shillings; the value of his oath and the penalty of trespass against him increased in proportion; his descendants in the third generation became gesithcund. Nor was the character of the thriving defined; it might, so far as the terms of the custom went, be either purchase, or inheritance, or the receipt of royal bounty. The successful merchant might also thrive to thegn-right. The thegn himself might also rise to the rank, the estimation and status of an earl."[2] It has been said that early German history is, as regards this matter, in contrast with English, and that true castes are to be found in the military associations (*Genossenschaften*) which arose from the older class of Dienstmannen, and in which every member—page, squire or knight—must prove his knightly descent; the Bauernstand, or rural non-military population; the Bürgerstand, or merchant-class. The ministry of the Catholic Church in the West, was, however, never restricted by blood relation. There is no doubt that at some time or other professions were in most countries hereditary. Thus Prescott[3] tells us that in Peru, notwithstanding the general rule that every man should make himself acquainted with the various arts, "there were certain individuals carefully trained to those occupations which minister to the wants of the more opulent classes. These occupations, like every other calling and office in Peru, always descended from father to son. The division of castes was in this particular as precise as that which existed in Hindustan or Egypt." Again, Zurita[4] says that in Mexico no one could carry on trade except by right of inheritance, or by public permission. The Fiji carpenters form a separate caste, and in the Tonga Islands all the trades, except tattoo-markers, barbers and club-carvers are hereditary,—the separate classes being named matabooles, mooas and tooas. Nothing is more natural than that a father should teach his son his handicraft, especially if there be no organized system of public instruction; it gives the father help at a cheap rate, it is the easiest introduction to life for the son, and the custom or reputation of the father as a craftsman is often the most important legacy he has to leave. The value of transmitted skill in the simple crafts was very great; and what was once universal in communities still survives in outlying portions of communities which have not been brought within the general market of exchange. But so long as this process remains natural, there can be no question of caste, which implies that the adoption of a new profession is not merely unusual, but wrong and punishable. Then, the word caste has been applied to sacred corporations. A family or a tribe is consecrated to the service of a particular altar, or all the altars of a particular god. Or a semi-sacred class, such as the Brehons or the Bards, is formed, and these, and perhaps some specially dignified professions, become hereditary, the others remaining free. Thus in Peru, the priests of the Sun at Cuzco transmitted their office to their sons; so did the Quipu-camayoc, or public registrars, and the *amantas* and *haravecs*, the learned men and singers.[5] In many countries political considerations, or distinctions of race, have prevented intermarriage between classes. Take, for example, the patricians and the plebeians at Rome, or the Σπαρτιᾶται, Λάκωνες or περίοικοι, and the Εἵλωτες at Sparta. In Guatemala it was the law that if any noble married a plebeian woman he should be degraded to the caste of *mazequal*, or plebeian, and be subject to the duties and services imposed on that class, and that the bulk of his estate should be sequestered to the king.[6] In Madagascar marriage is strictly forbidden between the four classes of Nobles, Hovas, Zarahovas and Andevos,—the lowest of whom, however, are apparently mere slaves. In a sense slavery might be called the lowest of castes, because in most of its forms it does permit some small customary rights to the slave. In a sense, too, the survival in European royalty of the idea of "equality of birth" (*Ebenbürtigkeit*) is that of a caste conception, and the marriage of one of the members of a European royal family with a person not of royal blood might be described as an infraction of caste rule.

Caste in India is a question of more than historical interest. It is the great obstacle to government in accordance with modern

[1] *History of Rise and Progress of the English Constitution*, i. 332.
[2] Stubbs' *Constitutional History of England*, i. p. 162.
[3] *History of Peru*, i. 143.
[4] *Rapport sur les différentes classes de chefs dans la nouvelle Espagne* (1840), p. 223.
[5] Something like this is to be found in the Russian notion of *chin*, or status according to official hierarchy of ranks, as modified by the custom of *myestnichestvo*, by which no one entering the public service could be placed beneath a person who had been subject to his father's orders. Hereditary nobility at one time belonged to every servant, military or civil, above a certain rank, and a family remaining out of office for two generations lost its rights of nobility; but in 1854 the privilege was confined to army colonels and state councillors of the 4th class. At one time, therefore, the *razryadniya knighi*, or special registers, superseded by Peter the Great's *barkhatnaya kniga*, or Velvet Book, contained a complete code of social privilege and precedence. Peter's "*tabel o rangakh*" contained fourteen classes. The subject is treated of in the 1600 articles of the ninth volume of the Russian Code *Svod Zakonov*. The Russian Nobility, though deprived of their exemptions from conscription, personal taxation and corporal punishment, still retain many advantages in the public service.
[6] Juarros, *Hist. of Guatemala*, Tr. (London, 1823).

ideas, and to the work of native religious reformers as well as of Christian missionaries. By some writers caste has been regarded as the great safeguard of social tranquillity, and therefore as the indispensable condition of the progress in certain arts and industries which the Hindus have made. Others, such as James Mill, have denounced it as fatal to the principle of free competition and opposed to individual happiness. The latter view assumes a state of facts which was denied by Colebrooke, one of the highest authorities on Indian matters. Writing in 1798 he says,[1] after pointing out that any person unable to earn a subsistence by the exercise of his profession may follow the trade of a lower caste or even of a higher: "Daily observation shows even Brahmans exercising the menial profession of a Sudra. We are aware that every caste forms itself into clubs or lodges, consisting of the several individuals of that caste residing within a small distance, and that these clubs or lodges govern themselves by particular rules or customs or by-laws. But though some restrictions and limitations, not founded on religious prejudices, are found among their by-laws, it may be received as a general maxim that the occupation appointed for each tribe is entitled merely to a preference. Every profession, with few exceptions, is open to every description of persons; and the discouragement arising from religious prejudices is not greater than what exists in Great Britain from the effects of municipal and corporation laws. In Bengal the numbers of people actually willing to apply to any particular occupation are sufficient for the unlimited extension of any manufacture." This was corroborated by Elphinstone,[2] who states that, during a long experience of India, he never heard of a single case of degradation from caste; and it is illustrated by the experience of the Indian army, in which men of all castes unite.[3]

The ordinary notion of modern caste is that it involves certain restrictions on marriage, on profession, and on social intercourse, especially that implied in eating and drinking together. How far intermarriage is permitted, what are the effects of a marriage permitted but looked on as irregular, what are the penalties of a marriage forbidden, whether the rules protecting trades and occupations are in effect more than a kind of unionism grown inveterate through custom, by what means caste is lost, and in what circumstances it may be regained,—these are questions on which very little real or definite knowledge exists. Sir H. Risley regards the absolute prohibition of mixed marriages as now the essential and most prominent characteristic. It is very remarkable that the Vedas, on which the whole structure of Brahmanic faith and morals professes to rest, give no countenance to the later regulations of caste. The only passage bearing on the subject is in the Purusha Sukta, the 90th Hymn of the 10th Book of the Rigveda Samhita. "When they divided man, how many did they make him? What was his mouth? what his arms? what are called his thighs and feet? The Brahmana was his mouth, the Raganya was made his arms, the Vaisya became his thighs, the Sudra was born from his feet." Martin Haug finds in this a subtle allegory that the Brahmans were teachers, the Kshatriyas the warriors of mankind. But this is opposed to the simple and direct language of the Vedic hymns, and to the fact that in the accounts of creation there the origin of many things besides classes of men is attributed in the same fanciful manner to parts of the divine person. It is in the Puranas and the Laws of Manu, neither of which claims direct inspiration, where they differ from the letter of the Veda, that the texts are to be found on which all that is objectionable in caste has been based. Even in the Vishnu Purana, however, the legend of caste speaks of the four classes as being at first "perfectly inclined to conduct springing from religious faith." It is not till after the whole human race has fallen into sin that separate social duties are assigned to the classes. The same hymn speaks of the evolution of qualities of Brahma. Sattva, or goodness, sprang from the mouth of Brahma; Rajas, or passion, came from his breast; Tamas, or darkness, from his thighs; others he created from his feet. For each one of these gunas, or primitive differences of quality, a thousand couples, male and female, have been created; to which the distinct heavens, or places of perfection of Prajapati, Indra, Maruts and Gandharvas are assigned. To the gunas are related the yugas, or ages: 1st, the Krita, or glorious age of truth and piety, in which apparently no distinctions, at least no grades of excellence were known; 2nd, the Treta, or period of knowledge; 3rd, the Dvapara, or period of sacrifice; 4th, the Kali, or period of darkness. Bunsen supposes there may be an historical element in the legend that Pururava, a great conqueror of the Treta age, founded caste. The yugas are hardly periods of historical chronology, but there is no doubt that the Vayu Purana assigns the definite origin of caste to the Treta period. "The perfect beings of the first age, some tranquil, some fiery, some active and some distressed, were again born in the Treta, as Brahmans, &c., governed by the good and bad actions performed in former births." The same hymn proceeds to explain that the first arrangement did not work well, and that a second was made, by which force, criminal justice and war were declared to be the business of the Kshatriyas; officiating at sacrifices, sacred study and the receipt of presents to belong to the Brahmans; traffic, cattle and agriculture to the Vaisyas; the mechanical arts and service to the Sudras. The Ramayana hymn suggests that in the four great periods the castes successively arrive at the state of *dharma* or righteousness. Thus, a Sudra cannot, even by the most rigorous self-mortification, become righteous in the period proper to the salvation of the Vaisyas. As the hymn speaks in the Dvapara age, it speaks of the salvation of Sudras as future, and not yet possible. Wholly in opposition to the story of a fourfold birth from Brahma is the legend that the castes sprang from Manu himself, who is removed by several generations of gods and demi-gods from Brahma. Then, again, the Santiparvan alleges that the world, at first entirely Brahmanic, was separated into castes merely by the evil works of man. Casthood consists in the exercise of certain virtues or vices. *Munis*, or persons born indiscriminately, frequently rise to the caste of Brahmans, and the offspring of Brahmans sink to a lower level. The serpent observes: "If a man is regarded by you as being a Brahman only in consequence of his conduct, then birth is vain, until action is shown." But this change of caste takes place only through a second birth, and not during the life which is spent in virtue. Another poetical conception of caste birth is expressed in the Harivamsa. The Brahmans were formed from an imperishable element (Akshara), the Kshatriyas from a perishable element (Kshara), the Vaisyas from alteration, and the Sudras from a modification of smoke.

The general result of the foregoing texts is that several contradictory accounts have been given of the origin of caste, and that these are for the most part unintelligible. Caste is described as a late episode in creation, and as born from different parts of different gods, from the mortal Manu, from abstract principles, and from non-entity. It is also described as coeval with creation, as existing in perfection during the Krita period, and subsequently falling into sin. It is also said that only Brahmans existed at first, the others only at later periods. Then the rationalistic theories of the Santiparvan upset the very foundation of caste, viz. hereditary transmission of the caste character.[4] It seems clear that when the Vedas were composed, many persons who were not Brahmans acted as priests, and saints, the "preceptors of gods," by their "austere fervour," rose from a lower rank to the dignity of Brahmanhood. Originally, indeed, access to the gods by prayer

[1] *Life and Essays of H. T. Colebrooke*, i. p. 104.

[2] *History of India.*

[3] "The crudities and cruelties of the caste system need not blind us to its other aspects. There is no doubt that it is the main cause of the fundamental stability and contentment by which Indian society has been braced up for centuries against the shocks of politics and the cataclysms of Nature. It provides every man with his place, his career, his occupation, his circle of friends. It makes him, at the outset, a member of a corporate body: it protects him through life from the canker of social jealousy and unfulfilled aspirations; it ensures him companionship and a sense of community with others in like case with himself. The caste organization is to the Hindu his club, his trade union, his benefit society, his philanthropic society. An Indian without caste, as things stand at present, is not quite easy to imagine." (Sidney Low, *Vision of India*, 1906, ch. xv. p. 263).

[4] Muir's *Sanskrit Texts*, vol. i. (1868).

and sacrifice was open to all classes of the community. As the Brahmans grow in political importance, they make religion an exclusive and sacred business. We find them deciding questions of succession to the throne, and enforcing their decisions. While in the earlier literature there are several instances of Brahmans receiving instruction from the hands of Kshatriyas, in the Puranas and Manu death is made to overtake Kshatriyas who are not submissive to the Brahmans; and in one case Visvamitra, the son of Gadhi, actually obtains Brahmanhood as a reward for his submission. It seems certain that many of the ancient myths were expressly manufactured by the Brahmans to show their superiority in birth and in the favour of Heaven to the Kshatriyas —a poetical effect which is sometimes spoiled by their claiming descent from their rivals. This brings us to a consideration of the theories which have been started to account for the appearance of Brahmanic caste, as it is stereotyped in the Laws of Manu. James Mill, who invariably underestimated the influence on history of "previous states of society," suggested that the original division must have been the work of some inspired individual, a legislator or a social reformer, who perceived the advantages which would result from a systematic division of labour. The subordination of castes he accounts for by the superstitious terror and the designing lust of power which have so frequently been invoked to explain the natural supremacy of the religious class. Because the ravages of war were dreaded most after the calamities sent by heaven, he finds that the military class properly occupy the second place. This arrangement he apparently contemplates as at no time either necessary or wholesome, and as finally destroyed by the selfish jealousies of caste, and by the degradations which the multiplication of trades made inevitable. Heeren[1] and Klaproth have contended that the division into castes is founded on an original diversity of race, and that the higher castes are possessed of superior beauty. The clear complexion and regular features of the Brahmans are said to distinguish them as completely from the Sudras as the Spanish Creoles were distinguished from the Peruvians. "The high forehead, stout build, and light copper colour of the Brahmins and other castes allied to them, appear in strong contrast with the somewhat low and wide heads, slight make, and dark bronze of the low castes" (Stevenson, quoted by Max Müller, *Chips*, ii. p. 327).[2] This explanation is, however, generally conjoined with that founded on the tradition of conquest by the higher castes. There is no doubt that the three castes of lighter colour (traivarnika), the white Brahmans, the red Kshatriyas, the yellow Vaisyas, are, at least in the early hymns and Brahmanas, spoken of as the Aryas, the Sanskrit-speaking conquerors, in contradistinction to the dark cloud of the Turanian aborigines Dasyus. In fact ârya, which means noble, is derived from ărya, which means householder, and was the original name of the largest caste, now called Vaisyas. The great Sanscrit scholar, Rudolf von Roth (1821–1895), in his *Brahma und die Brahmanan*[3] held that the Vedic people advanced from their home in the Punjab, drove the aborigines into the hills, and took possession of the country lying between the Ganges, the Jumna and the Vindhya range. "In this stage of complication and disturbance," he said, "power naturally fell into the hands of those who did not possess any direct authority," *i.e.* the domestic priests of the numerous tribal kings. The Sudras he regarded as a conquered race, perhaps a branch of the Aryan stock, which immigrated at an earlier period into India, perhaps an autochthonous Indian tribe. The latter hypothesis is opposed to the fact that, while the Sudra is debarred from sharing three important Vedic sacrifices, the Bhagasata Purana expressly permits him to sacrifice "without *mantras*," and imposes on him duties with reference to Brahmans and cows which one would not expect in the case of a nation strange in blood. But unless a previous subordination of castes among the conquering race be supposed, it seems difficult to see why the warrior-class, who having contributed most to the conquest must have been masters of the situation, should have consented to degradation below the class of Brahmans. The position of the Sudra certainly suggests conquest. But are there sound historical reasons for supposing that Brahmans and Sudras belonged to different nations, or that either class was confined to one nation? The hypothesis was held in a somewhat modified form by Meiners,[4] who supposed that instead of one conquest there may have been two successive immigrations,—the first immigrants being subdued by the second, and then forming an intermediate class between their conquerors and the aborigines; or, if there were no aborigines, the mixture of the two immigrant races would form an intermediate class. In the same way Talboys Wheeler[5] suggested that the Sudra may be the original conquerors of the race now represented by the Pariahs. Most of these explanations seem rather to describe the mode in which the existing institutions of caste might be transplanted from one land to another, from a motherland to its colonies, and altered by its new conditions. Military conquest, though it often introduces servitude, does not naturally lead to the elevation of the priesthood. It is unscientific to assume large historical events, or large ethnological facts, or the existence of some creator of social order.[6]

As Benjamin Constant[7] points out, caste rests on the religious idea of an indelible stain resting on certain men, and the social idea of certain functions being committed to certain classes. The idea of physical purity was largely developed under the Mosaic legislation; in fact the internal regulations of the Essenes (who were divided into four classes) resemble the frivolous prohibitions of Brahmanism. As the daily intercourse of men in trade and industry presents numberless occasions on which the stain of real or fancied impurity might be caught, the power of the religious class who define the rules of purity and the penalties of their violation becomes very great. Moreover, the Hindus are deeply religious, and therefore naturally prepared for Purohiti or priest-rule. They were also passionately attached to their national hymns, some of which had led them to victory, while others were associated with the benign influences of nature. Only the priest could chant or teach these hymns, and it was believed that the smallest mistake in pronunciation would draw down the anger of the gods. But however favourable the conditions of spiritual dominion might be, it seems to have been by no more natural process than hard fighting that the Brahmans finally asserted their supremacy. We are told that Parasurama, the great hero of the Brahmans, "cleared the earth thrice seven times of the Kshatriya caste, and filled with their blood the five large lakes of Samauta." Wheeler thinks that the substitution of blood-sacrifices for offerings of parched grain, clarified butter and *soma* wine marks an adaptation by the Brahmans of the great military banquets to the purposes of political supremacy. It is not, therefore, till the Brahmanic period of Indian history, which ends with the coming of Sakya Muni, in 600 B.C., that we find the caste-definitions of Manu realized as facts. These are —"To Brahmans he (*i.e.* Brahma) assigned the duties of reading

[1] *Ideen*, i. 610.

[2] The idea of a conquering white race is strangely repeated in the later history of India. The Rajputs and Brahmans are succeeded by the Mussulmans, the Turks, the Afghans. There was an aristocracy of colour under the Mogul dynasty. But under an Indian climate it could not last many generations. The Brahmans of southern India were as black as the lowest castes; the Chandalas are said to be descended from Brahmans. According to Manu the Chandala must not dwell within town; his sole wealth must be dogs and asses; his clothes must consist of the mantles of deceased persons; his dishes must be broken pots. Surely this vituperative description must apply to an aboriginal race.

[3] *Zeitschrift der deutschen morgenländischen Gesellschaft*, Band i. (quoted by Muir, *ubi supra*).

[4] *De Origine Castarum* (Göttingen).

[5] *History of India*, vol. i. (1867–1871).

[6] For a characteristic appreciation of caste see Comte, *Cours de philosophie positive*, vi. c. 8. He regards the hereditary transmission of functions under the rule of a sacerdotal class as a necessary and universal stage of social progress, greatly modified by war and colonization. The morality of caste was, he contends, an improvement on what preceded; but its permanence was impossible, because "the political rule of intelligence is hostile to human progress." The seclusion of women and the preservation of industrial inventions were features of caste; and the higher priests were also magistrates, philosophers, artists, engineers, and physicians.

[7] *De la religion*, ii. 8.

the Vedas, of teaching, of sacrificing, of assisting others to sacrifice, of giving alms if they be rich, and if indigent of receiving gifts."[1] The duties of the Kshatriya are "to defend the people, to give alms, to sacrifice, to read the Veda, to shun the allurements of sensual gratification." The duties of a Vaisya are "to keep herds of cattle, to bestow largesses, to sacrifice, to read the scripture, to carry on trade, to lend at interest, and to cultivate land." These three castes (the twice born) wear the sacred thread. The one duty of a Sudra is "to serve the before-mentioned classes without depreciating their worth."[2] The Brahman is entitled by primogeniture to the whole universe; he may eat no flesh but that of victims; he has his peculiar clothes. He is bound to help military and commercial men in distress. He may seize the goods of a Sudra, and whatever the latter acquires by labour or succession beyond a certain amount. The Sudra is to serve the twice born; and even when emancipated cannot be anything but a Sudra. He may not learn the Vedas, and in sacrifice he must omit the sacred texts. A Sudra in distress may turn to a handicraft; and in the same circumstances a Vaisya may stoop to service. Whatever crime a Brahman might commit, his person and property were not to be injured; but whoever struck a Brahman with a blade of grass would become an inferior quadruped during twenty-one transmigrations. In the state the Brahman was above all the ministers; he was the raja's priest, exempt from taxation, the performer of public sacrifices, the expounder of Manu, and at one time the physician of bodies as well as of souls. He is more liable than less holy persons to pollution, and his ablutions are therefore more frequent. A Kshatriya who slandered a Brahman was to be fined 100 panas (a copper weight of 200 grains); a Vaisya was fined 200 panas; a Sudra was to be whipped. A Brahman slandering any of the lower castes pays 50, 25 or 12 panas. In ordinary salutations a Brahman is asked whether his devotion has prospered; a Kshatriya, whether he has suffered from his wounds; a Vaisya whether his health is secure; a Sudra whether he is in good health.[3] In administering oaths a Brahman is asked to swear by his veracity; a Kshatriya by his weapons, house or elephant; a Vaisya by his kine, grain or goods; a Sudra by all the most frightful penalties of perjury. The Hindu mind is fertile in oaths; before the caste assembly the Dhurm, or caste custom, is sometimes appealed to, or the feet of Brahma, or some cow or god or sacred river, or the bel (the sacred creeper), or the roots of the turmeric plant. The castes are also distinguished by their modes of marriage. Those peculiar to Brahmans seem to be—1st, Brahma, when a daughter, clothed only with a single robe, is given to a man learned in the Veda whom her father has voluntarily invited and respectfully receives; 2nd, Devas or Daiva, when a daughter, in gay attire is given, when the sacrifice is already begun, to the officiating priest. The primitive marriage forms of Rashasas or Rachasa, when a maiden is seized by force from home, while she weeps and calls for help, is said to be appropriate to Kshatriyas. To the two lower castes the ceremony of Asura is open, in which the bridegroom, having given as much wealth as he can afford to the father and paternal kinsman and to the damsel herself, takes her voluntarily as his bride. A Kshatriya woman on her marriage with a Brahman must hold an arrow in her hand; a Vaisya woman marrying one of the sacerdotal or military classes must hold a whip; a Sudra woman marrying one of the upper castes must hold the skirt of a mantle.

How little the system described by Manu applies to the existing castes of India may be seen in these facts—(1) that there is no artisan caste mentioned by Manu; (2) that eating with another caste, or eating food prepared by another caste, is not said by him to involve loss of caste, though these are now among the most frequent sources of degradation. The system must have been profoundly modified by the teaching of Buddha: "As the four rivers which fall into the Ganges lose their names as soon as they mingle their waters with the holy river, so all who believe in Buddha cease to be Brahmans, Kshatriyas, Vaisyas, and Sudras." After Buddha, Sudra dynasties ruled in many parts of India, and under the Mogul dynasty the Cayets, a race of Sudras, had almost a monopoly of public offices. But Buddha did not wish to abolish caste. Thus it is related that a Brahman Pundit who had embraced the doctrines of Buddha nevertheless found it necessary, when his king touched him, to wash from head to foot.[4] Alexander the Great found no castes in the Punjab, but Megasthenes had left an account of the ryots and tradesmen, the military order and the gymnosophists (including the Buddhist Germanes) whom he found in the country of the Ganges.[5] From his use of the word gymnosophist it is probable that Megasthenes confounded the Brahmans with the hermits or fakirs; and this explains his statement that any Hindu might become a Brahman. Megasthenes spent some time at the court of Sandracottus (Chandragupta Maurya), a contemporary of Seleucus Nicator. All the later Greeks[6] follow his statement and concur in enumerating seven Indian castes —sophists, agriculturists, herdsmen, artisans, warriors, inspectors, councillors. On the revival of Brahmanism it was found that the second and third castes had disappeared, and that the field was now occupied by the Brahmans, the Sudras, and a host of mixed castes, sprung from the original twelve, Unulum and Prutilum, left-hand and right-hand, which were formed by the crossing of the four original castes. Manu himself gives a list of these impure castes, and the Ain-i-Akbari (1556–1605) makes the positive statement that there were then 500 tribes bearing the name of Kshatriya, while the real caste no longer existed. Most of these subdivisions are really trade-organizations, many of them living in village-communities, which trace descent from a pure caste. Thus in Bengal there are the Vaidya or Baidya, the physicians, who, Manu says, originated in the marriage of a Brahman father and a Vaisya mother.

As Colebrooke said, Brahmans and Sudras enter into all trades, but Brahmans (who are profoundly ignorant even of their own scriptures) have succeeded in maintaining their monopoly of Vedic learning, which really means a superficial acquaintance with the Puranas and Manu. Though they have succeeded in excluding others from sacred employment, only a portion of the caste are actually engaged in religious ceremonies, in sacred study, or even in religious begging. Many are privates in the army, many water-carriers, many domestic servants. And they have, like other castes, many subdivisions which prevent intimate association and intermarriage. The ideal Brahman is gone: the priest "with his hair and beard clipped, his passions subdued, his mantle white, his body pure, golden rings in his ear." But the hold which caste has on the Hindu minds may, perhaps, be most clearly seen in the history of the Christian missions and in comparatively recent times. The Jesuits Xavier and Fra dei

[1] The great mass of the Brahmans were in reality mendicants, who lived on the festivals of birth, marriage, and death, and on the fines exacted for infractions of caste rule. Others had establishments called Muths, endowed with Jagir villages. There were two distinct orders of officiating priests—the Purohita, or family priest, who performed all the domestic rites, and probably gave advice in secular matters, and the Guru, who is the head of a religious sect, making tours of superintendence and exaction, and having the power to degrade from caste and to restore. In some cases the Guru is recognized as the Mehitra or officer of the caste assembly, from whom he receives Huks, or salary, and an exemption from house and stamp taxes, and service as begarree (Steele's *Law and Customs of Hindoo Castes within the Dekhan Provinces*, 1826; later edition, 1868). Expulsion from caste follows on a number of moral offences (*e.g.* assault, murder, &c.), as well as ceremonial offences (*e.g.* eating prohibited food, eating with persons of lower caste, abstaining from funeral rites, having connexion with a low-caste woman). Exclusion means that it is not allowed to eat with or enter the houses of the members of the caste, the offender being in theory not degraded but dead. For some heinous offences, *i.e.* against the express letter of the Shasters, no readmission is possible. But generally this depends on the ability of the out-caste to pay a fine, and to supply the caste with an expiatory feast of sweetmeats. He has also to go through the Sashtanyam, or prostration of eight members, and to drink the Panchakaryam, *i.e.* drink of the five products of the cow (*Description of People of India*, Abbé J. A. Dubois, Missionary in Mysore, Eng. Trans., London, 1817; edition by Pope, Madras, 1862).

[2] *Manu*, x. 88-90. [3] Wheeler ii. 533.

[4] *Travels of Fah Hian*, c. 27. [5] Strabo, *Ind.* sec. 59.

[6] Arrian, *Indic.* c. 11, 12; Diod. Sic. ii. c. 40, 41; and Strabo xv. 1.

Nobili did everything but become Brahmans in order to convert the south of India—they put on a dress of cavy or yellow colour, they made frequent ablutions, they lived on vegetables and milk, they put on their foreheads the sandalwood paste used by the Brahmans—and Gregory XV. published a bull sanctioning caste regulations in the Christian churches of India. The Danish mission of Tranquebar, the German mission of the heroic Schwarz, whose headquarters were Tanjore, also permitted caste to be retained by their followers. Even the priests of Buddha, whose life was a protest against caste, re-erected the system in the island of Ceylon, where the *radis* or *radias* were reduced to much the same state as the Pariahs.[1] Protestant missions have made but little progress, even in recent years. The number of native converts to Christianity rose from 1,246,000 in 1872 to 2,664,000 in 1901; these figures, however, are by themselves rather misleading, for Christianity appears to have touched the higher classes in India not at all, only the out-castes.

It is still the general law that to constitute a good marriage the parties must belong to the same caste, but to unconnected families. Undoubtedly, however, the three higher castes were always permitted to intermarry with the caste next below their own, the issue taking the lower caste or sometimes forming a new class. A Sudra need not marry a wife of the same caste or sect as himself. In 1871 it was decided by the judicial committee of the privy council that a marriage between a zemindar (landowner) of the Malavar class, a subdivision of the Sudra caste, with a woman of the Vellala class of Sudras is lawful. Generally also a woman may not marry beneath her own caste. The feeling is not so strong against a man marrying even in the lowest caste, for Manu permits the son of a Brahman and a Sudra mother to raise his family to the highest caste in the seventh generation. The illegitimacy resulting from an invalid marriage does not render incapable of caste; at least it does not so disqualify the lawful children of the bastard. On a forfeiture of caste by either spouse intercourse ceases between the spouses: if the out-caste be a sonless woman, she is accounted dead, and funeral rites are performed for her; if she have a son, he is bound to maintain her. It is remarkable that the professional concubinage of the dancing-girl does not involve degradation, if it be with a person of the same caste. This suggests that whatever may be the function of caste, it is not a safe guardian of public morality. The rules as to prohibited degrees in marriage used to be very strict, but they are now relaxed. An act of 1856 legalized remarriage by widows in all the castes, with a conditional forfeiture of the deceased husband's estate, unless the husband has expressly sanctioned the second marriage. The later Indian Marriage Act was directed against the iniquitous child marriages; it requires a *minimum* age. In many ways the theoretical inferiority of the Sudra absolves him from the restraints which the letter of the law lays on the higher castes. Thus a Sudra may adopt a daughter's or sister's son, though this is contrary to the general rule that the adopter should be able to marry the mother of the adopted person. The rule requiring the person adopted to be of the same caste and *gotra* or family as the adopter is also dispensed with in the case of Sudras. In fact, it is only a married person whom a Sudra may not adopt. As regards inheritance the Sudra does not come off so well in competition with the other castes. "The sons of a Brahamana in the several tribes have four shares or three or two or one; the children of a Kshatriya have three portions or two or one; and those of a Vaisya take two parts or one." This refers to the case permitted by law, and not unknown in practice, of a Brahman having four wives of different castes, a Kshatriya three, and so on. But all sons of inferior caste are excluded from property coming by gift to the father; and a Sudra son is also excluded from land acquired by purchase. It must be recollected, however, that under an act of 1850, *loss* of caste no longer affects the capacity to inherit or to be adopted. In cases of succession *ab intestato* on failure of the preceptor, pupil, and fellow-student (heirs called by the Hindu law after relatives), a priest, or any Brahman, many succeed. Where a Sudra is the only son of a Brahman, the Sapinda, or next of kin, would take two-thirds of the inheritance; where he is the only son of any other twice-born father, the Sapinda would take one-half. Possibly, the rule of equal division among sons of equal caste did not at first apply to Brahmans, who, as the eldest sons of God, would perhaps observe the custom of primogeniture among themselves. On the other hand it was laid down in the judicial committee in 1869, contrary to the collected opinions of the Pundits of the Sudder court, that, in default of lawful children, the illegitimate children of the Sudra caste inherit their putative father's estate, and, even if there be lawful children, are entitled to maintenance out of the estate. It had previously been decided by Sir Edward Ryan in 1857 that the illegitimate children of a Rajput, or of any other member of a superior caste, have no right of inheritance even under will, but a mere right to maintenance, provided the children are docile. It seems then that the Kshatriya and Vaisya castes, though in one sense non-existent, still control Hindu succession.

With regard to Persia the *Zend Avesta* speaks of a fourfold division of the ancient inhabitants of Iran into priests, warriors, agriculturists and artificers; and also of a sevenfold division corresponding to the seven amschespands, or servants of Ormuzd. This was no invention of Zoroaster, but a tradition from the golden age of Jemshid or Diemschid. The priestly caste of Magi was divided into Herbeds or disciples, Mobeds or masters, and Destur Mobeds or complete masters. The last-named were alone entitled to read the liturgies of Ormuzd; they alone predicted the future and carried the sacred *costi*, or girdle, *havan*, or cup, and *barsom*, or bunch of twigs. The Zend word *baresma* is supposed to be connected with Brahma, or sacred element, of which the symbol was a bunch of kusa grass, generally called veda. The Persian and Hindu religions are further connected by the ceremony called Homa in the one and Soma in the other. Haug, in his *Tract on the Origin of Brahmanism* (quoted by Muir, *ubi supra*), maintains that the division in the *Zend Avesta* of the followers of Ahura Mazda into Atharvas, Rathaesvas, and Vastrya was precisely equivalent to the three superior Indian castes. He also asserts that only the sons of priests (Atharvas) could become priests, a rule still in force among the Parsis. The Book of Daniel rather suggests that the Magi were an elective body; and as regards the secular classes there does not seem to be a trace of hereditary employment or religious subordination. There is a legend in the Dabistan of a great conqueror, Mahabad, who divided the Abyssinians into the usual four castes; and Strabo mentions a similar classification of the Iberians into kings, priests, soldiers, husbandmen and menials.

At one time it was the universal opinion that in Egypt there were at least two great castes, priests and warriors, the functions of which were transmitted from father to son, the minor professions grouped under the great castes being also subject to hereditary transmission. This opinion was held by Otfried Müller,[2] Meiners of Göttingen, and others. Doubts were first suggested by Rossellini, and after Champollion had deciphered the hieroglyphic inscriptions, J. J. Ampère[3] boldly announced that there were in Egypt no castes strictly so called; that in particular the professions of priest, soldier, judge, &c., were not hereditary; and that the division of Egyptian society was merely that which is generally found in certain stages of social growth between the liberal professions and the mechanical arts and trades. No difference of colour, or indeed of any feature, has been observed in the monumental pictures of the different Egyptian castes. From an inspection of numerous tombs, sarcophagi, and funeral stones, which frequently enumerate the names and professions of several kinsfolk of the deceased, Ampère concluded that sacerdotal and military functions were sometimes united in the same person, and might even be combined with civil functions; that intermarriage might certainly take place between the sacred and military orders; and that the members of the same natural family did frequently adopt the different occupations which had been supposed to be the exclusive property of the castes. The tombs of Beni Hassan show in a striking manner the

[1] Irving, *Theory and Practice of Caste* (London, 1859).

[2] *Manual of Archaeology.*

[3] *Revue des deux mondes*, 15th September 1848.

Egyptian tendency to accumulate, rather than to separate, employments. Occasionally families were set apart for the worship of a particular divinity. An interesting "section" of Egyptian society is afforded by a granite monument preserved in the museum at Naples. Nine figures in bas-relief represent the deceased, his father, three brothers, a paternal uncle, and the father and two brothers of his wife. Another side contains the mother, wife, wife's mother and maternal aunts. The deceased is described as a military officer and superintendent of buildings; his elder brother as a priest and architect; his third brother as a provincial governor, and his father as a priest of Ammon. The family of the wife is exclusively sacerdotal. Egyptian caste, therefore, permitted two brothers to be of different castes, and one person to be of more castes than one, and of different castes from those to which his father or wife belonged. The lower employments, commerce, agriculture, even medicine, are never mentioned on the tombs. The absolute statements about caste in Egypt, circulated by such writers as Reynier and De Goguet, have, no doubt, been founded on passages in Herodotus (ii. 143, 164), who mentions seven classes, and makes war an hereditary profession; in Diodorus Siculus (i. 2-8), who mentions five classes and a hereditary priesthood; and in Plato, who, anxious to illustrate the principle of compulsory division of labour, on which his republic was based, speaks in the *Timaeus* of a total separation of the six classes—priests, soldiers, husbandmen, artisans, hunters and shepherds. Heeren (ii. 594) does not hesitate to ascribe the formation of Egyptian caste to the meeting of different races. According to the chronology constructed by Bunsen the division into castes began in the period 10,000–9000, and was completed along with the introduction of animal worship and the improvement of writing under the third dynasty in the 6th or 7th century of the Old Empire. The Scholiast of Apollonius Rhodius, on the authority of Dicaearchus, in the Second Book of *Hellas*, mentions a king, Sesonchosis, who, about 3712 B.C., "enacted that no one should abandon his father's trade, for this he considered as leading to avarice." Bunsen conjectures that this may refer to Sesostoris, the lawgiver of Manetho's third or Memphite dynasty, the eighth from Menes, who introduced writing, building with hewn stone, and medicine; possibly, also, to Sesostris, who, Aristotle says (*Polit.* vii. 1), introduced caste to Crete. He further observes that in Egypt there was never a conquered indigenous race. There was one nation with one language and one religion; the public panegyrics embraced the whole people; every Egyptian was the child and friend of the gods. The kings were generally warriors, and latterly adopted into the sacerdotal caste. Intermarriage was the rule, except between the swineherds and all other classes. "Every shepherd is an abomination unto the Egyptians" (Gen. xlvi. 34).

The comprehensive essay by Sir H. H. Risley in the introductory volume of the Indian Census Report for 1901 is the best recent account of caste in India. See also, besides the works mentioned in the text, Sir Denzil Ibbetson's *Report on the Punjab Census* (1881); W. Crooke, *Things Indian* (1905) and other books by this author on Indian religion and caste; Sevort, *Les Castes dans l'Inde* (1896); Jogendra Nath Bhattacharya, *Hindu Castes and Sects* (1896). There is an interesting chapter on the subject in Sidney Low's *Vision of India* (1906). See also INDIA, INDIAN LAW, and HINDUISM.

CASTEL, LOUIS BERTRAND (1688–1757), French mathematician, was born at Montpellier on the 11th of November 1688, and entered the order of the Jesuits in 1703. Having studied literature, he afterwards devoted himself entirely to mathematics and natural philosophy. He wrote several scientific works, that which attracted most attention at the time being his *Optique des couleurs* (1740), or treatise on the melody of colours. He endeavoured to illustrate the subject by a *clavecin oculaire*, or ocular harpsichord; but the treatise and the illustration were quickly forgotten. He also wrote *Mathématique universelle* (1728) and *Traité de physique sur la pesanteur universelle des corps* (1724). He also published a critical account of the system of Sir Isaac Newton in French in 1743.

CASTELAR Y RIPOLL, EMILIO (1832–1899), Spanish statesman, was born at Cadiz on the 8th of September 1832. At the age of seven he lost his father, who had taken an active part in the progressist agitations during the reign of Ferdinand VII., and had passed several years as an exile in England. He attended a grammar-school at Sax. In 1848 he began to study law in Madrid, but soon elected to compete for admittance at the school of philosophy and letters, where he took the degree of doctor in 1853. He was an obscure republican student when the Spanish revolutionary movement of 1854 took place, and the young liberals and democrats of that epoch decided to hold a meeting in the largest theatre of the capital. On that occasion Castelar delivered his maiden speech, which at once placed him in the van of the advanced politicians of the reign of Queen Isabella. From that moment he took an active part in politics, radical journalism, literary and historical pursuits. Castelar was compromised in the first rising of June 1866, which was concerted by Marshal Prim, and crushed, after much bloodshed, in the streets by Marshals O'Donnell and Serrano. A court-martial condemned him *in contumaciam* to death by "garote vil," and he had to hide in the house of a friend until he escaped to France. There he lived two years until the successful revolution of 1868 allowed him to return and enter the Cortes for the first time—as deputy for Saragossa. At the same time he resumed the professorship of history at the Madrid university. Castelar soon became famous by his rhetorical speeches in the Constituent Cortes of 1869, where he led the republican minority in advocating a federal republic as the logiçal outcome of the recent revolution. He thus gave much trouble to men like Serrano, Topete and Prim, who had never harboured the idea of drifting into advanced democracy, and who had each his own scheme for re-establishing the monarchy with certain constitutional restrictions. Hence arose Castelar's constant and vigorous criticisms of the successive plans mooted to place a Hohenzollern, a Portuguese, the duke of Montpensier, Espartero and finally Amadeus of Savoy on the throne. He attacked with relentless vigour the short-lived monarchy of Amadeus, and contributed to its downfall.

The abdication of Amadeus led to the proclamation of the federal republic. The senate and congress, very largely composed of monarchists, permitted themselves to be dragged along into democracy by the republican minority headed by Salmeron, Figueras, Pi y Margall and Castelar. The short-lived federal republic from the 11th of February 1873 to the 3rd of January 1874 was the culminating point of the career of Castelar, and his conduct during those eleven months was much praised by the wiser portion of his fellow-countrymen, though it alienated from him the sympathies of the majority of his quondam friends in the republican ranks.

Before the revolution of 1868, Castelar had begun to dissent from the doctrines of the more advanced republicans, and particularly as to the means to be employed for their success. He abhorred bloodshed, he disliked mob rule, he did not approve of military *pronunciamientos*. His idea would have been a parliamentary republic on the American lines, with some traits of the Swiss constitution to keep in touch with the regionalist and provincialist inclinations of many parts of the peninsula. He would have placed at the head of his commonwealth a president and Cortes freely elected by the people, ruling the country in a liberal spirit and with due respect for conservative principles, religious traditions and national unity. Such a statesman was sure to clash with the doctrinaires, like Salmeron, who wanted to imitate French methods; with Pi y Margall, who wanted a federal republic after purely Spanish ideas of decentralization; and above all with the intransigent and gloomy fanatics who became the leaders of the cantonal insurrections at Cadiz, Seville, Valencia, Malaga and Cartagena in 1873.

At first Castelar did his best to work with the other republican members of the first government of the federal republic. He accepted the post of minister for foreign affairs. He even went so far as to side with his colleagues, when serious difficulties arose between the new government and the president of the Cortes, Señor Martos, who was backed by a very imposing commission composed of the most influential conservative members of the last parliament of the Savoyard king, which had

suspended its sittings shortly after proclaiming the federal republic. A sharp struggle was carried on for weeks between the executive and this commission, at first presided over by Martos, and, when he resigned, by Salmeron. In the background Marshal Serrano and many politicians and military men steadily advocated a *coup d'état* in order to avert the triumph of the republicans. The adversaries of the executive were prompted by the captain-general of Madrid, Pavia, who promised the co-operation of the garrison of the capital. The president, Salmeron, and Marshal Serrano himself lacked decision at the last moment, and lost time and many opportunities by which the republican ministers profited. The federal republicans became masters of the situation in the last fortnight of April 1873, and turned the tables on their adversaries by making a pacific bloodless *pronunciamiento*.

The battalions of the militia that had assembled in the bull-ring near Marshal Serrano's house to assist the anti-democratic movement were disarmed, and their leaders, the politicians and generals, were allowed to escape to France or Portugal. The Cortes were dissolved, and the federal and constituent Cortes of the republic convened, but they only sat during the summer of 1873, long enough to show their absolute incapacity, and to convince the executive that the safest policy was to suspend the session for several months.

This was the darkest period of the annals of the Spanish revolution of 1873–1874. Matters got to such a climax of disorder, disturbance and confusion, from the highest to the lowest strata of Spanish society, that the president of the executive, Figueras, deserted his post and fled the country. Pi y Margall and Salmeron, in successive attempts to govern, found no support in the really important and influential elements of Spanish society. Salmeron had even to appeal to such well-known reactionary generals as Pavia, Sanchez, Bregna and Moriones, to assume the command of the armies in the south and in the north of Spain. Fortunately these officers responded to the call of the executive. In less than five weeks a few thousand men properly handled sufficed to quell the cantonal risings in Cordoba, Sevilla, Cadiz and Malaga, and the whole of the south might have been soon pacified, if the federal republican ministers had not once more given way to the pressure of the majority of the Cortes, composed of "Intransigentes" and radical republicans. The president, Salmeron, after showing much indecision, resigned, but not until he had recalled the general in command in Andalusia, Pavia. This resignation was not an unfortunate event for the country, as the federal Cortes not only made Castelar chief of the executive, though his partisans were in a minority in the Parliament, but they gave him much liberty to act, as they decided to suspend the sittings of the house until 2nd January 1874. This was the turning-point of the Spanish revolution, as from that day the tide set in towards the successive developments that led to the restoration of the Bourbons. .

On becoming the ruler of Spain at the beginning of September 1873, Castelar at once devoted his attention to the reorganization of the army, whose numbers had dwindled down to about 70,000 men. This force, though aided by considerable bodies of local militia and volunteers in the northern and western provinces, was insufficient to cope with the 60,000 Carlists in arms, and with the still formidable nucleus of cantonalists around Alcoy and Cartagena. To supply the deficiencies Castelar called out more than 100,000 conscripts, who joined the colours in less than six weeks. He selected his generals without respect of politics, sending Moriones to the Basque provinces and Navarre at the head of 20,000 men, Martinez Campos to Catalonia with several thousand, and Lopez Dominguez, the nephew of Marshal Serrano, to begin the land blockade of the last stronghold of the cantonal insurgents, Cartagena, where the crews of Spain's only fleet had joined the revolt.

Castelar next turned his attention to the Church. He renewed direct relations with the Vatican, and at last induced Pope Pius IX. to approve his selection of two dignitaries to occupy vacant sees as well as his nominee for the vacant archbishopric of Valencia, a prelate who afterwards became archbishop of Toledo, and remained to the end a close friend of Castelar. He put a stop to all persecutions of the Church and religious orders, and enforced respect of Church property. He attempted to restore some order in the treasury and administration of finance, with a view to obtain ways and means to cover the expense of the three civil wars, Carlist, cantonal and Cuban. The Cuban insurgents gave him much trouble and anxiety, the famous *Virginius* incident nearly leading to a rupture between Spain and the United States. Castelar sent out to Cuba all the reinforcements he could spare, and a new governor-general, Jovellar, whom he peremptorily instructed to crush the mutinous spirit of the Cuban militia, and not allow them to drag Spain into a conflict with the United States. Acting upon the instructions of Castelar, Jovellar gave up the filibuster vessels, and those of the crew and passengers who had not been summarily shot by General Burriel. Castelar always prided himself on having terminated this incident without too much damage to the prestige of Spain.

At the end of 1873 Castelar had reason to be satisfied with the results of his efforts, with the military operations in the peninsula, with the assistance he was getting from the middle classes and even from many of the political elements of the Spanish revolution that were not republican. On the other hand, on the eve of the meeting of the federal Cortes, he could indulge in no illusions as to what he had to expect from the bulk of the republicans, who openly dissented from his conservative and conciliatory policy, and announced that they would reverse it on the very day the Cortes met. Warnings came in plenty, and no less a personage than the man he had made captain-general of Madrid, General Pavia, suggested that, if a conflict arose between Castelar and the majority of the Cortes, not only the garrison of Madrid and its chief, but all the armies in the field and their generals, were disposed to stand by the president. Castelar knew too well what such offers meant in the classic land of *pronunciamientos*, and he refused so flatly that Pavia did not renew his advice. The sequel is soon told. The Cortes met on the 2nd of January 1874. The intransigent majority refused to listen to a last eloquent appeal that Castelar made to their patriotism and common sense, and they passed a vote of censure. Castelar resigned. The Cortes went on wrangling for a day and night until, at daybreak on the 3rd of January 1874, General Pavia forcibly ejected the deputies, closed and dissolved the Cortes, and called up Marshal Serrano to form a provisional government.

Castelar kept apart from active politics during the twelve months that Serrano acted as president of the republic. Another *pronunciamiento* finally put an end to it in the last week of December 1874, when Generals Campos at Sagunto, Jovellar at Valencia, Primo de Rivera at Madrid, and Laserna at Logroño, proclaimed Alphonso XII. king of Spain. Castelar then went into voluntary exile for fifteen months, at the end of which he was elected deputy for Barcelona. He sat in all subsequent parliaments, and just a month before his death he was elected as representative of Murcia. During that period he became even more estranged from the majority of the republicans. Bitter experience had shown him that their federal doctrines and revolutionary methods could lead to nothing in harmony with the aspirations of the majority of Spaniards. He elected, to use his own words, to defend and to seek the realization of the substance of the programme of the Spanish revolution of 1868 by evolution, and legal, pacific means. Hence the contrast between his attitude from 1876 to 1886, during the reign of Alphonso XII., when he stood in the front rank of the Opposition to defend the reforms of that revolution against Señor Canovas, and his attitude from 1886 to 1891. In this latter period Castelar acted as a sort of independent auxiliary of Sagasta and of the Liberal party. As soon as Castelar saw universal suffrage re-established he solemnly declared in the Cortes that his task was accomplished, his political mission at an end, and that he proposed to devote the remainder of his life to those literary, historical, philosophical, and economic studies which he had never neglected even in the busiest days of his political career. Indeed, it was his extraordinary activity and power of

assimilation in such directions that allowed him to keep his fellow-countrymen so well informed of what was going on in the outer world. His literary and journalistic labours occupied much of his time, and were his chief means of subsistence. He left unfinished a history of Europe in the 19th century. The most conspicuous of his earlier works were:—*A History of Civilization in the First Five Centuries of Christianity, Recollections of Italy, Life of Lord Byron, The History of the Republican Movement in Europe, The Redemption of Slaves, The Religious Revolution, Historical Essays on the Middle Ages, The Eastern Question, Fra Filippo Lippi, History of the Discovery of America*, and some historical novels. Castelar died near Murcia on the 25th of May 1899, at the age of 66. His funeral at Madrid was an imposing demonstration of the sympathy and respect of all classes and parties. (A. E. H.)

CASTELFRANCO NELL' EMILIA, a town of Emilia, Italy, in the province of Bologna, 16 m. N.W. by rail from the town of Bologna. Pop. (1901) 3163 (town), 13,484 (commune). The churches contain some pictures by later Bolognese artists. Just outside the town is a massive fort erected by Urban VIII. in 1628, on the frontier of the province of Bologna, now used as a prison. Castelfranco either occupies or lies near the site of the ancient Forum Gallorum, a place on the Via Aemilia between Mutina and Bononia, where in 43 B.C. Octavian and Hirtius defeated Mark Antony.

CASTELFRANCO VENETO, a town and episcopal see of Venetia, Italy, in the province of Treviso, 16 m. W. by rail from the town of Treviso. Pop. (1901) 5220 (town), 12,551 (commune). The older part of the town is square, surrounded by medieval walls and towers constructed by the people of Treviso in 1218 (see CITTADELLA). It was the birthplace of the painter Giorgio Barbarelli (Il Giorgione, 1477–1512), and the cathedral contains one of his finest works, the Madonna with SS. Francis and Liberalis (1504), in the background of which the towers of the old town may be seen.

CASTELL, EDMUND (1606–1685), English orientalist, was born in 1606 at Tadlow, in Cambridgeshire. At the age of fifteen he entered Emmanuel College, Cambridge, but afterwards changed his residence to St John's, on account of the valuable library there. His great work was the compiling of his *Lexicon Heptaglotton Hebraicum, Chaldaicum, Syriacum, Samaritanum, Aethiopicum, Arabicum, et Persicum* (1669). Over this book he spent eighteen years, working (if we may accept his own statement) from sixteen to eighteen hours a day; he employed fourteen assistants, and by an expenditure of £12,000 brought himself to poverty, for his lexicon, though full of the most unusual learning, did not find purchasers. He was actually in prison in 1667 because he was unable to discharge his brother's debts, for which he had made himself liable. A volume of poems dedicated to the king brought him preferment. He was made prebendary of Canterbury and professor of Arabic at Cambridge. Before undertaking the *Lexicon Heptaglotton*, Castell had helped Dr Brian Walton in the preparation of his Polyglott Bible. His MSS. he bequeathed to the university of Cambridge. He died in 1685 at Higham Gobion, Bedfordshire, where he was rector.

The Syriac section of the *Lexicon* was issued separately at Göttingen in 1788 by J. D. Michaelis, who offers a tribute to Castell's learning and industry. Trier published the Hebrew section in 1790–1792.

CASTELLAMMARE DI STABIA (anc. *Stabiae*), a seaport and episcopal see of Campania, Italy, in the province of Naples, 17 m. S.E. by rail from the town of Naples. Pop. (1901) town, 26,378; commune, 32,589. It lies in the south-east angle of the Bay of Naples, at the beginning of the peninsula of Sorrento, and owing to the sea and mineral water baths (12 different springs) and its attractive situation, with a splendid view of Vesuvius and fine woods on the hills behind, it is a favourite resort of foreigners in spring and autumn and of Neapolitans in summer. The castle from which it takes its name, on the hill to the south of the town, was built by the emperor Frederick II. There are three large churches of the late 18th century. There are a large royal dockyard and a small-arms factory; there are also iron works, cotton, flour and macaroni mills. The value of imports (chiefly coal, wheat, scrap-iron and cheese) for 1904 was £1,239,048, and the value of exports (chiefly macaroni and green fruit) £769,100. There is also a sponge trade, but the former coral trade is depressed. The port was cleared by 420 vessels of 477,713 tonnage in 1905. An electric tramway along the coast road to Sorrento was opened in 1905.

CASTELLESI, ADRIANO (*c.* 1460?–*c.* 1521?), known also as CORNETO from his birthplace, Italian cardinal and writer, was sent by Innocent VIII. to reconcile James III. of Scotland with his subjects. While in England he was appointed (1503), by Henry VII., to the see of Hereford, and in the following year to the more lucrative diocese of Bath and Wells, but he never resided in either. Returning to Rome, he became secretary to Alexander VI. and was made by him cardinal (May 31, 1503). A man of doubtful reputation, Alexander's confidant and favourite, he paid the pope a large sum for his elevation. He bought a *vigna* in the Borgo near the Vatican, and thereon erected a sumptuous palace after designs by Bramante; and it was here, in the summer of 1503, that he entertained the pope and Cesare Borgia at a banquet that went on till nightfall despite the unhealthy season of the year, when ague in its most malignant form was rife. Of the three, Cardinal Adrian was the first to fall ill, the pope succumbing a week after. The story of the poisoning of the pope is to be relegated to the realm of fiction. Soon after the election of Leo X. the cardinal was implicated in the conspiracy of Cardinal Petrucci against the pope, and confessed his guilt; but, pardon being offered only on condition of the payment of 25,000 ducats, he fled from Rome and was subsequently deposed from the cardinalate. As early as 1504 he had presented his palace (now the Palazzo Giraud-Torlonia) to Henry VII. as a residence for the English ambassador to the Holy See; and on his flight Henry VIII., who had quarrelled with him, gave it to Cardinal Campeggio. Adrian first fled to Venice. Of his subsequent history nothing is known for certain. It is said that he was murdered by a servant when on his way to the conclave that elected Adrian VI. As a writer, he was one of the first to restore the Latin tongue to its pristine purity; and among his works are *De Vera Philosophia ex quatuor doctoribus ecclesiae* (Bologna, 1507), *De Sermone Latino* (Basel, 1513), and a poem, *De Venatione* (Venice, 1534).

See Polydore Vergil, *Anglicae historiae*, edited by H. Ellis (London, 1844); and A. Aubéry, *Histoire générale des cardinaux* (Paris, 1642). (E. TH.)

CASTELLI, IGNAZ FRANZ (1781–1862), Austrian dramatist, was born at Vienna on the 6th of March 1781. He studied law at the university, and then entered the government service. During the Napoleonic invasions his patriotism inspired him to write stirring war songs, one of which, *Kriegslied für die österreichische Armee*, was printed by order of the archduke Charles and distributed in thousands. For this Castelli was proclaimed by Napoleon in the *Moniteur*, and had to seek refuge in Hungary. In 1815 he accompanied the allies into France as secretary to Count Cavriani, and, after his return to Vienna, resumed his official post in connexion with the estates of Lower Austria. In 1842 he retired to his property at Lilienfeld, where, surrounded by his notable collections of pictures and other art treasures, he for the rest of his life devoted himself to literature. Castelli's dramatic talent was characteristically Austrian; his plays were well constructed and effective and satirized unsparingly the foibles of the Viennese. But his wit was too local and ephemeral to appeal to any but his own generation, and if he is remembered at all to-day it is by his excellent *Gedichte in niederösterreichischer Mundart* (1828). He died at Lilienfeld on the 5th of February 1862.

Castelli's *Gesammelte Gedichte* appeared in 1835 in 6 vols.; a selection of his *Werke* in 1843 in 15 vols. (2nd ed., 1848), followed by 6 supplementary volumes in 1858. His autobiography, *Memoiren meines Lebens*, appeared in 1861–1862 in 4 vols.

CASTELLO, BERNARDO (1557–1629), Genoese portrait and historical painter, born at Albaro near Genoa, was the intimate friend of Tasso, and took upon himself the task of designing the figures of the *Gerusalemme Liberata*, published in 1592;

some of these subjects were engraved by Agostino Caracci. Besides painting a number of works in Genoa, mostly in a rapid and superficial style, Castello was employed in Rome and in the court of the duke of Savoy.

CASTELLO, GIOVANNI BATTISTA (1500?–1569?), Italian historical painter, was born near Bergamo in 1500 or perhaps 1509, and is hence ordinarily termed Il Bergamasco. He belongs, however, to the school of Genoa, but does not appear to have had any family relationship with the other two painters named Castello, also noticed here. He was employed to decorate the Nunziata di Portoria in Genoa, the saloon of the Lanzi Palace at Gorlago, and the Pardo Palace in Spain. His best-known works are the "Martyrdom of St Sebastian," and the picture of "Christ as Judge of the World" on one of the vaultings of the Annunziata. He was an architect and sculptor as well as painter. In 1567 he was invited to Madrid by Philip II., and there he died, holding the office of architect of the royal palaces. The date of death (as of birth) is differently stated as 1569 or 1579.

CASTELLO, VALERIO (1625–1659), Italian painter, was the youngest son of Bernardo Castello (*q.v.*). He surpassed his father, and particularly excelled in painting battle-scenes. He painted the "Rape of the Sabines," now in the Palazzo Brignole, Genoa, and decorated the cupola of the church of the Annunziata in the same city. In these works he is regarded by his admirers as combining the fire of Tintoretto with the general style of Paolo Veronese.

CASTELLO BRANCO, CAMILLO, Visconde de Correia Botelho (1825–1890), Portuguese novelist, was born out of wedlock and lost his parents in infancy. He spent his early years in a village in Traz-os-Montes. He learnt to love poetry from Camoens and Bocage, while Mendes Pinto gave him a lust for adventure, but he dreamed more than he read, and grew up undisciplined and proud. He studied in Oporto and Coimbra with much irregularity, and since his disdain for the intrigues and miseries of politics in Portugal debarred him from the chance of a government post, he entered the career of letters to gain a livelihood. After a spell of journalistic work in Oporto and Lisbon he proceeded to the Episcopal seminary in the former city with a view of studying for the priesthood, and during this period wrote a number of religious works and translated Chateaubriand. He actually took minor orders, but his restless nature prevented him from following one course for long and he soon returned to the world, and henceforth kept up a feverish literary activity to the end. He was created a viscount in 1885 in recognition of his services to letters, and when his health finally broke down and he could no longer use his pen, parliament gave him a pension for life. When, having lost his sight, and suffering from chronic nervous disease, he died by his own hand in 1890, it was generally recognized that Portugal had lost the most national of her modern writers.

Apart from his plays and verses, Castello Branco's works may be divided into three sections. The first comprises his romances of the imagination, of which *Os mysterios de Lisboa*, in the style of Victor Hugo, is a fair example. The second includes his novels of manners, a style of which he was the creator and remained the chief exponent until the appearance of *O Crime de Padre Amaro* of Eça de Queiroz. In these he is partly idealist and partly realist, and describes to perfection the domestic and social life of Portugal in the early part of the 19th century. The third division embraces his writings in the domain of history, biography and literary criticism. Among these may be cited *Noites de Lamego*, *Cousas leves e pesadas*, *Cavar em ruinas*, *Memorias do Bispo do Grão Para* and *Bohemia do Espirito*.

In all, his publications number about two hundred and sixty, belonging to many departments of letters, but he owes his great and lasting reputation to his romances. Notwithstanding the fact that his slender means obliged him to produce very rapidly to the order of publishers, who only paid him from £30 to £60 a book, he never lost his individuality under the pressure. Knowing the life of the people by experience and not from books, he was able to fix in his pages a succession of strongly marked and national types, such as the *brazileiro*, the old *fidalgo* of the north, and the Minho priest, while his lack of personal acquaintance with foreign countries and his relative ignorance of their literatures preserved him from the temptation, so dangerous to a Portuguese, of imitating the classical writers of the larger nations. Among the most notable of his romances are *O Romance de un Homem Rico*, his favourite, *Retrato de Ricardina*, *Amor de Perdição*, and the magnificent series entitled *Novellas do Minho*. Many of his novels are autobiographical, like *Onde está a felicidade*, *Memorias do Carcere* and *Vingança*. Castello Branco is an admirable story-teller, largely because he was a brilliant improvisatore, but he does not attempt character study. Nothing can exceed the richness of his vocabulary, and no other Portuguese author has shown so profound a knowledge of the popular language. Though nature had endowed him with the poetic temperament, his verses are mediocre, but his best plays are cast in bold lines and contain really dramatic situations, while his comedies are a triumph of the grotesque, with a mordant vein running through them that recalls Gil Vicente.

The collected works of Camillo Castello Branco are published by the Companhia Editora of Lisbon, and his most esteemed books have had several editions. The *Diccionario Bibliographico Portuguez*, vol. ix. p. 7 et seq., contains a lengthy but incomplete list of his publications. See *Romance do Romancista*, by A. Pimentel, a badly put together but informing biography; also a study on the novelist by J. Pereira de Sampaio in *A Geração Nova* (Oporto, 1886); Dr Theophilo Braga, *As Modernas Ideias na litteratura Portugueza* (Oporto, 1892); Padre Senna Freitas, *Perfil de Camillo Castello Branco* (S. Paulo, 1887); and Paulo Osorio, *Camillo, a sua vida, o seu genio, a sua obra* (Oporto, 1908). (E. Pr.)

CASTELLO BRANCO, an episcopal city and the capital of an administrative district formerly included in the province of Beira, Portugal; 1560 ft. above the sea, on the Abrantes-Guarda railway. Pop. (1900) 7288. Numerous Roman remains bear witness to the antiquity of Castello Branco, but its original name is unknown. The city is dominated by a ruined castle, and partly enclosed by ancient walls; its chief buildings are the cathedral and episcopal palace. Cloth is manufactured, and there is a flourishing local trade in cork, wine and olive oil. The administrative district of Castello Branco, which comprises the valleys of the Zezere, Ocreza and Ponsul, right-hand tributaries of the Tagus, coincides with the south-eastern part of Beira; pop. (1900) 216,608; area, 2582 sq. m.

CASTELLÓN DE LA PLANA, a maritime province of eastern Spain, formed in 1833 of districts formerly included in Valencia, and bounded on the N. by Teruel and Tarragona, E. by the Mediterranean Sea, S. by Valencia, and W. by Teruel. Pop. (1900) 310,828; area, 2495 sq. m. The surface of the province is almost everywhere mountainous, and flat only near the coast and along some of the river valleys. Even on the coast the Atalayas de Alcalá and the Desierto de las Palmas form two well-defined though not lofty ridges. The Mijares or Millares is the principal river, flowing east-south-east from the highlands of Teruel, between the Sierras of Espina and Espadan towards the south, and the peak called Peña Golosa (5945 ft.) towards the north, until it reaches the sea a little south of the capital, also called Castellón de la Plana. The Monlleo, a left-hand tributary of the Mijares; the Bergantes, which flows inland to join the Guadalope in Teruel; the Cenia, which divides Castellón from Tarragona; and a variety of lesser streams, render the province abundantly fertile. No considerable inlet breaks the regularity of the coast-line, and there is no first-class harbour. The climate is cold and variable in the hilly districts, temperate in winter and very warm in summer in the lowlands. Agriculture, fruit-growing, and especially the cultivation of the vine and olive, employ the majority of the peasantry; stock-farming and sea-fishing are also of importance. Lead, zinc, iron and other ores have been discovered in the province; but in 1903, out of 129 mining concessions registered, only two were worked, and their output, lead and zinc, was quite insignificant. The local industries are mainly connected with fish-curing, paper, porcelain, woollens, cotton, silk, esparto, brandy and oils. Wine, oranges and oil are exported to foreign countries and

other parts of Spain. The important Barcelona-Valencia railway skirts the coast, passing through the capital; and the Calatayúd-Sagunto line crosses the southern extremity of the province. Elsewhere the roads, which are generally indifferent, form the sole means of communication. Castellón (29,904), Villarreal (16,068), the port of Burriana (12,962), and Peñiscola (3142), a town of some historical interest, are described in separate articles. The other chief towns are Alcalá de Chisbert (6293), Almazora (7076), Benicarló (7251), Maella (7335), Onda (6595), Segorbe (7045), Vall de Uxó (8643), Villafamés (6708) and Vinaroz (8625).

CASTELLÓN DE LA PLANA, the capital of the province described above, on the Barcelona-Valencia railway, 4 m. from the Mediterranean Sea. Pop. (1900) 29,904. The broad and fértile plain in which Castellón is built is watered artificially by a Moorish aqueduct, largely cut through the solid rock, and supplied by the estuary of the Mijares, 5 m. south-east. The town is partly encircled by ancient walls; and, although most of its public buildings are modern, it contains several convents of early foundation, a curious old bell-tower, 150 ft. high, and a parish church chiefly noteworthy for a painting in the interior by Francisco Ribalta, who was born here in the middle of the 16th century. Castellón has a brisk trade, its manufactures comprising porcelain, leather, silk, linen, brandy and cork goods. Its harbour, El Grão de Castellón, about 4 m. east, is annually entered by some 200 small vessels. A light railway, which traverses the numerous and profitable orange plantations on the south-west, connects it with the towns of Almazora, Villarreal, Burriana and Onda. Under its Moorish rulers Castellón occupied a hill to the north of its present site; its removal to the plain by James I. of Aragon (1213–1276) gave the town its full name, "Castellón of the Plain."

CASTELNAU, MICHEL DE, Sieur de la Mauvissière (*c.* 1520–1592), French soldier and diplomatist, ambassador to Queen Elizabeth, was born in Touraine about 1520. He was one of a large family of children, and his grandfather, Pierre de Castelnau, was equerry to Louis XII. Endowed with a clear and penetrating intellect and remarkable strength of memory, he received a careful education, to complete which he travelled in Italy and made a long stay at Rome. He then spent some time in Malta, afterwards entered the army, and made his first acquaintance with war in the campaigns of the French in Italy. His abilities and his courage won for him the friendship and protection of the cardinal of Lorraine, who took him into his service. In 1557 a command in the navy was given to him, and the cardinal proposed to get him knighted. This, however, he declined, and then rejoined the French army in Picardy. Various delicate missions requiring tact and discretion were entrusted to him by the constable de Montmorency, and these he discharged so satisfactorily that he was sent by the king, Henry II., to Scotland with despatches for Mary Stuart, then betrothed to the dauphin (afterwards Francis II.). From Scotland he passed into England, and treated with Queen Elizabeth respecting her claims on Calais (1559), a settlement of which was effected at the congress of Cateau-Cambrésis. He was next sent as ambassador to the princes of Germany, for the purpose of prevailing upon them to withdraw their favour from the Protestants. This embassy was followed by missions to Margaret of Parma, governess of the Netherlands, to Savoy, and then to Rome, to ascertain the views of Pope Paul IV. with regard to France. Paul having died just before his arrival, Castelnau used his influence in favour of the election of Pius IV. Returning to France, he once more entered the navy, and served under his former patron. It was his good fortune, at Nantes, to discover the earliest symptoms of the conspiracy of Amboise, which he immediately reported to the government.

After the death of Francis II. (December 1560) he accompanied the queen, Mary Stuart, to Scotland, and remained with her a year, during which time he made several journeys into England, and attempted to bring about a reconciliation between Mary and Queen Elizabeth. The wise and moderate counsels which he offered to the former were unheeded. In 1562, in consequence of the civil war in France, he returned there. He was employed against the Protestants in Brittany, was taken prisoner in an engagement with them and sent to Havre, but was soon after exchanged. In the midst of the excited passions of his countrymen, Castelnau, who was a sincere Catholic, maintained a wise self-control and moderation, and by his counsels rendered valuable service to the government. He served at the siege of Rouen, distinguished himself at the battle of Dreux, took Tancarville, and contributed in 1563 to the recapture of Havre from the English.

During the next ten years Castelnau was employed in various important missions:—first to Queen Elizabeth, to negotiate a peace; next to the duke of Alba, the new governor of the Netherlands. On this occasion he discovered the project formed by the prince of Condé and Admiral Coligny to seize and carry off the royal family at Monceaux (1567). After the battle of St Denis he was again sent to Germany to solicit aid against the Protestants; and on his return he was rewarded for his services with the post of governor of Saint-Dizier, and a company of orderlies. At the head of his company he took part in the battles of Jarnac and Moncontour. In 1572 he was sent to England by Charles IX. to allay the excitement created by the massacre of St Bartholomew, and the same year he was sent to Germany and Switzerland. Two years later he was reappointed by Henry III. ambassador to Queen Elizabeth, and he remained at her court for ten years. During this period he used his influence to promote the marriage of the queen with the duke of Alençon, with a view especially to strengthen and maintain the alliance of the two countries. But Elizabeth made so many promises only to break them that at last he refused to accept them or communicate them to his government. On his return to France he found that his château of La Mauvissière had been destroyed in the civil war; and as he refused to recognize the authority of the League, the duke of Guise deprived him of the governorship of Saint-Dizier. He was thus brought almost to a state of destitution. But on the accession of Henry IV., the king, who knew his worth, and was confident that although he was a Catholic he might rely on his fidelity, gave him a command in the army, and entrusted him with various confidential missions.

Castelnau died at Joinville in 1592. His *Mémoires* rank very high among the original authorities for the period they cover, the eleven years between 1559 and 1570. They were written during his last embassy in England for the benefit of his son; and they possess the merits of clearness, veracity and impartiality. They were first printed in 1621; again, with additions by Le Laboureur, in 2 vols. folio, in 1659; and a third time, still further enlarged by Jean Godefroy, 3 vols. folio, in 1731. Castelnau translated into French the Latin work of Ramus, *On the Manners and Customs of the Ancient Gauls*. Various letters of his are preserved in the Cottonian and Harleian collections in the British Museum.

His grandson, Jacques de Castelnau (1620–1658), distinguished himself in the war against Austria and Spain during the ministries of Richelieu and Mazarin, and died marshal of France.

See Hubault, *Ambassade de Castelnau en Angleterre* (1856); *Relations politiques de la France . . . avec l'Écosse au seizième siècle*, edited by J. B. A. T. Teulet (1862); and De la Ferrière, *Les Projets de mariage d'Elisabeth* (1883).

CASTELNAUDARY, a town of south-western France, capital of an arrondissement in the department of Aude, 22 m. W.N.W. of Carcassonne, on the Southern railway between that city and Toulouse. Pop. (1906) 6650. It is finely situated on an elevation in the midst of a fertile and well-cultivated plain; and its commercial facilities are greatly increased by the Canal du Midi, which widens out, as it passes the town, into an extensive basin surrounded with wharves and warehouses for the timber used in the upkeep of the canal. The principal buildings are the law court, the hôtel de ville, and the church of St Michel, dating from the 14th century; none of these offers any feature of unusual interest. There are a number of flour-mills, as well as manufactories of earthenware, tiles and blankets; an extensive

trade is maintained in lime, gypsum, timber, grain, fruits, wine, wool, cattle and farm implements, and the building of canal boats forms an important industry. The public institutions include the sub-prefecture, tribunals of first instance and of commerce, a communal college and a farm school.

Castelnaudary probably represents the ancient town of *Sostomagus*, taken during the 5th century by the Visigoths, who, it is conjectured, rebuilt the town, calling it *Castrum Novum Arianorum*, whence the present name. Early in the 13th century the town was the scene of several struggles during the war against the Albigenses, between Simon IV., count of Montfort, and Raymond VI., count of Toulouse, and their supporters. In 1229 it was deprived of its ramparts, and after these had been rebuilt, it was captured and burned by the Black Prince in 1355, but again rebuilt in 1366. In 1632 it was the scene of a cavalry engagement in which the rebel Henry II., duke of Montmorency, was defeated and captured by the royal troops.

CASTELSARRASIN, a town of south-western France, capital of an arrondissement in the department of Tarn-et-Garonne, 12 m. W. of Montauban on the Southern railway. Pop. (1906) town, 3189; commune, 7496. Castelsarrasin, situated on the left bank of the lateral canal of the Garonne and about a mile from the right bank of that river, is surrounded by promenades occupying the site of the old fortifications. Its chief building is the brick-built church of St Sauveur, which dates from the 13th century. The administrative buildings are modern. The town has a sub-prefecture, a tribunal of first instance, and a communal college. The principal industrial establishment is the metal-foundry of Sainte-Marguerite, where copper, tin and other metals are worked; there are also flour-mills, saw-mills and dye-works. Trade is in cattle, agricultural produce, wine, baskets and game.

The name Castelsarrasin appears in the 13th century, when the village of Villelongue was replaced by the present bastide. Castrum Cerrucium, Castel-sur-Azine (from the neighbouring stream, Azine) and Castellum Sarracenum are suggested derivations, no one of which can be adopted with certainty.

CASTI, GIOVANNI BATTISTA (1721–1803), Italian poet, was born of humble parents at Montefiascone, in the states of the church, in 1721. He rose to the dignity of canon in the cathedral of his native place, but gave up his chance of church preferment to satisfy his gay and restless spirit by visiting most of the capitals of Europe. In 1782, on the death of Metastasio, he was appointed *Poeta Cesario*, or poet-laureate of Austria, in which capacity he applied himself with great success to the opera bouffe; but in 1796 he resigned this post, in order that he might not be hampered by political relations; and he spent the close of his life as a private gentleman at Paris, where he died in 1803. Casti is best known as the author of the *Novelle galanti*, and of *Gli Animali parlanti*, a poetical allegory, over which he spent eight years (1794–1802), and which, notwithstanding its tedious length, excited so much interest that it was translated into French, German and Spanish, and (very freely and with additions) into English, in W. S. Rose's *Court and Parliament of Beasts* (Lond., 1819). Written during the time of the Revolution in France, it was intended to exhibit the feelings and hopes of the people and the defects and absurdities of various political systems. The *Novelle Galanti* is a series of poetical tales, in the *ottava rima*—a metre largely used by Italian poets for that class of compositions. The sole merit of these poems consists in the harmony and purity of the style, and the liveliness and sarcastic power of many passages. They are, however, characterized by the grossest licentiousness; and there is no originality of plot—that, according to the custom of Italian novelists, being taken from classical mythology or other ancient legends. Among the other works of Casti is the *Poema Tartaro*, a mock-heroic satire on the court of Catherine II., with which he was personally acquainted.

CASTIGLIONE, BALDASSARE (1478–1529), Italian diplomatist and man of letters, was born at Casanatico near Mantua, and was educated at Milan under the famous professors Merula and Chalcondyles. In 1496 he entered the service of Lodovico Sforza, duke of Milan, returning to Mantua in 1500 when Lodovico was carried prisoner into France. In 1504 he was attached to the court of Guidobaldo Malatesta, duke of Urbino, and in 1506 he was sent by that prince on a mission to Henry VII. of England, who had before conferred on Federigo Malatesta, "the Good Duke," the most famous mercenary of his age, the order of the Garter. Guidobaldo dying childless in 1508, the duchy of Urbino was given to Francesco Maria della Rovere, for whom Castiglione, envoy at the court of Leo X. (Medici), obtained the office of generalissimo of the Papal troops. Charged with the arrangement of the dispute between Clement VII. (Medici) and Charles V., Castiglione crossed, in 1524, into Spain, where he was received with highest honours, being afterwards naturalized, and made bishop of Avila. In 1527, however, Rome was seized and sacked by the Imperialists under Bourbon, and in July of the same year the surrender of the castle of Sant' Angelo placed Clement in their hands. Castiglione had been tricked by the emperor, but there were not wanting accusations of treachery against himself. He had, however, placed fidelity highest among the virtues of his ideal "courtier," and when he died at Toledo in 1529 it was said that he had died of grief and shame at the imputation. The emperor mourned him as "one of the world's best cavaliers." A portrait of him, now at the Louvre, was painted by Raphael, who disdained neither his opinion nor his advice.

Castiglione wrote little, but that little is of rare merit. His verses, in Latin and Italian, are elegant in the extreme; his letters (Padua, 1769–1771) are full of grace and finesse. But the book by which he is best remembered is the famous treatise, *Il Cortegiano*, written in 1514, published at Venice by Aldus in 1528, and translated into English by Thomas Hoby as early as 1561. This book, called by the Italians *Il Libro d'oro*, and remarkable for its easy force and undemonstrative elegance of style no less than for the nobility and manliness of its theories (see the edition by V. Cian, Florence, 1894), describes the Italian gentleman of the Renaissance under his brightest and fairest aspect, and gives a charming picture of the court of Guidobaldo da Montefeltre, duke of Urbino, "confessedly the purest and most elevated court in Italy." In the form of a discussion held in the duchess's drawing-room—with Elizabetta Gonzaga, Pietro Bembo, Bernardo Bibbiena, Giuliano de' Medici, Emilia Pia, and Ceretino the Unique among the speakers—the question, What constitutes a perfect courtier? is debated. With but few differences, the type determined on is the ideal gentleman of the present day.

See P. L. Ginguené, *Histoire littéraire de l'Italie*, vi., vii.; J. A. Symonds, *The Renaissance in Italy* (London, 1875); C. Hare, *Courts and Camps of the Italian Renaissance* (1908); Julia Cartwright, *B. Castiglione, the Perfect Courtier* (1908), with good bibliography.

CASTIGLIONE, CARLO OTTAVIO, Count (1784–1849), Italian philologist, was born at Milan of an ancient family. His principal work was done in connexion with the Arabic and other Oriental languages, but he also performed good service in several other departments. In 1819 he published *Monete cufiche del Museo di Milano*, and assisted Cardinal Mai in his *Ulphilae partium ineditarum in Ambrosianis palimpsestis repertarum editio.* A learned *Mémoire géographique et numismatique sur la partie orientale de la Barbarie appelée Afrikia par les Arabes* appeared in 1826, and established his reputation. In 1829 he published by himself the Gothic version of the second epistle of Paul to the Corinthians; and this was followed by the Gothic version of the epistle to the Romans, the first epistle to the Corinthians, and the epistle to the Ephesians in 1834, by Galatians, Philippians, and 1 Thessalonians in 1835, and by 2 Thessalonians in 1839. He died at Genoa on the 10th of April 1849.

His *Life*, by Biondelli, appeared at Milan in 1856.

CASTIGLIONE, GIOVANNI BENEDETTO (1616–1670), called in Italy Il Grechetto, and in France Le Benédette, Italian painter of the Genoese school, was born in Genoa, and studied for some time under Vandyck. He painted portraits, historical pieces and landscapes, but chiefly excelled in fairs, markets and rural scenes with animals. Noah and the animals entering the

Ark was a favourite subject of his. His paintings are to be found in Rome, Venice, Naples, Florence, and more especially Genoa and Mantua. He also executed a number of etchings, which are spirited, free and full of taste; "Diogenes searching for a Man" is one of the principal of these. The etchings are remarkable for light and shade, and have even earned for Castiglione the name of "a second Rembrandt." The *Presepio* (Nativity of Jesus) in the church of San Luca, Genoa, ranks among his most celebrated paintings, and the Louvre contains eight characteristic examples. In his closing years he lived in Mantua, painting for the court; here he received his name of "Grechetto," from the classic air of his pastorals, and here he died of gout in 1670. His brother Salvatore and his son Francesco excelled in the same subjects; and it is thought that many paintings which are ascribed to Benedetto are only copies after him, or perhaps originals by his son or brother.

CASTIGLIONE DELLE STIVIERE, a town of Lombardy, Italy, in the province of Mantua, 20 m. N.W. of Mantua by road. Pop. (1901) 4122 (town), 5940 (commune). It has an old castle, much altered and restored, especially by the Gonzaga family of Mantua in the 16th century. During the War of the Spanish Succession, the French under the duke of Vendôme occupied it; and during the siege of Mantua in 1796, the Austrians under Würmser were defeated here by the French under Augereau, who was later created by Napoleon duke of Castiglione.

CASTIGLIONE OLONA, a town of Lombardy, Italy, in the province of Como, 27 m. N.E. of Milan by rail. Pop. (1901) 1806. The choir of the collegiate church, erected about 1428 by Cardinal Branda Castiglione, contains fine frescoes by Masolino of Florence: there are other works by the same master in the baptistery. The tomb of the cardinal (1443) is good. The church of S. Sepolcro, in the lower part of the town, has two large stone figures of saints on its façade (of the end of the 13th century) and, within, painted wooden figures and the tomb of Guido Castiglione (d. 1485) with fine sculptures of the school of Amadeo. The palace erected by Cardinal Castiglione has good terra-cotta decorations.

CASTILE, or CASTILLE (*Castilla*), an ancient kingdom of Spain, occupying the central districts of the Iberian Peninsula; and bounded on the N. by the Bay of Biscay, N.E. by the Basque Provinces and Navarre, E. by Aragon, S.E. by Valencia and Murcia, S. by Andalusia, W. by Estremadura and Leon, and N.W. by Asturias. Pop. (1900) 3,708,713; area, 55,307 sq. m. The name *Castile* is commonly said to be derived from the numerous frontier forts (*castillos*) erected in the middle ages as a defence against the Moors. The northern part of the kingdom, which was first freed from Moorish rule, is called Old Castile (*Castilla la Vieja*); the southern, acquired later, is called New Castile (*Castilla la Nueva*). These two divisions, with a third known as North Castile, now rank as military districts or captaincies-general; but the term "North Castile," which covers the northern extremity of Old Castile, is not generally used. In 1833 Old Castile was divided into the provinces of Ávila, Burgos, Logroño, Palencia, Santander, Segovia, Soria and Valladolid; while New Castile was similarly divided into Ciudad Real, Cuenca, Guadalajara, Madrid and Toledo. The modern progress of commerce, communications, &c. in these thirteen provinces is described in the separate articles upon each of them.

Castile extends for about 300 m. from north to south, and 160 m. from east to west. It consists of a vast central plateau, with an average altitude of about 2500 ft. This plateau has a natural frontier of high mountains on all sides, except on the borders of Leon and Murcia; it is also bisected by the Sierra de Guadarrama and Sierra de Grédos, which extend in a south-westerly direction across the central districts, and form the dividing line between Old and New Castile. Geographically it includes also the high plains of Leon, towards the north-west, and of Murcia on the south-east. The existing frontier is marked on the north by the Cantabrian Mountains (*q.v.*); on the east by the Sierra de la Demanda with its offshoots, and by the Serrania de Cuenca; on the south by the Sierra Morena; and on the west by various minor ranges which link together the three more or less parallel chains of the Sierra de Grédos, Sierra de Guadalupe and Sierra Morena. Three great rivers, the Douro, which traverses Old Castile, with the Tagus and Guadiana, which respectively drain the central and southern regions of New Castile, flow westward into Portugal, and finally reach the Atlantic; while the Ebro, which rises in the north of the kingdom, skirts the north-eastern frontier on its way to the Mediterranean. These rivers are described under their own names.

The climate of Old Castile is healthy, but liable to severe cold and heat. Snow falls early and lies late in the mountains, and there is a heavy rainfall in the north-west. New Castile has a still more rigorous climate, for although the mean annual temperature is about 59° Fahr., the summer heat in the valleys is peculiarly oppressive, and the highlands are swept by scorching or icy gales, laden with dust. The rainfall rarely exceeds 10 in. in a year.

In both the Castiles the central plateau has a naturally fertile soil, for after rain a luxuriant vegetation appears; but drought is common, owing to the insufficient volume of the rivers, and the failure of the Spaniards to extend the fine system of irrigation which the Moors originated. Certain districts, indeed, in which a layer of heavy loam underlies the porous and friable surface, are able to retain the moisture which elsewhere is absorbed. Such land is found in Palencia, and in the Mesa de Ocaña, where it yields abundant crops; and many of the northern mountains are well wooded. But vast tracts of land are useless except as pasture for sheep, and even the sheep are driven by the severe winters to migrate yearly into Estremadura (*q.v.*). The normal Castilian landscape is an arid and sterile steppe, with scarcely a tree or spring of water; and many even of the villages afford no relief to the eye, for they are built of sunburnt unbaked bricks, which share the dusty brownish-grey tint of the soil. Especially characteristic is the great plain of La Mancha (*q.v.*).

The transformation of Castile from a small county in the north of what is now Old Castile into an independent monarchy, was one of the decisive events in the reconquest of Spain from the Moors. The successful resistance offered by Asturias to the invaders had been followed by the liberation of Galicia and Leon, when Ferdinand I. of Castile (1035–1065), by his marriage with Sancha, widow of the last king of Leon, was enabled to unite Leon and Castile in a single kingdom, with its capital at Burgos. New territories were annexed on the south, until, after the capture of Toledo in 1085, and the consequent formation of a New Castile, the kingdom comprised the whole of central Spain. Thenceforward its history is inseparable from that of the whole country; and it is therefore described in full, together with the language and literature of Castile, under SPAIN (*q.v.*).

Castilian, which is the literary language of Spain, and with certain differences, of Spanish America, is spoken in Old and New Castile, Aragon, Estremadura, and the greater part of Leon; in Andalusia it is subject to various modifications of accent and pronunciation. As there is little, if any, difference of racial origin, character and physical type, among the inhabitants of this region, except in Andalusia, and, to a less extent, in Estremadura, the Castilian is justly regarded as the typical Spaniard. Among the Castilian peasantry, where education and foreign influence have never penetrated deeply, the national character can best be studied. Its intense pride, its fatalistic indolence and ignorance, its honesty and its bigotry, tempered by a keen sense of humour, are well-known characteristics. Apart from the peasant class, Castilians have contributed more to the development of Spanish art and literature than the inhabitants of any other region except, perhaps, Andalusia, which claims to be regarded as supreme in architecture and painting. Of the two great Spanish universities, Alcalá de Henares belonged in all respects to Castile, and Salamanca rose to equality with Paris, Oxford or Bologna, under the purely Castilian influence of Alphonso X. (1252–1284).

For a general description of Castile and its inhabitants, antiquities, commerce, &c., see *Castilla la Nueva*, three illustrated volumes in

the series *España*, by J. M. Quadrado and V. de la Fuente (Barcelona, 1885–1886), and the *Guia del antiguo reino de Castilla*, by E. Valverde y Alvarez (Madrid, 1886), which deals with the provinces of Burgos, Santander, Logroño, Soria, Ávila and Segovia. For the history, see in addition to the works cited under SPAIN (section *History*), *Cronicas de los reyes de Castilla*, by C. Rosell (Madrid, 1875–1877, 2 vols.); *Coleccion de las cronicas y memorias de los reyes de Castilla* (Madrid, 1779–1787, 7 vols.); and *Historia de las communidades de Castilla* (Madrid, 1897).

CASTILHO, ANTONIO FELICIANO DE (1800–1875), Portuguese man of letters, was born at Lisbon. He lost his sight at the age of six, but the devotion of his brother Augusto, aided by a retentive memory, enabled him to go through his school and university course with success; and he acquired an almost complete mastery of the Latin language and literature. His first work of importance, the *Cartas de Echo e Narciso* (1821), belongs to the pseudo-classical school in which he had been brought up, but his romantic leanings became apparent in the *Primavera* (1822) and in *Amor e Melancholia* (1823), two volumes of honeyed and prolix bucolic poetry. In the poetic legends *A noite de Castello* (1836) and *Cuimes do bardo* (1838) Castilho appeared as a full-blown Romanticist. These books exhibit the defects and qualities of all his work, in which lack of ideas and of creative imagination and an atmosphere of artificiality are ill compensated for by a certain emotional charm, great purity of diction and melodious versification. Belonging to the didactic and descriptive school, Castilho saw nature as all sweetness, pleasure and beauty, and he lived in a dreamland of his imagination. A fulsome epic on the succession of King John VI. brought him an office of profit at Coimbra. On his return from a stay in Madeira, he founded the *Revista Universal Lisbonense*, in imitation of Herculano's *Panorama*, and his profound knowledge of the Portuguese classics served him well in the introduction and notes to a very useful publication, the *Livraria Classica Portugueza* (1845–1847, 25 vols.), while two years later he established the "Society of the Friends of Letters and the Arts." A study on Camoens and treatises on metrification and mnemonics followed from his pen. His praiseworthy zeal for popular instruction led him to take up the study of pedagogy, and in 1850 he brought out his *Leitura Repentina*, a method of reading which was named after him, and he became government commissary of the schools which were destined to put it into practice. Going to Brazil in 1854, he there wrote his famous "Letter to the Empress." Though Castilho's lack of strong individuality and his over-great respect for authority prevented him from achieving original work of real merit, yet his translations of Anacreon, Ovid and Virgil and the *Chave do Enigma*, explaining the romantic incidents that led to his first marriage with D. Maria de Baena, a niece of the satirical poet Tolentino, and a descendant of Antonio Ferreira, reveal him as a master of form and a purist in language. His versions of Goethe's *Faust* and Shakespeare's *Midsummer Night's Dream*, made without a knowledge of German and English, scarcely added to his reputation. When the Coimbra question arose in 1865, Garrett was dead and Herculano had ceased to write, leaving Castilho supreme, for the moment, in the realm of letters. But the youthful Anthero de Quental withstood his claim to direct the rising generation and attacked his superannuated leadership, and after a fierce war of pamphlets Castilho was dethroned. The rise of João de Deus reduced him to a secondary position in the Portuguese Parnassus, and when he died ten years later much of his former fame had preceded him to the tomb.

See also "Memorias de Castilho" in the *Instituto* of Coimbra; Innocencio da Silva in *Diccionario bibliographico Portuguez*, i. 130 and viii. 132; Latino Coelho's study in the *Revista contemporanea de Portugal e Brazil*, vols. i. and ii.; Dr Theophilo Braga, *Historia do Romantismo* (Lisbon, 1880). (E. PR.)

CASTILLEJO, CRISTÓBAL DE (1490–1556), Spanish poet, was born at Ciudad Rodrigo in 1490. In 1518 he left Spain with Ferdinand of Austria, afterwards emperor, whose private secretary he eventually became. While residing at Vienna in 1528–1530 he wrote the *Historia de Píramo y Tisbe*, and dedicated it to Anna von Schaumberg, with whom he had a platonic love-affair. He seems to have visited Venice, to have been neglected by his patron, to have fallen ill in 1540, and to have passed his last years in poverty. He died on the 12th of June 1556, and was buried at Vienna. Castillejo's poems are interesting, not merely because of their intrinsic excellence, but also as being the most powerful protest against the metrical innovations imported from Italy by Boscán and Garcilaso de la Vega. He adheres to the native *quintillas* or to the *coplas de pie quebrado*, and only abandons these traditional forms when he indulges in caustic parody of the new school—as in the lines *Contra los que dejan los metros castellanos*. He excels by virtue of his charming simplicity and his ingenious wit, always keen, sometimes licentious, never brutal. The urbane gaiety of his occasional poems is delightfully spontaneous, and the cynical humour which informs the *Diálogo de las condiciones de las mujeres* and the *Diálogo de la vida de la corte* is impregnated with the Renaissance spirit. Castillejo is the Clément Marot of Spain. His plays are lost; the best text of his verses is that printed at Madrid in 1792.

CASTILLO SOLÓRZANO, ALONSO DE (1584?–1647?), Spanish novelist and playwright, is stated to have been baptized at Tordesillas near Valladolid on 1st October 1584. Nothing is known of his youth, and he is next heard of at Madrid in 1619 as a man of literary tastes. While in the service of the marquis de Villar, he issued his first work, *Donaires del Parnaso* (1624–1625), two volumes of humorous poems; his *Tardes entretenidas* (1625) and *Jornadas alegres* (1626) proved that he was a novelist by vocation. Shortly afterwards he joined the household of the marquis de los Vélez, viceroy of Valencia, and published in quick succession three clever picaresque novels: *La Niña de los embustes, Teresa de Manzanares* (1634), *Las Aventuras del Bachiller Trapaza* (1637), and a continuation entitled *La Garduña de Sevilla y Anzuelo de las bolsas* (1642). To these shrewd cynical stories he owes his reputation. He followed the marquis de los Vélez in his disastrous campaign in Catalonia, and accompanied him to Rome, where the defeated general was sent as ambassador. Castillo Solórzano's death occurred (probably at Palermo) before 1648, but the exact date is uncertain. His prolonged absence from Madrid prevented him from writing as copiously for the stage as he would otherwise have done; but he was popular as a playwright both at home and abroad. His *Marqués del Cigarral* and *El Mayorazgo figurón* are the sources respectively of Scarron's *Don Jophet d'Arménie* and *L'Héritier ridicule*. Among his numerous remaining works may be mentioned *Las Harpías en Madrid* (1633), *Fiestas del Jardín* (1634), *Los Alivios de Casandra* (1640) and the posthumous *Quinta de Laurel* (1649); the witty observation of these books forms a singular contrast to the prim devotion of his *Sagrario de Valencia* (1635). His versatility and graceful style deserve the highest praise. (J. F.-K.)

CASTLE (Lat. *castellum*, a fort, diminutive of *castra*, a camp; Fr. *château* and *châtel*), a small self-contained fortress, usually of the middle ages, though the term is sometimes used of prehistoric earthworks (*e.g.* Hollingbury Castle, Maiden Castle), and sometimes of citadels (*e.g.* the castles of Badajoz and Burgos) and small detached *forts d'arrêt* in modern times. It is also often applied to the principal mansion of a prince or nobleman, and in France (as *château*) to any country seat, this use being a relic of the feudal age. Under its twofold aspect of a fortress and a residence, the mediæval castle is inseparably connected with the subjects of fortification (see FORTIFICATION AND SIEGECRAFT) and architecture (*q.v.*). An account of Roman and pre-Roman *castella* in Britain will be found under BRITAIN.

The word "castle" (*castel*) was introduced into English shortly before the Norman Conquest to denote a type of fortress, then new to the country, brought in by the Norman knights whom Edward the Confessor had sent for to defend Herefordshire against the inroads of the Welsh. Richard's castle, of which the earthworks remain and which has given its name to a parish, was erected at this period on the border of Herefordshire and Shropshire by Richard Fitz Scrob. The essential feature of this type was a circular mound of earth surrounded by a dry ditch and flattened at the top. Around the crest of

its summit was placed a timber palisade. This moated mound was styled in French *motte* (latinized *mota*), a word still common in French place-names. It is clearly depicted at the time of the Conquest in the Bayeux tapestry, and was then familiar on the mainland of western Europe. A description of this earlier castle is given in the life of John, bishop of Terouanne (*Acta Sanctorum*, quoted by G. T. Clark, *Medieval Mil. Architecture*):—"The rich and the noble of that region being much given to feuds and bloodshed, fortify themselves . . . and by these strongholds subdue their equals and oppress their inferiors. They heap up a mound as high as they are able, and dig round it as broad a ditch as they can. . . . Round the summit of the mound they construct a palisade of timber to act as a wall. . . . Inside the palisade they erect a house, or rather a citadel, which looks down on the whole neighbourhood." St John, bishop of Terouanne, died in 1130, and this castle of Merchem, built by "a lord of the town many years before" may be taken as typical of the practice of the 11th century. But in addition to the mound, the citadel of the fortress, there was usually appended to it a bailey or basecourt (and sometimes two) of semilunar or horseshoe shape, so that the mound stood *à cheval* on the line of the enceinte. The rapidity and ease with which it was possible to construct castles of this type made them characteristic of the Conquest period in England and of the Anglo-Norman settlements in Wales, Ireland and the Scottish lowlands. In later days a stone wall replaced the timber palisade and produced what is known as the shell-keep, the type met with in the extant castles of Berkeley, Alnwick and Windsor.

From Clark's *Medieval Military Architecture*, by permission of Bernard Quaritch.

FIG. 1.—Plan of Laughton en-le-Morthen.

But the Normans introduced also two other types of castle. The one was adopted where they found a natural rock stronghold which only needed adaptation, as at Clifford, Ludlow, the Peak and Exeter, to produce a citadel; the other was a type wholly distinct, the high rectangular tower of masonry, of which the Tower of London is the best-known example, though that of Colchester was probably constructed in the 11th century also. But the latter type belongs rather to the more settled conditions of the 12th century when haste was not a necessity, and in the first half of which the fine extant keeps of Hedingham and Rochester were erected. These towers were originally surrounded by palisades, usually on earthen ramparts, which were replaced later by stone walls. The whole fortress thus formed was styled a castle, but sometimes more precisely "tower and castle," the former being the citadel, and the latter the walled enclosure, which preserved more strictly the meaning of the Roman *castellum*.

Reliance was placed by the engineers of that time simply and solely on the inherent strength of the structure, the walls of which defied the battering-ram, and could only be undermined at the cost of much time and labour, while the narrow apertures were constructed to exclude arrows or flaming brands.

At this stage the crusades, and the consequent opportunities afforded to western engineers of studying the solid fortresses of the Byzantine empire, revolutionized the art of castle-building, which henceforward follows recognized principles. Many castles were built in the Holy Land by the crusaders of the 12th century, and it has been shown (Oman, *Art of War: the Middle Ages*, p. 529) that the designers realized, first, that a second line of defences should be built within the main enceinte, and a third line or keep inside the second line; and secondly, that a wall must be flanked by projecting towers. From the Byzantine engineers, through the crusaders, we derive, therefore, the cardinal principle of the mutual defence of all the parts of a fortress. The *donjon* of western Europe was regarded as the fortress, the outer walls as accessory defences; in the East each envelope was a fortress in itself, and the keep became merely the last refuge of the garrison, used only when all else had been captured. Indeed the keep, in several crusader castles, is no more than a tower, larger than the rest, built into the enceinte and serving with the rest for its flanking defence, while the fortress was made strongest on the most exposed front. The idea of the flanking towers (which were of a type very different from the slight projections of the shell-keep and rectangular tower) soon penetrated to Europe, and Alnwick Castle (1140–1150) shows the influence of the new system. But the finest of all castles of the middle ages was Richard Cœur de Lion's fortress of Château Gaillard (1197) on the Seine near Les Andelys. Here the innermost ward was protected by an elaborate system of strong appended defences, which included a strong *tête-de-pont* covering the Seine bridge (see Clark, i. 384, and Oman, p. 533). The castle stood upon high ground and consisted of three distinct enceintes or wards besides the keep, which was in this case merely a strong tower forming part of the innermost ward. The donjon was rarely defended *à outrance*, and it

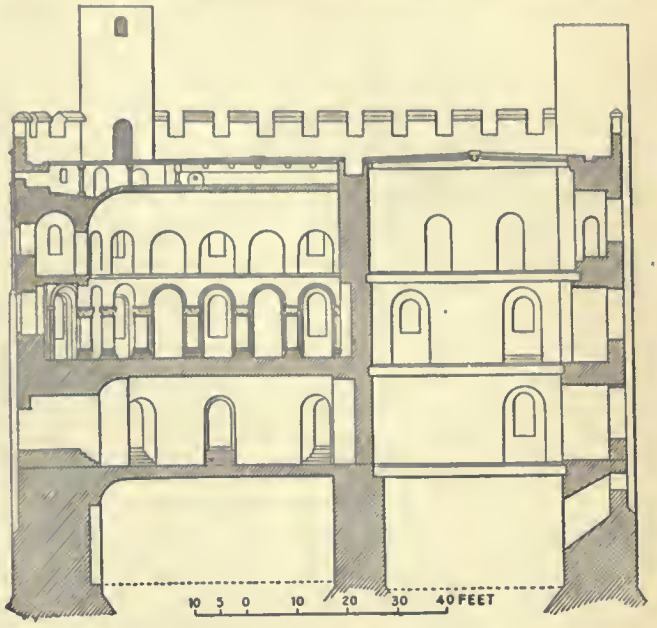
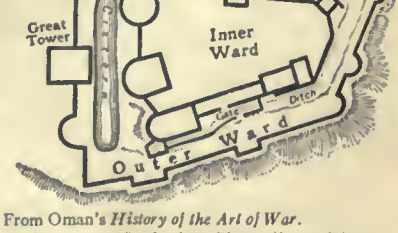


FIG. 2.—Vertical section of rectangular Norman Keep (Tower of London).

From Oman's *History of the Art of War*, by permission of Methuen & Co.

Fig. 3.—Berkeley Castle, late Norman Shell-Keep.



From Oman's *History of the Art of War*.

FIG. 4.—Krak-des-Chevaliers: Plan.

gradually sank in importance as the outer "wards" grew stronger. Round instead of rectangular towers were now becoming usual, the finest examples of their employment as keeps being at Conisborough in England and at Coucy in France. Against

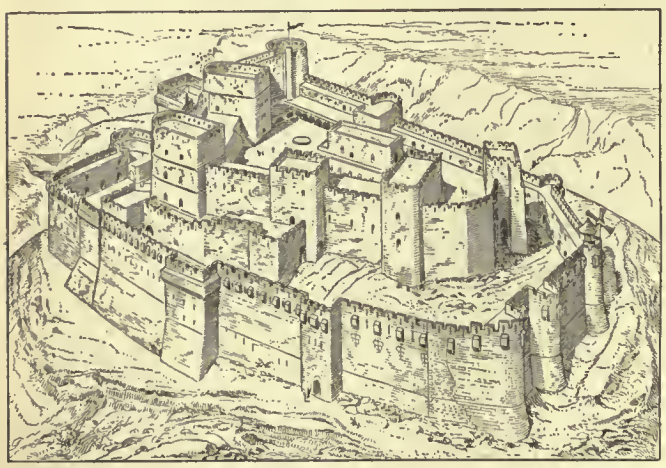


FIG. 5.—Krak-des-Chevaliers: View.

the relatively feeble siege artillery of the 13th century a well-built fortress was almost proof, but the mines and the battering ram of the attack were more formidable, and it was realized that corners in the stonework of the fortress were more vulnerable than a uniform curved surface. Château Gaillard fell to Philip Augustus in 1204 after a strenuous defence, and the success of the assailants was largely due to the wise and skilful employ-

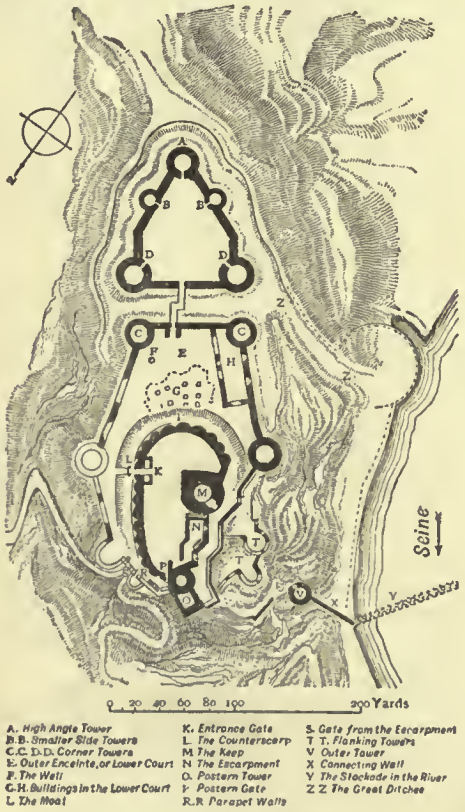


FIG. 6.—Château Gaillard.

ment of mines. An angle of the noble keep of Rochester was undermined and brought down by John in 1215.

The next development was the extension of the principle of successive lines of defence to form what is called the "concentric" castle, in which each ward was placed wholly within another which enveloped it; places thus built on a flat side (*e.g.* Caerphilly Castle) became for the first time more formidable than strongholds perched upon rocks and hills such as Château Gaillard, where the more exposed parts indeed possessed many successive lines of defence, but at other points, for want of room, it was impossible to build more than one or, at most, two walls. In these cases, the fall of the inner ward by surprise, escalade, *vive force*, or even by regular siege (as was sometimes feasible), entailed the fall of the whole castle.

The adoption of the concentric system precluded any such mischance, and thus, even though siege-engines improved during the 13th and 14th centuries, the defence, by the massive strength of the concentric castle in some cases, by natural inaccessibility of position in others, maintained itself superior to the attack during the latter middle ages. Its final fall was due to the introduction of gunpowder as a propellant. "In the 14th century the change begins, in the 15th it is fully developed, in the 16th the feudal fastness has become an anachronism."

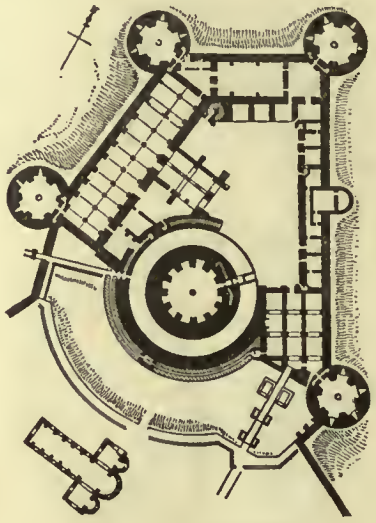


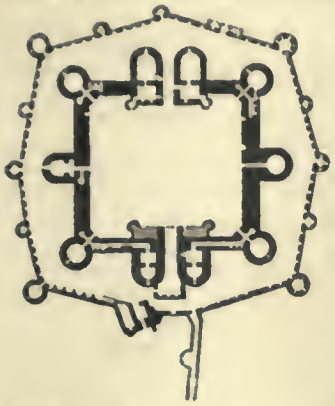
FIG. 7.—Coucy: Plan.

The general adoption of cannon placed in the hands of the central power a force which ruined the baronial fortifications in a few days of firing. The possessors of cannon were usually private individuals of the middle classes, from whom the prince hired the *matériel* and the technical workmen. A typical case will be found in the history of Brandenburg and Prussia (Carlyle, *Frederick the Great*, bk. iii. ch. i.), the impregnable castle of Friesack, held by an intractable feudal noble, Dietrich von

FIG. 8.—Coucy: View.

Quitzow, being reduced in two days by the elector Frederick I. with "Heavy Peg" (*Faule Grete*) and other guns hired and borrowed (February 1414). The beginnings of orderly government in Brandenburg thus depended upon the guns, and the taking of Friesack is, in Carlyle's phrase, "a fact memorable to every Prussian man." In England, the earl of Warwick in 1464

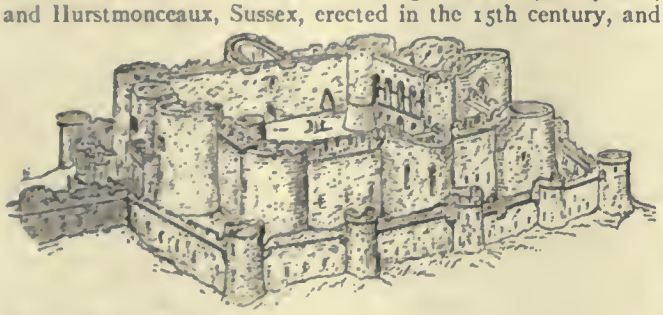
reduced the strong fortress of Bamborough in a week, and in Germany, Franz von Sickingen's stronghold of Landstuhl, formerly impregnable on its heights, was ruined in one day by the artillery of Philip of Hesse (1523). Very heavy artillery was used for such work, of course, and against lighter natures, some castles and even fortified country-houses or castellated mansions managed to make a stout stand even as late as the Great Rebellion in England.



From Clark's *Med. Mil. Arch.*

FIG. 9.—Beaumaris Castle: Plan.

The castle thus ceases to be the fortress of small and ill-governing local magnates, and its later history is merged in that of modern fortification. But an interesting transitional type between the medieval stronghold and the modern fortress is found in the coast castles erected by Henry VIII., especially those at Deal, Sandown and Walmer (*c.* 1540), which played some part in the events of the 17th century, and of which Walmer Castle is still the official residence of the lord warden of the Cinque Ports. Viollet-le-Duc, in his *Annals of a Fortress* (English trans.), gives a full and interesting account of the repeated renovations of the fortress on his imaginary site in the valley of the Doubs, the construction by Charles the Bold of artillery towers at the angles of the castle, the protection of the masonry by earthen outworks, boulevards and demi-boulevards, and, in the 17th century, the final service of the medieval walls and towers as a pure *enceinte de sûreté*. Here and there we find old castles serving as *forts d'arrêt* or block-houses in mountain passes and defiles, and in some few cases, as at Dover, they formed the nucleus of purely military places of arms, but normally the castle falls into ruins, becomes a peaceful mansion, or is merged in the fortifications of the town which has grown up around it. In the *Annals of a Fortress* the site of the feudal castle is occupied by the citadel of the walled town, for once again, with the development of the middle class and of commerce and industry, the art of the engineer came to be displayed chiefly in the fortification of cities. The baronial "castle" assumes *pari passu* the form of a mansion, retaining indeed for long some capacity for defence, but in the end losing all military characteristics save a few which survived as ornaments. Examples of such castellated mansions are seen in Wingfield Manor, Derbyshire, and Hurstmonceaux, Sussex, erected in the 15th century, and

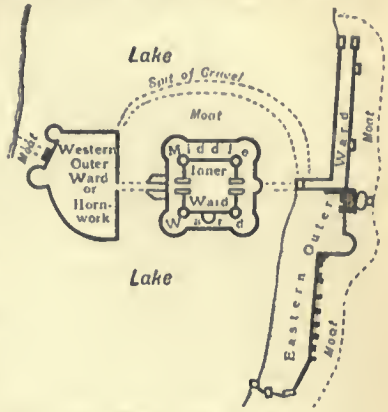


From Clark's *Med. Mil. Arch.*

FIG. 10.—Beaumaris Castle: View.

nearly all older castles which survived were continually improved and altered to serve as residences. (C. F. A.)

Influence of Castles in English History.—Such strongholds as existed in England at the time of the Norman Conquest seem to have offered but little resistance to William the Norman, who, in order effectually to guard against invasions from without as well as to awe his newly-acquired subjects, immediately began to erect castles all over the kingdom, and likewise to repair and augment the old ones. Besides, as he had parcelled out the lands of the English amongst his followers, they, to protect themselves from the resentment of the despoiled natives, built strongholds and castles on their estates, and these were multiplied so rapidly during the troubled reign of King Stephen that the "adulterine" (*i.e.* unauthorized) castles are said by one writer to have amounted to 1115.



From Oman's *History of the Art of War.*

FIG. 11.—Caerphilly Castle: Plan.

In the first instance, when the interest of the king and of his barons was identical, the former had only retained in his hands the castles in the chief towns of the shires, which were entrusted to his sheriffs or constables. But the great feudal revolts under the Conqueror and his sons showed how formidable an obstacle to the rule of the king was the existence of such fortresses in private hands, while the people hated them from the first for the oppressions connected with their erection and maintenance. It was, therefore, the settled policy of the crown to strengthen the royal castles and increase their number, while jealously keeping in check those of the barons. But in the struggle between Stephen and the empress Maud for the crown, which became largely a war of sieges, the royal power was relaxed and there was an outburst of castle-building, without permission, by the barons. These in many cases acted as petty sovereigns, and such was their tyranny that the native chronicler describes the castles as "filled with devils and evil men." These excesses paved the way for the pacification at the close of the reign, when it was provided that all unauthorized castles constructed during its course should be destroyed. Henry II., in spite of his power, was warned by the great revolt against him that he must still rely on castles, and the massive keeps of Newcastle and of Dover date from this period.

Under his sons the importance of the chief castles was recognized as so great that the struggle for their control was in the forefront of every contest. When Richard made vast grants at his accession to his brother John, he was careful to reserve the possession of certain castles, and when John rose against the king's minister, Longchamp, in 1191, the custody of castles was the chief point of dispute throughout their negotiations, and Lincoln was besieged on the king's behalf, as were Tickhill, Windsor and Marlborough subsequently, while the siege of Nottingham had to

From Clark's *Med. Mil. Arch.*

FIG. 12.—Caerphilly Castle: View.

be completed by Richard himself on his arrival. To John, in turn, as king, the fall of Château Gaillard meant the loss of Rouen and of Normandy with it, and when he endeavoured to repudiate the newly-granted Great Charter, his first step was to prepare the royal castles against attack and make them his centres of resistance. The barons, who had begun their revolt by besieging that of Northampton, now assailed that of Oxford as well and

seized that of Rochester. The king recovered Rochester after a severe struggle and captured Tonbridge, but thenceforth there was a war of sieges between John with his mercenaries and Louis of France with his Frenchmen and the barons, which was specially notable for the great defence of Dover Castle by Hubert de Burgh against Louis. On the final triumph of the royal cause, after John's death, at the battle of Lincoln, the general pacification was accompanied by a fresh issue of the Great Charter in the autumn of 1217, in which the precedent of Stephen's reign was followed and a special clause inserted that all "adulterine" castles, namely those which had been constructed or rebuilt since the breaking out of war between John and the barons, should be immediately destroyed. And special stress was laid on this in the writs addressed to the sheriffs.

In 1223 Hubert de Burgh, as regent, demanded the surrender to the crown of all royal castles not in official custody, and though he succeeded in this, Falkes de Breauté, John's mercenary, burst into revolt next year, and it cost a great national effort and a siege of nearly two months to reduce Bedford Castle, which he had held. Towards the close of Henry's reign castles again asserted, in the Baron's War, their importance. The Provisions of Oxford included a list of the chief royal castles and of their appointed castellans with the oath that they were to take; but the alien favourites refused to make way for them till they were forcibly ejected. When war broke out it was Rochester Castle that successfully held Simon de Montfort at bay in 1264, and in Pevensey Castle that the fugitives from the rout of Lewes were able to defy his power. Finally, after his fall at Evesham, it was in Kenilworth Castle that the remnant of his followers made their last stand, holding out nearly five months against all the forces of the crown, till their provisions failed them at the close of 1266.

Thus for two centuries after the Norman Conquest castles had proved of primary consequence in English political struggles, revolts and warfare. And, although, when the country was again torn by civil strife, their military importance was of small account, the crown's historic jealousy of private fortification was still seen in the need to obtain the king's licence to "crenellate" (*i.e.* embattle) the country mansion.

Bibliography.—G. T. Clark, *Medieval Military Architecture in England* (2 vols.), includes a few French castles and is the standard work on the subject, but inaccurate and superseded on some points by recent research; Professor Oman's *Art of War in the Middle Ages* is a wide survey of the subject, but follows Clark in some of his errors; Mackenzie, *The Castles of England* (1897), valuable for illustrations; Deville, *Histoire du Château-Gaillard* (1829) and *Château d'Argues* (1839); Viollet-le-Duc's *Essay on the Military Architecture of the Middle Ages* was translated by M. Macdermott in 1860. More recent studies will be found in J. H. Round's *Geoffrey de Mandeville* (1891); "English Castles" (*Quarterly Review*, July 1894); and "Castles of the Conquest" (*Archeologia*, lviii., 1902); St John Hope's "English Castles of the 10th and 11th Centuries" (*Archaeol. Journal*, lx., 1902); Mrs Armitage's "Early Norman Castles of England" (*Eng. Hist. Review*, xix. 1904), and her papers in *Scot. Soc. Ant. Proc.* xxxiv., and *The Antiquary*, July, August, 1906; G. Neilson's "The Motes in Norman Scotland" (*Scottish Review*, lxiv., 1898); G. H. Orpen, "Motes and Norman Castles in Ireland" (*Eng. Hist. Review*, xxi., xxii., 1906–1907). (J. H. R.)

CASTLEBAR, a market town and the county town of Co. Mayo, Ireland, in the west parliamentary division, on the river and near the lough of the same name, on the Manulla and Westport branch of the Midland Great Western railway. Pop. of urban district (1901) 3585. The county court buildings and other public offices occupy a square, and there is a pleasant mall shaded by fine trees. There are some breweries, and trade in linens and agricultural produce. The castle, which gives its name to the town, was a fortress of the De Burgh family; but the town itself was founded in the reign of James I., and received a charter from him in 1613. In 1641 the castle was held for the parliament by Sir Henry Bingham, but he was forced to surrender to Lord Mayo, and fell a victim, with all his garrison, to the fury and treachery of the besiegers. The massacre was afterwards avenged in 1653 by the execution of Sir Theobald Burke (by that time Lord Mayo), who had been in command along with his father at the siege. In 1798 the town was occupied for some weeks by the French under General J. J. Humbert, who had defeated the English under Luke Hutchison in a conflict which is jocularly styled the "Castlebar Races." The town returned two members to the Irish parliament until the Union. Four miles N.E. of Castlebar is Turlough, with a round tower 70 ft. high and 57 ft. in circumference, and other remains.

CASTLECONNELL, a village of Co. Limerick, Ireland, on the left bank of the Shannon, 8 m. N.E. of Limerick on the Great Southern & Western railway. It possesses a spa which was once considerably frequented, but is famous as a centre for the salmon fishing on the lower Shannon. Castleconnell is so intimately connected with this sport that it has given its name to a favourite pattern of fly-rod, in which a movable splice takes the place of the usual metal joint. The beautiful rapids of Doonas (avoided by a canal) are in the neighbourhood, and the surrounding scenery is generally attractive. There are remains of a castle from which the town took its name, which was the seat of the kings of Thomond, and was blown up by General Ginkel at the time of the siege of Limerick (1690).

CASTLE DONINGTON, a town in the Loughborough parliamentary division of Leicestershire, England, 123½ m. N.N.W. from London, on the Trent Junction and Western branch of the Midland railway. Pop. (1901) 2514. It lies on the flank of the hills overlooking the Trent and Soar valleys. There are slight remains of the castle. The church of St Luke is a fine building of Early English and later date. Donington Park, a neighbouring mansion, was offered to refugees during the French Revolution in 1830, and Charles X. availed himself of this retreat. Hosiery, silk and baskets are manufactured. Castle Donington is 2½ m. west of Kegworth station on the Midland main line. Kegworth (pop. 2078), on the Soar, has a hosiery and knitting industry.

CASTLE DOUGLAS, a burgh of barony and police burgh of Kirkcudbrightshire, Scotland. Pop. (1901) 3018. It is situated on Carlingwark Loch, 19½ m. S.W. of Dumfries by the Glasgow & South-Western railway. Its auction marts for sheep and cattle sales are the largest in the south-west of Scotland; at an autumn sale as many as 15,000 sheep and 1400 cattle are disposed of in one day. The leading industries comprise the making of agricultural implements and mineral waters, besides tanning. The Macmillan Free Church perpetuates the memory of John Macmillan (d. 1753), the Cameronian, who helped to found the Reformed Presbyterian Church. He had been chaplain to Murray of Broughton, and afterwards became minister of Balmaghie, about 3½ m. N.W. of Castle Douglas. The town is the chief centre of business in East Galloway, and it is also resorted to in midsummer for its beautiful scenery and excellent fishing. Till 1765 it was only a village under the name of Causewayhead, but the discovery of marl in the lake brought it some prosperity, and it was purchased in 1792 by Sir William Douglas and called after him. Since then its progress has been continuous. Carlingwark Loch contains several islets, on one of which is a crannog, or ancient lake dwelling.

CASTLEFORD, an urban district in the Osgoldcross parliamentary division of the West Riding of Yorkshire, England, on the river Aire near its junction with the Calder, 9 m. S.E. of Leeds, on the North-Eastern and Lancashire & Yorkshire railways. Pop. (1901) 17,386. Large glass-bottle and earthenware-jar works, chemical works, and neighbouring collieries employ the inhabitants. Here was the Roman village or fort of *Lagecium* or *Legeolium*; and though visible remains are wanting, a number of relics have been discovered.

CASTLE-GUARD, an arrangement under the feudal system, by which the duty of finding knights to guard royal castles was imposed on certain baronies, and divided among their knight's fees. The greater barons provided for the guard of their castles by exacting a similar duty from their knights. In both cases the obligation was commuted very early for a fixed money payment, which, as "castle-guard rent" lasted on to modern times.

See J. H. Round, "Castle-Guard," in *Archaeological Journal*, vol. lix., and "Castle-ward and Coinage," in *The Commune of London*. (J. H. R.)

CASTLEMAINE, a town of Talbot county, Victoria, Australia, 78 m. by rail N.N.W. of Melbourne. Pop. (1901) 5704. The gold-mines here were among the first discovered in the colony, and dredging for gold is carried on in Barker's and Forrest creeks, at the junction of which the town stands. Slate and flagstone are largely quarried in the district, which also produces wine and much fruit, especially apples. Castlemaine has a reputation as a health resort in cases of pulmonary complaints.

CASTLE RISING, a village of Norfolk, England, 4 m. by road N.E. of King's Lynn. The Norman castle for which it is famous stands on slightly elevated ground overlooking, to the west, the low marshy coast of the Wash. Its site is enclosed by artificial ramparts of earth and a dyke which is crossed by an ancient bridge. The keep is square and massive, and fairly perfect, and it is not difficult to reconstruct the arrangement of the rooms. In some parts, especially the entrance, the Norman carving is very rich. The foundations of a small chapel with apsidal eastern termination have been discovered outside the castle. The village of Castle Rising is the decayed remnant of a town of no little importance. Its church of St Laurence is late Norman, with much rich ornamentation; it shows traces of considerable alterations in the Early English period, but is an admirable example of the earlier style.

It is a matter of dispute whether Rising was or was not an early Saxon settlement; in Domesday Book the manor is given as having belonged to Archbishop Stigand, from whom it had passed to Odo of Bayeux, whose estates were confiscated in 1088. Granted to William de Albini, whose son built Rising Castle, it passed first to Robert de Montalt, and then by sale to Isabel, queen of England, in 1332, remaining in the possession of the crown until Henry VIII. exchanged it for other lands with the duke of Norfolk. In 1269 an inquisition found that the lord had the return of all writs. In 1275 Robert de Montalt died seised of the manor and vill with the assize of bread and ale. An inquisition of 1379, although it makes no mention of the borough, states that the lord has the rents of assizes, and perquisites of the courts with view of frank-pledge. A mayor is first mentioned in 1343, and a borough existed in the 15th century. A survey of 1589–1590 declared that Castle Rising was an ancient borough by prescription according to the grant made to Hugh de Albini by Henry III. In 1589–1590 the recorder was chosen by the lord of the manor. The mayor, the only member of the corporation, whose sole duty was the holding of the assize of bread and ale, was chosen by the burgesses and presented at the court leet for confirmation. Castle Rising became a parliamentary borough in 1558, but was disfranchised in 1832 and the corporation abolished in 1835, although a mayor was elected for special purposes until 1883. Having no manufactures, the trade of the town depended entirely on its fairs and markets; but these have been long obsolete.

CASTLETON, a village in the High Peak parliamentary division of Derbyshire, England, 17 m. W.S.W. of Sheffield, and 2 m. from Hope station on a branch of the Midland railway. Pop. (1901) 547. Lying itself at an elevation of about 600 ft., it is surrounded on the north, west and south by hills from 1400 to 1700 ft. in height, rising sharply, and in parts precipitously. The village is celebrated for its situation in the midst of the wild Peak country, for the caves and mines in the neighbourhood, and for the Castle of the Peak, the ruins of which are strongly placed on a cliff immediately above the village. The Peak Cavern or Devil's Hole, penetrating this cliff, is the most magnificent in Derbyshire. For many generations the entrance to this cave has served as a workshop, held free of rent, to families employed in rope and twine making. Speedwell Cavern is not far distant, at the entrance to the fine pass of Winnats, by which Castleton and the Vale of Hope are approached from the west. The beauties of this cavern, in which occurs the so-called bottomless pit, are in part readily accessible by boat, but the approach to the inner or Cliff cavern is so difficult that it has rarely been explored. Among several other caves is that known as the Blue John Mine, from the decorative fluorspar called "Blue John" which is obtained here. The church of St Edmund, Castleton, retains a fine Norman chancel arch, and the vestry contains a valuable library. At Brough near Castleton was a Roman fort, established to hold in check the hillmen of the Peak. It was connected by roads with Buxton, Manchester and Rotherham. The Castle of the Peak, or Peveril Castle, is famous through Sir Walter Scott's novel *Peveril of the Peak*. Early earthworks, which, extending from below the castle in a semicircle, enclosed the town, can still in great part be traced. Before the Conquest the site was held by Gernebern and Hundinc, and was granted by the Conqueror to William Peverell, by whom the castle was built. On the forfeiture of William Peverell, grandson of the first holder, it was granted by Henry II. to Prince John who, in 1204, made Hugh Nevill governor of the castle. In 1216 William Ferrers, earl of Derby, took it from the rebellious barons, and was made governor by Henry III., who in 1223 granted a charter for a weekly market at the town. In 1328 the castle was given to John of Gaunt on his marriage with Blanche of Lancaster, and thus became parcel of the duchy of Lancaster. The castle has often been used as a prison, and from its position was almost impregnable.

CASTLETOWN (Manx, *Bully Cashtel*), a town of the Isle of Man, 10 m. S.W. of Douglas, by the Isle of Man railway. Pop. (1901) 1975. It is picturesquely situated on both sides of a small harbour formed by the outflow of the Silver Burn into Castletown Bay. It was the legal capital of the island until 1862. In the centre of the town stands Castle Rushen, which is said to owe its foundation to the Danish chief, Guthred, in 947–960, though the existing building, which is remarkably well preserved, probably dates from the 14th century. Until the 18th century it was the residence of the lords of Man, and until 1891 served as a prison. The massive keep is square, and is surrounded by an outer wall, with towers and a moat. The council chamber and court-house were built in 1644. In the neighbourhood of the castle is the old House of Keys, where the members of the Manx parliament held their sessions until the removal of the seat of government to Douglas. A lofty Doric column commemorates Cornelius Smelt, lieutenant-governor of the island (d. 1832), near which there is a remarkable sun-dial with thirteen faces, dating from 1720. King William's College, situated a mile to the north-east of the town, was opened in 1833; but a complete restoration was rendered necessary by fire in 1844, and it was subsequently enlarged. It is the chief educational establishment in the island. At Hango Hill near the town William Christian, receiver-general, who had surrendered the castle, and with it the island, to the parliamentary forces in 1651, was executed in 1663 at the instance of the countess of Derby, who had undertaken to defend it for the king. A small shipping trade is maintained.

CASTOR and **POLLUX** (Gr. Πολυδεύκης), in Greek and Roman mythology, the twin sons of Leda, and brothers of Helen and Clytaemnestra. They were also known under the name of Dioscuri (Διόσκοροι, later Διόσκουροι, children of Zeus), for, according to later tradition, they were the children of Zeus and Leda, whose love the god had won under the form of a swan. In some versions Leda is represented as having brought forth two eggs, from one of which were born Castor and Pollux, from the other Helen. In another account, Zeus is the father of Pollux and Helen, Tyndareus (king of Sparta) of Castor and Clytaemnestra. In Homer, Castor, Pollux and Clytaemnestra are said to be the children of Tyndareus and Leda, Helen the daughter of Leda by Zeus. The Dioscuri were specially reverenced among people of Dorian race, and were said to have reigned at Sparta, where also they were buried. They were also worshipped, especially in Athens, as lords and protectors (ἄνακες, ἄνακτες). Sailors in a storm prayed to them (Horace, *Odes*, i. 3) and sacrificed a white lamb, whereupon they were wont to appear in the form of fire at the masthead (probably referring to the phenomenon of St Elmo's fire), and the storm ceased. Later, they were confounded with the Samothracian Cabeiri. In battle they appeared riding on white horses and gave victory to the side they favoured. They were the patrons of hospitality, and founded the sacred festival called Theoxenia.

They presided over public games, Castor especially as the horse-tamer, Pollux as the boxer; but both are represented as riding on horseback or driving in a chariot. In Sparta their ancient symbol was two parallel beams (*δόκανα*), connected by cross-bars, which the Spartans took with them into the field (Plutarch, *De Fraterno Amore*, 1; Herodotus v. 75); later, they were represented by two amphorae with snakes twined round them. Their most important exploits were the invasion of Attica, to rescue their sister Helen from Theseus; their share in the hunting of the Calydonian boar (see MELEAGER) and the Argonautic expedition, and their battle with the sons of Aphareus, brought about by a quarrel in regard to some cattle, in which Castor, the mortal (as the son of Tyndareus), fell by the hand of Idas. Pollux, finding him dead after the battle, implored Zeus to be allowed to die with him; this being impossible by reason of his immortality, Pollux was permitted to spend alternately one day among the gods, the other in Hades with his brother. According to another fable, the god marked his approval of their love by placing them together in the sky, as the Twins or the morning and evening star (Hyginus, *Poet. Astronom.* ii. 22). Like the Asvins of the *Veda*, the bringers of light in the morning sky, with whom they have been identified, the Dioscuri are represented as youthful horsemen, naked or wearing only a light chlamys. Their characteristic attribute is a pointed egg-shaped cap, surmounted by a star.

Though their worship was perhaps most carefully observed among people of Dorian origin, Castor and Pollux were held in no small veneration at Rome. It was the popular belief in that city from an early period that the battle of Lake Regillus had been decided by their interposition (Dion. Halic. vi. 13). They had fought, it was said, armed and mounted, at the head of the legions of the commonwealth, and had afterwards carried the news of the victory with incredible speed to the city. The well in the Forum at which they alighted was pointed out, and near it rose their ancient temple, in which the senate often held its sittings. On the 15th of July, the supposed anniversary of the battle, a great festival with sumptuous sacrifices was celebrated in their honour, and a solemn parade of the Roman knights (*transvectio equitum*), who looked upon the Dioscuri as their patrons, took place. (Apollodorus iii. 10. 7, 11. 2; Homer, *Odyssey*, xi. 299; Hyginus, *Fab.* 77. 155; Pindar, *Nem.* x. 60, 80 and schol.; Diod. Sic. iv. 43; Plutarch, *Theseus*, 32, 33; Theocritus, *Idyll*, xxii.)

See Maurice Albert, *Le Culte de Castor et Pollux en Italie* (1883), with special descriptions and representations in art, on coins, vases and statues; S. Eitrem, "Die göttlichen Zwillinge bei den Griechen" (treating of the divine beings mentioned in pairs in Greek mythology), in *Videnskabs-Selskab Skrifter* (Christiania, 1902); W. R. Paton, *De Cultu Dioscurorum apud Graecos* (Bonn, 1894); L. Myriantheus, *Açvins oder arische Dioskuren* (Munich, 1876); J. R. Harris, *The Dioscuri in the Christian Legends* (1903), and *The Cult of the Heavenly Twins* (1906); W. Helbig, "Die Castores als Schutzgötter des römischen Equitatus," in *Hermes*, xl. (1905); C. Jaisle, *Die Dioskuren als Retter zur See bei Griechen und Römern, und ihr Fortleben in christlichen Legenden* (Tübingen, 1907); L. Preller, *Griechische und römische Mythologie*; articles by A. Furtwängler in Roscher's *Lexikon der Mythologie*, and by M. Albert in Daremberg and Saglio's *Dictionnaire des antiquités*.

CASTOR OIL, the fixed oil obtained from the seeds of the castor oil plant or Palma Christi, *Ricinus communis*, belonging to the natural order Euphorbiaceae. The botanical name is from Lat. *ricinus*, a tick, from the form and markings of the seed. The plant is a native of tropical Africa, but it has been introduced, and is now cultivated in most tropical and in the warmer temperate countries. In size it varies from a shrubby plant to a tree of from 30 to 40 ft. in height according to the climate in which it grows, being arborescent in tropical latitudes. On account of its very large beautiful palmate-peltate leaves, which sometimes measure as much as 2 ft. in diameter, it is cultivated as an ornamental plant. In the south of England, with the habit of an annual, it ripens its seeds in favourable seasons; and it has been known to come to maturity as far north as Christiania in Norway. Plants are readily grown from seed, which should be sown singly in small pots and placed in heat early in March. The young plants are kept under glass till early in June when they are hardened and put out. The fruit consists of a three-celled capsule, covered externally with soft yielding prickles, and each cell develops a single seed. The seeds of the different cultivated varieties, of which there are a great number, differ much in size and in external markings; but average seeds are of an oval laterally compressed form, with their longest diameter about four lines. They have a shining, marble-grey and brown, thick, leathery outer coat, within which is a thin dark-coloured brittle coat. A large distinct leafy embryo lies in the middle of a dense, oily tissue (endosperm). The seeds contain a toxic substance, which makes them actively poisonous; so much so that three have been known to kill an adult.

The oil is obtained from the seeds by two principal methods—expression and decoction—the latter process being largely used in India, where the oil, on account of its cheapness and abundance is extensively employed for illuminating as well as for other domestic and medicinal purposes. The oil exported from Calcutta to Europe is prepared by shelling and crushing the seeds between rollers. The crushed mass is then placed in hempen cloths and pressed in a screw or hydraulic press. The oil which exudes is mixed with water and heated till the water boils, and the mucilaginous matter in the oil separates as a scum. It is next strained, then bleached in the sunlight, and stored for exportation. A considerable quantity of castor oil of an excellent quality is also made in Italy; and in California the manufacture is conducted on an extensive scale. The following is an outline of the process adopted in a Californian factory. The seeds are submitted to a dry heat in a furnace for an hour or thereby, by which they are softened and prepared to part easily with their oil. They are then pressed in a large powerful screw-press, and the oily matter which flows out is caught, mixed with an equal proportion of water, and boiled to purify it from mucilaginous and albuminous matter. After boiling about an hour, it is allowed to cool, the water is drawn off, and the oil is transferred to zinc tanks or clarifiers capable of holding from 60 to 100 gallons. In these it stands about eight hours, bleaching in the sun, after which it is ready for storing. By this method 100 lb of good seeds yield about 5 gallons of pure oil.

Castor oil is a viscid liquid, almost colourless when pure, possessing only a slight odour, and a mild yet highly nauseous and disagreeable taste. Its specific gravity is ·96, a little less than that of water, and it dissolves freely in alcohol, ether and glacial acetic acid. It contains palmitic and several other fatty acids, among which there is one—ricinoleic acid—peculiar to itself. This occurs in combination with glycerin, constituting the greater part of the bulk of the oil.

The active principle to which the oil owes its purgative properties has not been isolated. It is, indeed, probable that it is formed in the intestine, as a result of some decomposition as yet unknown. The dose is from a drachm to an ounce. The pharmacopoeial mixture is best avoided, being almost uniquely nauseous. By far the best way to administer the oil is in capsules. It acts in about five hours, affecting the entire length of the bowel, but not increasing the flow of bile except in very large doses. The mode of its action is unknown. The oil will purge when rubbed into the skin or injected *per rectum*. It is an invaluable drug in temporary constipation and whenever a mild action is essential, as in pregnancy. It is extremely useful for children and the aged, but must not be employed in cases of chronic constipation, which it only aggravates, whilst relieving the symptoms.

CASTRÉN, MATTHIAS ALEXANDER (1813–1853), Finnish ethnologist and philologist, was born at Tervola, in the parish of Kemi in Finland, on the 20th of November (December 2, 1813). His father, Christian Castrén, parish minister at Rovaniemi, died in 1825; and Matthias passed under the protection of his uncle, Mathias Castrén, the kindly and learned incumbent of Kemi. At the age of twelve he was sent to school at Uleåborg, and there he helped to maintain himself by teaching the younger children. On his removal to the Alexander University at Helsingfors in 1830, he first devoted himself to Greek and Hebrew

with the intention of entering the church; but his interest was soon excited by the language of his native country, and he even began before his course was completed to lay the foundations of a work on Finnish mythology. The necessity of personal explorations among the still unwritten languages of cognate tribes soon made itself evident; and in 1838 he joined a medical fellow-student, Dr. Ehrström, in a journey through Lapland. In the following year he travelled in Russian Karelia at the expense of the Literary Society of Finland; and in 1841 he undertook, in company with Dr Elias Lönnrot, the great Finnish philologist, a third journey, which ultimately extended beyond the Ural as far as Obdorsk, and occupied a period of three years. Before starting on this last expedition he had published a translation into Swedish of the Finnish epic of *Kalevala*; and on his return he gave to the world his *Elementa grammatices Syrjaenae* and *Elementa grammatices Tscheremissae*, 1844. No sooner had he recovered from the illness which his last journey had occasioned than he set out, under the auspices of the Academy of St Petersburg and the Helsingfors University, on an exploration of the whole government of Siberia, which resulted in a vast addition to previous knowledge, but seriously affected the health of the adventurous investigator. The first-fruits of his collections were published at St Petersburg in 1849 in the form of a *Versuch einer ostjakischen Sprachlehre*. In 1850 he published a treatise *De affixis personalibus linguarum Altaicarum*, and was appointed professor at Helsingfors of the new chair of Finnish language and literature. The following year saw him raised to the rank of chancellor of the university; and he was busily engaged in what he regarded as his principal work, a Samoyedic grammar, when he died on the 7th of May 1853.

Five volumes of his collected works appeared from 1852 to 1858, containing respectively—(1) *Reseminnen från åren* 1838–1844; (2) *Reseberättelser och bref åren* 1845–1849; (3) *Föreläsningar i Finsk mythologi*; (4) *Ethnologiska föreläsningar öfver Altaiska folken*; and (5) *Smärre afhandlingar och akademiska dissertationer*. A German translation was published by Anton Schiefner, who was also entrusted by the St Petersburg Academy with the editing of his manuscripts, which had been left to the Helsingfors University and which were subsequently published.

CASTRENSIS, PAULUS, an Italian jurist of the 14th century. He studied under Baldus at Perugia, and was a fellow-pupil with Cardinal Zabarella. He was admitted to the degree of doctor of civil law in the university of Avignon, but it is uncertain when he first undertook the duties of a professor. A tradition, which has been handed down by Panzirolus, represents him as having taught law for a period of fifty-seven years. He was professor at Vienna in 1390, at Avignon in 1394, and at Padua in 1429; and, at different periods, at Florence, at Bologna and at Perugia. He was for some time the vicar-general of Cardinal Zabarella at Florence, and his eminence as a teacher of canon law may be inferred from the language of one of his pupils, who styles him "famosissimus juris utriusque monarca." His most complete treatise is his readings on the *Digest*, and it appears from a passage in his readings on the *Digestum Vetus* that he delivered them at a time when he had been actively engaged for forty-five years as a teacher of civil law. His death is generally assigned to 1436, but it appears from an entry in a MS. of the *Digestum Vetus*, which is extant at Munich, made by the hand of one of his pupils who styles him "praeceptor meus," that he died on the 20th of July 1441.

CASTRES, a town of south-western France, capital of an arrondissement in the department of Tarn, 29 m. S.S.E. of Albi on a branch line of the Southern railway. Pop. (1906) town, 19,864; commune, 28,272. Castres, the busiest and most populous town of its department, is intersected from north to south by the Agout; the river is fringed by old houses the upper stories of which project over its waters. Wide boulevards traverse the west of the town, which is also rendered attractive by numerous fountains fed by a fine aqueduct hewn in the rock. The church of St Benoît, once a cathedral, and the most important of the churches of Castres, dates only from the 17th and 18th centuries. The hôtel de ville, which contains a museum and the municipal library, occupies the former bishop's palace, designed by Jules Mansart in the 17th century; the Romanesque tower beside it is the only survival of an old Benedictine abbey. The town possesses some old mansions of which the hôtel de Nayrac, of the Renaissance, is of most interest. Castres has a sub-prefecture, tribunals of first instance and of commerce, a board of trade-arbitrators, a chamber of commerce, a branch of the bank of France and two hospitals. There are also communal colleges for boys and girls, a school of artillery and school of draughtsmanship. The industrial establishments include manufactories of earthenware and porcelain and metal-foundries, and tanning, leather-dressing, turnery, the making of wooden shoes and furniture, the weaving of woollen and other fabrics, dyeing, and the manufacture of machinery, paper and parchment are carried on.

Castres grew up round a Benedictine abbey, which is believed to have been founded in the 7th century. It was a place of considerable importance as early as the 12th century, and ranked as the second town of the Albigenses. During the Albigensian crusade it surrendered of its own accord to Simon de Montfort; and in 1356 it was raised to a countship by King John of France. On the confiscation of the possessions of the D'Armagnac family, to which it had passed, it was bestowed by Louis XI. on Boffilo del Giudice, but the appointment led to so much disagreement that the countship was united to the crown by Francis I. in 1519. In the wars of the latter part of the 16th century the inhabitants sided with the Protestant party, fortified the town, and established an independent republic. They were brought to terms, however, by Louis XIII., and forced to dismantle their fortifications; and the town was made the seat of the *chambre de l'édit*, or chamber for the investigation of the affairs of the Protestants, afterwards transferred to Castelnaudary (in 1679). The bishopric of Castres, which had been established by Pope John XXII. in 1317, was abolished at the Revolution.

CASTRO, INEZ DE (d. 1355), mistress, and perhaps wife, of Peter I. (Pedro), king of Portugal, called *Collo de Garza, i.e.* "Heron's Neck," was born in Spanish Galicia, in the earlier years of the 14th century. Tradition asserts that her father, Don Pedro Fernandez de Castro, and her mother, Dona Aldonça Soares de Villadares, a noble Portuguese lady, were unmarried, and that Inez and her two brothers were consequently of bastard birth. Educated at the semi-Oriental provincial court of Juan Manuel, duke of Peñafiel, Inez grew up side by side with Costança, the duke's daughter by a scion of the royal house of Aragon, and her own cousin. After refusing several crowned heads in marriage, Costança was at last persuaded to accept the hand of the infante Dom Pedro, son of Alphonso the Proud, king of Portugal. In 1341 the two girls left Peñafiel; Costança's marriage was celebrated in the same year, and the young infanta and her cousin went to reside at Lisbon, or at Coimbra, where Dom Pedro conceived that luckless and furious passion for Inez which has immortalized them.

The morality of the age was lax, and more especially so in Spain and Portugal, where the looseness of the marriage tie and the example of the Moors encouraged polygamy. Pedro's connexion *par amours* with Inez would of itself have aroused no opposition. He might even have married her, after the death of his wife in childbirth in 1345. According to his own assurance he did marry her in 1354. But by that time the rising power of the Castro family had created the most brutal hatred among their rivals, both in Spain and Portugal. Alvaro Gonzales, Pedro Coelho, and Diogo Lopes Pacheco persuaded the king, Alphonso, that his throne was in danger from an alliance between his son and the Castros, and with all the brutality of the age they urged the king to remove the danger by murdering the poor woman. The old king listened, refused, wavered and ended by yielding. He went in secret to the palace at Coimbra, where Inez and the infante resided, accompanied by his three familiars, and by others who agreed with them. The beauty and tears of Inez disarmed his resolution, and he turned to leave her; but the gentlemen about him had gone too far to recede. Inez was stabbed to death and was buried immediately in the church of Santa Clara.

The infante raised at once the flag of revolt against his father, and was only appeased by the concession of a large share in the government. The three murderers of Inez were sent out of the kingdom by Alphonso, who knew his son too well not to be aware that the vengeance would be tremendous as the crime. They took refuge in Castile. In 1357, however, Alphonso died, and the infante was crowned king of Portugal. Peter the Cruel, his nephew, reigned over Castile; and the murderers were given up as soon as required. Diogo Lopes escaped through the gratitude of a beggar to whom he had formerly done a kindness; but Coelho and Gonzales were executed, with horrible tortures, in the very presence of the king.

The story of the exhumation and coronation of the corpse of Inez has often been told. It is said that to the dead body, crowned and robed in royal raiment, and enthroned beside the king, the assembled nobles of Portugal paid homage as to their queen, swearing fealty on the withered hand of the corpse. The gravest doubts, however, exist as to the authenticity of this story; Fernão Lopes, the Portuguese Froissart, who is the great authority for the details of the death of Inez, with some of the actors in which he was acquainted, says nothing of the ghastly ceremony, though he tells at length the tale of the funeral honours that the king bestowed upon his wife. Inez was buried at Alcobaça with extraordinary magnificence, in a tomb of white marble, surmounted by her crowned statue; and near her sepulchre Pedro caused his own to be placed. The monument, after repeatedly resisting the violence of curiosity, was broken into in 1810 by the French soldiery; the statue was mutilated, and the yellow hair was cut from the broken skeleton, to be preserved in reliquaries and blown away by the wind. The children of Inez shared her habit of misfortune. From her brother, however, Alvaro Perez de Castro, the reigning house of Portugal directly descends.

See Fernão Lopes, *Chronica del Rey Dom Pedro* (1735); Camoens, *Os Lusiadas*; Antonio Ferreira's *Ines de Castro*,—the first regular tragedy of the Renaissance after the *Sofonisba* of Trissino; Luis Velez de Guevara, *Reinar despues de morir*, an admirable play; and Ferdinand Denis, *Chroniques chevaleresques de l'Espagne et du Portugal*.

CASTRO, JOÃO DE (1500–1548), called by Camoens *Castro Forte*, fourth viceroy of the Portuguese Indies, was the son of Alvaro de Castro, civil governor of Lisbon. A younger son, and destined therefore for the church, he became at an early age a brilliant humanist, and studied mathematics under Pedro Nunez, in company with the infante Dom Luis, son of Emanuel the First, with whom he contracted a life-long friendship. At eighteen he went to Tangier, where he was dubbed knight by Duarte de Menezes the governor, and there he remained several years. In 1535 he accompanied Dom Luis to the siege of Tunis, where he had the honour of refusing knighthood and reward at the hands of the great emperor Charles V. Returning to Lisbon, he received from the king the small commandership of São Pablo de Salvaterra in 1538. He was exceedingly poor, but his wife Lenor de Coutinho, a noble Portuguese lady, admired and appreciated her husband sufficiently to make light of their poverty. Soon after this he left for the Indies in company with his uncle Garcia de Noronha, and on his arrival at Goa enlisted among the *aventureiros*, "the bravest of the brave," told off for the relief of Diu. In 1540 he served on an expedition under Estevão da Gama, by whom his son, Alvaro de Castro, a child of thirteen, was knighted, out of compliment to him. Returning to Portugal, João de Castro was named commander of a fleet, in 1543, to clear the European seas of pirates; and in 1545 he was sent, with six sail, to the Indies, in the room of Martin de Sousa, who had been dismissed the viceroyalty. The next three years were the hardest and most brilliant, as they were the last, of his life—years of battle and struggle, of glory and sorrow, of suffering and triumph. Valiantly seconded by his sons (one of whom, Fernão, was killed before Diu) and by João Mascarenhas, João de Castro achieved such popularity by the overthrow of Mahmud, king of Gujarat, by the relief of Diu, and by the defeat of the great army of the Adil Khan, that he could contract a very large loan with the Goa merchants on the simple security of his moustache. These great deeds were followed by the capture of Broach, by the complete subjugation of Malacca, and by the passage of Antonio Moniz into Ceylon; and in 1547 the great captain was appointed viceroy by João III., who had at last accepted him without mistrust. He did not live long to fill this charge, expiring in the arms of his friend, St Francis Xavier, on the 6th of June 1548. He was buried at Goa, but his remains were afterwards exhumed and conveyed to Portugal, to be reinterred under a splendid monument in the convent of Bemfica.

See Jacinto Freire de Andrade, *Vida de D. João de Castro* (Lisbon, 1651), English translation by Sir Peter Wyche (1664); Diogo de Couto, *Decadas da Asia*, vi. The *Roteiros* or logbooks of Castro's voyages in the East (Lisbon, 1833, 1843 and 1872) are of great interest.

CASTROGIOVANNI (Arab. *Kasr-Yani*, a corruption of *Castrum Ennae*), a town and episcopal see of the province of Caltanisetta, Sicily, 95 m. by rail S.E. of Palermo, and 56 m. W. of Catania, situated 2605 ft. above sea-level, almost in the centre of the island, and commanding a magnificent view of the interior. Pop. (1901) 25,826. Enna was one of the cities of the Sicels, and the statement of Stephanus Byzantinus that it was colonized by Syracuse in 664 B.C. is improbable. The question is discussed by E. Pais, *Atakta* (Pisa, 1891), 63. It does not appear in history before the time of Dionysius I. of Syracuse, who, after unsuccessful attempts, finally acquired possession of it by treachery about 397 B.C. Its natural position rendered it a fortress of great importance, and it is frequently mentioned in subsequent history. In 134–132 it was the headquarters of the slave revolt, and was only reduced by treachery. Cicero speaks of it as a place of some importance, but in imperial times it seems to have been of little account. In A.D. 837 the Saracens attempted to take it, but without success; and it was again only by treachery that they were able to take it in 859. In 1087 it fell into the hands of the Normans; and the existing remains of fortifications are entirely medieval. There are indeed no remains of earlier days. The cathedral, founded in 1307, is of some interest. There are no remains of the famous temple of Demeter, from which Verres, as Cicero tells us, removed the bronze statue of the goddess. The lake of Pergus, where Persephone, according to one of the myths, was carried off by Hades, lies 4 m. to the south. The myth itself must have had some local origin, but has had so much Greek detail grafted upon it that the very names of the earlier Sicel deities have been displaced.

CASTRO URDIALES, a seaport of northern Spain, in the province of Santander, situated on the bay of Biscay and at the head of a branch railway connected with the Bilbao-Santander line. Pop. (1870) about 3500; (1900) 14,191. Castro Urdiales is a modern town, although its castle and parish church date from the middle ages. It was destroyed by the French in 1813, but speedily rebuilt and fortified. Its rapid rise in population and prosperity dates from the increased development of iron-mining and railway communication which took place after 1879. Its chief industries are iron-mining, fishing, and the preservation of fish, especially sardines, in oil. Between 1894 and 1904 the exports of iron ore rose from 277,200 tons to 516,574 tons.

CASTRO Y BELLVIS, GUILLÉN DE (1569–1631), Spanish dramatist, was a Valencian by birth, and early enjoyed a reputation as a man of letters. In 1591 he became a member of a local literary academy called the *Nocturnos*. At one time a captain of the coast-guard, at another the protégé of Benavente, viceroy of Naples, who appointed him governor of Scigliano, patronized by Osuna and Olivares, Castro was nominated a knight of the order of Santiago in 1623. He settled at Madrid in 1626, and died there on the 28th of July 1631 in such poverty that his funeral expenses were defrayed by charity. He probably made the acquaintance of Lope de Vega at the festivals (1620–1622) held to commemorate the beatification and canonization of St Isidore, the patron saint of Madrid. On the latter occasion Castro's *octavas* were awarded the first prize. Lope de Vega dedicated to him a celebrated play entitled *Las Almenas*

de Toro (1619), and when Castro's *Comedias* were published in 1618–1621 he dedicated the first volume to Lope de Vega's daughter. The drama that has made Castro's reputation is *Las Mocedades del Cid* (1599?), to the first part of which Corneille was largely indebted for the materials of his tragedy. The two parts of this play, like all those by Castro, have the genuine ring of the old *romances*; and, from their intense nationality, no less than for their primitive poetry and flowing versification, were among the most popular pieces of their day. Castro's *Fuerza de la costumbre* is the source of *Love's Care*, a play ascribed to Fletcher. He is also the reputed author of *El Prodigio de los Montes*, from which Calderón derived *El Mágico prodigioso*.

Las Mocedades del Cid (Toulouse, 1890) and *Ingratitud de amor* (Philadelphia, 1899) have been well edited by E. Mérimée and H. A. Rennert respectively.

CASTRUCCIO CASTRACANI DEGLI ANTELMINELLI (1281–1328), duke of Lucca, was by birth a Lucchese, and by descent and training a Ghibelline. Being exiled at an early age with his parents and others of their faction by the Guelphs, then in the ascendant, and orphaned at nineteen, he served as a *condottiere* under Philip IV. of France in Flanders, later with the Visconti in Lombardy, and in 1313 under the Ghibelline chief, Uguccione della Faggiuola, lord of Pisa, in central Italy. He assisted Uguccione in many enterprises, including the capture of Lucca (1314) and the victory over the Florentines at Montecatini (1315). An insurrection of the Lucchese having led to the expulsion of Uguccione and his party, Castruccio regained his freedom and his position, and the Ghibelline triumph was presently assured. Elected lord of Lucca in 1316, he warred incessantly against the Florentines, and was at first the faithful adviser and stanch supporter of Frederick of Austria, who made him imperial vicar of Lucca in 1320. After the battle of Mühlbach he went over to the emperor Louis the Bavarian, whom he served for many years. In 1325 he defeated the Florentines at Altopascio, and was appointed by the emperor duke of Lucca, Pistoja, Volterra and Luni, and two years later he captured Pisa, of which he was made imperial vicar. But, subsequently, his relations with Louis seem to have grown less friendly and he was afterwards excommunicated by the papal legate in the interests of the Guelphs. At his death in 1328 the fortunes of his young children were wrecked in the Guelphic triumph.

Niccolò Machiavelli's *Life of Castruccio* is a mere romance; it was translated into French, with notes, by Dreux de Radier in 1753. See Niccolò Negrini, *Vita di Castruccio* (Modena, 1496); Winkler's *Castruccio, Herzog von Lucca* (Berlin, 1897); also Gino Capponi's *Storia di Firenze*, and G. Sforza, *Castruccio Castracani degli Antelminelli in Lunigiana* (Modena, 1891); S. de Sismondi, *Histoire des républiques italiennes* (Brussels, 1838).

CASTRUM MINERVAE (mod. *Castro*), an ancient town of the Sallentini in Calabria, 10 m. south of Hydruntum, with an ancient temple of Minerva, said to have been founded by Idomeneus, who formed the tribe of the Sallentini from a mixture of Cretans, Illyrians and Italian Locrians. It is also said to have been the place where Aeneas first landed in Italy, the port of which he named *Portus Veneris*. The temple had lost some of its importance in Strabo's day.

CASUARINA, a genus of trees containing about 30 species, chiefly Australian, but a few Indo-Malayan. The long whip-like green branches are longitudinally grooved, and bear at the nodes whorls of small scale-leaves, the shoots resembling those of *Equisetum* (horse-tail). The flowers are unisexual; the staminate are borne in spikes, each flower consisting of a central stamen which is surrounded by two scale-like perianth-leaves. The pistillate are borne in dense spherical heads; each flower stands in the axil of a bract and consists of two united carpels flanked by a pair of bracteoles; the long styles hang out beyond the bracts, and the one-chambered ovary contains two ovules. In the fruit the bracteoles form two woody valves between which is a nut; the aggregate of fruits resemble small cones. Pollen is transferred by the wind to the long styles. The pollen-tube does not penetrate the ovule through the micropyle but enters at the opposite end—the chalaza. This anomaly was discovered by Dr M. Treub (see *Annal. Jardin Botan. Buitenzorg*, x. 1891), and is associated with a peculiar development of the ovule, and an increased number and peculiar form of the embryo-sacs (nacrospores). Treub proposed to separate *Casuarina* as a distinct group of Angiosperms, and suggested the following arrangement:—

Angiospermae { Porogamae { Dicotyledons. / Monocotyledons. } / Chalazogamae (*Casuarina*). }

The names of the two subdivisions recall the manner of entrance of the pollen-tube. More recent investigations, chiefly by Nawaschin and Miss Benson, on members of the orders Betulaceae, Fagaceae, Juglans and Ulmus, showed a recurrence in a greater or less degree of the various anomalies previously observed in *Casuarina*, and suggest that the affinity of *Casuarina* is with these orders of Dicotyledons.

The wood is very hard, and several species are valuable timber trees. From a fancied resemblance of the wood to that of the oak these trees are known as "oaks," and the same species has different names in different parts such as "she-oak," "swamp-oak," "shingle-oak," "river-oak," "iron-wood," "beef-wood," &c.

See J. H. Maiden, *Useful Native Plants of Australia* (London and Sydney, 1889).

CASUISTRY (from the Lat. *casus*, a point of law), the art of bringing general moral principles to bear on particular actions. It is, in short, applied morality; anybody is a casuist who reflects about his duties and tries to bring them into line with some intelligible moral standard. But morality at different times has worn very different dresses. It has sometimes been thought of as an outward law, sometimes as an inward disposition; and each of these rival conceptions has developed a casuistical method of its own. Believers in law have put their trust in authority or logic; while believers in disposition chiefly look to our instinctive faculties—conscience, common-sense or sentiment. The legal is the older group, and to it the name of casuist is often exclusively reserved, generally with the implication that its methods are too purely technical to commend themselves to mankind at large. But common-sense and conscience are quite as definite guides as logic or authority; and there seems no good reason for refusing to give the name of casuistry to their operations.

The casuistry of primitive man is uncompromisingly legal. His morality is not yet separated from his religion; and religion for him means the cult of some superior being—the king or priest of his tribe—whose person is charged with a kind of sacred electricity. "His divinity is a fire, which, under proper restraints, confers endless blessings; but if rashly touched, or allowed to break bounds, it burns or destroys what it touches. Hence the disastrous effects supposed to follow a breach of taboo; the offender has thrust his hand into the divine fire, which shrivels up and consumes him on the spot" (Frazer, *The Golden Bough*, i. 169). Elaborate rules are accordingly drawn up to secure the maximum of benefit, and the minimum of inconvenience, from this sacred fire; and in the application of these rules does savage casuistry consist. At a higher stage of civilization the god is no longer present in person but issues to his worshippers categorical commands. These logic must seize upon and develop as far as they will go; for the breach of some trifling consequence of a rule might mean the loss of the deity's favour. Hence the rise of sacred books among most Eastern peoples. On the Jewish Decalogue, for instance, follows the law, and on the law the rabbinical schools. Some of these will be stricter, and some laxer; but on the whole all tend to "aggravate" the law—down to the point of forbidding the faithful to wear a girdle, or to kill a noxious insect on the Sabbath. Though indeed we might look nearer home than the Talmud for similar absurdities; most Puritan communities could furnish strange freaks of Sabbatarian casuistry. Nor have the Catholics been one whit behind them. Their scholastic doctors gravely discuss whether—since water is the "matter" of baptism—a soul can be made regenerate by milk, or rose-water or wine.

At the opposite pole stood ancient Greece. Here ceremonial

casuistry found no place, because there were no sacred books. "Among the Greeks writing never attained the consecration of religion. No system of doctrine and observance, no manuals containing authoritative rules of morality, were ever transmitted in documentary form. In conduct they shrank from formulae. Unvarying rules petrified action; the need of flexibility, of perpetual adjustment, was strongly felt" (Butcher, *The Greek Genius*, p. 182). For this reason their interest in ethical speculations was all the keener; their great thinkers were endlessly engaged in settling what the relation ought to be between duty and self-interest. Ought one to swallow up the other—and, if so, which should prevail? Or was it possible to patch up a compromise between them? The great Stoic philosophers took the austerest line, and held that duty should always and everywhere be our only law. But it was one thing to enunciate such magnificent theories in a lecture, and quite another to apply them in the market-place. Casuistry came to the aid of average human nature—that is to say, pupils began to confront the master with hard cases taken from daily life. And more than one master was disposed to make large—even startlingly large—concessions to the exigencies of practice. This concrete side of moral philosophy came specially into evidence when Stoicism was transplanted to Rome. Cicero's *De Officiis* abounds in the kind of question afterwards so warmly discussed by Dr Johnson and his friends. Is it ever right to tell a lie? May a lawyer defend a client whom he knows to be guilty? In selling my goods, is it enough not to disguise their shortcomings, or ought I candidly to admit them? Seneca even made the discussion of such problems into a regular discipline, claiming that their concrete character gave an interest in morality to those who had no love for abstractions; while they prevented those who had from losing themselves in the clouds. And M. Thamin maintains that, if his heroes did not form great characters, at any rate they taught the Roman child to train its conscience. But, then, Cicero and Seneca took common-sense as their guide. They decided each problem on its merits, looking more to the spirit than to the letter, and often showing a practical sagacity worthy of Johnson himself. Quite in the great doctor's spirit is Cicero's counsel to his son, to hear what the philosophers had to say, but to decide for himself as a man of the world. Such advice could not be grateful to the philosophers themselves—then a definite professional class, not unlike the "spiritual directors" of a later Rome, who earned their bread by smoothing away the doubts of the scrupulous on all matters intellectual and moral. Their great weapon was their logic; and a logician, as Pascal says, must be very unfortunate or very stupid if he cannot manage to find exceptions to every conceivable rule. In their hands casuistry became the art of finding such exceptions. From the Greek sophists they borrowed ingenious ways of playing off one duty against another, or duty in general against self-interest—leaving the doubter in the alternative of neglecting the one and being a knave, or neglecting the other and being a fool. Or else they raised a subtle distinction between the act and the intention. To get drunk for the sake of the drink was the mark of a beast; but wine was a powerful stimulant to the brain, and to fuddle oneself in order to think great thoughts was worthy of a sage. No doubt these airy paradoxes were not always seriously taken; but it is significant that a common Roman proverb identified "philosophizing" (*philosophatur*) with thinking out some dirty trick.

Christianity swept the whole discussion on to a higher plane. All the stress now fell on the disposition, not on the outward act. The good deeds of a just man were a natural consequence of his justice; whereas a bad man was no whit the better, because he now and then deviated into doing right. Actions, in short, were of no account whatever, apart from the character that produced them. "All things are lawful unto me," said St Paul, "but all are not expedient." And St Augustine sums the whole matter up in the famous phrase: "Have charity, and do as thou wilt." Narrow-minded Christian consciences, however, could not stay long on this level; law was so very much more satisfying a guide than vague, elusive charity. And law in plenty was forthcoming, so soon as the Church developed the discipline of public confessions followed by appropriate penances for each fault. At first the whole proceeding was informal and impulsive enough; but by the 7th century it had grown thoroughly stereotyped and formal. *Libri Poenitentiales* began to appear—detailed lists of all possible sins, with the forfeit to be exacted from each. As public penance finally decayed, and auricular confession took its place, these were superseded by the *Summae de Poenitentia*,—law-books in the strictest sense. These were huge digests of all that popes, councils, primitive fathers had decided on every kind of question pertaining to the confessional—what exactly is a sin, what kind of questions the priests must ask, under what conditions he could give absolution. As such, they were eagerly welcomed by the clergy; for a single magistrate, sitting in secret without appeal, necessarily grasps at whatever will lighten his burden of responsibility. Nor was their complexity a stumbling-block. The medieval mind was only too prone to look on morality as a highly technical art, quite as difficult as medicine or chancery law—a path where wayfaring men were certain to err, with no guide but their unsophisticated conscience. What could they possibly do but cling to their priest with a "blind and unexpressed faith"?

Against this state of things the Reformation was a violent protest. Catholicism increasingly took for granted that a man imperilled his soul by thinking for himself; Protestantism replied that he could certainly lose it, if he left his thinking to another. For it is to the individual conscience that God speaks; through the struggles of the individual conscience He builds up a strong and stable Christian character. "A man may be a heretic in the truth," says Milton in his *Areopagitica* (1644), "if he believes things only because his pastor says so, or the Assembly so determines, without knowing other reason, though his belief be true, yet the very truth he holds becomes his heresy. There is not any burden that some would not gladlier post off to another than the charge and care of their religion. A wealthy man, addicted to his pleasures and his profits, finds religion to be a traffic so entangled, and of so many piddling accounts, that of all mysteries he cannot skill to keep a stock going upon that trade. What does he therefore but resolve to give over toiling, and find himself some factor, to whose care and conduct he may commit the whole managing of his religious affairs—some divine of note and estimation that must be. To him he adheres, resigns the whole warehouse of his religion with all the locks and keys into his custody, and indeed makes the very person of that man his religion. So that a man may say his religion is now no more within himself, but is become a dividual moveable, which goes or comes near him, according as that good man frequents the house."

Twelve years after the *Areopagitica* appeared Pascal's *Provincial Letters* (1656–1657). These deal with the casuists of the Counter-Reformation in the spirit of Milton, laying especial stress on the artificiality of their methods and the laxity of their results. Not, of course, that they meant deliberate evil; Pascal expressly credits them with good intentions. But they were drawn, almost to a man, from Italy or Spain, the two countries least alive to the spirit of the Reformation; and most of them were Jesuits, the order that set out to be nothing Protestantism was, and everything that Protestantism was not. Hence they were resolutely opposed to any idea of reform; for to begin making changes in the Church's system would be a tacit admission that Luther had some show of reason on his side. On the other hand, they would certainly lose their hold on the laity, unless some kind of change were made; for many of the Church's rules were obsolete, and others far too severe to impose on the France of Montaigne or even the Spain of Cervantes. Thus caught between two fires the casuists developed a highly ingenious method, not unlike that of the Roman Stoics, for eviscerating the substance of a rule while leaving its shadow carefully intact. The next step was to force the confessors to accept their lax interpretation of the law; and this was accomplished by their famous theory of *probabilism*—first taught in Spain about 1580. This made it a grave sin in the priest to refuse absolution, whenever there

was some good reason for giving it even when there were other and better reasons for refusing it. This principle does not deserve all the abuse that has been lavished upon it. It secured uniformity in the confessional, and thereby protected the penitent from the caprices of individual priests; and by depriving these of responsibility, it forced the penitent back on himself. But the gain was more than counterbalanced by the evil. The less the Church could expect from its penitents, the more it was driven to trust to the miraculous efficiency of sacramental grace. Once get a sinner to confession, and the whole work was done. However bad his natural disposition, the magical words of absolution would make him a new man. As for most penitents, all they cared for was to scrape through by the skin of their teeth. Casuistry might insist that it only proposed to fix the minimum of a minimum, and beg them for their soul's sake to aim a little higher. Human nature seldom resists the charms of a fixed standard—least of all when it is applied by a live judge in a visible court. If the priest must be satisfied with little, why be at the trouble of offering more? For this reason, probabilism found vigorous opponents in Bossuet and other eminent divines; and various of its excesses were condemned by the popes during the latter half of the 17th century. After a long eclipse it was finally re-established, though in a very modified form, by Alfonso Liguori about the middle of the 18th century.

In Protestant countries casuistry shrank and dwindled, though works on the subject continued to be written both in Germany and England during the 17th century. The best known of the Anglican books is Jeremy Taylor's *Ductor Dubitantium* (1660). But the Protestant casuist never pretended to speak authoritatively; all he did was to give his reasons, and leave the decision to the conscience of his readers. "In all this discourse," says Bishop Sanderson, one of the best of the English writers, "I take it upon me not to write edicts, but to give my advice." Very soon, however, these relics of casuistry were swept away by the rising tide of common-sense. The 18th century loved to discuss hard cases of conscience, as a very cursory glance at Fielding's novels (1742–1751) or Boswell's *Life of Johnson* (1791) will show. But the age was incurably suspicious of attempts to deal with such difficulties on any kind of technical system. Pope was never tired of girding at

> "Morality by her false guardians drawn,
> Chicane in furs, and casuistry in lawn";

while Fielding has embodied the popular conception of a casuist in Parson Thwackum and Philosopher Square, both of whom only take to argument when they want to reason themselves out of some obvious duty. Still more outspoken is the Savoyard vicar in the *Émile* (1762) of Jean Jacques Rousseau: "Whence do I get my rules of action? I find them in my heart. All I feel to be good is good; all I feel to be evil is evil. Conscience is the best of casuists; it is only when men wish to cheat it that they fly to logical quibbles." Extravagant as this sentiment sounds, it paved the way to better things. The great object of 17th-century moralists had been to find some general principle from which the whole of ethics could be deduced; common-sense, by turning its back on abstract principles of every kind, forced the philosophers to come down to the solid earth, and start by inquiring how the world does make up its mind in fact. During the last two centuries deduction has gone steadily out, and psychology come in. Ethics have become more distinctively a science, instead of an awkward hybrid between a science and an art; their business has been to investigate what moral conduct is, not to lay down the law as to what it ought to be. Hence they deliberately refuse to engage in casuistry of the old-fashioned sort. Further, it is increasingly felt that ethical judgments do not depend on reason alone, but involve every element in our character; and that the real problem of practical morality is to establish a harmonious balance between the intelligence and the feelings—to make a man's "I think this is right" correspond with his "I feel that it is so." Whether systematic training can do anything to make the attainment of this balance easier is a question that has lately engaged the attention of many educational reformers; and whatever future casuistry may still have before it would seem to lie along the lines indicated by them.

There is an excellent study of the ancient casuists by M. Raymond Thamin, *Un Problème moral dans l'antiquité* (Paris, 1884). For the Roman Catholic casuists see Döllinger und Reusch, *Moralstreitigkeiten im siebzehnten Jahrhundert* (2 vols., Nordlingen, 1889), and various articles ("Casuistik," "Ethik," "Moralsysteme," &c.) in Wetzer and Welte's *Kirchenlexicon* (Freiburg, 1880–1896). See also the editions of Pascal's *Provincial Letters*, by John de Soyres (with English notes, Cambridge, 1880), and A. Molinier (2 vols., Paris, 1891). The Anglican casuists are discussed in Whewell, *Lectures on Moral Philosophy* (London, 1862). For general reflections on the subject see the appendix to Jowett's edition of the Epistle to the Romans (London, 1855). Most modern text-books on ethics devote some attention to the matter—notably F. H. Bradley in his *Ethical Studies* (London, 1876). See also Hastings Rashdall, *Theory of Good and Evil* (2 vols., Oxford, 1907). (St. C.)

CASUS BELLI, the technical term for cases in which a state holds itself justified in making war, if a certain course to which it objects is persisted in. Interference with the full exercise of a nation's rights or independence, an affront to its dignity, an unredressed injury, are instances of *casus belli*. Most of the new compulsory treaties of arbitration entered into by Great Britain and other states exclude from their application cases affecting the "vital interests" or "national honour" of the contracting states. These may therefore be considered as a sort of definition of *casus belli* in so far as the high contracting parties to them are concerned.

CAT,[1] properly the name of the well-known domesticated feline animal usually termed by naturalists *Felis domestica*, but in a wider sense employed to denote all the more typical members of the family *Felidae*. According to the *New English Dictionary*, although the origin of the word "cat" is unknown, yet the name is found in various languages as far back as they can be traced. In old Western Germanic it occurs, for instance, so early as from A.D. 400 to 450; in old High German it is *chazza* or *catero*, and in Middle German *katlaro*. Both in Gaelic and in old French it is *cat*, although sometimes taking the form of *chater* in the latter; the Gaelic designation of the European wild cat being *cat fiadhaich*. In Welsh and Cornish the name is *cath*. If Martial's *cattae* refer to this animal, the earliest Latin use of the name dates from the 1st century of our era. In the work of Palladius on agriculture, dating from about the year A.D. 350, reference is made to an animal called *catus* or *cattus*, as being useful in

[1] The word "cat" is applied to various objects, in all cases an application of the name of the animal. In medieval siegecraft the "cat" (Med. Lat. *chattus* or *gattus*, *chatta* or *gatta*, in Fr. *chat* or *chat-chasteil*) was a movable pent-house used to protect besiegers when approaching a wall or gateway, for the purpose of sapping, mining or direct attack, or to cover a ram or other battering-engine. The word is also sometimes applied to a heavy timber fitted with iron spikes or projections to be thrown down upon besiegers, and to the large work known as a "cavalier." "Cat" or "cat-head," in nautical usage, is the projecting beam on the bows of a ship used to clear the anchor from the sides of the vessel when weighed. The stock of the anchor rests on the cat-head when hung outside the ship. The name is also used of a type of a vessel, now obsolete, and formerly used in the coal and timber trade on the north-east coast of England; it had a deep waist and narrow stem; it is still applied to a small rig of sailing boats, with a single mast stepped far forward, with a fore and aft sail. Among other objects also known by the name of "cat" is the small piece of wood pointed at either end used in the game of tip-cat, and the instrument of punishment, generally known as the "cat o' nine tails." This consists of a handle of wood or rope, about 18 in. long, with nine knotted cords or thongs. The multiplication of thongs for purposes of flogging is found in the old Roman *flagellum*, a scourge, which had sometimes three thongs with bone or bronze knots fastened to them. The "cat" was the regular instrument with which floggings were performed in the British army and navy. Since the abolition of flogging in the services, the use of the cat is now restricted to certain classes of offenders in military prisons (Army Act 1881, § 133). In the English criminal law, where corporal punishment is ordered by the court for certain criminal offences, the "cat" is used only where the prisoner is over sixteen years of age. It may not be used except when actually ordered in the sentence, and must be of a pattern approved by a secretary of state. Further floggings are inflicted with the "cat" upon convicted prisoners for breaches of discipline in prison. They must be ordered by the visitors of the prison and confirmed by the home secretary.

granaries for catching mice. This usage, coupled with the existence of a distinct term in Gaelic for the wild species, leaves little doubt that the word "cat" properly denotes only the domesticated species. This is confirmed by the employment in Byzantine Greek of the term κάττος or κάττα to designate domesticated cats brought from Egypt. It should be added that the αἴλουρος of the Greeks, frequently translated by the older writers as "cat," really refers to the marten-cat, which appears to have been partially domesticated by the ancients and employed for mousing.

As regards the origin of the domesticated cats of western Europe, it is well known that the ancient Egyptians were in the habit of domesticating (at least in some degree) the Egyptian race of the African wild cat (*Felis ocreata maniculata*), and also of embalming its remains, of which vast numbers have been found in tombs at Beni Hasan and elsewhere in Egypt. These Egyptian cats are generally believed by naturalists to have had a large share in the parentage of the European breeds, which have, however, in many cases been crossed to a greater or less extent with the European wild cat (*F. catus*).

One of the features by which the Egyptian differs from the European wild cat is the longer and less bushy tail; and it has been very generally considered that the same feature is characteristic of European domesticated cats. According, however, to Dr E. Hamilton, "the measurement of a number of tails of the [European] wild cat and of the domestic cat gives a range between 11 in. and 14½ in., the longer length being quite as often found in the wild cats as in the domestic. The bushy appearance depends entirely on the length of the fur, and accords with the thick fur of the rest of the body of the wild cat, while in the domestic race the fur both on the body and tail is thinner and softer."

Possibly those domesticated cats with unusually short and bushy tails may have a larger share of European wild-cat blood; while, conversely, such wild cats as show long tails may have a cross of domesticated blood.

More importance was attached by Dr A. Nehring of Berlin (*SB. Ges. Nàturfor.*, Berlin, 1887) to the colour of the soles of the hind-feet as a means of determining the relationship of the domesticated cat of Europe. According to his observations, in the Egyptian wild cat the pads of the toes are wholly black, while the black extends back either continuously or in long stripes as far as the calcaneum or heel-bone. In the European wild cat, on the other hand, the black is limited to a small round spot on the pads, while the colour of the hair as far back as the heel-bone is yellowish or yellowish-grey. Since in all domesticated cats retaining the colouring of the wild species the soles of the hind-feet correspond in this particular with the Egyptian rather than with the European wild cat, the presumption is in favour of their descent from the former rather than from the latter.

Later, Dr Nehring (*op. cit.* 1889) came to the conclusion that the domesticated cat has a dual parentage, one stock coming from south-eastern Asia and the other from north-eastern Africa; in other words, from a domesticated Chinese cat (itself derived from a wild Chinese species) on the one hand, and from the Egyptian cat on the other. The ordinary domesticated cats of Europe are, however, mainly of African origin, although they have largely crossed, especially in Germany (and probably also in Great Britain), with the wild cat. The same author was likewise of opinion that the domestication or taming of various species of wild cats took place chiefly among nationalities of stationary or non-nomadic habits who occupied themselves with agricultural pursuits, since it would be of vital importance that their stores of grain should be adequately protected from the depredations of rats and mice.

The foregoing opinion as to the dual parentage of our domesticated cats receives support from observations made many years ago by E. Blyth, which have recently been endorsed and amplified by R. I. Pocock (*Proc. Zool. Soc. London*, 1907). According to these observations, two distinct types of so-called tabby cats are recognizable. In the one the pattern consists of narrow vertical stripes, and in the other of longitudinal or obliquely longitudinal stripes, which, on the sides of the body, tend to assume a spiral or sub-circular arrangement characteristic of the blotched tabby. This latter type appears to be the true "tabby"; since that word denotes a pattern like that of watered silk. One or other of these types is to be found in cats of almost all breeds, whether Persian, short-haired or Manx; and there appear to be no intermediate stages between them. Cats of the striped type are no doubt descended from the European and North African wild cats; but the origin of cats exhibiting the blotched pattern appears to be unknown. As it was to a cat of the latter kind that Linnaeus gave the name of *Felis catus*, Pocock urges that this title is not available for the European wild cat, which he would call *Felis sylvestris*. Without accepting this proposed change in nomenclature, which is liable to lead to confusion without any compensating advantage, it may be suggested that the blotched tabby type represents Dr Nehring's presumed Chinese element in the cat's parentage, and that the missing wild stock may be one of the numerous phases of the leopard-cat (*F. bengalensis*), in some of which an incipient spiral arrangement of the markings may be noticed on the shoulder.

As to the introduction of domesticated cats into Europe, the opinion is very generally held that tame cats from Egypt were imported at a relatively early date into Etruria by Phoenician traders; and there is decisive evidence that these animals were established in Italy long before the Christian era. The progeny of these cats, more or less crossed with the indigenous species, thence gradually spread over Europe, to become mingled at some period, according to Dr Nehring's hypothesis, with an Asiatic stock. The earliest written record of the introduction of domesticated cats into Great Britain dates from about A.D. 936, when Hywel Dda, prince of South Wales, enacted a law for their protection. "The Romans," writes Dr Hamilton, "were probably the original introducers of this cat, and as the final evacuation of Britain by that nation took place under the emperor Valentinian about A.D. 436, the period of its introduction may certainly be dated some 500 years previous to the Welsh chronicle and even much earlier." It is added that the remains of cats from Roman villas at Silchester and Dursley are probably referable to the domesticated breed.

Before proceeding to notice some of the different types of domesticated cats, a few lines may be devoted to the wild European species, *F. catus*. Beyond stating that in colour it conforms very closely to the striped phase of domesticated tabby, it will be unnecessary to describe the species. Its geographical range was formerly very extensive, and included Great Britain, France, the Netherlands, Switzerland, Germany, Bohemia, Hungary, Poland, Transylvania, Galicia, the Caucasus as far as the Caspian, southern Russia, Italy, Spain, Greece, Rumania, Bulgaria, Servia, and portions of central and northern Asia. "At the present time," observes Dr Hamilton, "the wild cat has become almost extinct in many of the above districts. Examples may perhaps occasionally still be found in the uninhabited forests of Hungary and Transylvania, and occasionally in Spain and Greece, as well as in the Caucasus and in some of the Swiss cantons, but the original race has in most countries interbred with the domestic cat wherever the latter has penetrated." In Great Britain wild cats survive only in some of the Scottish forests, and even there it is difficult to decide whether pure-bred specimens are extant. Remains of the wild cat occur in English caverns; while from those of Ireland (where the wild species has apparently been unknown during the historic period) have been obtained jaws and teeth which it has been suggested are referable to the Egyptian rather than to the European wild cat. Such a determination is, however, extremely hazardous, even if it be admitted that the remains of cats from the rock-fissures of Gibraltar pertain to *Felis ocreata*.

The favourite haunts of the wild cat are mountain forests where masses or rocks or cliffs are interspersed with trees, the crevices in these rocks or the hollow trunks of trees affording sites for the wild cat's lair, where its young are produced and reared. In the Spanish plains, however, the young are often produced in nests built in trees, or among tall bamboos in

FIG 1.—SKINS OF THE BLOTCHED DOMESTIC CAT, SHOWING SOME OF THE VARIATIONS TO WHICH THE PATTERN IS LIABLE. (Cf. Fig. 5 on Plate II.)

FIG. 2.—SKINS OF THE STRIPED DOMESTIC CAT, GIVING THE "TICKED" BREED AND A PARTIALLY ALBINO SPECIMEN. (Cf. Fig. 4 on Plate II.)

FIG. 3.—SKINS OF THE EUROPEAN WILD CAT, FROM ROSS-SHIRE, SCOTLAND. (Cf. Fig. 1 on Plate II.)

Note—Of the two types of colouration found in modern domestic cats, the striped type obviously corresponds to the original wild cat as seen in various parts of North Europe to-day. The origin of the blotched as a special type is wholly unknown.

(Photos from Plates VIII., IX., and X., *P. Z. S.*, 1907, by permission of the Zoological Society of London.)

Photo, W. G. Berridge.

FIG. 1.—EUROPEAN WILD CAT.

Photo, W. G. Berridge.

FIG. 2.—PALLAS'S CAT.

Photo, R. C. Ryan.

FIG. 3.—ROYAL SIAMESE CAT.

Photo, Topical Press Agency.

FIG. 4.—STRIPED DOMESTIC CAT.

Photo, Topical Press Agency.

FIG. 5.—BLOTCHED DOMESTIC CAT.

Photo, R. C. Ryan.

FIG. 6.—TAIL-LESS CAT.

Photo, Topical Press Agency.

FIG. 7.—WHITE PERSIAN KITTEN.

Photo, Topical Press Agency.

FIG. 8.—BLUE PERSIAN CAT.

Photo, Topical Press Agency.

FIG. 9.—BLACK PERSIAN KITTEN.

cane-brakes. "To fight like a wild cat" is proverbial, and wild cats are described as some of the most ferocious and untamable of all animals. How far this untamable character lends support to the view of the origin of our domesticated breeds has not yet been determined. Hares, rabbits, field-mice, water-rats, rats, squirrels, moles, game-birds, pigeons, and small birds, form the chief food of the wild cat.

Apart from the above-mentioned division of the striped members of both groups into two types according to the pattern of their markings, the domesticated cats of western Europe are divided into a short-haired and a long-haired group. Of these, the former is the one which bears the closest relationship to the wild cats of Africa and of Europe, the latter being an importation from the East. The striped (as distinct from the blotched) short-haired tabby is probably the one most nearly allied to the wild ancestors, the stripes being, however, to a great extent due to the European wild cat. In one direction the tabby shows a tendency to melanism which culminates in complete blackness, while in the other direction there is an equally marked tendency to albinism; grey cats, which may be regarded as tabbies whose stripes have disappeared, forming the connecting link between the tabby and the white cat. A mixture of the melanistic with the albinistic type will of course give rise to parti-coloured cats. A third colour-phase, the "erythristic" or red, is represented by the sandy cat, the female of which takes the form of the "tortoise-shell," characterized, curiously enough, by the colour being a blend of black, white, and sandy. The so-called orange tabby is one phase of the erythristic type.

As to long-haired cats, there appear originally to have been two closely-allied strains, the Angora and the Persian, of which the former has been altogether replaced in western Europe by the latter. That these long-haired cats have an ancestry, to some extent at any rate distinct from the ordinary short-haired breeds, is practically certain, and it has been suggested that they are derived from the "manul" cat, or Pallas's cat (*Felis manul*), of the deserts of central Asia, which is a long-haired and bushy-tailed species with comparatively slight striping. The fact that in tabby Persians the body-markings are never so strong as in the short-haired breeds is in some degree confirmatory of this, as suggesting descent from a nearly whole-coloured type. At the present day, however, Persians exhibit nearly all the colour and pattern types of the short-haired breeds, the "orange Persian" representing the erythristic phase.

Turning to the tailless or so-called Manx cats, in which the tail should be represented merely by a tuft of hair without any remnant of bone, it seems that the strain is to be met with in many parts of Russia, and there is a very general opinion that it originally came from Japan or some other far eastern country. Throughout Japan, China, Siam, and the Malay countries, normal long-tailed cats are indeed seldom seen. Instead of these are cats with more or less abbreviated tails, showing in greater or less degree a decided kink or bend near the tip. In other cases the tail is of the short curling type of that of a bulldog; sometimes it starts quite straight, but divides in a fork-like manner near the tip; and in yet other instances it is altogether wanting, as in the typical Manx cats. These kink-tailed or tailless cats are moreover smaller in size than the ordinary short-tailed breeds, with rather longer hair, whose texture approaches that of rabbit-fur, and a cry said to be like that of the jungle-cat (*F. chaus*) of India and Africa, and more dog-like habits. Unless the jungle-cat, which is a nearly whole-coloured species, can claim the position, the ancestry of these Manx-Malay cats is still unknown. Kink-tailed cats, it should be added, are also known from Madagascar.

Among the domesticated cats of India a spotted type of colouring, with a more or less decided tendency for the spots to coalesce into stripes, is very noticeable; and it is probable that these cats are derived from the spotted Indian desert-cat (*F. ornata*), with a certain amount of crossing from other species. The so-called *F. torquata* of India is probably based on cats of this type which have reverted to the wild state. Other Indian cats with a tawny or fulvous type of colouring are probably the more or less modified descendants of the jungle-cat. From the same stock may be derived the Abyssinian breed, in which the ears are relatively large and occasionally tipped with long hairs (thus recalling the tufted ears of the jungle-cat). The colour is typically reddish-brown, each individual hair being "ticked" like that of a wild rabbit, whence the popular name of "bunny cat." Another African breed is the Mombasa cat, in which the hair is reported to be unusually short and stiff.

By far the most remarkable of all the Old World domesticated breeds is, however, the royal Siamese cat, which almost certainly has an origin quite distinct from that of the ordinary European breeds; this being rendered evident not only by the peculiar type of colouring, but likewise by the cry, which is quite unmistakable. Siamese cats may have the tail either straight or kinked, but whether the latter feature belongs of right to the breed, or has been acquired by crossing with the ordinary black and tabby kink-tailed cats of the country, is not known. In the royal Siamese breed the head is rather long and pointed, the body also elongated with relatively slender limbs, the coat glossy and close, the eyes blue, and the general colour some shade of cream or pink, with the face, ears, feet, under-parts, and tail chocolate or seal-brown. There is however a wholly chocolate-coloured strain in which the eyes are yellow. The most remarkable feature about the breed is that the young are white. "The kittens," observes a lady writer, "are born absolutely white, and in about a week a faint pencilling comes round the ears, and gradually all the points come. At four or five months they are lovely, as generally they retain their baby whiteness, which contrasts well with their almost black ears, deep-brown markings, and blue eyes." In constitution these cats are extremely delicate. The blue eyes and the white coat of the kitten indicate that the Siamese breed is a semi-albino, which when adult tends towards melanism, such a combination of characters being apparently unknown in any other animal. If the frequent presence of a kink in the tail be an inherent feature, the breed is evidently related to the other kink-tailed Malay cats which, as already stated, have a cry differing from that of European cats. Should this be so, then if the ordinary Malay cats are the descendants of the jungle-cat, we shall have to assign the same ancestry to the Siamese breed.

Although definite information on this point is required, it seems probable that the southern part of North America and South America possessed certain native domesticated breeds of cats previous to the European conquest of the country; and if this be so, it will be obvious that these breeds must be derived from indigenous wild species. One of these breeds is the Paraguay cat, which when adult weighs only about three pounds, and is not more than a quarter the size of an ordinary cat. The body is elongated, and the hair, especially on the tail, short, shiny and close. This small size and elongated form suggest origin from the jaguarondi (*F. jaguarondi*), a chestnut-coloured wild species; but information appears to be lacking with regard to the colouring of the domesticated breed. Another South American breed is said to be free from the hideous "caterwauling" of the ordinary cat. In old days New Mexico was the home of a breed of hairless cats, said to have been kept by the ancient Aztecs, but now well-nigh if not completely extinct. Although entirely naked in summer, these cats developed in winter a slight growth of hair on the back and the ridge of the tail.

LITERATURE.—St George Mivart, *The Cat* (London, 1881); R. Lydekker, "Cats," in *Allen's Naturalists' Library* (1888); F. Hamilton, *The Wild Cat of Europe* (London, 1896); Frances Simpson, *The Book of the Cat* (London, 1903). (R. L.*)

CATABOLISM, or KATABOLISM (Gr. *κατά*, down, *βολή*, a throw), the biological term for the reverse of anabolism, namely the breaking down of complex into simpler substances, destructive metabolism (see PHYSIOLOGY).

CATACLYSM (Gr. *κατακλυσμός*, a deluge), a great flood or deluge (*q.v.*). The term is used in geology to denote an

overwhelming catastrophe which has produced sudden changes in the earth's surface; and also, figuratively, of any great and violent change which sweeps away the existing social or political order.

CATACOMB, a subterranean excavation for the interment of the dead or burial-vault. In this sense the word "catacomb" has gained universal acceptance, and has found a place in most modern languages. The original term, *catacumbae*, however, had no connexion with sepulture, but was simply the name of a particular locality in the environs of Rome. It was derived from the Greek *κατά* and *κύμβη*, "a hollow," and had reference to the natural configuration of the ground. In the district that bore this designation, lying close to the Appian Way, the basilica of San Sebastiano was erected, and the extensive burial-vaults beneath that church—in which, according to tradition, the bodies of the apostles St Peter and St Paul rested for a year and seven months previous to their removal to the basilicas which bear their names—were, in very early times, called from it *coemeterium ad catacumbas*, or *catacumbas* alone. From the celebrity of this cemetery as an object of pilgrimage its name became extensively known, and in entire forgetfulness of the origin of the word, *catacumbae* came to be regarded as a generic appellation for all burial-places of the same kind. This extension of the term to Christian burial-vaults generally dates from the 9th century, and obtained gradual currency through the Christian world. The original designation of these places of sepulture is *crypta* or *coemeterium*.

The largest number of Christian catacombs belong to the 3rd and the early part of the 4th centuries. The custom of subterranean interment gradually died out, and entirely ceased with the sack of Rome by Alaric, A.D. 410. "The end of the catacomb graves," writes Mommsen (*Cont. Rev.*, May 1871), "is intimately connected with the end of the powerful city itself.... Poverty took the place of wealth,... the traditions of the Christian tomb-architects sank into utter insignificance, and the expanse of the wasted Campagna now offered room enough to bury the few bodies, without having to descend as once far down below the surface of the earth." The earliest account of the catacombs, that of St Jerome narrating his visits to them when a schoolboy at Rome, about A.D. 354, shows that interment in them was even then rare if it had not been altogether discontinued; and the poet Prudentius's description of the tomb of the Christian martyr Hippolytus, and the cemetery in which it stood, leads us to the same conclusion. With the latter part of the 4th century a new epoch in the history of the catacombs arose—that of religious reverence. In the time of Pope Damasus, A.D. 366–384, the catacombs had begun to be regarded with special devotion, and had become the resort of large bands of pilgrims, for whose guidance catalogues of the chief burial-places and the holy men buried in them were drawn up. Some of these lists are still extant.[1] Pope Damasus himself displayed great zeal in adapting the catacombs to their new purpose, restoring the works of art on the walls, and renewing the epitaphs over the graves of the martyrs. In this latter work he employed an engraver named Furius Philocalus, the exquisite beauty of whose characters enables the smallest fragment of his work to be recognized at a glance. This gave rise to extensive alterations in their construction and decoration, which has much lessened their value as authentic memorials of the religious art of the 2nd and 3rd centuries. Subsequent popes manifested equal ardour, with the same damaging results, in the repair and adornment of the catacombs, and many of the paintings covering their walls, which have been assigned to the period of their original construction, are really the work of these later times. The catacombs shared in the devastation of Rome by the Goths under Vitiges in the 6th century and by the Lombards at a later period; and partly through the spoliation of these barbarian invaders, partly through the neglect of those who should have been their guardians, they sank into such a state of decay and pollution that, as the only means of preserving the holy remains they enshrined from further desecration, Pope Paul I., in the latter part of the 8th century, and Pope Paschal, at the beginning of the 9th, entered upon the work of the translation of the relics, which was vigorously carried on by successive pontiffs until the crypts were almost entirely despoiled of their dead. The relics having been removed, the visits of pilgrims naturally ceased, and by degrees the very existence of those wonderful subterranean cemeteries was forgotten. Six centuries elapsed before the accidental discovery of a sepulchral chamber by some labourers digging for *pozzolana* earth (May 31, 1578) revealed to the amazed inhabitants of Rome "the existence," to quote a contemporary record, "of other cities concealed beneath their own suburbs." Baronius, the ecclesiastical historian, was one of the first to visit the new discovery, and his *Annals* in more than one place evidence his just appreciation of its importance. The true "Columbus of this subterranean world," as he has been aptly designated, was the indefatigable Antonio Bosio (d. 1629), who devoted his life to the personal investigation of the catacombs, the results of which were given to the world in 1632 in a huge folio, entitled *Roma sotterranea*, profusely illustrated with rude but faithful plans and engravings. This was republished in a Latin translation with considerable alterations and omissions by Paolo Aringhi in 1651; and a century after its first appearance the plates were reproduced by Giovanni Bottari in 1737, and illustrated with great care and learning. Some additional discoveries were described by Marc Antonio Boldetti in his *Osservazioni*, published in 1720; but, writing in the interests of the Roman Church with an apologetic, not a scientific object, truth was made to bend to polemics, and little addition to our knowledge of the catacombs is to be gained from his otherwise important work. The French historian of art, Seroux d'Agincourt, 1825, by his copious illustrations, greatly facilitated the study of the architecture of the catacombs and the works of art contained in them. The works of Raoul Rochette display a comprehensive knowledge of the whole subject, extensive reading, and a thorough acquaintance with early Christian art so far as it could be gathered from books, but he was not an original investigator. The great pioneer in the path of independent research, which, with the intelligent use of documentary and historical evidence, has led to so vast an increase in our acquaintance with the Roman Catacombs, was Padre Marchi of the Society of Jesus. His work, *Monumenti delle arti christiane primitive*, is the first in which the strange misconception, received with unquestioning faith by earlier writers, that the catacombs were exhausted sand-pits adapted by the Christians to the purpose of interment, was dispelled, and the true history of their formation demonstrated. Marchi's line of investigation was followed by the Commendatore De Rossi, and his brother Michele, the former of whom was Marchi's fellow-labourer during the latter part of his explorations; and it is to them that we owe the most exhaustive scientific examination of the whole subject. The Catacombs of Rome are the most extensive with which we are acquainted, and, as might be expected in the centre of the Christian world, are in many respects the most remarkable. No others have been so thoroughly examined and illustrated. These may, therefore, be most appropriately selected for description as typical examples.

Catacombs of Rome.

Our description of the Roman Catacombs cannot be more appropriately introduced than by St Jerome's account of his visits to them in his youth, already referred to, which, after the lapse of above fifteen centuries, presents a most accurate picture of these wonderful subterranean labyrinths. "When I was a boy," he writes, "receiving my education in Rome, I and my schoolfellows used, on Sundays, to make the circuit of the sepulchres of the apostles and martyrs. Many a time did we go down into the catacombs. These are

[1] The most important of these lists are the two Itineraries belonging to the first half of the 7th century, in the Salzburg library. One still earlier, but less complete, appears in the *Notitia Urbis Romae*, under the title *Index Coemeteriorum*. Another Itinerary, preserved at Einsiedeln, printed by Mabillon, dates from the latter half of the same century. That found in the works of William of Malmesbury (Hardy's ed. vol. ii. pp. 539-544) appears to be copied from it, or both may be from the same source. De Rossi gives a comparative table of these Itineraries and other similar lists.

excavated deep in the earth, and contain, on either hand as you enter, the bodies of the dead buried in the wall. It is all so dark there that the language of the prophet (Ps. lv. 15) seems to be fulfilled, 'Let them go down quick into hell.' Only occasionally is light let in to mitigate the horror of the gloom, and then not so much through a window as through a hole. You take each step with caution, as, surrounded by deep night, you recall the words of Virgil—

"Horror ubique animos, simul ipsa silentia terrent."[1]

In complete agreement with Jerome's vivid picture the visitor to the Roman Catacombs finds himself in a vast labyrinth of narrow galleries, usually from 3 to 4 ft. in width, interspersed with small chambers, all excavated at successive levels, in the strata of volcanic rock subjacent to the city and its environs, and constructed originally for the interment of the Christian dead. The galleries are not the way of access to the cemeteries, but are themselves the cemeteries, the dead being buried in long low horizontal recesses, excavated in the vertical walls of the passages, rising tier above tier like the berths in a ship, from a few inches above the floor to the springing of the arched ceiling, to the number of five, six or even sometimes twelve ranges. These galleries are not arranged on any definite plan, but, as will be seen from the plan (fig. 1), they intersect one another at different angles, producing an intricate network which it is almost impossible to reduce to any system. They generally run in straight lines, and as a rule preserve the same level. The different storeys of galleries lie one below the other (fig. 2) to the number of four or five (in one part of the cemetery of St Calixtus they reach seven storeys), and communicate with one another by stairs cut out of the living rock. Light and air are introduced by means of vertical shafts (*luminaria*) running up to the outer air, and often serving for several storeys. The drawing (fig. 3) from Northcote gives a very correct idea of these galleries, with the tiers of graves pierced in the walls. The doorways which are seen interrupting the lines of graves are those of the family sepulchral chambers, or *cubicula*, of which we shall speak more particularly hereafter.

The graves, or *loculi*, as they are commonly designated, were, in the Christian cemeteries, with only a few exceptions (Padre Marchi produces some from the cemetery of St Ciriaca, *Monum. primitiv.* tav. xiv. xliii. xliv.), parallel with the length of the gallery. In the pagan cemeteries, on the other hand, the sepulchral recess as a rule entered the rock like an oven at right angles to the corridor, the body being introduced endways. The plan adopted by the Christians saved labour, economized space, and consulted reverence in the deposition of the corpse. These *loculi* were usually constructed for a single body only. Some, however, were formed to contain two, three, or four, or even more corpses. Such recesses were known respectively as *bisomi*, *trisomi*, *quadrisomi*, &c., terms which often appear in the sepulchral inscriptions. After the introduction of the body the *loculi* were closed with the greatest care, either with slabs of marble the whole length of the aperture, or with huge tiles, three being generally employed, cemented together with great exactness so as to prevent the escape of the products of decomposition (fig. 4). Where any epitaph was set up—an immense number are destitute of any inscription at all—it is always painted or engraved on these slabs or tiles. In the earlier interments the

FIG. 1.—Plan of part of the Cemetery of Sant' Agnese. (From Martigny.)

A. Entrance from the Basilica of St Agnes.
1, 2. Ancient staircases leading to the first storey.
3. Corridors from the staircases.
4. Two ruined staircases leading to the lower storey.
5. Steps of the rock.
6. Air-shafts, or luminaria.
7. Ruined vault.
8. Blind ways.
9. Passages built up or ruined.
10. Passages obstructed by landslips.
11. Unfinished passage.
12. Passages destitute of tombs.
13. Narrow apertures between adjoining galleries.
14-17. Arcosolia.
18-32. Cubicula. [two chairs.
33. Chapel with vestibule and apse, and
34. Double chapel with three chairs.
35. Large chapel in five divisions.

[1] Hieron., *Comment. in Ezech.* lib. xx. c. 40. The translation is Dean Burgon's.

epitaph is usually daubed on the slab in red or black paint. In later examples it is incised in the marbles, the letters being rendered clearer by being coloured with vermilion. The enclosing slab very often bears one or more Christian symbols, such as the

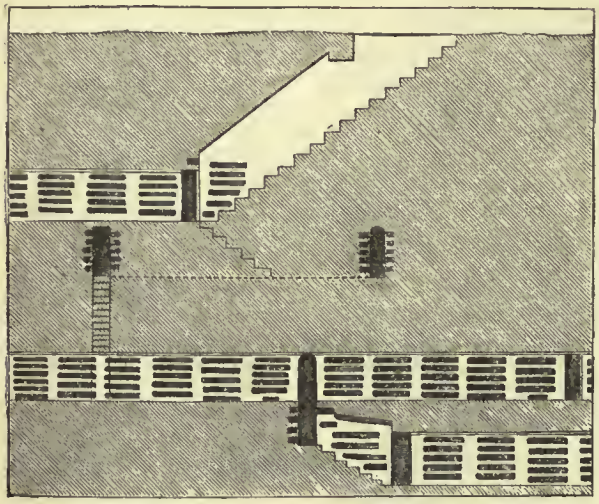


FIG. 2.—Section of Galleries at different levels. (From Seroux d'Agincourt.)

dove, the anchor, the olive-branch, or the monogram of Christ (figs. 5, 6). The palm branch, which is also of frequent occurrence, is not an indisputable mark of the last resting-place of a martyr, being found in connexion with epitaphs of persons dying natural deaths, or those prepared by persons in their lifetime, as well as in those of little children, and even of pagans. Another frequent concomitant of these catacomb interments, a small glass vessel containing traces of the sediment of a red fluid, embedded in the cement of the *loculus* (fig. 7), has no better claim. The red matter proves to be the remains of wine, not of blood; and the conclusion of the ablest archaeologists is that

FIG. 3.—View of a Gallery.

the vessels were placed where they are found, after the eucharistic celebration or *agape* on the day of the funeral or its anniversary, and contained remains of the consecrated elements as a kind of religious charm. Not a few of the slabs, it is discovered, have done double duty, bearing a pagan inscription on one side and a Christian one on the other. These are known as *opisthographs*. The bodies were interred wrapped in linen cloths, or swathed in bands, and were frequently preserved by embalming. In the case of poorer interments the destruction of the body was, on the contrary, often accelerated by the use of quicklime.

Interment in the wall-recess or *loculus*, though infinitely the most common, was not the only mode employed in the catacombs.

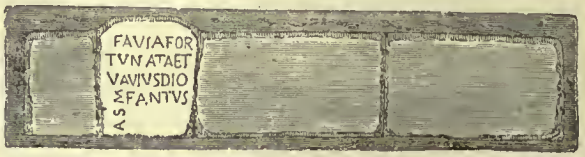
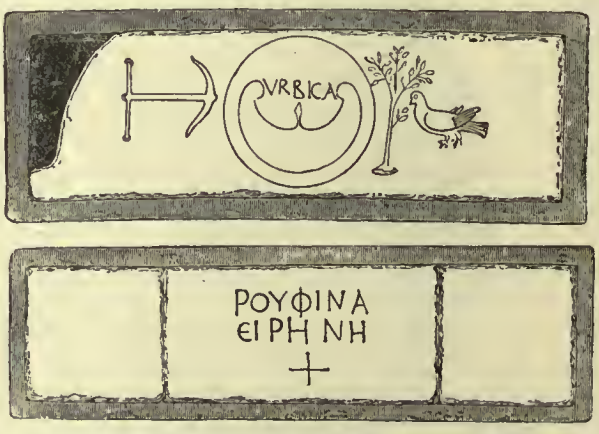


FIG. 4.—Loculi. (From de Rossi.)

Other forms of very frequent recurrence are the *table-tomb* and *arched tomb*, or *arcosolium*. From the annexed woodcuts it will be seen that these only differ in the form of the surmounting recess. In each case the arched tomb was formed by an oblong chest, either hollowed out of the rock, or built of masonry, and closed with a horizontal slab. But in the table-tomb (fig. 8) the recess above, essential for the introduction of the corpse, is square, while in the arcosolium (fig. 9), a form of later date, it is semicircular. Sarcophagi are also found in the catacombs, but are



FIGS. 5 and 6.—Loculi. (From de Rossi.)

of rare occurrence. They chiefly occur in the earlier cemeteries, and the costliness of their construction confined their use to the wealthiest classes—*e.g.* in the cemetery of St Domitilla, herself a member of the imperial house. Another unfrequent mode of interment was in graves like those of modern times, dug in the floor of the galleries (Marchi, *u.s.*, tav. xxi. xxvi.). Table-tombs and arcosolia are by no means rare in the corridors of the catacombs, but they belong more generally to the *cubicula*, or family vaults, of which we now proceed to speak.

These *cubicula* are small apartments, seldom more than 12 ft. square, usually rectangular, though sometimes circular or

FIG. 7.—Glass Bottles. (From Bosio.)

polygonal, opening out of the main corridors. They are not unfrequently ranged regularly along the sides of the galleries, the doors of entrance, as may be seen in a previous illustration (fig. 3), following one another in as orderly succession as the bedchamber doors in the passage of a modern house. The roof is sometimes

flat, but is more usually vaulted, and sometimes rises into a cupola. Both the roof and the walls are almost universally coated with stucco and covered with fresco paintings—in the earlier works merely decorative, in the later always symbolical or historical. Each side of the cubiculum, except that of the entrance, usually contains a recessed tomb, either a table-tomb or an arcosolium. That facing the entrance was the place of greatest honour, where in many instances the remains of a martyr were deposited, whose tomb, according to primitive usage, served as an altar for the celebration of the eucharist. This was sometimes, as in the Papal crypt of St Calixtus (fig. 10), protected from irreverence by lattice work (*transennae*) of marble. The cubiculum was originally designed for the reception of a very limited number of dead. But the natural desire to be buried near one's relatives caused new tombs to be cut in the walls, above and around and behind the original tombs, the walls being thus completely honeycombed with *loculi*, sometimes as many as seventy, utterly regardless of the paintings originally depicted on the walls. Another motive for multiplying the number of graves operated when the cubiculum contained the remains of any noted saint or martyr. The Christian antiquary has cause continually to lament the destruction of works of art due to this craving. One of the most perfect examples of early Christian pictorial decoration, the so-called "Dispute with the Doctors," in the catacomb of Calixtus, the "antique style of beauty" of which is noticed by Kugler, has thus suffered irreparable mutilation, the whole of the lower part of the picture having been destroyed by the excavation of a fresh grave-recess (Bottari, vol. ii. tav. 15). The plates of De Rossi, Perret, and, indeed, all illustrations of the catacombs, exhibit frequent examples of the same destructive superstition. The illustrations (figs. 11 and 12), taken from De Rossi's great work, representing two of the cubicula in the cemetery of St Calixtus, show the general arrangement of the loculi and the

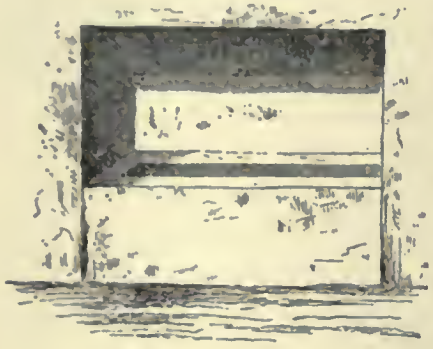


FIG. 8.—Table-tomb.

FIG. 9.—Arcosolia. (From Bosio.)

character of the frescoes which ornament the walls and roof. These paintings, it will be seen, are simply decorative, of the same style as the wall-paintings of the baths, and those of Pompeii.

Each *cubiculum* was usually the burying-place of some one family, all the members of which were interred in it, just as in the chantry-chapels connected with medieval churches. In them was celebrated the funeral-feast on the day of burial and on its anniversary, as well as the eucharist, which was the invariable accompaniment of funerals in the primitive church (Bingham,

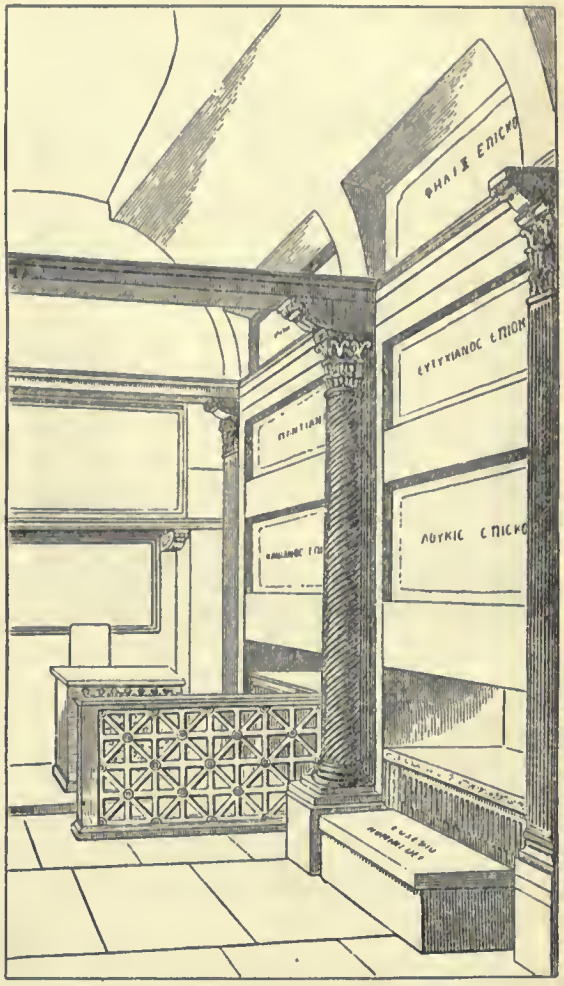


FIG. 10.—Restoration of the Papal Crypt, Cemetery of St Calixtus. (From de Rossi.)

Orig. Eccl. bk. xxiii. c. iii. 12). The funeral-banquet descended to the Christian church from pagan times, and was too often profaned by heathen licence. St Augustine, in several passages, inveighs against those who thus by "gluttony and insobriety buried themselves over the buried," and "made themselves

FIG. 11.—Cubiculum in Cemetery of St Calixtus. (From de Rossi.)

drunk in the chapels of the martyrs, placing their excesses to the score of religious reverence for the dead" (August., *De Mor. Eccl. Cathol.* c. 34; *Contr. Faust.* lib. xx. c. 21; *Confess.* lib. vi. c. 2). Some curious frescoes representing these funeral-feasts, found in the *cubicula* which were the scene of them, are

reproduced by Bosio (pp. 355, 391) and others. A romantic air has been thrown over these burial chapels by the notion that they were the places of worship used by the Christians in times of

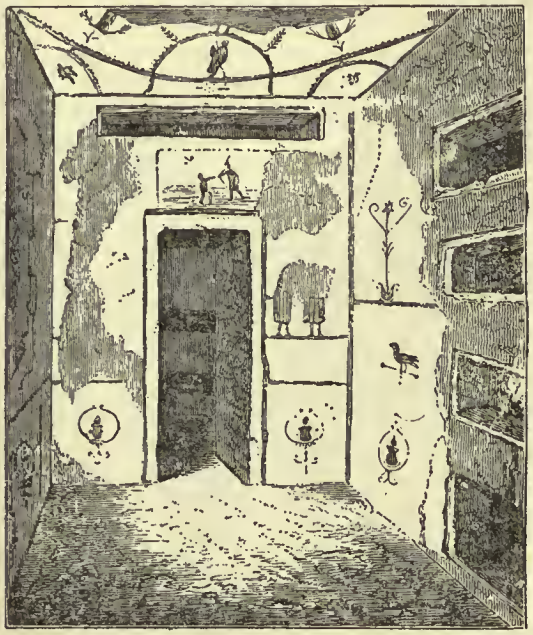


FIG. 12.—Cubiculum in the Cemetery of St Calixtus. (From de Rossi.)

persecution. This to a certain extent is doubtless true, as in the case of the chapel of Santa Priscilla, where the altar or stone coffin of a martyr remains, with a small platform behind it for the priest or bishop to stand upon. But that they can have been so used to any large extent is rendered impossible by their limited dimensions, as none of them could hold more than fifty or sixty persons. In some of the catacombs, however, there are larger halls and connected suites of chapels which may possibly have been constructed for the purpose of congregational worship during the dark periods when the public exercise of the Christian religion was made penal. The most remarkable of these is in the cemetery of Sant' Agnese (see plan, fig. 13). It consists of five rectangular compartments, three on one side of the corridor

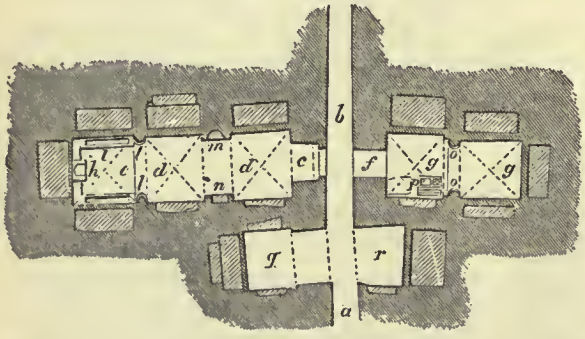


FIG. 13.—Plan of a supposed Church, Catacomb of Sant' Agnese. (From Marchi.)

and two on the other, connected by a passage intersecting the gallery at right angles. Two of the five compartments are supposed to have been assigned to male, and two to female worshippers, the fifth, at the extremity of the whole, being reserved for the altar and its ministers. In the centre of the end-wall stands a stone chair (fig. 14), considered to have been the episcopal cathedra, with a bench for the clergy on each side. There is no trace of an altar, which may, Marchi thinks, have been portable. The walls of the compartments are occupied by arched sepulchral recesses, above and below which are tiers of ordinary graves or *loculi*. The arrangements are certainly such as indicate a congregational purpose, but the extreme narrowness of the suite, and still more of the passage which connects the two divisions, must have rendered it difficult for any but a small number to take any intelligent part in the services at the same time. Although the idea of the use of the catacombs for religious worship may have been pressed too far, there can be no doubt that the sacred rites of the church were celebrated within them. We have already spoken of the eucharistic celebrations of which the *cubicula* were the scene; and still existing baptisteries prove that the other sacrament was also administered there. The most remarkable of these baptisteries is that in the catacomb of San Pontianus (fig. 15). Ten steps lead down to a basin of sufficient depth for immersion, supplied by a spring. Some of the subterranean chambers contain armed seats and benches cut out of the tufa rock. These are supposed by Marchi and others to indicate schoolrooms, where the catechumens were instructed by the bishop or presbyters. But this theory wants verification. It is impossible not to be struck with the remarkable analogy between these rock-hewn chairs and those discovered in the Etruscan tombs, of the purpose of which no satisfactory explanation has been given.

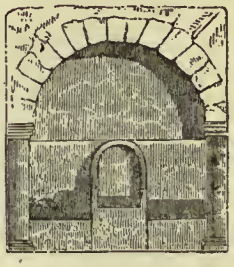


FIG. 14. — Bishop's Chair. Catacomb of Sant' Agnese.

Very exaggerated statements have been made as to the employment of the catacombs as dwelling-places by the Christians in times of persecution. We have, however, sufficient evidence that they were used as places of refuge from the fury of the heathen, in which the believers— especially the bishops and clergy, who would naturally be the first objects of attack—might secrete themselves until the storm had blown over. This was a purpose for which they were

Theories of the use of the catacombs.

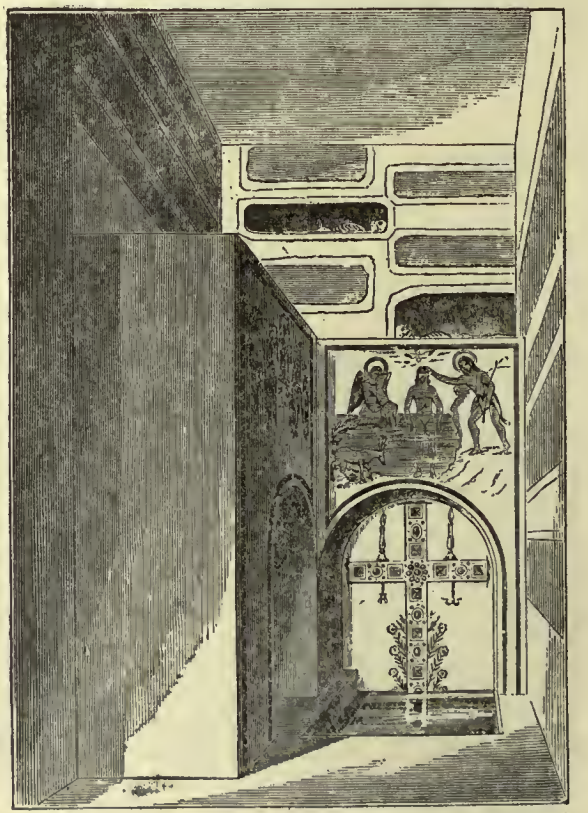


FIG. 15.—Baptistery of San Pontianus. (From Perret.)

admirably adapted both by the intricacy of their labyrinthine passages, in which any one not possessing the clue would be inevitably lost, and the numerous small chambers and hiding-places at different levels which might be passed unperceived in the dark by the pursuers. As a rule also the catacombs had

more than one entrance, and frequently communicated with an *arenaria* or sand-quarry; so that while one entrance was carefully watched, the pursued might escape in a totally different direction by another. But, to quote J. H. Parker, "the catacombs were never intended, nor fit for, dwelling-places, and the stories of persons living in them for months are probably fabulous. According to modern physicians it is impossible to live many days in the caves of *pozzolana* in which many of the catacombs are excavated." Equally exaggerated are the statements as to the linear and lateral extent of the catacombs, and their intercommunication with one another. Without resorting to this exaggeration, Mommsen can speak with perfect truth of the "enormous space occupied by the burial vaults of Christian Rome, not surpassed even by the *cloacae* or sewers of Republican Rome," but the data are too vague to warrant any attempt to define their dimensions. Marchi has estimated the united length of the galleries at from 800 to 900 m., and the number of interments at between 6,000,000 and 7,000,000; Martigny's estimate is 587 m.; and Northcote's, lower still, at "not less than 350 m." The idea of general intercommunication is negatived by the fact that the chief cemeteries are separated by low ground or valleys, where any subterranean galleries would be at once filled with water.

It now remains to speak of the history of these subterranean burial-places, together with the reasons for, and mode of, their construction. From the period of the rediscovery of the catacombs in the 16th century till comparatively recent times a gigantic fallacy prevailed, repeated by writer after writer, identifying the Christian burial-places with disused sand-pits. It was accepted as an unquestionable fact by every one who undertook to describe the catacombs, that the Christians of Rome, finding in the labyrinthine mazes of the exhausted *arenariae*, which abounded in the environs of the city, whence the sand used in building had been extracted, a suitable place for the interment of their martyred brethren, where also the sacred rites accompanying the interment might be celebrated without fear of interruption, took possession of them and used them as cemeteries. It only needed a comparison of the theory with the visible facts to refute it at once, but nearly three centuries elapsed before the independence of the *arenariae* and the catacombs was established. The discovery of this independence is due to Marchi. Starting with the firmest belief in the old traditional view, his own researches by degrees opened his eyes to the truth, now universally recognized, that the catacombs were exclusively the work of the Christians, and were constructed for the interment of the dead. It is true that a catacomb is often connected with the earlier sand-quarry, and starts from it as a commencement, but the two are excavated in different strata, suitable to their respective purposes, and their plan and construction are so completely unlike as to render any confusion between them impossible.

The igneous formation of which the greater part of the Roman Campagna is, in its superior portion, composed, contains three strata known under the common name of *tufa*,—the "stony," "granular," and "sandy" tufa,—the last being commonly known as *pozzolana*.[1] The *pozzolana* is the material required for building purposes, for admixture with mortar; and the sandpits are naturally excavated in the stratum which supplies it. The stony tufa (*tufa litoide*) is quarried as building-stone. The granular tufa is useless for either purpose, containing too much earth to be employed in making mortar, and being far too soft to be used as stone for building. Yet it is in this stratum, and in this alone, that the catacombs are constructed; their engineers avoiding with equal care the solid stone of the *tufa litoide* and the friable *pozzolana*, and selecting the stratum of medium hardness, which enabled them to form the vertical walls of their galleries, and to excavate the *loculi* and *cubicula* without severe labour and also without fear of their falling in. The annexed illustration (fig. 16) from Marchi's work, when compared with that of the catacomb of Sant' Agnese already given, presents to the eye the contrast between the wide winding irregular passages of the sand-pit, calculated for the admission of a horse and cart, and the narrow rectilinear accurately-defined galleries of the catacomb. The distinction between the two is also plainly exhibited when for some local or private reasons an ancient *arenaria* has been transformed into a cemetery. The modifications required to strengthen the crumbling walls to support the roof and to facilitate the excavation of *loculi*, involved so much labour that, as a rule, after a few attempts, the idea of utilizing an old quarry for burial purposes was abandoned.

[1] In Rome the three strata are known to geologists as *tufa litoide*, *tufa granolare* and *pozzolana*.

Another equally erroneous idea was that these vast burial-places of the early Christians remained entirely concealed from the eyes of their pagan neighbours, and were constructed not only without the permission of the municipal authorities but without their cognizance. Nothing can be farther from the truth. Such an idea is justly stigmatized by Mommsen as ridiculous, and reflecting a discredit as unfounded as it is unjust on the imperial police of the capital. That such vast excavations should have been made without attracting attention, and that such an immense number of corpses could have been carried to burial in perfect secrecy is utterly impossible. Nor was there any reason why secrecy should have been desired. The decent burial of the dead was a matter especially provided for by the Roman laws. No particular mode was prescribed. Interment was just as legal as cremation, and had, in fact, been universally practised by the Romans until the later days of the republic.[2] The bodies of the Scipios and Nasos were buried in still existing catacombs; and if the Christians preferred to adopt that which Minucius Felix calls "the better, and more ancient custom of inhumation" (*Octavius*, c. 2), there was absolutely nothing, to quote the words of Northcote (*Roma sotterran.* pp. 56, 61), "either in their social or religious position to interfere with their freedom of action. The law left them entire liberty, . . . and the faithful did but use their liberty in the way that suited them best, burying their dead according to a fashion to which many of them had been long accustomed, and which enabled them at the same time to follow in death the example of him who was also their model in life." Interment in rock-hewn tombs, "as the manner of the Jews is to bury," had been practised in Rome by the Jewish settlers for a considerable period anterior to the rise of the Christian Church. A Jewish catacomb, now lost, was discovered and described by Bosio (*Rom. sott.* p. 141), and others are still accessible. They are to be distinguished from Christian catacombs only by the character of their decorations, the absence of Christian symbols and the language of their inscriptions. There would, therefore, be nothing extraordinary in the fact that a community, always identified in the popular heathen mind with the Jewish faith, should adopt the mode of interment belonging to that religion. Nor have we the slightest trace of any official interference with Christian burials, such as would render secrecy necessary or desirable. Their funerals were as much under the protection of the law, which not only invested the tomb itself with a sacred character, but included in its protection the area in which it stood, and the *cella memoriae* or chapel connected with it, as those of their heathen fellow-citizens, while the same shield would be thrown over the burial-clubs, which, as we learn from Tertullian

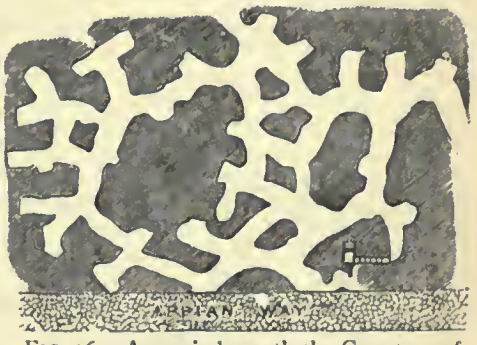


FIG. 16.—Arenaria beneath the Cemetery of Calixtus.

[2] Cicero is our authority for the burial of Marius, and for Sulla's being the first member of the Gens Cornelia whose dead body was burnt (*De Legg.* ii. 22).

(*Apolog.* c. 39), were common among the early Christians, as over those existing among the heathen population of Rome.

We may then completely dismiss the notion of there being any studied secrecy in connexion with the early Christian cemeteries, and proceed to inquire into the mode of their formation.

Mode of formation. Almost without exception, they had their origin in small burial areas, the property of private persons or of families, gradually ramifying and receiving additions of one subterranean storey after another as each was required for interments. The first step would be the acquisition of a plot of ground either by gift or purchase for the formation of a tomb. Christians were not beyond the pale of the law, and their faith presented no hindrance to the property being secured to them in perpetuity. To adapt the ground for its purpose as a cemetery, a gallery was run all round the area in the tufa rock at a convenient depth below the surface, reached by staircases at the corners. In the upright walls of these galleries *loculi* were cut as needed to receive the dead. When these first four galleries were full others were mined on the same level at right angles to them, thus gradually converting the whole area into a net-work of corridors. If a family vault was required, or a burial chapel for a martyr or person of distinction, a small square room was excavated by the side of the gallery and communicating with it. When the original area had been mined in this way as far as was consistent with stability, a second storey of galleries was begun at a lower level, reached by a new staircase. This was succeeded by a third, or a fourth, and sometimes even by a fifth. When adjacent burial areas belonged to members of the same Christian confraternity, or by gift or purchase fell into the same hands, communications were opened between the respective cemeteries, which thus spread laterally, and gradually acquired that enormous extent which, "even when their fabulous dimensions are reduced to their right measure, form an immense work."[1] This could only be executed by a large and powerful Christian community unimpeded by legal enactments or police regulations, "a living witness of its immense development corresponding to the importance of the capital." But although, as we have said, in ordinary times there was no necessity for secrecy, yet when the peace of the Church was broken by the fierce and often protracted persecutions of the heathen emperors, it became essential to adopt precautions to conceal the entrance to the cemeteries, which became the temporary hiding-places of the Christian fugitives, and to baffle the search of their pursuers. To these stormy periods we may safely assign the alterations which may be traced in the staircases, which are sometimes abruptly cut off, leaving a gap requiring a ladder, and the formation of secret passages communicating with the *arenariae*, and through them with the open country.

When the storms of persecution ceased and Christianity had become the imperial faith, the evil fruits of prosperity were not slow to appear. Cemetery interment became a regular trade in the hands of the *fossores*, or grave-diggers, who appear to have established a kind of property in the catacombs, and whose greed of gain led to that destruction of the religious paintings with which the walls were decorated, for the quarrying of fresh *loculi*, to which we have already alluded. Monumental epitaphs record the purchase of a grave from the fossores, in many cases during the lifetime of the individual, not unfrequently stating the price. A very curious fresco, found in the cemetery of Calixtus, preserved by the engravings of the earlier investigators (Bottari, tom. ii. p. 126, tav. 99), represents a "fossor" with his lamp in his hand and his pick over his shoulder, and his tools lying about him. Above is the inscription, "Diogenes Fossor in Pace depositus."

It is unnecessary to enter on any detailed description of the frescoes which cover the walls and ceilings of the burial-chapels in the richest abundance. It must suffice to say that the earliest examples are only to be distinguished from the mural decorations employed by their pagan contemporaries (as seen at Pompeii and elsewhere) by the absence of all that was immoral or idolatrous, and that it was only very slowly and timidly that any distinctly religious representations were introduced. These were at first purely symbolical, meaningless to any but a Christian eye, such as the Vine, the Good Shepherd, the Sheep, the Fisherman, the Fish, &c. Even the personages of ancient mythology were pressed into the service of early Christian art, and Orpheus, taming the wild beasts with his lyre, symbolized the peaceful sway of Christ; and Ulysses, deaf to the Siren's song, represented the Believer triumphing over the allurements of sensual pleasure. The person of Christ appeared but rarely, and then commonly simply as the chief personage in an historical picture. The events depicted from the life of Christ are but few, and always conform rigidly to the same traditional type. The most frequent are the miracle at Cana, the multiplication of the loaves and fishes, the paralytic carrying his bed, the healing of the woman with the issue of blood, the raising of Lazarus,

Decoration.

FIG. 17.—Fresco Ceiling. (From Bosio.)

The subjects, beginning at the top and going to the right, are—

(1) The paralytic carrying his bed.
(2) The seven baskets full of fragments.
(3) Raising of Lazarus.
(4) Daniel in the lions' den.
(5) Jonah swallowed by the fish.
(6) Jonah vomited forth.
(7) Moses striking the rock.
(8) Noah and the dove.

In the centre, the Good Shepherd.

Zacchaeus, and the triumphal entry into Jerusalem. The Crucifixion, and subjects from the Passion, are never represented. The cycle of Old Testament subjects is equally limited. The most common are the history of Jonah as a type of the Resurrection, the Fall, Noah receiving the dove with the olive branch, Abraham's sacrifice of Isaac, Moses taking off his shoes, David with the sling, Daniel in the lions' den, and the Three Children in the fiery furnace. The mode of representation is always conventional, the treatment of the subject no less than its choice being dictated by an authority to which the artist was compelled to bow. All the more valuable of these paintings have been produced in J. H. Parker's series of photographs taken in the catacombs by the magnesium light.[2] Wilpert's great work, in which these frescoes are reproduced in colours, now enables the student even better to distinguish the styles of different centuries and follow the course of artistic development or decay.

Beyond Rome and its suburbs the most remarkable Christian catacombs are those in the vicinity of Naples, described by Pelliccia (*De Christ. Eccl. Polit.* vol. iv. Dissert. 5), and in separate treatises by Bellerman and Schultze. Plans of them are also given by Agincourt in his great work on Christian art. These

[1] Mommsen's chosen example of an ancient burial-chamber, extending itself into a catacomb, or gathering subterranean additions round it till a catacomb was established, is that of the cemetery of St Domitilla, traditionally identified with a granddaughter of Vespasian, and the catacomb of Santi Nereo ed Achilleo on the Appian and Ardeatine way.

[2] Parker's invaluable series of Roman photographs may be seen at the library of the Victoria and Albert museum, at the Ashmolean museum and the Bodleian library, Oxford.

catacombs differ materially from those of Rome. They were certainly originally stone-quarries, and the hardness of the rock has made the construction practicable of wide, lofty corridors and spacious halls, very unlike the narrow galleries and contracted chambers in the Roman cemeteries. The mode of interment, however, is the same as that practised in Rome, and the *loculi* and *arcosolia* differ by little in the two. The walls and ceilings are covered

Catacombs of Naples.

FIG. 18.—Fresco Ceiling. (From Bosio.)

The subjects, beginning at the bottom and going to the right, are—
(1) Moses striking the rock. (4) Abraham's sacrifice.
(2) Noah and the dove. (5) The miracle of the loaves.
(3) The three children in the furnace.

with fresco paintings of different dates, in some cases lying one over the other. This catacomb contains an unquestionable example of a church, divided into a nave and chancel, with a rude stone altar and bishop's seat behind it.

At Syracuse also there are very extensive catacombs known as "the Grottos of St John." They are also figured by Agincourt, and described by Denon (*Voyage en Sicile et Malte*) and Führer. There is an entire underground city with several storeys of larger and smaller streets, squares and cross ways, cut out of the rock; at the intersection of the cross ways

Syracuse.

FIG. 19.—Plan of the Catacombs of St John, Syracuse.

are immense circular halls of a bottle shape, like a glass-house furnace, lighted by air shafts. The galleries are generally very narrow, furnished on each side with arched tombs, and communicating with family sepulchral-chambers closed originally by locked doors, the marks of the hinges and staples being still visible. The walls are in many places coated with stucco adorned with frescoes, including palms, doves, labara and other Christian symbols. The ground-plans (figs. 19, 20), from Agincourt, of the catacomb and of one of the circular halls, show how widely this cemetery differs in arrangement from the Roman catacombs. The frequency of blind passages and of circular chambers will be noticed, as well as the very large number of bodies in the cruciform recesses, apparently amounting in one instance to nineteen. Agincourt remarks that this cemetery "gives an idea of a work executed with design and leisure, and with means very different from those at command in producing the catacombs of Rome."

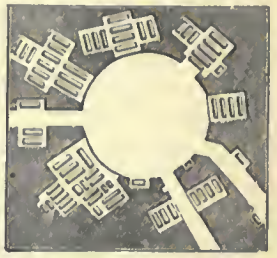


FIG. 20.—Plan of Circular Hall, Catacombs of St John, Syracuse. (From Agincourt.)

Denon also describes catacombs at Malta near the ancient capital of the island. The passages were all cut in a close-grained stone, and are very narrow, with arched ceilings, running very irregularly, and ramifying in all directions. The greater part of the tombs stand on either side of the galleries in square recesses (like the table-tombs of the Roman catacombs), and are rudely fashioned to imitate sarcophagi. The interments are not nearly so numerous as in other catacombs, nor are there any vestiges of painting, sculpture or inscriptions. At Taormina in Sicily is a Saracenic catacomb, also figured by Agincourt. The main corridor is 12 ft. wide, having three or more ranges of *loculi* on either side, running longitudinally into the rock, each originally closed by a stone bearing an inscription.

Malta.

Taormina.

Passing to Egypt, a small Christian catacomb at Alexandria is described and figured by de Rossi.[1] The *loculi* here also are set endways to the passage. The walls are abundantly decorated with paintings, one of a liturgical character. But the most extensive catacombs at Alexandria are those of Egypto-Greek origin, from the largest of which, according to Strabo (lib. xvii. p. 795), the quarter where it is placed had the name of the Necropolis. The plan, it will be seen, is remarkable for its regularity (figs. 21, 22). Here, too, the graves run endways into the rock. Other catacombs in the vicinity of the same city are described by Pocock and other travellers, and are figured by Agincourt.

Egypt.

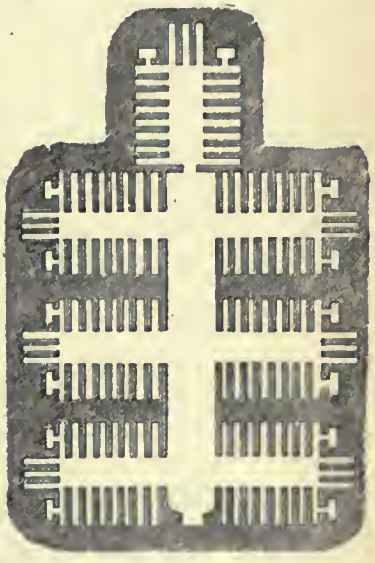


FIG. 21.—Plan of Catacomb at Alexandria. (From Agincourt.)

Subterranean cemeteries of the general character of those described are very frequent in all southern and eastern countries. A vast necropolis in the environs of Saida, the ancient Sidon, is described in Renan's *Mission en Phénicie*, and figured in Thobois's plates. It consists of a series of apartments approached by staircases,

Sidon.

Fig. 22.—Section of a Gallery in Catacomb at Alexandria. (From Agincourt.)

[1] *Bulletino di archaeologia cristiana*, November 1864, August 1865. See also *Authorities*, below.

the sides pierced with sepulchral recesses running lengthwise into the rock.

Rock-tombs of Etruria.

The rock-hewn tombs of Etruria scarcely come under the category of catacombs, in the usual sense, being rather independent family burial-places, grouped together in a necropolis. They are, however, far too remarkable to be altogether passed over. These sepulchres are usually hollowed out of the face of low cliffs on the side of a hill. They often rise tier above tier, and are sometimes all on the same level "facing each other as in streets, and branching off laterally into smaller lanes or alleys"; and

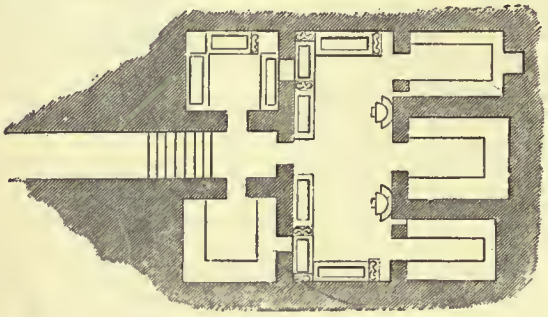


FIG. 23.—Plan of a Tomb at Cervetri. (From Dennis.)

occasionally forming "a spacious square or piazza surrounded by tombs instead of houses" (Dennis, *Cities and Cemeteries of Etruria*, ii. 31). The construction of the tombs commonly keeps up the same analogy between the cities of the living and those of the dead. Their plan is for the most part that of a house, with a door of entrance and passage leading into a central chamber or *atrium*, with others of smaller size opening from it, each having a stone-hewn bench or *triclinium* on three of its sides, on which the dead, frequently a pair of corpses side by side, were laid as if at a banquet. These benches are often hewn in the form of couches with pillows at one end, and the legs carved in relief. The ceilings have the representation of beams and rafters cut in the rock. In some instances arm-chairs, carved out of the living rock, stand between the doors of the chambers, and the walls above are decorated with the semblance of suspended shields. The walls are often covered with paintings in a very simple archaic style, in red and black. As a typical example of the Etruscan tombs we give the plan and section (figs. 23, 24) of the *Grotta della Sedia* at Cervetri from Dennis (pp. 32, 35). The tombs in some instances form subterranean groups more analogous to the general idea of a catacomb. Of this nature is the very remarkable cemetery at Poggio Gaiella, near Chiusi, the ancient Clusium, of a portion of the principal storey of which the woodcut (fig. 25) is a plan. The most remarkable of these sepulchral chambers is a large circular hall about 25 ft. in diameter, supported by a huge cylindrical pillar

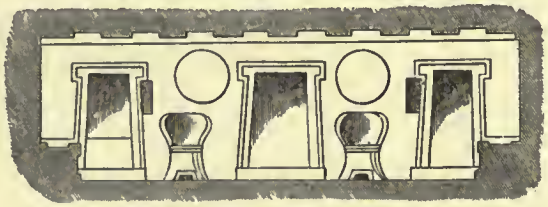


FIG. 24.—Section of the Tomb of the Seats and Shields, Cervetri. (From Dennis.)

hewn from the rock. Opening out of this and the other chambers, and connecting them together, are a series of low winding passages or *cuniculi*, just large enough for a man to creep through on all fours. No plausible suggestion has been offered as to the purpose of these mysterious burrows, which cannot fail to remind us of the labyrinth which, according to Varro's description as quoted by Pliny (*Hist. Nat.* lib. xxxvi. c. 19, § 4), was the distinguishing mark of Porsena's tomb, and which have led some adventurous archaeologists to identify this sepulchre with that of the great king of Etruria (Dennis, *u.s.*, pp. 393 ff.). (E. V.; O. M. D.)

Modern Discoveries.—In 1873 was discovered, near the cemetery of St Domitilla, the semi-subterranean basilica of Santi Nereo ed Achilleo, 100 ft. by 60 ft. This is now covered with a roof, and the fallen columns have been raised up. The lower

FIG. 25.—Plan of a portion of the principal storey in the Poggio Gajella. (From Dennis.)

part of a pillar, which once supported a baldachino over the altar, still preserves the name ACILLEUS, and beneath it a bas-relief of the martyr, with his hands bound, receiving his death-blow from the executioner. The base of a similar column has only feet in the same attitude, and probably bore the name NEREUS. In a grave in the apse was found a large fragment of an inscription, composed by Pope Damasus, but set up by his successor Siricius, which, from the note-book of a Salzburg pilgrim of the 8th century, can be completed thus:—

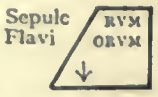
Militiae nomen dederant saevum
Officium pariter spectantes juss
Praeceptis pulsante metu servi
Mira fides rerum subito posue
Conversi fugiunt ducis impia castr
Projiciunt clypeos faleras tel
Confessi gaudent Christi portar
Credite per Damasum possit quid

Nereus (see Rom. xvi. 15) and Achilleus, said to have been baptized by St Peter, refused to do the bidding of Domitian as praetorians, and entering the service of Flavia Domitilla, suffered martyrdom with their mistress Petronilla, of the Aurelian family closely connected with the Flavii, and the spiritual daughter of St Peter, who was buried in a sarcophagus with the inscription:—

AVRELIAE · PETRONILLAE · FIL · DVLCISSIMAE

This is now in St Peter's, but was probably originally behind the apse of this basilica, for there is a fresco of her in an arcosolium, with a matron named Veneranda. The original entrance to the cemetery leads directly into a spacious corridor with no *loculi*, but recesses for sarcophagi, and decorations of the classical style of the 2nd century. From this a wide staircase leads directly down to a chamber, discovered in March 1881, of a very early date. Within an arcosolium is a tablet set up by "Aurelius Ampliatus and his son Gordian, to Aurelia Bonifatia, his incomparable wife, a woman of true chastity, who lived 25 years, 2 months, 4 days, and 2 hours." The letters are of the 2nd century; but above the arcosolium was found a stone with great letters, 5 or 6 in. high: "AMPLIATI, the tomb of Ampliatus." Now Ampliatus is a servile name: how comes it to be set up with such distinction in the sepulchre of the Flavii? Romans xvi. 8 supplies the answer: "Salute Ampliatus, most

beloved to me in the Lord." De Rossi thinks the identification well grounded (*Bullettino*, 1881, p. 74). Epitaphs of members of the Flavian family have been found here, and others stating that they are put up "EX INDULGENTIA FLAVIAE DOMITILLAE VESPASIANI NEPTIS." So that De Rossi did not hesitate to complete an inscription on a broken stone thus:—



De Rossi began his excavations in the cemetery of Santa Priscilla in 1851, but for thirty years nothing but what had been described by Bosio came to light. In 1880 he unearthed a portion near the Cappella Greca, and found galleries that had not been touched since they were filled in during the Diocletian persecution. The *loculi* were intact and the epitaphs still in their places, so that "they form a kind of museum, in which the development, the formulae, and the symbolic figures of Christian epigraphy, from its origin to the end of the 3rd or 4th century, can be notified and contemplated, not in artificial specimens as in the Lateran, but in the genuine and living reality of their original condition." (*Bullett.*, 1884, p. 68). Many of the names mentioned in St Paul's Epistles are found here: Phoebe, Prisca, Aquilius, Felix Ampliatus, Epenetus, Olympias, Onesimus, Philemon, Asyncritus, Lucius, Julia, Caius, Timotheus, Tychicus, Crescens, Urbanus, Hermogenes, Tryphaena and Trypho(sa) on the same stone. Petrus, a very rare name in the catacombs, is found here several times, both in Greek and in Latin. The neighbouring *Coemeterium Ostrianum* was anciently known as "*Fons S. Petri*," "*ubi Petrus baptizavit*," "*ubi Petrus prius sedit.*" This cemetery derives its name from Priscilla, mother of Pudens, who is said to have given hospitality to St Peter the Apostle. We are reminded of St Paul, and of his friends Aquila and Prisca, by a monument erected by an imperial freedman who was PRAEPOSITVS TABERNACVLORVM—chief tentmaker. In 1888 a corridor was discovered which had at one time been isolated from the rest of the cemetery. It had no *loculi*, but recesses in the wall to receive sarcophagi. At the end of the corridor there was a large chamber, 23 ft. by 13 ft., once lined with marble and the ceiling covered with mosaic, a few fragments of which still remain. The only tomb here was a sarcophagus, of which the broken front bears the letters which show it to have been the epitaph of one of the Acilian family:—

ACILIO GLABRIONI FILIO

In the vicinity are fragments of the epitaphs of Manius Acilius and Priscilla, of Quintus Acilius and Caia Acilia in Greek, another Greek inscription "Acilius Rufinus mayest thou live in God." After careful examination of the nine Acillii, who were consuls, De Rossi concludes that this was the resting-place of that Acilius Glabrio, consul with Trajan, A.D. 91, who in the year of his consulate was compelled by Domitian to fight with beasts in the arena, and then banished and put to death in 95. The question of his Christianity seems settled by the discovery of the sepulchre of these Christian Acilii. From this crypt a staircase led up to the basilica in which Pope Silvester was buried, and the whole plan of which was laid bare by De Rossi. The tomb of St Silvester could be identified, and that of Pope Siricius "at his feet," as the pilgrim noted (*Bullett.*, 1890, pp. 106-119).

Just before De Rossi's death, Mgr. Wilpert discovered in the Cappella Greca a painting of the "Fractio Panis" or eucharistic feast, which he cleansed from the dust with which it had been covered. The picture of the Blessed Virgin and Child, which De Rossi ascribed to the 2nd, if not to the 1st century, has received an unexpected proof of its antiquity. In 1890 the floor of the gallery in which it stands was excavated, and another floor was found to be 6 ft. below its supposed level. The *loculi* in this lower portion were intact, with inscriptions of the 2nd century still in their places, proving that the niche in which that picture was painted must have been considerably older than the lowering of the floor. A flight of iron steps enables the visitor now to examine this venerable specimen of early Christian art.

After the death of De Rossi, one of his pupils, H. Stevenson, since dead, discovered in 1896 a small subterranean basilica in the catacomb of Santi Pietro e Marcellino on the Via Labicana, with pious acclamations on the plaster similar to those in the Papal crypt in St Calixtus. Near the well-known subterranean chapel in the *Coemeterium Ostrianum* was discovered by Mgr. Crostarosa, in 1877, another chapel, in which Signor Armellini found traces of St Emerentiana, foster-sister of St Agnes. Near this a whole region of galleries has been brought to light with *loculi* intact.

Explorations conducted in the cemetery of Domitilla in 1897–1898 brought to light a fine double crypt with frescoes representing Christ seated between six male and female saints; also an inscription relating to a new saint (Eulalius) in a cubiculum of the 3rd century. In 1899–1900 were discovered two opposite cubicula in the catacomb of Santi Pietro e Marcellino. These were unknown to Bosio, and are both covered with frescoes, the vault being in one case decorated with the scene which represents Christ seated among the apostles and pronouncing sentence upon the defunct. An inscription discovered in 1900 on the site of the ancient cemetery of St Ciriaca, and dating from A.D. 405, states that one Euryalus bought a site *ad mensam beati martyris Laurentii* from a certain *fossor* whose name has been erased. This is interesting as an example of what was known as *memoriae damnatio* or the blotting out of a name on account of some dishonourable action. From the end of the 4th to the first half of the 5th century, the *fossores* had the privilege of selling sites, which frequently led to grave abuses. In 1901–1902 excavations in the cemetery of Santa Priscilla, near the Cappella Greca, revealed a polygonal chamber. This may have originally been the *nymphaeum* of the great villa of the Acilii Glabriones, the *hypogaeum* of which was discovered by De Rossi near this spot in 1888. It may have been used as a burial-place for martyrs, and Professor Marucchi is inclined to see in it the sepulchral chapel of Pope Marcellinus, who died in A.D. 304 during the persecutions of Diocletian. In 1902, in that part of the Via Ardeatina which passes between the cemeteries of Calixtus and Domitilla, was discovered a crypt with frescoes and the sanctuary of a martyr: it is thought that this, rather than a neighbouring crypt brought to light in 1897, may prove to be the sepulchral crypt of SS. Marcus and Marcellianus. In a cubiculum leading out of a gallery in the vicinity there was also discovered an interesting impression in plaster of an inscription of the mother of Pope Damasus, beginning:

HIC DAMASI MATER POSVIT LAVREN[TIA MEMBRA].

In the same year building operations in the Via di Sant' Onofrio revealed the presence of catacombs beneath the foundations: examination of the *loculi* showed that no martyrs or illustrious persons were buried here.

In 1903 a new cemetery with frescoes came to light on the Via Latina, considered by Marucchi to have belonged to a heretical sect. In the same year the Jewish cemetery on the Via Portuense, known to Bosio but since forgotten, was rediscovered. The subterranean basilica of SS. Felix and Adauctus, discovered by Boldetti and afterwards choked up with ruins, was cleared again: the crypt, begun by Damasus and enlarged by Siricius, contains frescoes of the 6th-7th centuries.

A good plan of the catacombs at Albano (at the 15th milestone of the Appian way), discovered by Boldetti and described by De Rossi, has been published by Marucchi (*Nuovo Bulletino di archeologia cristiana*, 1902, pp. 89 ff.). In 1904 a small subterranean cemetery was discovered at Anagnia. Catacombs have also been recently discovered on the site of Hadrumetum near Sousse in Tunisia. (✠ W. R. B.; O. M. D.)

AUTHORITIES.—The classical work on the catacombs of Rome is G. B. De Rossi's *Roma sotterranea*, on which most of the accounts in other languages than Italian have been based. The fine volume by Mgr. Wilpert, *Le Pitture delle catacombe romane* (Rome, 1903), in which all the important frescoes are reproduced in colours, is to be regarded as an addition to the *Roma sotterranea*. All new

discoveries made by the active *Commissione di archeologia sacra* are chronicled with as little delay as possible in the *Nuovo Bulletino de archeologia cristiana* published in Rome.

The most recent accounts of the catacombs are to be found in the following books:—Armellini, *Gli Antichi Cimiteri cristiani di Roma e d' Italia* (Rome, 1893); O. Marucchi, *Le Catacombe romane* (Rome, 1903; also translated into French), *Manuale di epigrafia cristiana* (Milan, 1904); M. Besnier, *Les Catacombes de Rome* (Paris, 1909).

Among the older works are: Bosio, *Roma sotterranea*, Severano's edition (1632), and Aringhi's edition (1651); Boldetti, *Osservazioni sopra i cimiteri dei santi martiri* (Rome, 1720); Bottari, *Sculture e pitture sagre*, &c. (Rome, 1737–1754); Seroux d'Agincourt, *Histoire de l'art par les monuments* (Paris, 1823; German ed., 1840); G. Marchi, *Monumenti delle arti cristiane primitive* (Rome, 1844); Raoul Rochette, *Tableau des catacombes de Rome* (2nd ed., Paris, 1853); Perret, *Les Catacombes de Rome* (Paris, 1855)—a sumptuous folio work, but not always accurate; Roller, *Les Catacombes de Rome* (Paris, 1881); V. Schultze, *Die Katakomben* (Leipzig, 1882).

Works written in English are: Northcote and Brownlow, *Roma sotterranea* (London, 1869; based upon De Rossi); Wharton Marriott, *The Testimony of the Catacombs* (London, 1870); J. H. Parker, *The Archaeology of Rome: the Catacombs*; Smith and Cheetham, *Dictionary of Christian Antiquities, s.v.* "Catacombs"; R. Lanciani, *Pagan and Christian Rome* (London, 1892); W. Lowry, *Christian Art and Archaeology*, ch. ii. (London, 1901; a useful introduction to the subject); H. Gee, "The Church in the Catacombs," in W. Lefroy's *Lectures in Ecclesiastical History* (1896); Th. Mommsen, in the *Contemporary Review*, May 1871.

Accounts of the catacombs will also be found in the encyclopaedias and manuals published under the following names: Martigny, Pératé, F. X. Kraus (*Realencyklopädie* and *Geschichte der christlichen Kunst*), Reusens, V. Schultze and C. M. Kauffmann, and in the large new *Dictionnaire d'archéologie chrétienne et liturgie*, published at Paris under the editorship of Dom F. Cabrol.

The catacombs at Naples are described in C. F. Bellermann, *Über die ältesten christlichen Begräbnisstätten und besonders die Katakomben zu Neapel* (Hamburg, 1839); Armellini, as above, and V. Schultze, *Die Katakomben von San Gennaro dei Poveri in Neapel* (Jena, 1877).

For the catacombs in Malta, A. A. Caruana, *Ancient Pagan Tombs and Christian Cemeteries in the Islands of Malta* (Malta, 1898), and A. Mayr, "Die altchristlichen Begräbnisstätten auf Malta," in *Römische Quartalschrift*, vol. xv. pp. 216 and 352 (Rome, 1901), may be consulted.

The fullest account of the Sicilian catacombs is given by J. Führer, *Forschungen zur Sicilia sotterranea* (Munich, 1897); and D. C. Barrecca, *Le Catacombe di San Giovanni in Siracusa* (Syracuse, 1906).

A catacomb of the 5th century, discovered at Kertch in South Russia, is described by J. Kulakovsky in *Materials for Russian Archaeology* (St Petersburg, 1896; a publication of the Russian Imperial Archaeological Commission), but it is written in Russian, as also is the account by V. Latyshev, in *Vizantieski Vremennik*, vol. vi. pp. 337 ff. (St Petersburg, 1899).

The catacombs at Hadrumetum (Sousse) are described by A. F. Leynard, *Les Catacombes d'Hadrumète, deuxième campagne de fouilles* (1904–1905). See also *Revue Tunisienne* (1905), p. 250.

For the catacombs of Alexandria, Neroutsos Bey, *L'Ancienne Alexandrie*, may be consulted in addition to De Rossi's article mentioned in the text. (O. M. D.)

CATAFALQUE (a word of unknown origin, occurring in various forms in many European languages, meaning a funeral scaffold or temporary stage), a movable structure of wood sometimes richly decorated, erected temporarily at funeral ceremonies in a church to receive the coffin or effigy of the deceased; also an open hearse or funeral car.

CATALANI, ANGELICA (1780–1849), Italian opera-singer, daughter of a tradesman at Sinigaglia, was educated at the convent of Santa Lucia at Gubbio, where her magnificent soprano voice, of extraordinary compass and purity, soon became famous. In 1795 she made her début on the stage at Venice, and from that moment every impresario in Europe was anxious to engage her. For nearly thirty years she sang at all the great houses, receiving very large fees; her first appearance in London being at the King's theatre in 1806. She remained in England, a prima donna without a serious rival, for seven years. Then she was given the management of the opera in Paris, but this resulted in financial failure, owing to the incapacity and extravagance of her husband, Captain Valabrègue, whom she married in 1806. But her continental tours continued to be enormously successful, until she retired in 1828. She settled at Florence in 1830, where she founded a free singing school for girls; and her charity and kindness were unbounded. She died of cholera in Paris on the 12th of June 1849.

CATALEPSY (from Gr. *κατάληψις*, a seizure), a term applied to a nervous affection characterized by the sudden suspension of sensation and volition, accompanied with a peculiar rigidity of the whole or of certain muscles of the body. The subjects of catalepsy are in most instances females of highly nervous temperament. The exciting cause of an attack is usually mental emotion operating either suddenly, as in the case of a fright, or more gradually in the way of prolonged depression. The symptoms presented vary in different cases, and even in the same individual in different attacks. Sometimes the typical features of the disease are exhibited in a state of complete insensibility, together with a statue-like appearance of the body which will retain any attitude it may be made to assume during the continuance of the attack. In this condition the whole organic and vital functions appear to be reduced to the lowest possible limit consistent with life, and to such a degree as to simulate actual death. At other times considerable mental excitement will accompany the cataleptic symptoms, and the patient will sing or utter passionate exclamations during the fit, being all the while quite unconscious. The attack may be of short duration, passing off within a few minutes. It may, however, last for many hours, and in some rare instances persist for several days; and it is conceivable that in such cases the appearances presented might be mistaken for real death, as is alleged to have occasionally happened. Catalepsy belongs to the class of functional nervous disorders (see MUSCLE AND NERVE: *Pathology*) in which morbid physical and psychical conditions are mixed up. Although it is said to occur in persons in perfect health, careful inquiry will usually reveal some departure from the normal state, as is shown by the greater number of the recorded cases. More particularly is this true of females, in whom some form of menstrual derangement is generally found to have preceded the cataleptic affection. Catalepsy is sometimes associated with epilepsy and with grave forms of mental disease. In ordinary cases, however, the mental phenomena bear close resemblance to those witnessed in hysteria. In many of the subjects of catalepsy there appears to be a remarkable weakness of the will, whereby the tendency to lapse into the cataleptic state is not resisted but rather in some measure encouraged, and attacks may thus be induced by the most trivial circumstances.

CATALOGUE (a Fr. adaptation of the Gr. *κατάλογος*, a register, from *καταλέγειν*, to enrol or pick out), a list or enumeration, generally in alphabetical order, of persons, things, &c., and particularly of the contents of a museum or library. A *catalogue raisonnée* is such a list classified according to subjects or on some other basis, with short explanations and notes. (See also articles BIBLIOGRAPHY AND BIBLIOLOGY, and LIBRARIES.)

CATALONIA (*Cataluña*), a captaincy-general, and formerly a province of Spain, formerly also a principality of the crown of Aragon; bounded on the N. by the Pyrenees, W. by Aragon, S. by Valencia, and E. by the Mediterranean Sea. Pop. (1900) 1,966,382; area, 12,427 sq. m. The triangular territory of Catalonia forms the north-eastern corner of the Iberian Peninsula. A full account of the physical features, and of the modern development of commerce, communications, &c., in this area is given in the articles on the four provinces Barcelona, Gerona, Lérida and Tarragona, into which Catalonia was divided in 1833.

The coast, which is partly sandy, partly rocky, extends about 240 m.; its chief harbours are those of the capital, Barcelona, of Mataró, of Rosas and of Tarragona. The surface is much broken by spurs of the Pyrenees, the direction of which is generally south. Running south-west to north-east, and united on the north with one of the offsets of the Pyrenees, is the range of the Sierra Llena, which bisects Catalonia, and forms its central watershed. The principal rivers are the Ter, the Llobrégat, and the Ebro (*q.v.*), which all run into the Mediterranean. None of them is navigable. The climate, in spite of frequent mists and rains, sudden changes of temperature, and occasional great mid-day heat, is healthy and favourable to vegetation. The dwarf-palm, orange, lime, and olive grow in the warmer tracts; and on the higher grounds the thorn-apple, pomegranate, myrtle, esparto and heaths flourish. These is much woodland,

but meadows and pastures are rare. Maize, millet, rye, flax, liquorice and fruits of all sorts—especially nuts, almonds, oranges, figs, walnuts and chestnuts—are produced. Wheat sufficient for one-fourth of the population is grown, and the vine is extensively cultivated. Few cattle, but numbers of sheep, goats and swine are reared. Game is plentiful, and the fisheries on the coast are excellent. The wines are for the most part rough and strong, though some are very good, especially when matured. They are much used to adulterate those of Oporto, or, after undergoing the blending operation termed *compage*, are passed off as Bordeaux wines in France. The best of them, *priorato*, is chiefly known in England, under the disguise of second or third-rate port; it was much used in the military hospitals of America during the Civil War.

The Catalonians are a frugal, sharp-witted, and industrious people, having much national pride, and a strong revolutionary spirit. They are distinct in origin from the other inhabitants of Spain, from whom they differ in their dialect and costume. In their great energy and their love of enterprise they resemble the Basques. Irrigation, careful husbandry and railroad communications have much developed the resources of their country, in themselves excellent; and there are many manufacturing towns and industrial establishments.

Catalonia was one of the first of the Roman possessions in Spain, and formed the north-eastern portion of Hispania Tarraconensis. About 470 it was occupied by the Alans and Goths. It was conquered by the Moors in 712, but these invaders were in turn dispossessed by the Spaniards and the troops of Charlemagne in 788. Catalonia was subsequently ruled by French counts, who soon, however, made themselves independent of France. By the marriage of Count Raymond Berenger IV. of Barcelona with Petronilla of Aragon, Catalonia became annexed to Aragon; but this union was frequently severed. In 1640, when Philip IV. attempted to deprive Catalonia of its rights and privileges, it gave itself up to Louis XIII. of France. It was restored to Spain in 1659, and was once more occupied by the French from 1694 to 1697. Under Philip V. Catalonia, in 1714, was deprived of its cortes and liberties. From 1808 to 1813 it was held by France. It was the scene of civil war in 1823, and of important revolutionary operations in the Carlist wars.

The history and literature of Catalonia have been closely studied, and in many cases the results of research are published in the Catalan language. See *Cataluña, sus monumentos y artes, su naturaleza e historia* (2 vols. of the illustrated series *España*), by P. Piferrer, F. Pi Margall, and A. A. Pijoan (Barcelona, 1884); *Historia de Cataluña*, by V. Balaguer (11 vols., Madrid, 1886, &c.); *Historia de Cataluña*, by A. Bori y Fontestá (Barcelona, 1898); *Orígines históricos de Cataluña*, by J. Balari y Jovany (Barcelona, 1899); *Coleccio dels monografias de Catalunya*, by J. Reig y Vilardell (Barcelona, 1890); *Historia del derecho en Catalonia, Mallorca y Valencia*, by B. Oliver (Madrid, 1876–1880); and *Antigua marina catalana*, by F. de Bofarull y Sans (Barcelona, 1898). The *Revista catalana* (Catalan Review), published at Barcelona from 1889, contains many valuable papers on local affairs. See also SPAIN: sections *Language*, *Literature* and *History*, and BARCELONA.

CATALPA, in botany, a genus belonging to the family *Bignoniaceae* and containing about ten species in America and eastern Asia. The best known is *Catalpa bignonioides*, a native of the eastern United States which is often cultivated in parks and gardens. It is a stately tree with large heart-shaped pointed leaves and panicles of white bell-shaped flowers streaked with yellow and brown purple.

CATALYSIS (from the Gr. *κατά*, down, and *λύειν*, to loosen), in chemistry, the name given to chemical actions brought about by a substance, termed the "catalyst," which is recovered unchanged after the action. The term was introduced by Berzelius, who first studied such reactions. It is convenient to divide catalytic actions into two groups:—(1) when the catalyst first combines with one of the reaction components to form a compound which immediately reacts with the other components, the catalyst being simultaneously liberated, and free to react with more of the undecomposed first component; and (2), when the catalyst apparently reacts by mere contact. The theory of catalysis is treated under CHEMICAL ACTION; in this article mention will be made of some of the more interesting examples.

A familiar instance of a catalytic action is witnessed when a mixture of potassium chlorate and manganese dioxide is heated to 350°, oxygen being steadily liberated, and the manganese dioxide being unchanged at the end of the reaction. The action may be explained as follows:—part of the chlorate reacts with the manganese dioxide to form potassium permanganate, chlorine and oxygen, the chlorine subsequently reacting with the permanganate to produce manganese dioxide, potassium chloride and oxygen, thus

$$2KClO_3+2MnO_2 = 2KMnO_4+Cl_2+O_2 = 2KCl+2MnO_2+3O_2.$$

This explanation is supported by the facts that traces of chlorine are present in the gas, and the pink permanganate can be recognized when little dioxide is used. Other oxides bring about the same decomposition at temperatures below that at which the chlorate yields oxygen when heated alone; but since such substances as kaolin, platinum black and some other finely powdered compounds exercise the same effect, it follows that the explanation given above is not quite general. Another example is Deacon's process for the manufacture of chlorine by passing hydrochloric acid gas mixed with air over heated bricks which had been previously impregnated with a copper sulphate solution. The nitrous gases employed in the ordinary chamber process of manufacturing sulphuric acid also act catalytically. Mention may be made of the part played by water vapour in conditioning many chemical reactions. Thus sodium will not react with dry chlorine or dry oxygen; carbon, sulphur and phosphorus will not burn in perfectly dry oxygen, neither does nitric oxide give red fumes of the peroxide. In organic chemistry many catalytic actions are met with. In the class of reaction known as "condensations," it may be found that the course of the reaction is largely dependent upon the nature of some substance which acts catalytically. One of the most important is the Friedel and Craft's reaction, in which an aromatic compound combines with an alkyl haloid in the presence of aluminium, zinc or ferric chloride. It seems in this, as in other cases, that addition compounds are first formed which subsequently react with the re-formation of the catalyst. The formation of benzoin from benzaldehyde in the presence of potassium cyanide is another example; this action has been investigated by G. Bredig and Stern (*Zeit. Elektrochem.*, 1904, 10, p. 582).

The second class of catalytic actions, viz. those occasioned by the presence of a metal or some other substance which undergoes no change, is of especial interest, and has received much attention. The accelerating influence of a clean platinum plate on the rate of combination of hydrogen and oxygen was studied by Faraday. He found that with the pure gases the velocity of reaction increased until the mixture exploded. The presence of minute quantities of carbon monoxide, carbon disulphide, sulphuretted hydrogen and hydrochloric acid inhibited the action; in the case of the first two gases, there is no alteration of the platinum surface, since the plate brings about combination when removed to an atmosphere of pure hydrogen and oxygen; with the last two gases, however, the surface is altered, since the plate will not occasion the combination when placed in the pure gases. M. Bodenstein (*Zeit. phys. Chem.*, 1904, 46, p. 725) showed that combination occurs with measurable velocity at ordinary temperatures in the presence of compact platinum. More energetic combination is observed if the metal be finely divided, as, for instance, by immersing asbestos fibres in a solution of platinum chloride and strongly heating. The "spongy" platinum so formed brings about the combination of ammonia and oxygen to form water and nitric acid, of nitric oxide and hydrogen to form ammonia (see German Patent, 1905, 157,287), and of sulphur dioxide and oxygen to form sulphur trioxide. The last reaction, which receives commercial application in the contact process of sulphuric acid manufacture, was studied by M. Bodenstein and W. Pohl (*Zeit. Elektrochem.*, 1905, 11, p. 373), who found that the equilibrium followed the law of mass-action (see also F. W. Küster, *Zeit. anorg. Chem.*, 1904, 42, p. 453, R. Lucas, *Zeit. Elektrochem.*, 1905, 11, p. 457). Other metals, such as nickel, iron, &c., can also react as catalysts.

The use of finely divided nickel (obtained by reducing the oxide in a current of pure hydrogen at a temperature of 350°) has been carefully studied by P. Sabatier and J. B. Senderens; a summary of their results is given in the *Ann. Chim. Phys.*, 1905 (viii.) 4, pp. 319–488. Of special interest is the condensation of acetylene. If this gas mixed with hydrogen be passed over the reduced nickel in the cold, the temperature may rise to as high as 150°, the acetylene disappearing and becoming replaced by a substance like petroleum. If the nickel be maintained at 200°, and the gases circulated for twenty-eight hours, a product, condensible to a yellow liquid having a beautiful fluorescence and boiling at 45°, is obtained. This substance closely resembles ordinary Pennsylvanian petroleum. If acetylene be passed alone over nickel heated to 200°–300°, a mixture, boiling at 60°–70° and having a green colour by diffused and a red by transmitted light, was obtained. This substance closely resembles Caucasian petroleum. The decomposition of carbon monoxide according to the reaction $2CO \rightleftarrows C + CO_2$ is purely catalytic in the presence of nickel and cobalt, and also in the presence of iron, so long as the amount of carbon dioxide present does not exceed a certain amount (R. Schenck and W. Heller, *Ber.*, 1905, 38, pp. 2132, 2139). It is of interest that finely divided aluminium and magnesium decompose methane, ethane, and ethylene into carbon and hydrogen in the same way as nickel. Charcoal at 350° also reacts catalytically; for example, Senderens found that ethyl alcohol was decomposed by animal charcoal into methane, ethylene, hydrogen, carbon monoxide and a little carbon dioxide, and propyl alcohol gave propylene, ethane, carbon monoxide and hydrogen, while G. Lemoine obtained from ethyl alcohol and wood charcoal a mixture of acetaldehyde and hydrogen.

CATAMARAN (a Tamil word, from *catta*, to tie, and *maram* wood), a surf-boat or raft used by the natives of Madras and along the Coromandel Coast in India. It is usually made of three tree trunks lashed together, the centre trunk being the largest and longest, and having one end bent upward to form a kind of prow. Catamarans of a larger size are in use in the West Indies and South America. The name is also given to two boats lashed together. Apparently through an erroneous connexion with cat, the name has been applied to a noisy scolding woman.

CATAMARCA, an Andean province of the Argentine Republic, lying W. of Santiago del Estero and Tucuman and extending to the Chilean frontier, with Los Andes and Salta on the N., Cordoba on the S.E., and Rioja on the S. Pop. (1895) 90,161; (1904, estimate) 103,082; area, 47,531 sq. m. The surface of the province is extremely broken, the Andes forming its western boundary, and the Aconquija, Ancaste, Ambato, Gulampaja and other ranges traversing it from north to south. It is composed very largely of high plateaus with a general slope southward broken by a few fertile valleys. The greater part of the province is arid and barren, being sheltered from the moist, eastern winds by the high mountain barriers of Aconquija and Ancaste. The rivers are small, and some of them are lost in the barren, sandy wastes. Others, especially in the foothills of the high sierras, are utilized to irrigate the fertile valleys. The climate of some of the low, sheltered valleys is extremely hot and unhealthy, but on the open plateaus it is peculiarly dry and bracing and is probably beneficial in the treatment of pulmonary diseases. The mineral resources of the province include gold, silver, copper, lead, nickel, iron, coal and malachite, but of these only copper and silver are mined, and these chiefly in the Andalgalá district. Salt deposits also exist, but are worked only to a limited extent. Cereals, alfalfa and fruit are grown. Large numbers of cattle, fattened in the alfalfa fields of Pucará, Tinogasta and Copacabana, are driven into northern Chile across the San Francisco pass (13,124 ft. above sea level) and mules are bred for the Bolivian market. Wine of an excellent quality is produced and exported. Tanning leather is another industry of the province, some of the trees growing in the Catamarca forests being rich in tannin. Catamarca is traversed by the Northern Central railway between Cordoba and the city of Catamarca, its capital, which passes around the southern extremity of the Sierra de Ancaste and makes a long detour to Chumbicha, near the Rioja frontier. The more important towns, after Catamarca, the capital, are Andalgalá and Tinogasta with populations (estimated, 1904) of 5000 to 6000 each. Belen is the oldest Spanish settlement in the province and was founded in 1550, being called Barco at first. The population is largely mixed with Indian blood.

CATAMARCA (*San Fernando de Catamarco*), capital of the above province on the Rio del Valle de Catamarca, 230 m. (318 m. by rail) N.N.W. of Cordoba. Pop. (1895) 7397; (1905, estimate) 8000, with a large percentage of mestizos. Catamarca is connected by railways with Rioja and Patquia and with Cordoba. The city stands in a narrow, picturesque valley at the foot of the Sierra de Ambato, 1772 ft. above sea level. The valley is highly fertile, partially wooded, and produces fruit in abundance, wine and some cereals. In the city are flour mills and tanneries, and among its exports are leather, fruit, wine, flour, and a curious embroidery for which the women of Catamarca have long been famous. There is a fine church, 220 by 90 ft., and a national college occupies the old Merced convent. The alameda is one of the prettiest in the Argentine Republic, having a reservoir of two acres surrounded by shrubbery and walks. Catamarca was founded in 1685 by Fernando de Mendoza because the town of Chacra, the former provincial capital, a few miles north of Catamarca, had been found unhealthy and subject to inundations. Previous to the selection of Chacra as the provincial capital, the seat of government was at San Juan de Londres, founded in 1558 and named after the capital of England by order of Philip II. in honour of his marriage with Queen Mary. The arid surroundings of Londres led to its partial abandonment and it is now a mere village. Cholla, a suburb of Catamarca, is inhabited wholly by Calchaqui Indians, a remnant of the original inhabitants of this region.

CATANIA (Gr. *Katane*, Rom. *Catina*[1]), a city and episcopal see of Sicily, the chief town of the province of Catania, on the east coast, 59 m. by rail S. of Messina, and 151 m. by rail S.E. of Palermo (102 m. direct). Pop. (1881) 100,417; (1905) 157,722. The principal buildings are handsome, and the main streets, meeting in the Piazzo del Duomo, are fine. The cathedral of S. Agatha, containing the relics of the saint, retains its three original Norman apses (1091), but is otherwise a large baroque edifice. The monument of Don Ferrando d'Acunea, a Spanish viceroy of Sicily, is a fine early Renaissance work (1494). In the west portion of the town is the huge Benedictine abbey of S. Nicola (now suppressed), the buildings of which occupy an area of about 21 acres and contain the museum, a library, observatory, &c. The church, dating, like the rest of the buildings, from 1693–1735, is the largest in Sicily, and the organ, built in 1760 by Donato del Piano, with 72 stops and 2916 pipes, is very fine. The university, founded in 1444, has regained some of its former importance. To the south near the harbour is the massive Castell' Ursino, erected in 1232 by Frederick II. Remains of several ancient buildings exist, belonging in the main to the Roman period. The theatre, covered by a stream of lava, and built partly of small rectangular blocks of the same material, though in the main of concrete, has been superimposed upon the Greek building, some foundations of which, in calcareous stone, of which the seats are also made, still exist. It is 106 yds. in diameter, and is estimated to have accommodated 7000 spectators. Close to it are the remains of the so-called Odeum, of similar plan to the theatre but without a stage, and to the north is the church of S. Maria Rotonda, originally a Roman domed structure, perhaps part of a bath. To the north, in the Piazza Stesicoro, is the amphitheatre, a considerable portion of which has been uncovered, including the two corridors which ran round the whole building and gave access to the seats, while a part of the arcades of the exterior has been excavated and left open; the pillars are made of blocks of lava, and the arches of brick. The external diameters of the amphitheatre are 410 and 348 ft., while the corresponding diameters of the arena are 233 and 167 ft. It is thus the third largest Roman amphitheatre known, being surpassed only by that at Verona and the Colosseum. Remains

[1] This is the form vouched for by the inscriptions.

of many other Roman buildings also exist beneath the modern town, among the best preserved of which may be noted the public baths (*Thermae Achilleae*) under the cathedral, and those under the church of S. Maria dell' Indirizzo. The number of baths is remarkable, and gives some idea of the luxury of the place in Roman times. Their excellent preservation is accounted for by their burial under the lava. The majority were excavated by Prince Ignazio Biscari (1719–1786), who formed an important private collection of antiquities. Of the ancient city walls no authenticated remains exist.

Catania has a considerable export trade in sulphur, pumice stone, asphalt, oranges and lemons, almonds, filberts, cereals, wine (the total production of wine in the province amounted to 28,600,000 gallons in 1905) and oil. The total value of exports in 1905 was £1,647,075, and of imports £1,326,055, the latter including notably coal, almost entirely from the United Kingdom, and wheat, from Russian ports. The harbour is a good one, and has been considerably enlarged since 1872; £128,000 was voted in 1905 towards the completion of the harbour works by the Italian government. Sulphide of carbon is produced here; and there are large dyeworks, and a factory for making bed-stuffing from seaweed.

The ancient Catina was founded in 729 B.C. by colonists from Naxos, perhaps on the site of an earlier Sicel settlement—the name is entirely un-Greek, and may be derived from *κάτινον*, which in the Sicel language, as *catinum* in Latin, meant a basin, and would thus be descriptive of the situation of the town. Charondas, a citizen of Catina, is famous as its lawgiver, but his date and his birthplace are alike uncertain; the fragments preserved of his laws show that they belong to a somewhat primitive period. The poet Stesichorus of Himera died here. Very little is heard of Catina in history until 476 B.C., when Hiero I. removed its inhabitants to Leontini, repeopled it with 5000 Syracusans and 5000 Peloponnesians, and changed its name to Aetna. In 461 B.C., however, with the help of Ducetius and the Syracusans, the former inhabitants recovered possession of their city and revived the old name. Catina was, however, an ally of Athens during the Syracusan expedition (415–413 B.C.), and served as the Athenian base of operations in the early part of the war. In 403 B.C. it was taken by Dionysius of Syracuse, who plundered the city, sold the inhabitants into slavery and replaced them with Campanian mercenaries. In the First Punic War it was one of the first cities of Sicily to be taken by the Romans (263 B.C.). Marcellus constructed a gymnasium here out of the booty of Syracuse. In 123 B.C. there was an eruption of Etna so violent that the tithe on the territory of Catina payable to Rome was remitted for ten years. It appears to have been a flourishing city in the 1st century B.C., but to have suffered from the ravages of Sextus Pompeius. It became a Roman *colonia* under Augustus, and it is from this period that the fertile plain, hitherto called the plain of Leontini, begins to be called the plain of Catina. It seems to have been at this time the most important city in the island, to judge from the language of Strabo and the number of inscriptions found there. In A.D. 251 a lava stream threatened the town and entered the amphitheatre, which in the time of Theodoric had fallen into ruins, as is clear from the fact that he permitted the use of its fallen stones to build the city wall. It was recovered by Belisarius in 535, sacked by the Saracens in 902 and taken by the Normans. The latter founded the cathedral; but the town was almost entirely destroyed by earthquake in 1170, and devastated by Henry VI. in 1197. It became the usual residence of the Aragonese viceroys of the 13th and 14th centuries. In 1669 an eruption of Etna partly filled up the harbour, but spared the town, which was, however, almost entirely destroyed by the earthquake of 1693. Since that catastrophe it has been rebuilt, and has not further suffered from its proximity to Etna.

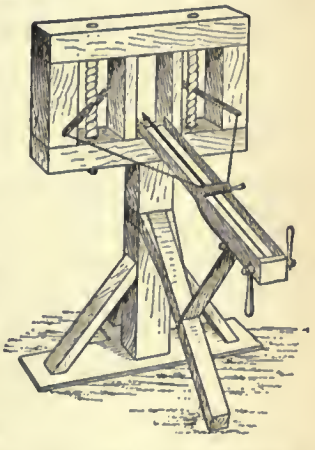
See A. Holm, *Das alte Catania* (Lübeck, 1873). (T. As.)

CATANZARO, a town and episcopal see of Calabria, Italy, capital of the province of Catanzaro, 1125 ft. above sea-level. Pop. (1901) 22,799 (town); 32,005 (commune). The station for the town (Catanzaro Sala) is situated on a branch line connecting the two main lines along the east and west coasts of Calabria, 6 m. N. by W. of Catanzaro Marina on the east coast, and 20 m. E. of S. Eufemia Biforcazione, on the west coast line. The town enjoys a comparatively cool climate in summer, and commands fine views. Numerous wealthy families reside here, and the town has a trade in olive-oil, silk and velvet. The castle, built by Robert Guiscard, has been modernized, and so has the cathedral. The see was founded in 1121. The provincial museum contains antiquities and especially coins from the ancient cities of Magna Graecia, and a few pictures.

CATAPHYLL (Gr. *κατά*, down, *φύλλον*, leaf), a botanical term for the early leaf-forms produced in the lower part of a shoot, such as bud-scales, or scales on underground stems.

CATAPULT (Lat. *catapulta*, Gr. *καταπέλτης*), a generic name for warlike engines of the cross-bow type used by the ancients. Although engines of war appear on Assyrian remains, and are mentioned in 2 Chronicles xxvi. 15, it appears that Greek armies, even of the 5th century, did not possess them, and the first record of a large siege train in classical literature is of the year 399 B.C., when Dionysius I. of Syracuse, contemplating an expedition against Carthage, provided himself with engines. From Sicily siege engines found their way some years later into Greece; they were used by Philip of Macedon at the siege of Byzantium in 340, and thereafter, as a natural consequence of the regularizing or professionalizing of armies, artillery, as we may call it, came into prominence and called into existence technical corps to work it.

The war engines of the Romans, during the republic and early principate, are of the same type as those of Alexander's successors in Greece. They are usually classed as (*a*) catapults and (*b*) ballistae (*λιθοβόλοι*). The former were smaller and were used with arrows for what is now called direct fire (*i.e.* at low angles of elevation); the latter were large siege engines discharging heavy bolts or stones at a high angle of elevation, like the modern howitzer. They were, of course, principally siege engines, but the smaller natures of catapult appear in field warfare from time to time, and eventually, during the early principate, they are found as part of the regulation equipment of infantry units. Both were constructed on the same principle.



The essential parts of the catapult (see illustration) were the frame, the propelling gear, the trough (corresponding to the modern barrel) and the pedestal. The frame consisted of two horizontal beams forming top and bottom sills, and four strong upright bars mortised into them. The three open spaces or compartments, resembling narrow windows, between these four uprights carried the propelling and laying gear. The propelling gear occupied the two outer "windows." In each a thick skein of cord or sinews was fastened to the top and bottom sills and tightly twisted. Two stiff wooden arms were inserted in the two skeins, and a specially strong bowstring joined the tips of these arms. In the middle compartment was the hinged fore-end of the trough, which was at right angles to the frame and at the back of it. The trough could be laid for elevation by a movable prop, the upper end of which was hinged to the trough, while the lower ran up and down a sort of trail fastened to the pedestal. The whole equipment was laid for "line" by turning the frame, and with it the trough, prop and trail by a pivot in the head of the pedestal. Sliding up and down in the trough was a block, fitted with a trigger mechanism, through which passed the middle of the bowstring. The pedestal was a strong and solid upright resting upon, and strutted to, a framework on the ground; its upper end, as mentioned above, took the pivot of the frame and the head of the trail.

On coming into action the machine was laid for direction and elevation. The block and with it the bowstring was next forced back against the resistance of the twisted skeins to the rear end of the trough, this being effected by a windlass attachment. The trigger being then pressed or struck with a hammer, the bowstring was released from the block, the stiff arms were violently brought back to the frame by the untwisting of the skeins, and the arrow was propelled through the centre "window" with great velocity. A small machine of the type described weighed about 85 lb, and sent a "three-span" (26-in.) arrow weighing ½ lb at an effective man-killing velocity somewhat over 400 yds.

The ballista was considerably larger and more expensive than this. In Scipio's siege train, at the attack of New Carthage (Livy xxvi. 47. 5), the number of the ballistae was only one-sixth that of the catapults. In the ballista the rear end of the trough (which projected in front of the frame) always rested upon the ground, or rather was fixed to the framework of the pedestal—which was a heavy trestle construction—and the trough was thus restricted to the angle of elevation, giving the maximum range (45°). Even so the range was not appreciably greater than that of a catapult, and in the case of the largest ballistae (ninety-pounder) it was much less. These enormous engines, which, once in position, could not be laid on any fresh target, were used for propelling beams and stones rather than for shooting arrows, that is, more for the destruction of material than for man-killing effect. The skeins that supplied the motive force of all these engines were made of the sinews of animals, twisted raw hide, horsehair rope, and, in at least one celebrated case, of women's hair. In 146 B.C., the authorities of Carthage having surrendered their engines to the Romans in the vain hope of staying their advance, new ones were hurriedly constructed, and the women and virgins of the city cut off their hair to supply the needed skeins.

The modern implement known as a "catapult" is formed by a forked stick, to the forks of which are attached the ends of a piece of elastic. To the middle of this elastic a pocket is fitted to contain a bullet or small stone. In use the forked stick is held in the left hand and the pocket drawn back with the right. Aim is taken and, the pocket being released, the missile flies through the fork of the stick. Though classed as a toy, this weapon can do considerable execution among birds, &c., when skilfully used. The name of "catapult" has also been given to a bowling machine which is used for cricket practice.

CATARACT (from the Lat. form *cataracta* of the Gr. καταῤῥάκτης, a floodgate, or waterfall, properly something which rushes down), a downpour of water, a waterfall. The earliest use in English is of a floodgate or portcullis, and this survives in the name of a disease of the eye (see EYE: *Eye Diseases*), in which the crystalline lens becomes opaque, and forms an apparent grating over the eye. The term is also used of a device to regulate the strokes in certain types of steam-engine.

CATARGIU (or CATARGI), **LASCAR** (1823–1899), Rumanian statesman, was born in Moldavia in November 1823. He belonged to an ancient Walachian family, one of whose members had been banished in the 17th century by Prince Matthew Bassaraba, and had settled in Moldavia. Under Prince Gregory Ghica (1849–1856), Catargiu rose to be prefect of police at Jassy. In 1857 he became a member of the *Divan ad hoc* of Moldavia, a commission elected in accordance with the treaty of Paris (1856) to vote on the proposed union of Moldavia and Walachia. His strongly conservative views, especially on agrarian reform, induced the Conservatives to support him as a candidate for the throne in 1859. During the reign of Prince Cuza (1859–1866), Catargiu was one of the Opposition leaders, and received much assistance from his kinsman, Barbu Catargiu (b. 1807), a noted journalist and politician, who was assassinated at Bucharest on the 20th of June 1862. On the accession of Prince Charles in May 1866, Lascar Catargiu became president of the council, or prime minister; but, finding himself unable to co-operate with his Liberal colleagues, I. C. Bratianu and C. A. Rosetti, he resigned in July. After eight more ministerial changes, culminating in the anti-dynastic agitation of 1870–1871, Catargiu formed, for the first time in Rumanian history, a stable Conservative cabinet, which lasted until 1876. His policy, which averted revolution and revived the popularity of the crown, was regarded as unpatriotic and reactionary by the Liberals, who resumed office in 1876; and a proposal to impeach the whole Catargiu cabinet was only withdrawn in 1878. Catargiu remained in opposition until 1889, when he formed another cabinet, taking the portfolio of the Interior; but this administration fell after seven months. In the Florescu ministry of March 1891 he occupied the same position, and in December he again became president of the council, retaining office until 1895. During this period he was responsible for several useful reforms, chiefly financial and commercial. He died suddenly at Bucharest on the 11th of April 1899.

CATARRH (from the Gr. καταῤῥεῖν, to flow down), a term principally employed to describe a state of irritation of the mucous membrane of the respiratory passages, or what is called in popular language a "cold." It is the result of infection by a micro-organism in one or more of various predisposing conditions, damp, chill, fatigue, &c. The complaint usually begins as a nasal catarrh or *coryza* (Gr. κόρυς, head), with a feeling of weight about the forehead and some degree of difficulty in breathing through the nose, increased on lying down. Fits of sneezing accompanied with a profuse watery discharge from the nostrils and eyes soon follow, while the sense of smell and to some extent that of taste become considerably impaired. There is usually present some amount of sore throat and of bronchial irritation, causing hoarseness and cough. Sometimes the vocal apparatus becomes so much inflamed (laryngeal catarrh) that temporary loss of voice results. There is always more or less feverishness and discomfort, and frequently an extreme sensitiveness to cold. After two or three days the symptoms begin to abate, the discharge from the nostrils and chest becoming thicker and of purulent character, and producing when dislodged considerable relief to the breathing. On the other hand the catarrh may assume a more severe aspect and pass into some form of pulmonary inflammation (see BRONCHITIS) or influenza (*q.v.*).

When the symptoms are first felt it is well to take a good purge, and to encourage free perspiration by a hot bath, some diaphoretic drug, as spirits of nitrous ether, being taken before retiring to bed. Some of the older school of physicians still pin their faith to a dose of Dover's powder. When the cold manifests itself by aches and pains in back and limbs, aspirin taken three or four times in the first twenty-four hours will often act like magic. Locally a snuff made of menthol 1 part, ammonium chloride 3 parts and boracic acid 2 parts will relieve the discomfort of the nose. Also, remembering the microbic origin of the disease, gargling and nasal syringing should be repeated at intervals. As soon as the attack shows signs of subsiding, a good tonic and, still better, a change of air are very helpful.

The term catarrh is used in medical nomenclature in a wider sense to describe a state of irritation of any mucous surface in the body, which is accompanied with an abnormal discharge of its natural secretion, hence the terms gastric catarrh, intestinal catarrh, &c.

See also RESPIRATORY SYSTEM: *Pathology*, and DIGESTIVE ORGANS, *Pathology of*.

CATARRHINE APE, the term used to describe those apes which have the nostrils approximated, the aperture pointing downward, and the intervening septum narrow; distinguishing features of both the lower "doglike" apes (Cynomorpha) and the higher "manlike" apes (Anthropomorpha). The Catarrhini are restricted entirely to the Old World, and include the gorilla, the chimpanzee and orang-utan.

CATASTROPHE (Gr. καταστροφή, from καταστρέφειν, to overturn), a term of the ancient Greek drama for the change in the plot which leads up to the conclusion. The word is thus used of any sudden change, particularly of a violent or disastrous nature, and in geology of a cataclysm or great convulsion of the earth's surface.

CATAUXI, a numerous cannibal tribe of South American Indians of the Purus river district, Brazil. They are a fine warlike race, with remarkably clear complexions and handsome features; round wrists and ankles they wear rings of twisted hair. They cultivate mandioc, and make pottery and bark canoes.

CATAWBAS (from the Choctaw for "divided"), a tribe of North American Indians of Siouan stock; formerly the dominant people of South Carolina. Some of their divisions extended into North Carolina. They are now almost extinct, but were at one time able to send nearly 2000 "braves" into battle. In the American War of Independence they furnished a valuable contingent to the South Carolina troops. They then occupied a number of small towns on the Catawba river, but they afterwards leased their land and removed to the territory of the Cherokees, with whom they had been formerly at war. There, however, they did not long remain, but returned to a reservation in their original district. Their affinities have not been very clearly made out, and by Albert Gallatin they were grouped with the Cherokees, Choctaws, Muskogees and Natchez. A vocabulary of sixty of their words was published by Horatio Hale in vol. ii. of the *Transactions of the American Ethnological Society* in 1848; and a much fuller list—about 300—collected by Oscar M. Lieber, the geologist, in 1856, made its appearance in vol. ii. of *Collections of the South Carolina Historical Society*, 1858. Of the one hundred Catawbas still said to be surviving, few, if any, can claim to be full-blooded. They are in the Catawba Reservation in York county, South Carolina. The name is familiar in connexion with the white American wine, the praises of which have been sung by Longfellow. The grape from which the wine is obtained was first discovered about 1801, near the banks of the Catawba river, and named by Major Adlum in 1825, but it is now cultivated extensively in Illinois, Ohio and New York, and especially on the shores of Lake Erie.

See also *Handbook of American Indians* (Washington, 1907).

CATCH THE TEN, sometimes called *Scotch Whist*, a game played with a pack of 36 cards, from ace, king, queen to six in each suit, the ace being highest both in play and cutting. In trumps, however, the knave ranks highest. Any number from two to eight may play. If an even number, partners are cut for; if odd, each plays for himself. An odd number of players sit as they like; four players sit as at whist; six playing in two sides sit so that no two partners shall be next each other; six playing three sides sit so that two opponents shall divide each pair; eight are arranged in alternate pairs. After cutting, the cards are dealt according to the number of players. The last card is turned up for the trump. When five or seven play, the six of spades is usually omitted; when eight play, the four sixes are thrown out. The eldest hand leads any card he chooses and all must follow suit if able, the penalty for a revoke being the loss of the game. The tricks are not kept separate but gathered in by one player for his side. At the end of the deal there are six hands of six cards on the table. The players first play out the first two hands, next the second two and finally the last two, the trump card remaining on the table until the first four hands are played out. The game is 41 points, the object of the play being to win the cards which have a special value. These are, with their values: knave of trumps 11, ace of trumps 4, king of trumps 3, queen of trumps 2, ten of trumps 10. All other cards have no counting value. As the ten can be taken by any other honour the object is to "catch the ten."

CATECHISM (from Gr. *κατηχεῖν*, teach by word of mouth), a compendium of instruction (particularly of religious instruction) arranged in the form of questions and answers. The custom of catechizing, common to all civilized antiquity, was followed in the schools of Judaism and in the Early Church, where it helped to preserve the Gospel narrative (see CATECHUMEN).

The catechism as we know it is intended primarily for children and uneducated persons. Its aim is to instruct, and it differs from a creed or confession in not being in the first instance an act of worship or a public profession of belief. The first regular catechisms seem to have grown out of the usual oral teaching of catechumens, and to have been compiled in the 8th and 9th centuries. Among them the work of Notker Labeo and of Kero, both monks of St Gall, and that of Ottfried of Weissenburg in Alsace deserve mention. But it is not until the first stirrings of revolt against the hierarchy, which preceded the Reformation, that they became at all widespread or numerous. The Waldenses of Savoy and France, the *Brethren* (small communities of evangelical dissenters from the medieval faith) of Germany, and the *Unitas Fratrum* of Bohemia all used the same catechism (one that was first printed in 1498, and which continued to be published till 1530) for the instruction of their children. It was based on St Augustine's *Enchiridion*, and considers (*a*) Faith, *i.e.* the Creed, (*b*) Hope, *i.e.* the Lord's Prayer, and (*c*) Love, *i.e.* the Decalogue.

The age of the Reformation gave a great stimulus to the production of catechisms. This was but natural at a time when the invention of printing had thrown the Bible open to all, and carried the war of religious opinion from the schools into the streets. The adherents of the "old" and the "new" religions alike had to justify their views to the unlearned as well as to the learned, and to give in simple formulas their reasons for the faith that was in them. Moreover, in the universal unrest and oversetting of all authority, Christianity itself was in danger of perishing, not only as the result of the cultured paganism of the Renaissance, but also through the brutish ignorance of the common folk, deprived now of their traditional religious restraints. To the urgency of this peril the reformers were fully alive; and they sought its remedy in education. "Let the people be taught," said Luther, "let schools be opened for the poor, let the truth reach them in simple words in their own mother tongue, and they will believe."

Catechisms of the Chief Religious Communions.—(*a*) *Evangelical* (*Lutheran and Reformed*).—It was the ignorance of the peasantry, as revealed by the horrors of the Peasants' War of 1524–25, and his pastoral visitation of the electorate of Saxony 1525–1527, that drew the above exclamation from Luther, and impelled him to produce his two famous catechisms (1529). In 1520 he had brought out a primer of religion dealing briefly with the Decalogue, the Creed and the Lord's Prayer; and Justus Jonas, Johannes Agricola and other leaders had done something of the same kind. Now all these efforts were superseded by Luther's Smaller Catechism meant for the people themselves and especially for children, and by his Larger Catechism intended for clergy and schoolmasters. These works, which did much to mould the character of the German people, were set among the doctrinal standards of the Lutheran Church and powerfully influenced other compilations. The Smaller Catechism, with the Augsburg Confession, was made the Rule of Faith in Denmark in 1537.

In this same year (1537) John Calvin at Geneva published his catechism for children. It was called *Instruction and Confession of Faith for the Use of the Church of Geneva* (a reprint edited by A. Rilliet and T. Dufour was published in 1878), and explained the Decalogue, the Apostles' Creed, the Lord's Prayer and the Sacraments. Though it was meant, as he said, to give expression to a simple piety rather than to exhibit a profound knowledge of religious truth, it was the work of a man who knew little of the child mind, and, though it served as an admirable and transparent epitome of his famous *Institutes*, it was too long and too minute for the instruction of children. Calvin came to see this, and in 1542, after his experience in Strassburg, drafted a new one which was much more suitable for teaching purposes, though, judged by modern standards, still far beyond the theological range of childhood. It was used at the Sunday noon instruction of children, on which Calvin laid much stress, and was adopted and similarly used by the Reformed Church of Scotland. The Reformed churches of the Palatinate, on the other hand, used the Heidelberg Catechism (1562–1563), "sweet-spirited, experiential, clear, moderate and happily-phrased," mainly the work of two of Calvin's younger disciples, Kaspar Olevianus and Zacharias Ursinus. The Heidelberg Catechism, set forth by order of the elector, is perhaps the most widely accepted symbol of the Calvinistic faith, and is noteworthy for its

emphasis on the less controversial aspects of the Genevan theology. As revised by the synod of Dort in 1619, this catechism became the standard of most of the Reformed churches of central Europe, and in time of the Dutch and German Reformed churches of America. Other compilations were those of Oecolampadius (Basel, 1526), Leo Juda (Zürich, 1534), and Bullinger (Zürich, 1555). In France, after Calvin's day, the Reformed church used besides Calvin's book the catechisms of Louis Capell (1619), and Charles Drelincourt (1642), and at the present time Bonnefon's *Nouveau Catéchisme élémentaire* (14th ed., 1900) seems most in favour. In Scotland both Calvin's Geneva Catechism and then the Heidelberg Catechism were translated by order of the General Assembly and annotated. In 1592 these were superseded by that of John Craig, for a time the colleague of John Knox at the High Church, Edinburgh.

Since 1648 the standard Presbyterian catechisms have been those compiled by the Westminster Assembly, presented to parliament in 1647, and then authorized by the General Assembly of the Church of Scotland (July 1648) and by the Scottish parliament (January 1649). The Larger Catechism is "for such as have made some proficiency in the knowledge of the Christian religion," but is too detailed and minute for memorizing, and has never received anything like the reception accorded to the Shorter Catechism, which is "for such as are of weaker capacity." The work was done by a committee presided over first by Herbert Palmer, master of Queens', Cambridge, and then by Anthony Tuckney, master of Emmanuel. The scriptural proof texts were added at the request of the English parliament. In his negotiations with the parliament in 1648 Charles I. offered to license the printing of the catechism, but, as the negotiations were broken off, this was not done. The Shorter Catechism, after a brief introduction on the end, rule and essence of religion, is divided into two parts:—I. The doctrines we are to believe (1) concerning the nature of God, (2) concerning the decrees of God and their execution—(*a*) in creation and providence, (*b*) in the covenant of works, (*c*) in the covenant of grace; II. The duties we are to perform (1) in regard to the moral law, (2) in regard to the gospel—(*a*) inward duties, *i.e.* faith and repentance, (*b*) outward duties as to the Word, the sacraments and prayer. It has 107 questions and answers, while that of the Anglican Church has but 24, grouping as it does the ten commandments and also the petitions of the Lord's Prayer, instead of dealing with them singly. Though the Shorter Catechism, closely associated as this has been from the first with Scottish public elementary education, has had very great influence in forming and training the character of Presbyterians in Scotland, America and the British colonies, it is, like most other catechisms drawn up by dogmatic theologians, more admirable as an epitome of a particular body of divinity than as an instruction for the young and the unlearned. Its use is now generally preceded by something more adapted to the child-mind, and this is true also in other communions and in the case of other catechisms.

(*b*) *Roman Catholic.*—There was no universal catechism published by the Latin Church before the council of Trent, but several provincial councils, *e.g.* in Germany and Scotland (where Archbishop Hamilton's catechism appeared in 1552 and was ordered to be read in church by the parish priest), moved in self-defence along the lines already adopted by the reformers. The council of Trent in 1563 resolved on an authoritative work which was finally carried through by two small papal commissions, and issued in 1566 by Pius V. (Eng. trans. by Donovan, Dublin, 1829). Being uncatechetical in form and addressed to the clergy rather than to the people, it missed its intention, and was superseded by others of less exalted origin, especially by those of the Jesuit Peter Canisius, whose *Summa Doctrinae et Institutionis Christianae* (1554) and its shorter form (1556) were already in the field. The catechisms of Bellarmine (1603) and Bossuet (1687) had considerable vogue, and a summary of the former known as *Schema de Parvo* was sanctioned by the Vatican council of 1870. But the Roman Catholic Church as a whole has never had any one official catechism, each bishop being allowed to settle the matter for his own diocese. In England the Roman Catholic bishops have agreed on the use of what is known as "The Penny Catechism," which is very lucid and well constructed.

(*c*) *Orthodox Eastern Church.*—Peter Mogilas, metropolitan of Kiev, drew up in 1643 the *Orthodox Confession of the Catholic and Apostolic Eastern Church.* This bulwark against the encroachments of the Jesuits and the Reformed Church was standardized by the synod of Jerusalem in 1672. A smaller catechism was drawn up by order of Peter the Great in 1723. The catechisms of Levshin Platon (1762) and V. D. Philaret (1839), each in his day metropolitan of Moscow, are bulky compilations which cannot be memorized, though there is a short introductory catechism prefaced to Philaret's volume (Eng. trans. in Blackmore's *Doctrine of the Russian Church*, 1845). These works are not to any extent in the hands of the people, but are used by the Russian clergy and schoolmasters as guides in giving instruction. The Coptic and Armenian churches also have what H. Bonar describes as "mere pretences at catechisms."

(*d*) *Anglican.*—The catechism of the Church of England is included in the Book of Common Prayer between the Orders for Baptism and Confirmation. It has two parts: (i.) the baptismal covenant, the Creed, the Decalogue and the Lord's Prayer, drawn up probably by Cranmer[1] and Ridley in the time of Edward VI., and variously modified between then (1549) and 1661; (ii.) the meaning of the two sacraments, written on the suggestion of James I. at the Hampton Court Conference in 1604 by John Overall, then dean of St Paul's, and afterwards bishop successively of Coventry and Lichfield and of Norwich. This supplement to what had become known as the Shorter Catechism established its use as against the longer one, *King Edward VIth's Catechisme*, which had been drawn up in 1553 by John Ponet or Poynet, bishop of Winchester, and then revised and enlarged in 1570 by Alexander Nowell, Overall's predecessor as dean of St Paul's. The Anglican catechism with occasional modification, especially in the sacramental section, is used not only in the Church of England but in the Episcopal churches of Ireland, Scotland, the British dominions and the United States of America. By the rubric of the Prayer Book and by the 59th canon of 1603 the clergy are enjoined to teach the catechism in church on Sundays and holidays after the second lesson at Evening Prayer. This custom, long fallen into disuse, has largely been revived during recent years, the children going to church for a special afternoon service of which catechizing is the chief feature. Compared with the thoroughness of most other catechisms this one seems very scanty, but it has a better chance of being memorized, and its very simplicity has given it a firm hold on the inner life and conscience of devout members of the Anglican communion throughout the world.

(*e*) *Other Communions.*—Almost every section of the church, *e.g.* the Wesleyan Methodist, has its catechism or catechisms, but in addition to those already enumerated only a few need be mentioned. The Socinians embodied their tenets in the larger and smaller works drawn up by Fausto Sozzini and Schmalz, and published at Rakow in Poland in 1605;[2] modern Unitarians have modern catechisms. The Quakers or Friends possess a kind of catechism said to have been written by George Fox in 1660, in which father and son are respectively questioner and answerer, and an interesting work by Robert Barclay, in which texts of Scripture form the replies. Congregationalists for some time used Isaac Watts's *Catechisms for Children and Youth* (1730), since superseded by the manuals of J. H. Stowell, J. H. Riddette and others. In 1898 the National Council of the Evangelical Free Churches in England and Wales published

[1] Cranmer had published a separate and larger catechism on the basis of the work of Justus Jonas in 1548; note also *Allen's Catechisme, A Christen Instruccion of the Principall Pointes of Christes Religion* (1551).

[2] A Latin edition in 1609 was dedicated to James I. of England. The British Houses of Parliament passed a resolution ordering all copies of it to be publicly burned, and again in 1652 when another edition appeared. An English translation, probably by John Bidle, was printed in Amsterdam and widely circulated.

an *Evangelical Free Church Catechism*, the work of a committee (convened by Rev. Hugh Price Hughes) comprising Congregationalists, Baptists, Methodists (Wesleyan, Primitive and others), and Presbyterians, and thus representing directly or indirectly the beliefs of sixty or seventy millions of avowed Christians in all parts of the world, a striking example of inter-denominational unity. More remarkable still in some respects is *The School Catechism*, issued in 1907 by a conference of members of the Reformed churches in Scotland, which met on the invitation of the Church of Scotland. In its compilation representatives of the Episcopal Church in Scotland co-operated, and the book though "not designed to supersede the distinctive catechisms officially recognized by the several churches for the instruction of their own children," certainly "commends itself as suitable for use in schools where children of various churches are taught together."

Catechisms have a strong family likeness. In the main they are expositions of the Creed, the Lord's Prayer and the Decalogue, and thus follow a tradition that has come down from the days when Cyril of Jerusalem delivered his catechetical Lectures. Even when (as in the Shorter Westminster Catechism and the School Catechism) the Creed is simply printed as an appendix, or where (as in the Free Church Catechism) it is not mentioned at all, its substance is dealt with. The order in which these three main themes are treated is by no means constant. The Heidelberg and Westminster Catechisms are of a more logical and independent character. The former is based on the Epistle to the Romans, and deals with the religious life as (1) Repentance, (2) Faith, (3) Love. Under these heads it discusses respectively the sin and misery of men, the redemption wrought by Christ (here are included the Creed and the Sacraments), and the grateful service of the new life (the Decalogue).

It may be noted that Sir Oliver Lodge has adopted the catechetical form in his book, *The Substance of Faith Allied with Science* (1907), which is described as "a catechism for parents and teachers."

See Ehrenfeuchter, *Geschichte des Katechismus* (1857); P. Schaff, *History of the Creeds of Christendom* (3 vols., 1876–1877); Mitchell, *Catechisms of the Second Reformation* (1887); C. Achelis, *Lehrbuch der prakt. Theologie* (2 vols., 1898); L. Pullan, *History of the Book of Common Prayer*, pp. 207-208; E. A. Knox, *Pastors and Teachers* (1902), chs. iii. and iv.; W. Beveridge, *A Short History of the Westminster Assembly* (1904), ch. x. (A. J. G.)

CATECHU, or CUTCH (Malay, *kachu*), an extract obtained from several plants, its chief sources being the wood of two species of acacia (*A. catechu* and *A. suma*), both natives of India. This extract is known as black catechu. A similar extract, known in pharmacy as pale catechu (*Catechu pallidum*), and in general commerce as gambir, or *terra japonica*, is produced from the leaves of *Uncaria gambir* and *U. acida*, cinchonaceous plants growing in the East Indian Archipelago. A third product to which the name catechu is also applied, is obtained from the fruits of the areca or betel palm, *Areca catechu*.

Ordinary black catechu is usually imported in three different forms. The first and best quality, known as Pegu catechu, is obtained in blocks externally covered with large leaves; the second and less pure variety is in masses, which have been moulded in sand; and the third consists of large cubes packed in coarse bags. The wood of the two species of *Acacia* yielding catechu is taken for the manufacture when the trees have attained a diameter of about 1 ft. The bark is stripped off and used for tanning, and the trunk is split up into small fragments, which are covered with water and boiled. When the extract has become sufficiently thick it is cast into the forms in which the catechu is found in commerce. Catechu so prepared is a dark brown, or, in mass, almost black, substance, brittle, and having generally a shining lustre. It is astringent, with a sweetish taste. In cold water it disintegrates, and in boiling water, alcohol, acetic acid and strong caustic alkali it is completely dissolved. Chemically it consists of a mixture of a peculiar variety of tannin termed catechu-tannic acid with catechin or catechuic acid, and a brown substance due to the alteration of both these principles. Catechu-tannic acid is an amorphous body soluble in cold water, while catechin occurs in minute, white, silky, needle-shaped crystals, which do not dissolve in cold water. A very minute proportion of quercetin, a principle yielded by quercitron bark, has been obtained from catechu.

Gambir, which is similar in chemical composition to ordinary catechu, occurs in commerce in the form of cubes of about an inch in size, with a pale brown or yellow colour, and an even earthy fracture. For the preparation of this extract the plants above mentioned are stripped of their leaves and young twigs, and these are boiled down in shallow pans. The juice is strained off, evaporated, and when sufficiently concentrated is cast into shallow boxes, where, as it hardens and dries, it is cut into small cubes.

Gambir and catechu are extensively employed in dyeing and tanning. For dyeing they have been in use in India from the most remote period, but it was only during the 19th century that they were placed on the list of European dyeing substances. Catechu is fixed by oxidation of the colouring principle, catechin, on the cloth after dyeing or printing; and treated thus it yields a variety of durable tints of drabs, browns and olives with different mordants (see DYEING). The principal consumption of catechu occurs in the preparation of fibrous substances exposed to water, such as fishing-lines and nets, and for colouring stout canvas used for covering boxes and portmanteaus under the name of tanned canvas. Black catechu is official in most pharmacopoeias except that of Great Britain, in which pale catechu is the official drug. The actions and uses of the two are similar, but black catechu is the more powerful. The dose is from five to twenty grains. The *pulvis catechu compositus* contains catechu and kino, and may be given in doses twice as large as those named. The drug has the actions and uses of tannic acid, but owing to the relative insolubility of catechu-tannic acid, it is more valuable than ordinary tannic acid in diarrhoea, dysentery and intestinal haemorrhage.

CATECHUMEN (Lat. *catechumenus*, Gr. κατηχούμενος, instructed, from κατηχεῖν, to teach orally), an ecclesiastical term applied to those receiving instruction in the principles of the Christian religion with a view to baptism. As soon as Christianity became a missionary religion, it was found necessary to make arrangements for giving instruction to new converts. At the beginning the Apostles themselves seem to have undertaken this duty, and the instruction was apparently given after baptism, for in Acts ii. 41, 42, we are told that "they that gladly received the word were baptized . . . and they continued stedfastly in the Apostles' teaching." There are two instances in the New Testament where reference is made to individual instruction in this technical sense. Luke (i. 4) in dedicating the third Gospel to Theophilus tells him that his aim in writing the book was "that thou mightest have certainty in the things in which thou has been instructed" (κατηχήθης), and we are told that Apollos was instructed (κατηχημένος) "in the way of the Lord" (Acts xviii. 25).

With the development of Christianity the instruction became more definite and formal. It is probable that the duty of instructing converts was assigned to "the teachers," who are ranked by Paul immediately after the Apostles and prophets (1 Cor. xii. 28), and occupied an important position in the Christian ministry. In the *Didache*, or Teaching of the Apostles, we have an excellent illustration of the teaching which was given to candidates for baptism in early times. There can be little doubt that the *Didache* was used as a manual for catechumens for several centuries. Athanasius (*Festal Epistles*, 39), for instance, says that "it was appointed by the Fathers to be read by those who are just recently coming to us, and wish to be instructed in the word of godliness" (κατηχεῖσθαι τὸν τῆς εὐσεβείας λόγον). The instruction prescribed by the *Didache* is very largely ethical, and stands in striking contrast to the more elaborate doctrinal teaching which came into vogue in later days. The *Shepherd of Hermas* too is another book which seems to have been used for the purpose of catechesis, for Eusebius says that it "was deemed most necessary for those who have need of elementary instruction" (*Eccles. Hist.* iii. 3-6).

With the rise of theological controversy and the growth of heresy catechetical instruction became of vital importance to the Church, and much greater importance was attached to it. After the middle of the 4th century it was regarded as essential that the candidate for baptism should not only be acquainted

with the spiritual truths and ethical demands which form the basis of practical Christianity, but should also be trained in theology and the interpretation of the creeds. Two books have been preserved which throw a striking light upon the transformation which had taken place in the conception of catechesis; (1) the Catechetical Lectures of Cyril of Jerusalem; (2) the *De rudibus Catechizandis* of Augustine. Cyril's Lectures may be termed the *Pearson on the Creed* of the 4th century. He takes each article separately, discusses it clause by clause, explains the meaning of each word, and justifies each statement from Scripture. Augustine's treatise was written at the request of a catechist, named Deogratias, who had asked him for advice. After replying to the question of Deogratias, and giving sundry counsels as to the best method of interesting catechumens, Augustine concludes by giving a model catechetical lecture, in which he covers the whole of biblical history, beginning from the opening chapters of Genesis, and laying particular stress on the doctrinal parts of Scripture. Cyril and Augustine differ, as we should expect, in the doctrines which they select for emphasis, but they both agree in requiring a knowledge of sound doctrine on the part of the candidates.

In spite of the numerous references to catechumens in Patristic literature, our knowledge of the details of the system is often very deficient, and upon some points there is considerable diversity of opinion amongst experts. The following are the most important questions which come under consideration.

1. *The Classification of Catechumens.*—Bingham and many of the older writers held that there were four classes of catechumens, representing different stages in the process of instruction: (*a*) "The inquirers" whose interest in Christianity had been sufficiently aroused to make them desire further information, and who received private and individual instruction from the teachers before they were admitted into the second class. (*b*) "The hearers" (*audientes*), who were admitted into the Church for the purpose of listening to sermons and exhortations. (*c*) The *prostrati* or *genu flectentes*, who were allowed also to take part in the prayers. (*d*) The *electi* or *competentes*, who had completed the period of probation and were deemed ready to receive baptism. Modern scholars, however, for the most part, deny that there is sufficient basis to justify this elaborate classification, and think that its advocates have confused the catechumenate with the system of penance. The evidence does not seem to warrant more than two classes, (*a*) the *audientes*, who were in the initial stages of their training, (*b*) the *competentes*, who were qualified for baptism.

2. *The Relation of Catechumens to the Church.*—Catechumens were allowed of course to attend church services, but at a certain point were dismissed with the words "Ite catechumeni, missa est." The moment at which the dismissal took place cannot be exactly determined, and it is not clear whether the catechumens were allowed to remain for a portion of the Communion service, and if so, whether as spectators or as partial participants. A passage in Augustine seems to imply that in some way they shared in the Sacrament, "that which they (the catechumens) receive, though it be not the Body of Christ, is yet an holy thing and more holy than the common food which sustains us, because it is a Sacrament" (*De peccatorum meritis*, ii. 42). The explanation of these words has occasioned considerable controversy. Many scholars hold (and this certainly seems the most natural interpretation) that consecrated bread was taken from the Eucharist and given to the catechumens. Bingham, however, maintains that the reference is not to the consecrated bread, but to salt, which was given to them as a symbol "that they might learn to purge and cleanse their souls from sin."

3. *The Duration of the Training.*—Various statements with regard to the duration of the catechumenical training are found in ecclesiastical authorities. The Apostolical Constitutions, for instance, fix it at three years;[1] the synod of Elvira at two.[2] The references in the Fathers, however, imply that for practical purposes it was limited to the forty days of Lent. Very probably, however, the forty days of actual instruction were preceded by a period of probation.

4. *The Relation between the Catechumenate and Baptism.*—Catechetical instruction was designed as a preliminary to baptism. There were two directions, however, in which this purpose was enlarged: (*a*) We have no reason to suppose that when infant baptism was introduced, those who had been baptized in infancy were excluded from the catechetical training, or that instruction was deemed unnecessary in their case, though as a matter of fact we have no definite reference to their admission. The custom of postponing baptism, which was very general in the 4th and 5th centuries, probably made such cases more rare than is generally supposed, and so accounts for the absence of any allusion to them in connexion with the catechumenate. (*b*) We have no reason to suppose that the instruction given in the famous catechetical schools of Alexandria and Carthage was restricted to candidates for baptism. There is no doubt that "catechetical" is used in a much wider sense when applied to the lectures of Origen than when used of the addresses of Cyril of Jerusalem. The "instruction" of Origen was given to all classes of Christians, and not merely to those who were in the initial stages.

5. *Characteristics of the Catechumenical Training.*—Besides instruction there were some other important features connected with the catechumenate. (*a*) The duty of *confession* was impressed on the candidates. (*b*) The ceremony of *exorcism* was often performed in order to free the catechumen from evil spirits. (*c*) At a certain point in the training the creed and the doctrine of the Sacraments were delivered to the candidates by the bishop with much impressive ceremonial. This teaching constituted the "holy secret" or "mystery" (*disciplina arcani*) of Christianity, and could only be imparted to those who were qualified to receive it. The acquisition of this arcanum was regarded as the most essential element in the catechetical discipline, and marked off its possessors from the rest of the world. There can be little doubt that this conception of the "Holy Secret" came into the Church originally from the Greek mysteries, and that much of the ceremonial connected with the catechumenate and baptism was derived from the same source.

AUTHORITIES.—Cyril, *Catecheses*; Gregory of Nyssa, *Oratio Catechetica*; Chrysostom, *Catecheses ad illuminandos*; Augustine, *De rudibus Catechizandis*; Mayer, *Geschichte des Katechumenats . . . in den ersten sechs Jahrhunderten* (1868); S. Cheetham, *The Mysteries, Pagan and Christian*. (H. T. A.)

CATEGORY (Gr. *κατηγορία*, "accusation"), a term used both in ordinary language and in philosophy with the general significance of "class" or "group." In popular language it is used for any large group of similar things, and still more generally as a mere synonym for the word "class." The word was introduced into philosophy as a technical term by Aristotle, who, however, several times used it in its original sense of "accusation." He also used the verb *κατηγορεῖν*, to accuse, in the specific logical sense, to predicate; *τὸ κατηγορούμενον* becomes the predicate; and *κατηγορικὴ πρότασις* may be translated as affirmative proposition. But though the word thus received a new signification from Aristotle, it is not on that account certain that the thing it was taken to signify was equally a novelty in philosophy. In fact we find in the records of Oriental and early Greek thought something corresponding to the Aristotelian classification.

Hindu philosophy.

Our knowledge of Hindu philosophy, and of the relations in which it may have stood to Greek speculation, scarcely enables us to give decisive answers to various questions that naturally arise on observation of their many resemblances (see an article by Richard Garbe in *Monist*, iv. 176-193). Yet the similarity between the two is so striking that, if not historically connected, they must at least be regarded as expressions of similar philosophic needs. The Hindu classification to which we specially refer is that of Kanada, who lays down six categories, or classes of existence, a seventh being generally added by the commentators. The term employed is *Padārtha*, meaning "signification of a word." This is in entire harmony with the Aristotelian doctrine, the categories of which may with truth be described as significations of simple terms, *τὰ κατὰ μηδεμίαν συνπλοκὴν λεγόμενα*. The six categories of Kanada are Substance, Quality, Action, Genus, Individuality, and Concretion or Co-inherence. To these is added Non-Existence, Privation or Negation. *Substance* is the permanent substance in which *Qualities* exist. *Action*, belonging to or inhering in substances, is that which produces change, *Genus* belongs to substance, qualities and actions; there are higher and lower genera. *Individuality*, found only in substance, is that by which a thing is self-existent and marked off from others. *Concretion* or Co-inherence denotes inseparable or necessary connection, such as that between substance and quality. Under these six classes, *γένη τοῦ ὄντος*, Kanada then proceeds to range the facts of the universe.[3]

Greek philosophy.

Within Greek philosophy itself there were foreshadowings of the Aristotelian doctrine, but nothing so important as to warrant the conclusion that Aristotle was directly influenced by it. Doubtless the One and Many, Being and Non-Being, of the Eleatic dialectic, with their subordinate oppositions, may be called categories, but they are not so in the Aristotelian sense, and have little or nothing in common with the later system. Their

[1] *Apost. Constit.* viii. 2. [2] Canon 42.

[3] For details of this and other Hindu systems see H. T. Colebrooke, *Miscellaneous Essays* (1837; new ed., E. B. Cowell, 1873); H. H. Wilson, *Essays and Lectures on the Religions of the Hindus* (1861–1862); Monier Williams, *Indian Wisdom* (4th ed., 1893); A. E. Gough's *Vaiseshika-Sutras* (Benares, 1873), and *Philosophy of the Upanishads* (London, 1882, 1891); Max Müller, *Sanskrit Literature*, and particularly his appendix to Thomson's *Laws of Thought*.

starting-point and results are wholly diverse. Nor does it appear necessary to do more than mention the Pythagorean table of principles, the number of which is supposed to have given rise to the decuple arrangement adopted by Aristotle. The two classifications have nothing in common; no term in the one list appears in the other; and there is absolutely nothing in the Pythagorean principles which could have led to the theory of the categories.[1]

Plato.

One naturally turns to Plato when endeavouring to discover the genesis of any Aristotelian doctrine, and undoubtedly there are in the Platonic writings many detached discussions in which the matter of the categories is touched upon. Special terms also are anticipated at various times, *e.g.* ποιότης in the *Theaetetus*, ποιεῖν and πάσχειν in the *Gorgias*, and πρός τι in the *Sophist*.[2] But there does not seem to be anything in Plato which one could say gave occasion directly and of itself to the Aristotelian doctrine; and even when we take a more comprehensive view of the Platonic system and inquire what in it corresponds to the widest definition of categories, say as ultimate elements of thought and existence, we receive no very definite answer. The Platonic dialectic never worked out into system, and only in two dialogues do we get anything like a list of ultimate or root-notions. In the *Sophist*, Being, Rest and Motion (τὸ ὄν αὐτὸ καὶ στάσις καὶ κίνησις are laid down as μέγιστα τῶν γενῶν.[3] To these are presently added the Same and the Other (ταὐτὸν καὶ θάτερον), and out of the consideration of all five some light is cast upon the obscure notion of Non-Being (τὸ μὴ ὄν). In the same dialogue (262 seq.) is found the important distinction of ὄνομα and ῥῆμα, noun and verb. The *Philebus* presents us with a totally distinct classification into four elements—the Infinite, the Finite, the Mixture or Unity of both and the Cause of this unity (τὸ ἄπειρον, τὸ πέρας, ἡ σύμμιξις, ἡ αἰτία). It is at once apparent that, however these classifications are related to one another and to the Platonic system, they lie in a different field from that occupied by the Aristotelian categories, and can hardly be said to have anything in common with them.

Aristotle.

The Aristotelian doctrine is most distinctly formulated in the short treatise Κατηγορίαι, which generally occupies the first place among the books of the *Organon*. The authenticity of the treatise was doubted in early times by some of the commentators, and the doubts have been revived by such scholars as L. Spengel and Carl Prantl. On the other hand, C. A. Brandis, H. Bonitz, and Ed. Zeller are of opinion that the tract is substantially Aristotle's. The matter is hardly one that can be decided either *pro* or *con* with anything like certainty; but this is of little moment, for the doctrine of the categories, even of the *ten* categories, does not stand or fall with only one portion of Aristotle's works.

It is surprising that there should yet be so much uncertainty as to the real significance of the categories, and that we should be in nearly complete ignorance as to the process of thought by which Aristotle was led to the doctrine. On both points it is difficult to extract from the matter before us anything approaching a satisfactory solution. The terms employed to denote the categories have been scrutinized with the utmost care, but they give little help. The most important—κ. τοῦ ὄντος or τῆς οὐσίας, γένη τοῦ ὄντος or τῶν ὄντων, γένη simply, τὰ πρῶτα or τὰ κοινὰ πρῶτα, αἱ πτῶσεις, or αἱ διαιρέσεις—only indicate that the categories are general classes into which Being as such may be divided, that they are *summa genera*. The expressions γένη τῶν κατηγοριῶν and σχήματα τῶν κ., which are used frequently, seem to lead to another and somewhat different view. κατηγορία being taken to mean that which is predicated, γένη τῶν κ. would signify the most general classes of predicates, the framework into the divisions of which all predicates must come. To this interpretation there are objections. The categories must be carefully distinguished from predicables; in the scholastic phraseology the former refer to *first intentions*, the latter to *second intentions*, *i.e.* the one denote real, the other logical connexion. Further, the categories cannot without careful explanation be defined as predicates; they are this and something more. The most important category, οὐσία, in one of its aspects cannot be predicate at all.

In the Κατηγορίαι Aristotle prefixes to his enumeration a grammatico-logical disquisition on homonyms and synonyms, and on the elements of the proposition, *i.e.* subject and predicate. He draws attention to the fact that things are spoken of either in the connexion known as the proposition, *e.g.* "a man runs," or apart from such connexion, *e.g.* "man" and "runs." He then proceeds, "Of things spoken of apart from their connexion in a proposition (τῶν κατὰ μηδεμίαν συμπλοκὴν λεγομένων), each signifies either Substance (οὐσία), or Quantity (ποσόν), or Quality (ποιόν), or Relation (πρός τι), or Where (*i.e.* Place, ποῦ), or When (*i.e.* Time, ποτέ), or Position (κεῖσθαι), or Possession (ἔχειν), or Action (ποιεῖν), or Passion (πάσχειν). οὐσία, the first category, is subdivided into πρώτη οὐσία or primary substance, which is defined to be τόδε τι, the singular thing in which properties inhere, and to which predicates are attached, and δεύτεραι οὐσίαι, genera or species which can be predicated of primary substances, and are therefore οὐσία only in a secondary sense. Nevertheless, they too, after a certain fashion, signify the singular thing, τόδε τι (*K.* p. 3 b 12, 13). It is this doctrine of πρώτη οὐσία that has raised doubts with regard to the authenticity of the Κατηγορίαι. But the tenfold classification, which has also been captiously objected to, is given in an acknowledged writing of Aristotle's (see *Topica*, i. 9, p. 103 b 20).[4] At the same time it is at least remarkable that in two places where the enumeration seems intended to be complete (*Met.* p. 1017 a 25; *An. Pos.* i. 22, p. 83 a 21), only eight are mentioned, ἔχειν and κεῖσθαι being omitted. In other passages[5] six, five, four, and three are given, frequently with some addition, such as καὶ αἱ ἄλλαι κ. It is also to be observed that, despite of this wavering, distinct intimations are given by Aristotle that he regarded his list as complete, and he uses phrases which would seem to indicate that the division had been exhaustively carried out. He admits certainly that some predicates which come under one category might be referred to another, but he declines to deduce all from one highest class, or to recognize any relation of subordination among the several classes.

The full import of the categories will never be adequately reached from the point of view taken up in the Κατηγορίαι, which bears all the marks of an early and preliminary study. For true understanding we must turn to the *Metaphysics*, where the doctrine is handled at large. The discussion of Being in that work starts with a distinction that at once gives us a clue. τὸ ἕν is spoken of in many ways; of these four are classified—τὸ ὂν κατὰ συμβεβηκός, τὸ ὂν ὡς ἀληθές, τὸ ὂν δυνάμει καὶ ἐνεργείᾳ, and τὸ ὂν κατὰ τὰ σχήματα τῶν κατηγοριῶν. It is evident from this that the categories can be regarded neither as purely logical nor as purely metaphysical elements. They indicate the general forms or ways in which Being can be predicated; they are determinations of Being regarded as an object of thought, and consequently as matter of speech. It becomes apparent also why the analysis of the categories starts from the singular thing, for it is the primary form under which all that is becomes object of knowledge, and the other categories modify or qualify this real individual. Πάντα δὲ τὰ γιγνόμενα ὑπό τέ τινος γίγνεται καὶ ἔκ τινος καὶ τί. Τὸ δὲ τί λέγω καθ' ἑκάστην κατηγορίαν· ἢ γὰρ τόδε ἢ ποσὸν ἢ ποιὸν ἢ ποῦ (*Met.* p. 1032 a 13-15). . . . The categories, therefore, are not logical forms, but real predicates; they are the general modes in which Being may be expressed. The definite thing, that which comes forward in the process from potentiality to full actuality, can only appear and be spoken of under forms of individuality, quality, quantity and so on. The nine later categories all denote entity in a certain imperfect fashion.

The categories then are not to be regarded as heads of predicates, the framework into which predicates can be thrown. They are real determinations of Being—*allgemeine Bestimmtheiten*, as Hegel calls them. They are not *summa genera* of existences, still less are they to be explained as a classification of namable things in general. The objections Mill has taken to the list are entirely irrelevant, and would only have significance if the categories were really—what they are not—an exhaustive division of concrete existences. Grote's view (*Aristotle*, i. 108) that Aristotle drew up his list by examining various popular propositions, and throwing the different predicates into genera, "according as they stood in different logical relation to the subject," has no foundation. The relation of the predicate category to the subject is not entirely a logical one; it is a relation of real existence, and wants the essential marks of the propositional form. The logical relations of τὸ ὄν are provided for otherwise than by the categories.

Aristotle has given no intimation of the course of thought by which he was led to his tenfold arrangement, and it seems hopeless to discover it. Trendelenburg in various essays has worked out the idea that the root of the matter is to be found in grammatical considerations, that the categories originated from investigations into grammatical functions, and that a correspondence will be found to obtain between categories and parts of speech. Thus, Substance corresponds to noun substantive, Quantity and Quality to the adjective, Relation partly to the comparative degree and perhaps to the preposition, When and Where to the adverbs of time and place, Action to the active, Passion to the passive of the verb, Position (κεῖσθαι) to the intransitive verb, ἔχειν to the peculiar Greek perfect. That there should be a very close correspondence between the categories and grammatical elements is by no means surprising; that the one were deduced from the other is both philosophically and historically improbable. Reference to the detailed criticisms of Trendelenburg by Ritter, Bonitz, and Zeller will be sufficient.

Aristotle has also left us in doubt on another point. Why should there be only *ten* categories? and why should these be the ten? Kant and Hegel, it is well known, signalize as the great defect in the Aristotelian categories the want of a principle, and yet some of Aristotle's expressions would warrant the inference that he *had* a principle, and that he thought his arrangement exhaustive. The leading idea of all later attempts at reduction to unity of principle,

[1] The supposed origin of that theory in the treatise περὶ τοῦ παντός, ascribed to Archytas (*q.v.*), has been proved to be an error. The treatise itself dates in all probability from the Neo-Pythagorean schools of the 2nd century A.D.

[2] Prantl, *Ges. der Logik*, i. 74-75; F. A. Trendelenburg, *Kategorienlehre*, 209. *n.*

[3] *Soph.* 254 D.

[4] Against this passage even Prantl can raise no objection of any moment; see *Ges. der Logik*, i. 206. *n.*

[5] See Bonitz, *Index Aristotelicus*, s.v., and Prantl, *Ges. der Logik*, i. 207.

the division into substance and accident, was undoubtedly not overlooked by Aristotle, and Fr. Brentano[1] has collected with great diligence passages which indicate how the complete list might have been deduced from this primary distinction. His tabular arrangements (pp. 175, 177) are particularly deserving of attention. The results, however, are hardly beyond the reach of doubt.

Later Greek.

There was no fundamental change in the doctrine of the categories from the time of Aristotle to that of Kant, and only two proposed reclassifications are of such importance as to require notice. The Stoics adopted a fivefold arrangement of highest classes, *γενικώτατα*. *τὸ ὄν* or *τί*, Being, or somewhat in general, was subdivided into *ὑποκείμενα* or subjects, *ποιά* or qualities in general, which give definiteness to the blank subject, *πῶς ἔχοντα*, modes which further determine the subject, and *πρός τι πῶς ἔχοντα*, definite relative modes. These categories are so related that each involves the existence of one higher than itself, thus there cannot be a *πρός τι πῶς ἔχον* which does not rest upon or imply a *πῶς ἔχον*, but *πῶς ἔχον* is impossible without *ποιόν*, which only exists in *ὑποκείμενον*, a form or phase of *τὸ ὄν*.[2]

Plotinus, after a lengthy critique of Aristotle's categories, sets out a twofold list. *τὸ ἕν, κίνησις, στάσις, ταὐτότης, ἑτερότης* are the primitive categories (*πρῶτα γένη*) of the intelligible sphere. *οὐσία, πρός τι, ποιά, ποσόν, κίνησις* are the categories of the sensible world. The return to the Platonic classification will not escape notice.

Modern philosophy.

Modern philosophy, neglecting altogether the dry and tasteless treatment of the Aristotelian doctrine by scholastic writers, gave a new, a wider and deeper meaning to the categories. They now appear as ultimate or root notions, the metaphysical or thought elements, which give coherence and consistency to the material of knowledge, the necessary and universal relations which obtain among the particulars of experience. There was thus to some extent a return to Platonism, but in reality, as might easily be shown, the new interpretation was, with due allowance for difference in point of view, in strict harmony with the true doctrine of Aristotle. The modern theory dates in particular from the time of Kant, who may be said to have reintroduced the term into philosophy. Naturally there are some anticipations in earlier thinkers. The Substance, Attribute and Mode of Cartesianism can hardly be classed among the categories; nor does Leibnitz's chance suggestion of a fivefold arrangement into Substance, Quantity, Quality, Action and Passion, and Relations, demand any particular notice. Locke, too, has a classification into Substances, Modes and Relations, but in it he has manifestly no intention of drawing up a table of categories. What in his system corresponds most nearly to the modern view of these elements is the division of kinds of real predication. In all judgments of knowledge we predicate either (1) Identity or Diversity, (2) Relation, (3) Co-existence, or necessary connexion, or (4) Real existence. From this the transition was easy to Hume's important classification of *philosophical relations* into those of Resemblance, Identity, Time and Place, Quantity or Number, Quality, Contrariety, Cause and Effect.

These attempts at an exhaustive distribution of the necessary relations of all objects of knowledge indicate the direction taken by modern thought, before it received its complete expression from Kant.

Kant.

The doctrine of the categories is the very kernel of the Kantian system, and, through it, of later German philosophy. To explain it fully would be to write the history of that philosophy. The categories are called by Kant Root-notions of the Understanding (*Stammbegriffe des Verstandes*), and are briefly the specific forms of the a priori or formal element in rational cognition. It is this distinction of matter and form in knowledge that marks off the Kantian from the Aristotelian doctrine. To Kant knowledge was only possible as the synthesis of the material or a posteriori with the formal or a priori. The material to which a priori forms of the understanding were applied was the sensuous content of the pure intuitions, Time and Space. This content could not be *known* by sense, but only by intellectual function. But the understanding in the process of knowledge makes use of the universal form of synthesis, the judgment; intellectual function is essentially of the nature of judgment or the reduction of a manifold to unity through a conception. The specific or type forms of such function will, therefore, be expressed in judgments; and a complete classification of the forms of judgments is the key by which one may hope to discover the system of categories. Such a list of judgments Kant thought he found in ordinary logic, and from it he drew up his well-known scheme of the twelve categories. These forms are the determinations of all objects of experience, for it is only through them that the manifold of sense can be reduced to the unity of consciousness, and thereby constituted experience. They are a priori conditions, subjective in one sense, but objective as being universal, necessary and constitutive of experience.

The table of logical judgments with corresponding categories is as follows:—

Judgments.		Categories.
Universal	I. Of Quantity	Unity.
Particular		Plurality.
Singular		Totality.
Affirmative	II. Of Quality	Reality.
Negative		Negation.
Infinite		Limitation.
Categorical	III. Of Relation	Inherence and Subsistence (Substance and Accident).
Hypothetical		Causality and Dependence (Cause and Effect).
Disjunctive		Community (Reciprocity).
Problematical	IV. Of Modality	Possibility and Impossibility.
Assertoric		Existence and Non-Existence.
Apodictic		Necessity and Contingency.

Kant, it is well known, criticizes Aristotle severely for having drawn up his categories without a principle, and claims to have disclosed the only possible method by which an exhaustive classification might be obtained. What he criticized in Aristotle is brought against his own procedure by the later German thinkers, particularly Fichte and Hegel. And in point of fact it cannot be denied that Kant has allowed too much completeness to the ordinary logical distribution of propositions; he has given no proof that in these forms are contained all species of synthesis, and in consequence he has failed to show that in the categories, or pure conceptions, are contained all the modes of a priori synthesis. Further, his principle has so far the unity he claimed for it, the unity of a single function, but the specific forms in which such unity manifests itself are not themselves accounted for by this principle. Kant himself hints more than once at the possibility of a completely rational system of the categories, at an evolution from one single movement of thought, and in his *Remarks on the Table of the Categories* gave a pregnant hint as to the method to be employed. From any complete realization of this suggestion Kant, however, was precluded by one portion of his theory. The categories, although the necessary conditions under which alone an object of experience can be thrown, are merely forms of the mind's own activity; they apply only to sensuous and consequently subjective material. Outside of and beyond them lies the thing-in-itself, which to Kant represented the ultimately real. This subjectivism was a distinct hiatus in the Kantian system, and against it principally Fichte and Hegel directed criticism. It was manifest that at the root of the whole system of categories there lay the synthetizing unity of self-consciousness, and it was upon this unity that Fichte fixed as giving the possibility of a more complete and rigorous deduction of the pure notions of the understanding. Without the act of the Ego, whereby it is self-conscious, there could be no knowledge, and this primitive act or function must be, he saw, the *position* or affirmation of itself by the Ego. The first principle then must be that the Ego posits itself as the Ego, that Ego = Ego, a principle which is unconditioned both in form and matter, and therefore capable of standing absolutely first, of being the *prius* in a system. Metaphysically regarded this act of self-position yields the categories of Reality. But, so far as matter is concerned, there cannot be affirmation without negation, *omnis determinatio est negatio.* The determination of the Ego presupposes or involves the Non-Ego. The form of the proposition in which this second act takes to itself expression, the Ego is not = Not-Ego, is unconditioned, not derivable from the first. It is the absolute antithesis to the primitive thesis. The category of Negation is the result of this second act. From these two propositions, involving absolutely opposed and mutually destructive elements, there results a third which reconciles both in a higher synthesis. The notion in this third is determination or limitation; the Ego and Non-Ego limit, and are opposed to one another. From these three positions Fichte proceeds to evolve the categories by a series of thesis, antithesis and synthesis.

Fichte.

In thus seizing upon the unity of self-consciousness as the origin for systematic development, Fichte has clearly taken a step in advance of, and yet in strict harmony with, the Kantian doctrine. For, after all that can be said as to the demonstrated character of formal logic, Kant's procedure was empirical, and only after the list of categories had been drawn out, did he bring forward into prominence what gave them coherence and reality. The peculiar method of Fichte, also, was nothing but a consistent application of Kant's own Remark on the Table of the Categories. Fichte's doctrine, however, is open to some of the objections advanced against Kant. His method is too abstract and external, and wants the unity of a single principle. The first two of his fundamental propositions stand isolated from one another, not to be resolved into a primitive unity. With him, too, the whole stands yet on the plane of subjectivity. He speaks, indeed, of the universal Ego as distinct from the empirical self-consciousness; but the universal does not rise with him to concrete spirit. Nevertheless the *Wissenschaftslehre* contains the only real advance in the treatment of the categories from the time of Kant to that of Hegel.[3] This, of

[1] Brentano, *Bedeutung des Seienden nach A.*, pp. 148-178.

[2] For detailed examination of the Stoic categories, see Prantl, *Ges. d. Logik*, i. 428 sqq.; Zeller, *Ph. d. Griech.* iii. 1, 82, sqq.; Trendelenburg, *Kateg.* p. 217.

[3] It does not seem necessary to do more than refer to the slight alterations made on Kant's Table of Categories by J. G. von Herder (in the *Metakritik*), by Solomon Maimon (in the *Propädeutik zu einer*

course, does not imply that there were not certain elements in Schelling, particularly in the *Transcendental Idealism*, that are of value in the transition to the later system; but on the whole it is only in Hegel that the whole matter of the Kantian categories has been assimilated and carried to a higher stage. The Hegelian philosophy, in brief, is a system of the categories; and, as it is not intended here to expound that philosophy, it is impossible to give more than a few general and quite external observations as to the Hegelian mode of viewing these elements of thought. With Kant, as has been seen, the categories were still subjective, not as being forms of the individual subject, but as having over against them the world of *noumena* to which they were inapplicable. Self-consciousness, which was, even with Kant, the *nodus* or kernel whence the categories sprang, was nothing but a logical centre,—the reality was concealed. There was thus a dualism, to overcome which is the first step in the Hegelian system. The principle, if there is to be one, must be universally applicable, all-comprehensive. Self-consciousness is precisely the principle wanted; it is a unity, an identity, containing in itself a multiplicity. The universal in absolute self-consciousness is just pure thinking, which in systematic evolution is the categories; the particular is the natural or multiform, the external as such; the concrete of both is spirit, or self-consciousness come to itself. The same law that obtains among the categories is found adequate to an explanation of the external thing which had so sadly troubled Kant. The categories themselves are moments of the universal of thought, type forms, or definite aspects which thought assumes; determinations, *Bestimmungen*, as Hegel most frequently calls them. They evolve by the same law that was found to be the essence of ultimate reality—*i.e.* of self-consciousness. The complete system is pure thought, the Universal *par excellence*.

After the Hegelian there can hardly be said to have been a philosophical treatment of the categories in Germany which is not more or less a criticism of that system. It does not seem necessary to mention the unimportant modifications introduced by Kuno Fischer, J. E. Erdmann, or others belonging to the school. In the strongly-opposed philosophy of J. F. Herbart the categories can hardly be said to hold a prominent place. They are, with him, the most general notions which are psychologically formed, and he classifies them as follows:—(1) Thing, either as product of thought or as given in experience; (2) Property, either qualitative or quantitative; (3) Relation; (4) The Negated. Along with these he posits as categories of inner process—(1) Sensation, (2) Cognition, (3) Will, (4) Action. Joh. Fr. L. George (1811–1873),[1] who in the main follows Schleiermacher, draws out a table of categories which shows, in some points, traces of Herbartian influence. His arrangement by enneads, or series of nine, is fanciful, and wanting in inner principle.

The most imposing of more recent attempts at a reconstruction of the categories is that of F. A. Trendelenburg. To him the first principle, or primitive reality, is Motion, which is both real as external movement, and ideal as inner construction. The necessary conditions of Motion are Time and Space, which are both subjective and objective. From this point onwards are developed the mathematical (point, line, &c.) and real (causality, substance, quantity, quality, &c.) categories which appear as involved in the notion of motion. Matter cannot be regarded as a product of motion; it is the condition of motion, we must think something moved. All these categories, "under the presupposition of motion as the first energy of thought, are ideal and subjective relations; as also, under the presupposition of motion as the first energy of Being, real and objective relations."[2] A serious difficulty presents itself in the next category, that of End (*Zweck*), which can easily be thought for inner activity, but can hardly be reconciled with real motion. Trendelenburg solves the difficulty only empirically, by pointing to the insufficiency of the merely mechanical to account for the organic. The consideration of Modality effects the transition to the forms of logical thought. On the whole, Trendelenburg's unique fact of motion seems rather a blunder. There is much more involved than he is willing to allow, and motion *per se* is by no means adequate to self-consciousness. His theory has found little favour.

Trendelenburg.

Hermann Ulrici works out a system of the categories from a psychological or logical point of view. To him the fundamental fact of philosophy is the distinguishing activity (*unterscheidende Tätigkeit*) of thought. Thought is only possible by distinction, difference. The fixed points in the relations of objects upon which this activity turns are the categories, which may be called the forms or laws of thought. They are the aspects of things, notions under which things must be brought, in order to become objects of thought. They are thus the most general predicates or heads of predicates. The categories cannot be completely gathered from experience, nor can they be evolved a priori; but, by attending to the general relations of thought and its purely indefinite matter, and examining what we must predicate in order to know Being, we may attain to a satisfactory list. Such a list is given in great detail in the *System der Logik* (1852), and in briefer, preciser form in the *Compendium der Logik* (2nd ed., 1872); it is in many points well deserving of attention.

Ulrici.

The definition of the categories by the able French logician Charles Bernard Renouvier in some respects resembles that of Ulrici. To him the primitive fact is Relation, of which all the categories are but forms. "The categories," he says, "are the primary and irreducible laws of knowledge, the fundamental relations which determine its form and regulate its movements." His table and his criticism of the Kantian theory are both of interest.[3] The criticism of Kant's categories by Cousin and his own attempted classification are of no importance. Of little more value is the elaborate table drawn out by Sir W. Hamilton.[4] The generalized category of the *Conditioned* has but little meaning, and the subordinate categories evolve themselves by no principle, but are arranged after a formal and quite arbitrary manner. They are never brought into connexion with thought itself, nor could they be shown to spring from its nature and relations. J. S. Mill presented, "as a substitute for the abortive classification of Existences, termed the categories of Aristotle," the following as an enumeration of all nameable things:—(1) Feelings, or states of consciousness; (2) The minds which experience these feelings; (3) Bodies, or external objects which excite certain of those feelings; (4) Successions and co-existences, likenesses and unlikenesses, between feelings or states of consciousness.[5] This classification proceeds on a quite peculiar view of the categories, and is here presented only for the sake of completeness.

Renouvier, Cousin, Hamilton, Mill.

By modern psychologists the subject has been closely investigated. Professor G. F. Stout (*Manual of Psychology*, vol. ii. pp. 312 foll.) defines categories as "forms of cognitive consciousness, universal principles or relations presupposed either in all cognition or in all cognition of a certain kind." He then treats External (or Physical) Reality, Space, Time, Causality and "Thinghood" from the standpoint of the perceptual consciousness; showing in what sense the categories of causality, substance and the rest exist in the sphere of perception. As contrasted with the ideational, the perceptual consciousness is concerned with practice. Perception tells the child of things as separate entities, not in their ultimate relations as parts of a coherent whole. G. T. Ladd (*Psychology Descriptive and Explanatory*, ch. xxi., on "Space, Time and Causality") defines the categories from the psychological standpoint as "those highly abstract conceptions which the mind frames by reflection upon its own most general modes of behaviour. They are our own notions resulting from co-operation of imagination and judgment, concerning the ultimate and unanalyzable forms of our own existence and development." In other words, the categories are highly abstract, have no content, and are realized as a kind of thinking which has for its object all the other mental processes.

Modern psychologists.

AUTHORITIES.—Besides those quoted above, see Eduard v. Hartmann, *Kategorienlehre* (Leipzig, 1896), and "Begriff der Kategorialfunktion," in *Zeitschr. f. Philos. und phil. Krit.* cxv. (1899), pp. 9-19; E. König in the same periodical, cxiii. (1889), pp. 232-279, and cxiv. (1899), pp. 78-105; F. A. Trendelenburg, *Geschichte der Kategorienlehre* (1846); P. Ragnisco, *Storia critica delle categorie* (2 vols., Florence, 1871); W. Windelband, *Vom System der Kategorien* (Tübingen, 1900); R. Eisler, *Wörterbuch der philosophischen Begriffe* (Berlin, 1899), pp. 400-409; S. Joda, *Studio critico su le categorie* (Naples, 1881); H. Vaihinger, *Die transcendentale Deduktion der Kategorien* (Halle, 1902); H. W. B. Joseph, *Introduction to Logic* (Oxford, 1906), ch. iii.; F. H. Bradley, *Principles of Logic* (1883); B. Bosanquet's *Knowledge and Reality* (1885, 2nd ed. 1892); histories of philosophy. For further authorities see works quoted under ARISTOTLE and KANT, and in J. M. Baldwin's *Dict. Philos. Psych.* vol. iii. pt. 2, p. 685. (R. AD.; X.)

CATENARY (from Lat. *catena*, a chain), in mathematics, the curve assumed by a uniform chain or string hanging freely between two supports. It was investigated by Galileo, who erroneously determined it to be a parabola; Jungius detected Galileo's error, but the true form was not discovered until 1691, when James Bernoulli published it as a problem in the *Acta Eruditorum*. Bernoulli also considered the cases when (1) the chain was of variable density, (2) extensible, (3) acted upon at each point by a force directed to a fixed centre. These curves attracted much attention and were discussed by John Bernoulli, Leibnitz, Huygens, David Gregory and others.

neuen Theorie des Denkens), by J. F. Fries (in the *Neue Kritik der Vernunft*), or by Schopenhauer, who desired to reduce all the categories to one—that of Causality. We should require a new philosophical vocabulary even to translate the extraordinary compounds in which K. C. F. Krause expounds his theory of the categories. Notices of the changes introduced by Antonio Rosmini-Serbati, and of Vincenzo Gioberti's remarkable theory, will be found in Ragnisco's work referred to below.

[1] *System der Metaphysik* (1844).

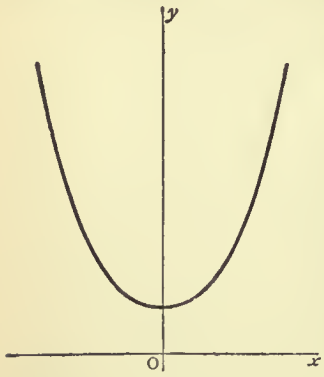
[2] *Logische Untersuchungen*, i. 376-377.

[3] *Essais de critique générale* (2nd ed.), *La Logique*, i. pp. 184, 190, 207-225.

[4] *Discussions*, p. 577.

[5] *Logic*, i. 83; cf. Bain, *Ded. Log.*, App. C.

The mechanical properties of the curves are treated in the article MECHANICS, where various forms are illustrated. The simple catenary is shown in the figure. The cartesian equation referred to the axis and directrix is $y=c\cosh(x/c)$ or $y=\frac{1}{2}c(e^{x/c}+e^{-x/c})$; other forms are $s=c\sinh(x/c)$ and $y^2=c^2+s^2$, s being the arc measured from the vertex; the intrinsic equation is $s=c\tan\psi$. The radius of curvature and normal are each equal to $c\sec^2\psi$.



The surface formed by revolving the catenary about its directrix is named the *alysseide*. It is a minimal surface, *i.e.* the catenary solves the problem: to find a curve joining two given points, which when revolved about a line co-planar with the points traces a surface of minimum area (see VARIATIONS, CALCULUS OF).

The involute of the catenary is called the *tractory*, *tractrix* or *antifriction* curve; it has a cusp at the vertex of the catenary, and is asymptotic to the directrix. The cartesian equation is

$$x=\sqrt{(c^2-y^2)}+\tfrac{1}{2}c\log[\{c-\sqrt{(c^2-y^2)}\}/\{c+\sqrt{(c^2+y^2)}\}],$$

and the curve has the geometrical property that the length of its tangent is constant. It is named the tractory, since a weight placed on the ground and drawn along by means of a flexible string by a person travelling in a straight line, the weight not being in this line, describes the curve in question. It is named the antifriction curve, since a pivot and step having the form of the surface generated by revolving the curve about its vertical axis wear away equally (see MECHANICS: *Applied*).

CATERAN (from the Gaelic *ceathairne*, a collective word meaning "peasantry"), the band of fighting men of a Highland clan; hence the term is applied to the Highland, and later to any, marauders or cattle-lifters.

CATERHAM, an urban district in the Wimbledon parliamentary division of Surrey, England, 20 m. S. of London by the South-Eastern & Chatham railway. Pop. (1901) 9486. It lies in a healthy, hilly district, and has grown in modern times from a village into a large residential town. There are large barracks in the neighbourhood, and the Metropolitan lunatic asylum is close to the town.

CATERPILLAR, the popular name of the larva of various insects, particularly of butterflies and moths (see LEPIDOPTERA, HEXAPODA, METAMORPHOSIS). The word appears first in the form *caterpyl* (*Promptorium Parvulorum*, about the middle of the 15th century). This may be the original form, with the addition of *-ar* or *-er*; if so, it represents the O. Fr. *chatepelose* or *chatepeleuse*, *i.e.* "hairy-cat" (*chat*, cat, and *pelouse*, hairy, Lat. *pilosus*), a name applied to the hairy caterpillar, and also according to Cotgrave to a weevil. The use of "cat" in this connexion is paralleled by the Swiss name for a caterpillar, *teufelskatz*, and the popular English name for the blossom of the willow, "catkin," somewhat resembling a caterpillar (cf. "palmer"); the modern French is *chenille*, Latin *canicula*, a little dog. The termination of the word seems to have been early connected with "piller," a robber, plunderer from the destructive habits of the larva, cf. Joel i. 4—"That which the palmer-worm hath left, hath the locust eaten." The spelling "caterpillar," a 17th century corruption, has been the usual form since Johnson.

CATESBY, ROBERT (1573–1605), English conspirator, son of Sir William Catesby of Lapworth in Warwickshire, a prominent recusant who was a descendant of Sir William Catesby, speaker of the House of Commons in 1484, executed by Henry VII. after the battle of Bosworth, was born in 1573, and entered Gloucester Hall (now Worcester College), Oxford, in 1586. He possessed a considerable estate, and was said to be wild and extravagant in his youth. In 1596 he was one of those arrested on suspicion during an illness of Queen Elizabeth. In 1601 he took part in the rebellion of Essex, was wounded in the fight and imprisoned, but finally pardoned on the payment of an enormous fine, to obtain which he was forced to sell a portion of his property. In 1602 he despatched Thomas Winter and the Jesuit Tesimond *alias* Greenway to Spain to induce Philip III. to organize an invasion of England, and in 1603, after James's accession, he was named as an accomplice in the "Bye Plot." Catesby was a man of great beauty of person, "above 2 yards high," says Father Gerard, "and though slender, yet as well-proportioned to his height as any man one should see." He possessed a clear head and unflinching courage, and with a strong determination and fascinating manner mastered the minds of his associates and overpowered all opposition. He was, however, headstrong, wilful and imprudent, fit for action, but incapable of due deliberation, and entirely wanting in foresight. Exasperated by his personal misfortunes and at the repressive measures under which his co-religionists were suffering, and blinded by a religious zeal which amounted to fanaticism, he was now to be the chief instigator of the famous Gunpowder Plot, which must in any event have brought disaster upon the Roman Catholic cause. The idea of some great stroke seems to have first entered his mind in May 1603. About the middle of January 1604 he imparted his scheme of blowing up the Parliament House to his cousin Thomas Winter, subsequently taking in Guy Fawkes and several other conspirators and overcoming all fears and scruples. But it was his determination, from which he would not be shaken, not to allow warning to be given to the Roman Catholic peers that was the actual cause of the failure of the plot. A fatal mistake had been made in imparting the secret to Francis Tresham (*q.v.*), in order to secure his financial assistance; and there is scarcely any doubt that he was the author of the celebrated letter to his brother-in-law, Lord Monteagle, which betrayed the conspiracy to the government, on the 26th of October. On receiving the news of the letter on the 28th, Catesby exhibited extraordinary coolness and fortitude, and refused to abandon the attempt, hoping that the government might despise the warning and still neglect precautions; and his confidence was strengthened by Fawkes's report that nothing in the cellar had been touched or tampered with. On the 2nd of November his resolution was shaken by Tresham's renewed entreaties that he would flee, and his positive assurance that Salisbury knew everything. On the evening of the 3rd, however, he was again, through Percy's insistence, persuaded to stand firm and hazard the great stroke. The rest of the story is told in the article GUNPOWDER PLOT. Here it need only be said that Catesby, after the discovery of the conspiracy, fled with his fellow-plotters, taking refuge ultimately at Holbeche in Staffordshire, where on the night of the 8th of November he was overtaken and killed. He had married Catherine, daughter of Thomas Leigh of Stoneleigh, Warwickshire, and left one son, Robert, who inherited that part of the family estate which had been settled on Catesby's mother and was untouched by the attainder, and who is said to have married a daughter of Thomas Percy.

CAT-FISH, the name usually applied to the fishes of the family *Siluridae*, in allusion to the long barbels or feelers about the mouth, which have been compared to the whiskers of a cat. The *Siluridae* are a large and varied group, mostly inhabitants of fresh waters; some of them by their singular form and armature are suggestive of the Devonian mailed fishes, and were placed at one time in their vicinity by L. Agassiz. Even such authorities as T. H. Huxley and E. D. Cope were inclined to ascribe ganoid affinities to the *Siluridae*; but this view has gradually lost ground, and most modern ichthyologists, if not all, have adopted the conclusions of M. Sagemehl, who has placed the *Siluridae* near the carps and Characinids in the group Ostariophysi. The Silurids and Cyprinids may be regarded as two parallel series derived from some common stock which cannot have been very different from the existing Characinids. In spite of the archaic appearance of some of its members, the family *Siluridae* does not appear to extend far back in time, its oldest known representative being the *Bucklandium diluvii* of the Lower Eocene (London Clay) of Sheppey. A great number of forms were placed by Cuvier and his successors in the family *Siluridae*, which has since been broken up by T. Gill and other American authors into several families, united under the name of Nematognathi. A middle course appears the more reasonable to the

present writer, who has divided the *Siluridae* of Cuvier into three families, with the following definitions:—

Siluridae—ribs attached to strong parapophyses; operculum well developed.

Loricariidae—ribs sessile; parapophyses absent; operculum more or less developed.

Aspredinidae—ribs sessile; strong parapophyses; operculum absent.

These three families may be defined among the Ostariophysi by having the parietal bones fused with the supraoccipital, no symplectic, the body naked or with bony scutes, the mouth usually toothed, with barbels, and usually an adipose dorsal fin.

The *Siluridae* embrace more than one thousand species, spread over the fresh waters of all parts of the world, but mostly from between the tropics. They are absent from western Europe and north-west Africa, and from North America west of the Rocky Mountains, but this deficiency has been made good by now, the introduction of *Amiurus nebulosus* and allied species in various parts of continental Europe and California having proved a success. Only a few forms are marine (*Plotosus*, *Arius*, *Galeichthys*).

The species which has given the name to the whole family is the "Wels" of the Germans, *Silurus glanis*, the largest European fresh-water fish, inhabiting the greater part of Europe from the Rhine eastwards and north of the Alps. Its head is large and broad, its mouth wide, furnished with six barbels, of which those

FIG. 1.—The "Wels" (*Silurus glanis*).

of the upper jaw are very long. Both jaws and the palate are armed with broad bands of small closely-set teeth, which give the bones a rasp-like appearance. The eyes are exceedingly small. The short body terminates in a long, compressed, muscular tail, and the whole fish is covered with a smooth, scaleless, slippery skin. Specimens of 4 and 5 ft. in length, and of 50 to 80 lb in weight, are of common occurrence, and the fish grows to 10 ft., with a weight of 400 lb, in the Danube. Its food consists chiefly of other bottom-feeding fishes, and in inland countries it is considered one of the better class of food fishes. Stories about children having been found in the stomach of very large individuals are probably inventions. An allied species (*S. aristotelis*) is found in Greece.

The *Clarias* and *Heterobranchus* of Africa and south-eastern Asia have an elongate, more or less eel-shaped body, with long dorsal and anal fins, and are known to be able to live a long time out of water, being provided with an accessory dendritic breathing organ situated above the gills. Some species live in burrows during the dry season, crawling about at night in search of food. The common Nile species, the "Harmoot" (*Clarias lazera*), occurs abundantly in the Lake of Galilee and was included in, if not chiefly aimed at, by the Mosaic law which forbade the Jews to eat scaleless fishes, a prohibition which has been extended to eels in spite of the obvious presence of minute scales in the latter.

The *Saccobranchus* of India and Ceylon, a genus more nearly related to *Silurus*, have also an accessory organ for breathing atmospheric air. It consists of a long sac behind the gill-cavity, extending far back on each side of the body under the muscles.

In the majority of the *Siluridae*, called by A. Günther the *Proteropterae*, a section extremely numerous in species, and represented throughout the tropics, the dorsal fin consists of a short-rayed and an adipose portion, the former belonging to the abdominal vertebral column; the anal is always much shorter than the tail. The gill-membranes are not confluent with the skin of the isthmus; they have a free posterior margin. When a nasal barbel is present, it belongs to the posterior nostril. This section includes among many others the genus *Bagrus*, of which the bayad (*B. bayad*) and docmac (*B. docmac*) frequently come under the notice of travellers on the Nile; they grow to a length of 5 ft. and are eaten.

Of the "cat-fishes" of North America (*Amiurus*), locally called "bull-heads" or "horned-pouts," with eight barbels, some twenty species are known. Some of them are valued as food, especially one which is abundant in the ponds of New England, and capable of easy introduction into other localities (*A. nebulosus*). Others which inhabit the great lakes (*A. nigricans*) and the Mississippi (*A. ponderosus*) often exceed the weight of 100 lb. *Platystoma* and *Pimelodus* people the rivers and lakes of tropical America, and many of them are conspicuous in this fauna by the ornamentation of their body, by long spatulate snouts, and by their great size.

The genus *Arius* is composed of a great number of species and has the widest distribution of all Silurids, being represented in almost all tropical countries which are drained by large rivers. Most of the species live in salt water. They possess six barbels, and their head is extensively osseous on its upper surface; their dorsal and pectoral spines are generally developed into powerful weapons. *Bagarius*, one of the largest Silurids of the rivers of India and Java, exceeding a length of 6 ft., differs from *Arius* in having eight barbels and the head covered with skin.

R. Semon has made observations in Queensland on the habits of *Arius australis*, which builds nests in the sandy bed of the Burnett river. These nests consist of circular basin-like excavations about 20 in. in diameter, at the bottom of which the eggs are laid and covered over by several layers of large stones. In the marine and estuarine species of *Arius*, *Galeichthys* and *Osteogeniosus*, the male, more rarely the female, carries the eggs in the mouth and pharynx; these eggs, few in number, are remarkably large, measuring as much as 17 or 18 millimetres in diameter in *Arius commusonii*, a fish 3 or 4 ft. in length.

The common North American *Amiurus nebulosus* also takes care of its eggs, which are deposited beneath protecting objects at the bottom of the water, failing which both parents join in excavating a sort of nest in the mud. The male watches over the eggs, and later leads the young in great schools near the shore, seemingly caring for them as the hen for her chickens.

In the *Siluridae Stenobranchiae* of Günther the dorsal fin consists of an adipose portion and a short-rayed fin which belongs to the abdominal vertebral column, and, like the adipose fin, may be sometimes absent. The gill-membranes are confluent with the skin of the isthmus. The Silurids belonging to this section are either South American or African. Among the former we notice specially the genus *Doras*, which is distinguished by having a series of bony scutes along the middle of the side. The narrow-

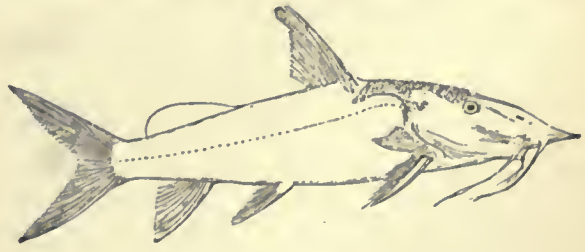


FIG. 2.—*Synodontis xiphias*.

ness of their gill-openings appears to have developed in them a habit which has excited the attention of all naturalists who have visited the countries bordering upon the Atlantic rivers of tropical America, viz. the habit of travelling during seasons of drought from a piece of water about to dry up to ponds of greater capacity. These journeys are occasionally of such a length that the fish have to travel all night; they are so numerous

that the Indians fill many baskets of them. J. Hancock supposes that the fish carry a small supply of water with them in their gill-cavity, which they can easily retain by closing their branchial apertures. The same naturalist adds that they make regular nests, in which they cover up their eggs with care and defend them—male and female uniting in this parental duty until the eggs are hatched. *Synodontis* is an African genus and common in the Nile, where the various species are known by the name of "Shal." They frequently occur among the representations of animals left by the ancient Egyptians. The upper part of their

FIG. 3.—*Malopterurus electricus*.

head is protected by strong osseous scutes, and both the dorsal and pectoral fins are armed with powerful spines. Their mouth is small, surrounded by six barbels, which are more or less fringed with a membrane or with branched tentacles.

The curious fact of some species of *Synodontis* having the lower parts darker than the upper, some being whitish above and blackish beneath, appears to be connected with their habit of swimming in a reversed position, the belly turned upwards. This habit, known to the ancient Egyptians, who have frequently represented them in that attitude, has been described by E. Geoffroy, who says they nearly constantly swim on their back, moving quite freely forwards and sidewards; but if alarmed, they revert to the normal position to escape more rapidly.

The electric cat- or sheath-fishes (*Malopterurus*) have been referred to the same section. Externally they are at once recognized by the absence of a rayed dorsal fin, of which only a rudiment remains as a small interneural spine concealed below the skin. The entire fish is covered with soft, villose skin, an osseous defensive armour having become unnecessary in consequence of the development of a powerful electric apparatus, the strength of which, however, is exceeded by that of the electric eel and the large species of *Torpedo*.

The electric organ of *Malopterurus* differs essentially from that of other fishes provided with such batteries, being part of the tegumentary system instead of being derived from the muscles. It consists of rhomboidal cells of a fine gelatinous substance immediately under the skin. It is put into action by a single ganglionic cell at the anterior extremity of the spinal cord. Contrary to what takes place in other electric fishes, the current proceeds from the head to the tail.

The electric cat-fish, which grows to a length of 3 ft. in the Congo, has a wide distribution in Africa, extending from the Nile to the Zambezi and from the Senegal to the Congo. It was well known to the ancient Egyptians, who have depicted it in their mural paintings and elsewhere, and an account of its electric properties was given by an Arab physician of the 12th century; then as now the fish was known under the suggestive name of *Raad* or *Raash*, which means "thunder."

Günther's *Siluridae Branchicolae* comprise the smallest and least developed members of the family; they are referred to two genera only from South America, *Stegophilus* and *Vandellia*, the smallest of which does not exceed the length of 2 in. Their body is soft, narrow, cylindrical and elongate; the dorsal and anal fins short; the vent far behind the middle of the length of the body; gill-membranes confluent with the skin of the isthmus. Each maxillary is provided with a small barbel; and the gill-covers are armed with short stiff spines. Their small size notwithstanding, these Silurids are well known to the Brazilians, who accuse them of entering and ascending the urethra of persons while bathing, causing inflammation and sometimes death. Some certainly live parasitically in the gill-cavity of large Silurids, and F. Silvestri has observed *Stegophilus insidiosus* to suck the blood in the gills of *Platystoma coruscans*, a Silurid growing to a length of 6 ft.

The mailed cat-fish of the South American genus *Callichthys*

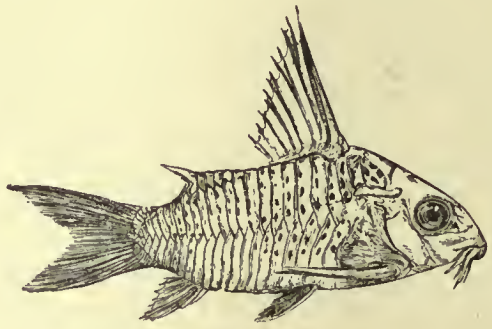


FIG. 4.—*Callichthys armatus*, from the upper Amazons. (Natural size.)

builds regular nests of grass on leaves, sometimes placed in a hole scooped out in the bank, in which they cover their eggs and defend them, male and female sharing in this parental duty. In the allied *Corydoras* a lengthy courtship takes place, followed by an embrace, during which the female receives the seminal fluid in a sort of pouch formed by the folded membranes of her ventral fins; immediately after, five or six eggs are produced and received in the pouch, to be afterwards carefully placed in a secluded spot. This operation is repeated many times, until the total number of eggs, about 250, have been deposited. In accordance with these pairing habits, the pectoral spines of the male, which are used in amplexation, are larger and stronger than those of the female. These fish are monogamous, and both parents remain by the side of the nest, furiously attacking any assailant.

The allied family *Loricariidae*

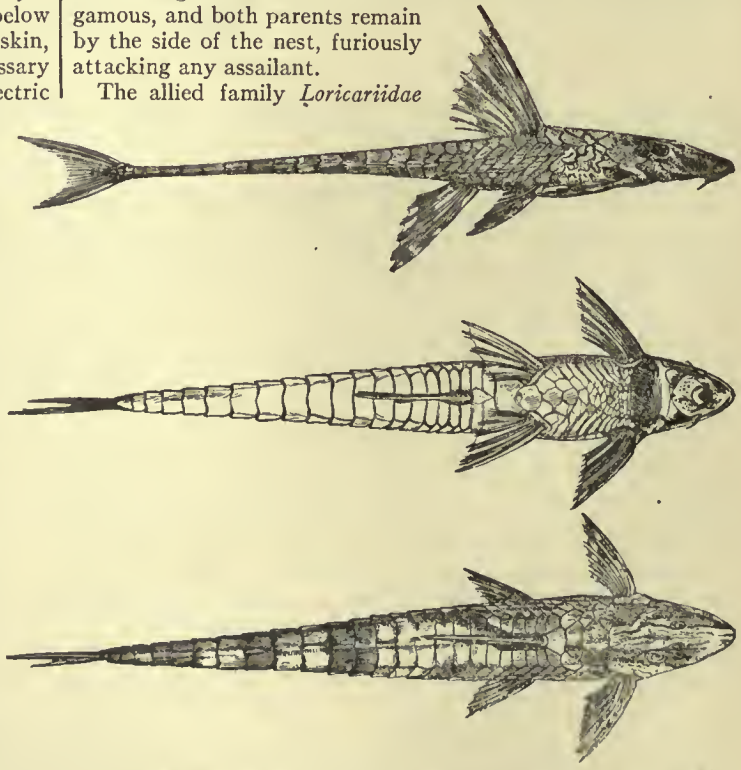


FIG. 5.—*Loricaria lanceolata*, from the upper Amazons. (Natural size.)

is entirely confined to the fresh waters of Central and South America. C. T. Regan, who has recently published an elaborate monograph of them, recognizes 189 species, referred to 17 genera. Many of them are completely mailed; but all have in common a short-rayed dorsal fin, with the

ventrals below or rarely in front of it. Their gill-openings are reduced to a short slit. The first group of this section comprises alpine forms of the Andes, without any armature, and with a very broad and pendent lower lip. They have been referred to several genera (*Stygogenes*, *Arges*, *Brontes*, *Astroblepus*), but are collectively called "preñadillas" by the natives, who state that they live in subterranean craters within the bowels of the volcanoes of the Andes, and are ejected with streams of mud and water during eruptions. These fishes may, however, be found in surface waters at all times, and their appearance in great quantities in the low country during volcanic

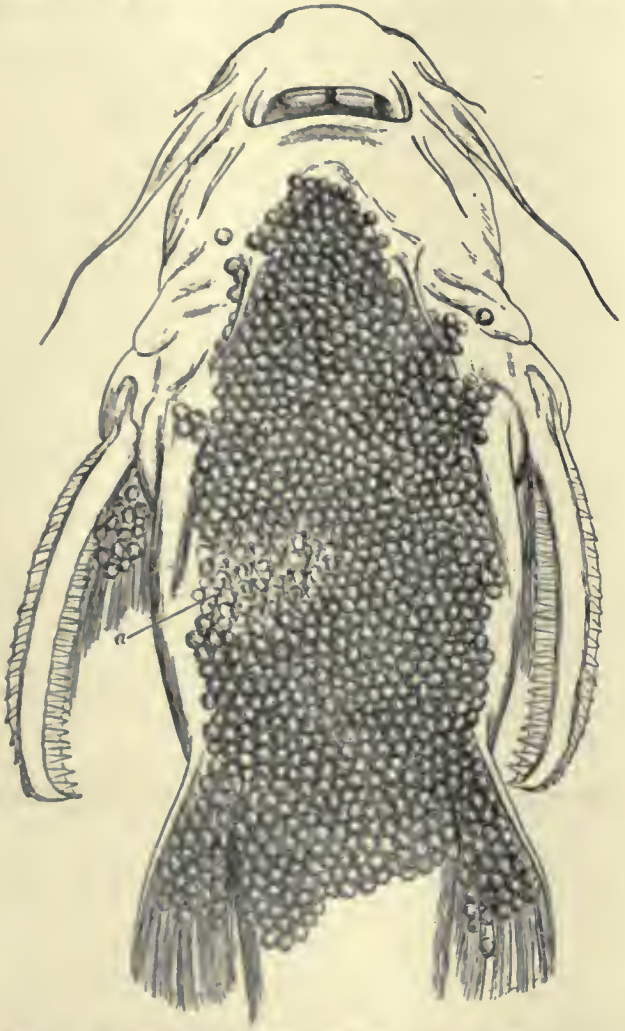


FIG. 6.—Abdomen of *Aspredo batrachus*, with the ova attached; at *a* the ova are removed, to show the spongy structure of the skin, and the processes filling the interspaces between the ova. (Natural size.)

eruptions can be accounted for by numbers being killed by the sulphuretted gases which escape during an eruption and by their being swept down with the torrents of water issuing from the volcano. The lowland forms have their body encased in large scutes, either rough, scale-like, and arranged in four or five series (*Chaetostomus*), or polished, forming broad rings round the slender and depressed tail (*Loricaria*, fig. 5). They are mostly of small size.

In certain of the mailed genera the secondary sexual differences may be very pronounced, and have given rise to many nominal species. The shape of the snout may differ according to the sex, and its margin may be beset with tentacles in the male, whilst it frequently happens that the head of the latter is margined with spines or bristles which are either absent or considerably shorter in the female.

The *Aspredinidae*, which are also closely related to the *Siluridae*, are represented by four genera and eighteen species from South America. *Aspredo batrachus* (fig. 6), of the Guianas, the largest form, reaching to about a foot in length, deserves notice from the manner in which the female carries her eggs attached to the belly and paired fins, in a single layer, each egg being connected with the skin by a cup-shaped pedunculate base supplied with blood-vessels and coated with a layer of epithelium, the formation of which is still unexplained. (G. A. B.)

CATGUT, the name applied to cord of great toughness and tenacity prepared from the intestines of sheep, or occasionally from those of the horse, mule and ass. Those of the cat are not employed, and therefore it is supposed that the word is properly *kitgut*, *kit* meaning "fiddle," and that the present form has arisen through confusion with *kit*=cat. The substance is used for the strings of harps and violins, as well as other stringed musical instruments, for hanging the weights of clocks, for bow-strings, and for suturing wounds in surgery. To prepare it the intestines are cleaned, freed from fat, and steeped for some time in water, after which their external membrane is scraped off with a blunt knife. They are then steeped for some time in an alkaline ley, smoothed and equalized by drawing out, subjected to the antiseptic action of the fumes of burning sulphur, if necessary dyed, sorted into sizes, and twisted together into cords of various numbers of strands according to their uses. The best strings for musical instruments are imported from Italy ("Roman strings"); and it is found that lean and ill-fed animals yield the toughest gut.

CATHA, the *khat* of the Arabs, a shrub widely distributed and much cultivated in Arabia and tropical Africa from Abyssinia to the Cape. The dried leaves are used for the preparation of a kind of tea and also as tobacco. The plant is a member of the natural order *Celastraceae*, a family of shrubs and trees found in temperate and tropical climates and represented in Britain by the spindle-tree (*Euonymus europaeus*).

CATHARS (CATHARI or CATHARISTS), a widespread heretical sect of the middle ages. They were the débris of an early Christianity, scattered in the 10th to 14th centuries over East and West, having their analogues in the Mahommedan world as well. In the East they were called Bogomils (*q.v.*) and Paulicians; in the West, Patarenes, Tixerands (*i.e.* Weavers), Bulgars, Concorricii, Albanenses, Albigeois, &c.; in both, Cathars and Manicheans. This article relates to the Western Cathars, as they appear (1) in the Cathar Ritual written in Provençal and preserved in a 13th-century MS. in Lyons, published by Clédat, Paris, 1888; (2) in Bernard Gui's *Practica inquisitionis haereticae pravitatis*, edited by Canon C. Douais, Paris, 1886; and (3) in the *procès verbal* of the inquisitors' reports. Some were downright dualists, and believed that there are two gods or principles, one of good and the other of evil, both eternal; but as a rule they subordinated the evil to the good. All were universalists in so far as they believed in the ultimate salvation of all men.[1]

Their tenets were as follows:—The evil god, Satan, who inspired the malevolent parts of the Old Testament, is god and lord of this world, of the things that are seen and are temporal, and especially of the outward man which is decaying, of the earthen vessel, of the body of death, of the flesh which takes us captive under the law of sin and desire. This world is the only true purgatory and hell, being the antithesis of the world eternal, of the inward man renewed day by day, of Christ's peace and kingdom which are not of this world. Men are the result of a primal war in heaven, when hosts of angels incited by Satan or Lucifer to revolt were driven out, and were imprisoned in terrestrial bodies created for them by the adversary. But there are also celestial bodies, bodies spiritual and not natural. These the angel souls left behind in heaven, and they are buildings from God, houses not made with hands, tunics eternal.

[1] A certain Peter (*Doc. Doat.*, 22, p. 98) declared that could he but get hold of the false and perfidious God of the Catholics who created a thousand men in order to save a single one and damn all the rest, he would break him to pieces and tear him asunder with his nails and spit in his face.

Imprisoned in the garment of flesh, burdened with its sin, souls long to be clothed upon with the habitations they left in heaven. So long as they are at home in the body, they are absent from the Lord. They would fain be at home with the Lord, and absent from the body, for which there is no place in heaven since flesh and blood cannot inherit the kingdom of God, nor corruption inherit incorruption. There is no resurrection of the flesh. The true resurrection is the spiritual baptism bequeathed by Christ to the *boni homines*. How shall man escape from his prison-house of flesh, and undo the effects of his fall? For mere death brings no liberation, unless a man is become a new creation, a new Adam, as Christ was; unless he has received the gift of the spirit and become a vehicle of the Paraclete. If a man dies unreconciled to God through Christ, he must pass through another cycle of imprisonment in flesh; perhaps in a human, but with equal likelihood in an animal's body. For when after death the powers of the air throng around and persecute, the soul flees into the first lodging of clay that it finds.[1] Christ was a life-giving spirit, and the *boni homines*, the "good men," as the Cathars called themselves, are his ambassadors. They alone have kept the spiritual baptism with fire which Christ instituted, and which has no connexion with the water baptism of John; for the latter was an unregenerate soul, who failed to recognize the Christ, a Jew whose mode of baptism with water belongs to the fleeting outward world and is opposed to the kingdom of God. It would be interesting to trace Bardesanes and the Syriac Hymn of the Soul in all this.

The Cathars fell into two classes, corresponding to the Baptized and the Catechumens of the early church, namely, the Perfect, who had been "consoled," *i.e.* had received the gift of the Paraclete; and the *credentes* or Believers. The Perfect formed the ordained priesthood, were women no less than men, and controlled the church; they received from the Believers unquestioning obedience, and as vessels of election in whom the Holy Spirit already dwelt, they were adored by the faithful, who were taught to prostrate themselves before them whenever they asked for their prayers. For none but the Consoled had received into their hearts the spirit of God's Son, which cries "Abba, Father." They alone were become adopted sons, and so able to use the Lord's Prayer, which begins, "Our Father, which art in heaven." The Perfect alone knew God and could address him in this prayer, the only one they used in their ceremonies. The mere *credens* could at best invoke the living saint, and ask him to pray for him.

All adherents of the sect seem to have kept three Lents in the year, as also to have fasted Mondays, Wednesdays and Fridays of each week; in these fasts a diet of bread and water was usual. But a *credens* under probation for initiation, which lasted at least one and often several years, fasted always. The life of a Perfect was so hard, and, thanks to the inquisitors, so fraught with danger, that most Believers deferred the rite until the death-bed, as in the early centuries many believers deferred baptism. The rule imposed complete chastity. A husband at initiation left his wife, committing her "to God and the gospel"; a wife her husband. A male Perfect could not lay his hand on a woman without incurring penance of a three-days' fast. All begetting of children is evil, for Adam's chambering with Eve was the forbidden fruit. It is good for a man not to touch a woman; a man's relations with his own wife are merely a means of fornication, and marriage and concubinage are indistinguishable as against the kingdom of God, in which there is no marrying or giving in marriage. Those only have been redeemed from earth who were virgins, undefiled with women. The passages of the New Testament which seem to connive at the married relation were interpreted by the Cathars as spoken in regard of Christ and the church. The Perfect must also leave his father and mother, and his children, for a man's foes are they of his own household. The family must be sacrificed to the divine kinship. He that loveth father or mother more than Christ is not worthy of him, nor he that loveth more his son or daughter. The Perfect takes up his cross and follows after Christ.

Next he must abstain from all flesh diet except fish. He may not even eat cheese or eggs or milk, for they, like meat, are produced *per viam generationis seu coitus*. Everything that is sexually begotten is impure. Fish were supposed to be born in the water without sexual connexion, and on the basis of this old physiological fallacy the Cathars equally with the Catholic framed their rule of fasting. And there was yet another reason why the Perfect should not eat animals, for a human soul might be doing time in its body. Nor might a Perfect or one in course of probation kill anything, for the Mosaic commandment applies to all life. He might not lie nor take an oath, for the precept "Swear not at all" was, like the rest of the gospel, taken seriously. This was the chief of their "anarchist doctrines."[2]

The Cathar rites, which remain to us in a manual of the sect, "recall," says the Abbé Guiraud, no too favourable a witness, "those of the primitive church with a truth and precision the more striking the nearer we go back to the apostolic age." The medieval inquisitor saw in them an aping of the rites of the Catholic church as he knew them; but they were really, says the same authority, "archaeological vestiges (*i.e.* survivals) of the primitive Christian liturgy. In the bosom of medieval society they were the last witness to a state of things that the regular development of Catholic cult had amplified and modified. They resemble the erratic blocks which lost amid alien soils recall, where we find them, the geological conditions of earlier ages. This being so, it is of the deepest interest to study the Cathar cult, since through its rites we can get a glimpse of those of the primitive church, about which want of documents leaves us too often in the dark."

The central Cathar rite was *consolamentum*, or baptism with spirit and fire. The spirit received was the Paraclete derived from God and sent by Christ, who said, "The Father is greater than I." Of a consubstantial Trinity the Cathars naturally had never heard. Infant baptism they rejected because it was unscriptural, and because all baptism with water was an appanage of the Jewish demiurge Jehovah, and as such expressly rejected by Christ.

The *consolamentum* removes original sin, undoes the sad effects of the primal fall, clothes upon us our habitation which is from heaven, restores to us the lost tunic of immortality. A Consoled is an angel walking in the flesh, whom the thin screen of death alone separates from Christ and the beatific vision. The rite was appointed by Christ, and has been handed down from generation to generation by the *boni homines*.

The long probation called "abstinence" which led up to it is a survival of the primitive catechumenate with its scrutinies. The prostrations of the *credens* before the Perfect were in their manner and import identical with the prostrations of the catechumen before the exorcist. We find the same custom in the Celtic church of St Columba. Just as at the third scrutiny the early catechumen passed a last examination in the Gospels, Creed and Lord's Prayer, so after their year of abstinence the *credens* receives creed and prayer; the allocution with which the elder "handed on" this prayer is preserved, and of it the Abbé Guiraud remarks that, if it were not in a Cathar ritual, one might believe it to be of Catholic origin. It is so Christian in tone, he quaintly remarks elsewhere, that an inquisitor might have used it quite as well as a heretic. In it the Perfect addresses the postulant, as in the corresponding Armenian rite, by the name of Peter; and explains to him from Scripture the indwelling of the spirit in the Perfect, and his adoption as a son by God. The Lord's Prayer is then repeated by the postulant after the elder, who explains it clause by clause; the words *panis*

[1] Here we have a doctrine of metempsychosis which seems of Indian origin (see ASCETICISM). But Julius Caesar (*de B.G.* vi. 13) attests this belief among the ancient Druids of Gaul.

[2] The Abbé Guiraud remarks that in refusing to take oaths the Cathars "contraried the social principles on which the constitutions of all states repose," and congratulates himself that society is not yet so thoroughly "laicized" as to have given up oaths in the most important acts of social life.

superstantialis being interpreted not of the material but of the spiritual bread, which consists of the Words of Life.

There followed the Renunciation, primitive enough in form, but the postulant solemnly renounced, not Satan and his works and pomp, but the harlot church of the persecutors, whose prayers were more deadly than desirable. He renounced the cross which its priests had signed on him with their chrism, their sham baptisms and other magical rites. Next followed the spiritual baptism itself, consisting of imposition of hands, and holding of the Gospel on the postulant's head. The elder begins a fresh allocution by citing Matt. xxviii. 19, Mark xvi. 15, 16, John iii. 3 (where the Cathars' text must originally have omitted in v. 5 the words "of water and," since their presence contradicts their argument). Acts ix. 17, 18, viii. 14-17, are then cited; also John xx. 21-23, Matt. xvi. 18,19, Matt. xviii. 18-20, for the Perfect one receives in this rite power to bind and loose. The Perfect's vocation is then defined: he must not commit adultery nor homicide, nor lie, nor swear any oath, nor pick and steal, nor do unto another that which he would not have done unto himself. He shall pardon his wrongdoers, love his enemies, pray for them that calumniate and accuse him, offer the other cheek to the smiter, give up his mantle to him that takes his tunic, neither judge nor condemn. Asked if he will fulfil each of these, the postulant answers: "I have this will and determination. Pray God for me that he give me his strength."

The next episode of the rite exactly reproduces the Roman *confiteor* as it stood in the 2nd century; "the postulant says: '*Parcite nobis*. For all the sins I have committed, in word or thought or deed, I come for pardon to God and to the church and to you all.' And the Christians shall say: 'By God and by us and by the church may they be pardoned thee, and we pray God that he pardon you them.'"

There follows the act of "consoling." The elder takes the Gospel off the white cloth, where it has lain all through the ceremony, and places it on the postulant's head, and the other good men present place their right hands on his head; they shall say the *parcias* (spare), and thrice the "Let us adore the Father and Son and Holy Spirit," and then pray thus: "Holy Father, welcome thy servant in thy justice and send upon him thy grace and thy holy spirit." Then they repeat the "Let us adore," the Lord's Prayer, and read the Gospel (John i. 1-17).

This was the vital part of the whole rite. The *credens* is now a Perfect one. He is girt with the sacred thread round his naked body under the breasts. Where the fear of the persecutor was absent he was also clad in a black gown. The Perfect ones present give him the kiss of peace, and the rite is over. This part of the rite answers partly to the Catholic confirmation of a baptized person, partly to the ordination of a pope of Rome or Alexandria. The latter in being ordained had the Gospel laid on their heads, and the same feature occurs in old Gallican and Coptic rites of ordaining a bishop.

Thus the Cathar ritual, like that of the Armenian dissenters (see PAULICIANS), reflects an age when priestly ordination was not yet differentiated from confirmation. "Is it not curious," says the Abbé Guiraud, "to remark that the essential rite of the *consolamentum* is in effect nothing but the most ancient form of Christian ordination?"

The Cathar Eucharist was equally primitive, and is thus described by a contemporary writer in a 13th-century MS. of the Milan Library:—"The Benediction of bread is thus performed by the Cathars. They all, men and women, go up to a table, and standing up say the 'Our Father.'[1] And he who is prior among them, at the close of the Lord's Prayer, shall take hold of the bread and say: 'Thanks be to the God of our Jesus Christ. May the Spirit be with us all.' And after that he breaks and distributes to all. And such bread is called bread blessed, although no one believes that out of it is made the body of Christ. The Albanenses, however, deny that it can be blessed or sanctified, because it is corporeal" (*i.e.* material).

As Tertullian relates of his contemporaries in the 2nd century, so the Cathars would reserve part of their bread of blessing and keep it for years, eating of it occasionally though only after saying the *Benedicite*. The Perfect kept it wrapped up in a bag of pure white cloth, tied round the neck,[2] and sent it long distances to regions which through persecution they could not enter. On the death-bed it could even, like the Catholic *Viaticum*, take the place of the rite of *Consolamentum*, if this could not be performed. Once a month this solemn rite of breaking bread was held, the *credentes* assisting. The service was called *apparellamentum*, because a table was covered with a white cloth and the Gospel laid on it. The Perfect were adored, and the kiss of peace was passed round.

The influence of Catharism on the Catholic church was enormous. To counteract it celibacy was finally imposed on the clergy, and the great mendicant orders evolved; while the constant polemic of the Cathar teachers against the cruelty, rapacity and irascibility of the Jewish tribal god led the church to prohibit the circulation of the Old Testament among laymen. The sacrament of "extreme unction" was also evolved by way of competing with the death-bed *consolamentum*.

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CATHAY, the name by which China (*q.v.*) was known to mediaeval Europe and is still occasionally referred to in poetry, as in Tennyson's "Better fifty years of Europe than a cycle of Cathay." It is derived from Khitāī, or Khitāt, the name which was properly that of the kingdom established by the Khitān conquerors in the northern provinces of China about A.D. 907, which after the fall of this dynasty in 1125 remained attached to their former territory, and was subsequently applied by the nations of Central Asia to the whole of China. Thus "Kitai" is still the Russian name for China. The name penetrated to Europe in the 13th century with the fame of the conquests of Jenghiz Khan. After the discovery of southern China by European navigators Cathay was erroneously believed to be a country to the north of China, and it was the desire to reach it that sent the English adventurers of the 16th century in search of the north-east passage.

CATHCART, SIR GEORGE (1794–1854), English soldier, third son of the 1st Earl Cathcart, was born in London on the 12th of May 1794. He was educated at Eton and Edinburgh University. In 1810 he entered the army, and two years later accompanied his father to Russia as aide-de-camp. With him he joined the Russian headquarters in March 1813; and he was present at all the great battles of that year in Germany, and of the following year in France, and also at the taking of Paris. The fruits of his careful observation and critical study of these operations appeared in the *Commentaries* on the war in Russia and Germany 1812–1813, a plain soldier-like history, which he published in 1850. After the peace of 1814 he accompanied his father to the congress of Vienna. He was present at Quatre Bras and at Waterloo, as an aide-de-camp to the duke of Wellington, and remained on the staff till the army of occupation quitted France.

[1] Cf. S. Gregorii *Ep.* ix. 12 (26): "Mos apostolorum fuit ut ad ipsam solummodo orationem oblationis hostiam consecrarent." ("The custom of the apostles was to use no other prayer but the Lord's in consecrating the host of the offering.")

[2] Cf. Duchesne, *Origines*, ed. 1898, p. 177.

Reappointed almost immediately, he accompanied the duke to the congresses of Aix-la-Chapelle and Verona, and in 1826 to Prussia. Promoted lieutenant-colonel in 1826, he was placed on half-pay in 1834. He was recalled to active service in 1838, and sent as commander of the King's Dragoon Guards to Canada, where he played an important part in suppressing the rebellion and pacifying the country. In 1844 he returned to England, and two years later was appointed deputy-lieutenant of the Tower, a post which he held up to the time of his promotion to major-general in 1851. In March 1852 he succeeded Sir Harry Smith as governor and commander-in-chief at the Cape, and brought the Kaffir war, then in progress, to a successful conclusion. He promulgated the first constitution of Cape Colony, and conducted operations against the Basuto. Cathcart was made a K.C.B. and received the thanks of both Houses for his services (1853). In December 1853 he was made adjutant-general of the army, but never entered upon his duties, being sent out to the Crimean War as soon as he arrived in England. He was even given a dormant commission entitling him to the chief command in case of accident to Lord Raglan, and the highest hopes were fixed on him as a scientific and experienced soldier. But these hopes were not to be fulfilled; for he fell at the battle of Inkerman (November 5, 1854). His remains, with those of other officers, were buried on Cathcart's Hill. Sir George Cathcart married in 1824 Lady Georgiana Greville, who survived him, and by whom he had a family.

See *Colburn's United Service Magazine*, January 1855; *Correspondence of the Hon. Sir George Cathcart relative to Kaffraria* (1856); A. W. Kinglake's *Invasion of the Crimea*, vol. v.

CATHCART, WILLIAM SCHAW CATHCART, 1ST EARL (1755–1843), English soldier and diplomatist, was born at Petersham on the 17th of September 1755, and educated at Eton. In 1771 he went to St Petersburg, where his father, Charles, 9th Baron Cathcart (1721–1776), a general in the army, was ambassador. From 1773 to 1777 he studied law, but after succeeding to the barony in 1776 he obtained a commission in the cavalry. Proceeding to America in 1777, he had before the close of his first campaign twice won promotion on the field of battle. In 1778 he further distinguished himself in outpost work, and at the battle of Monmouth he commanded an irregular corps, the "British Legion," with conspicuous success; for a time also he acted as quartermaster-general to the forces in America. He returned home in 1780, and in February 1781 was made captain and lieutenant-colonel in the Coldstream Guards. He was elected a representative peer for Scotland in 1788, and in 1792 he became colonel of the 29th foot. He served with distinction in the campaigns in the Low Countries, 1793–1795, in the course of which he was promoted major-general; and in 1801 he was made a lieutenant-general, having in the meanwhile received the appointments of vice-admiral of Scotland (1795), privy councillor (1798), and colonel of the 2nd Life Guards (1797). From 1803 to 1805 Lord Cathcart was commander-in-chief in Ireland, and in the latter year he was sent by Pitt in command of the British expedition to Hanover (see NAPOLEONIC CAMPAIGNS). After the recall of this expedition Cathcart commanded the forces in Scotland until 1807, when he was placed in charge of the expedition to Copenhagen, which surrendered to him on the 6th of September. Four weeks later he was created Viscount Cathcart of Cathcart and Baron Greenock of Greenock in the peerage of the United Kingdom, resuming the Scottish command on his return from the front. On the 1st of January 1812 he was promoted to the full rank of general, and a few months later he proceeded to Russia as ambassador and military commissioner. In the latter capacity he served with the headquarters of the allies throughout the War of Liberation (1812–1814); his success in the delicate and difficult task of maintaining harmony and devotion to the common cause amongst the generals of many nationalities was recognized after the war by his elevation to the earldom (July 1814). He then went to St Petersburg, and continued to hold the post of ambassador until 1820, when he returned to England. He died at his estate near Glasgow on the 16th of June 1843.

His son, CHARLES MURRAY CATHCART, 2nd earl (1783–1859), succeeded to the title in 1843. He entered the 2nd Life Guards in 1800, and saw active service under Sir James Craig in the Mediterranean, 1805–1806. In 1807 he became by courtesy Lord Greenock. He took part in the Walcheren expedition of 1809 as a major, and as a lieutenant-colonel served at Barossa, Salamanca and Vittoria. He had already gained staff experience, and he now served under Graham in Holland, 1814, as quartermaster-general. He was present at Waterloo, and for his services received the C.B. and several foreign orders. During the peace he became deeply interested in scientific pursuits, and a new mineral discovered by him in 1841 was named Greenockite. His later military services included the chief command in Canada during a period of grave unrest (1846–1849). He retired from active service in 1859, becoming a full general just before his death. The title passed to his son and grandson as 3rd and 4th earls.

CATHCART, a parish situated partly in Renfrewshire and partly in Lanarkshire, Scotland. The Renfrewshire portion has the larger area (2387 acres), but the smaller population (7375), the area of the Lanarkshire portion being 745 acres and the population (1901) 20,983. The industries include paper-making, dyeing and sandstone quarrying, but limestone and coal have also been worked. The parish includes the town of Cathcart (pop. 4808), and the villages of Old and New Cathcart, but much of it, though outside the city boundaries, is practically continuous with some of the southern suburbs of Glasgow, with which there is communication by electric tram and the Caledonian railway's circular line. The White Cart flows through the parish. In the 12th century Cathcart became a barony of the Cathcarts, who derived the title of their lordship (1460) and earldom (1814) from it. On the Queen's Knowe, a hillock near the ruins of Cathcart Castle, a memorial marks the spot where Queen Mary watched the progress of the battle of Langside (1568), the site of which lies within the parish.

CATHEDRAL, more correctly "cathedral church" (*ecclesia cathedralis*), the church which contains the official "seat" or throne of a bishop—*cathedra*, one of the Latin names for this, giving us the adjective "cathedral." The adjective has gradually, for briefness of speech, assumed the character of a substantive, but though an instance of this (strictly incorrect) use of the word as a substantive has been found as far back as 1587, it became common only at the end of the 18th, or first half of the 19th, century. One of the earliest instances of the term *ecclesia cathedralis* is said to occur in the acts of the council of Tarragona in 516. Another name for a cathedral church is *ecclesia mater*, indicating that it is the mother church. As being the one important church, it was also known as *ecclesia major*. This is the formal expression used by Archbishop Walter Gray of York (1216–1255), and it is preserved in modern times by the name of "*La Majeure*," by which the old cathedral church of Marseilles is popularly known. Again, as the chief house of God, the cathedral church was the *Domus Dei*, and from this name the German *Domkirche*, or *Dom*, is derived, as also the Swedish *Domkyrka*, and the Italian *Duomo*.

History and Organization.—It was early decreed that the *cathedra* of a bishop was not to be placed in the church of a village, but only in that of a city. There was no difficulty as to this on the continent of Europe, where towns were numerous, and where the cities were the natural centres from which Christianity was diffused among the people who inhabited the surrounding districts. In the British islands, however, the case was different; towns were few, and owing to other causes, instead of exercising jurisdiction over definite areas or districts, many of the bishops were bishops of tribes or peoples, as the bishops of the south Saxons, the west Saxons, the Somersaetas and others. The *cathedra* of such a bishop was often migratory, and was at times placed in one church, and then another, and sometimes in the church of a village. In 1075 a council was held in London, under the presidency of Archbishop Lanfranc, which, reciting the decrees of the council of Sardica held in 347 and that of Laodicea held in 360 on this matter, ordered the

bishop of the south Saxons to remove his see from Selsey to Chichester; the Wilts and Dorset bishop to remove his *cathedra* from Sherborne to Old Sarum, and the Mercian bishop, whose *cathedra* was then at Lichfield, to transfer it to Chester. Traces of the tribal and migratory system may still be noted in the designations of the Irish see of Meath (where the result has been that there is now no cathedral church) and Ossory, the cathedral church of which is at Kilkenny. Some of the Scottish sees were also migratory.

By the canon law the bishop is regarded as the pastor of the cathedral church, the *parochia* of which is his diocese. In view of this, canonists speak of the cathedral church as the one church of the diocese, and all others are deemed chapels in their relation to it.

Occasionally two churches jointly share the distinction of containing the bishop's *cathedra*. In such case they are said to be con-cathedral in relation to each other. Instances of this occurred in England before the Reformation in the dioceses of Bath and Wells, and of Coventry and Lichfield. Hence the double titles of those dioceses. In Ireland an example occurs at Dublin, where Christ Church and St Patrick's are jointly the cathedral churches of that diocese. In France the bishop of Couserans (a see suppressed at the Revolution) had two con-cathedral churches at St Lizier, and the bishop of Sisteron (a see also suppressed) had a second throne in the church of Forcalquier which is still called "La Con-cathédrale." Other instances might be named. In the case of York the collegiate churches of Beverley, Ripon and Southwell were almost in the same position, but although the archbishop had a stall in each he had no diocesan *cathedra* in them, and the chapters were not united with that of the metropolitical church in the direct government of the diocese, or the election of the archbishop, nor had they those other rights which were held to denote the cathedral character of a church.

Cathedral churches are reckoned as of different degrees of dignity: (1) the simple cathedral church of a diocesan bishop, (2) the metropolitical church to which the other diocesan cathedral churches of a province are suffragan, (3) the primatial church under which are ranged metropolitical churches and their provinces, (4) patriarchal churches to which primatial, metropolitical, and simple cathedral churches alike owe allegiance. The title of "primate" was occasionally conferred on metropolitans of sees of great dignity or importance, such as Canterbury, York, Rouen, &c., whose cathedral churches remained simply metropolitical. Lyons, where the cathedral church is still known as "La Primatiale," and Lund in Sweden, may be cited as instances of churches which were really primatial. Lyons had the archbishops of Sens and Paris and their provincial dioceses subject to it till the Revolution, and Lund had the archbishop of Upsala and his province subject to it. As with the title of primate, so also that of "patriarch" has been conferred on sees such as Venice and Lisbon, the cathedral churches of which are patriarchal in name alone. The cathedral church of St John Lateran, the cathedral church of the pope as bishop of Rome and patriarch of the West, alone in western Europe possesses potentially a patriarchal character. Its formal designation is "*Patriarchalis Basilica, Sacrosancta Romana Cathedralis Ecclesia Lateranensis.*"

The removal of a bishop's *cathedra* from a church deprives that church of its cathedral dignity, although often the name clings in common speech, as for example at Antwerp, which was deprived of its bishop at the French Revolution.

The history of the body of clergy attached to the cathedral church is obscure, and as in each case local considerations affected its development, all that can be attempted is to give a general outline of the main features which were more or less common to all. Originally the bishop and cathedral clergy formed a kind of religious community, which, in no true sense a monastery, was nevertheless often called a *monasterium*. The word had not the restricted meaning which it afterwards acquired. Hence the apparent anomaly that churches like York and Lincoln, which never had any monks attached to them, have inherited the name of minster or monastery. In these early communities the clergy often lived apart in their own dwellings, and were not infrequently married. In the 8th century, however, Chrodegang, bishop of Metz (743–766), compiled a code of rules for the clergy of the cathedral churches, which, though widely accepted in Germany and other parts of the continent, gained little acceptance in England. According to Chrodegang's rule the cathedral clergy were to live under a common roof, occupy a common dormitory and submit to the authority of a special officer. The rule of Chrodegang was, in fact, a modification of the Benedictine rule. Gisa, a native of Lorraine, who was bishop of Wells from 1061 to 1088, introduced it into England, and imposed its observance on the clergy of his cathedral church, but it was not followed for long there, or elsewhere in England.

During the two centuries, roughly bounded by the years 900 and 1100, the cathedral clergy became more definitely organized, and were also divided into two classes. One was that of a monastic establishment of some recognized order of monks, very often that of the Benedictines, while the other class was that of a college of clergy, living in the world, and bound by no vows, except those of their ordination, but governed by a code of statutes or canons. Hence the name of "canon" given to them. In this way arose the distinction between the monastic and secular cathedral churches. In England the monastic cathedral churches were Bath, Canterbury, Carlisle, Coventry, Durham, Ely, Norwich, Rochester, Winchester and Worcester, all of them Benedictine except Carlisle, which was a church of Augustinians. The secular churches were Chichester, Exeter, Hereford, Lichfield, Lincoln, St Paul's (London), Salisbury, Wells, York, and the four Welsh cathedral churches. In Ireland all were secular except Christ Church, Dublin (Augustinian), and Down (Benedictine), and none, even in their earliest days, were ever, it is believed, churches of recognized orders of monks, except the two named. In Scotland St Andrew's was Augustinian, Elgin (or Moray), Glasgow and Aberdeen were always secular, and ordered on the models of Lincoln and Salisbury. Brechin had a community of Culdees till 1372, when a secular chapter was constituted. The cathedral church of Galloway, at Whithorn, of English foundation, was a church of Praemonstratensians. In Germany, as in England, many of the cathedral churches were monastic. In Denmark all seem to have been Benedictine at first, except Börglum, which was Praemonstratensian till the Reformation. The others were changed to churches of secular canons. In Sweden, Upsala was originally Benedictine, but was secularized about 1250, and it was ordered that each of the cathedral churches of Sweden should have a chapter of at least fifteen secular canons. In France monastic chapters were very common, but nearly all the monastic cathedral churches there had been changed to churches of secular canons before the 17th century. One of the latest to be so changed was that of Seez, in Normandy, which was Augustinian till 1547, when Pope Paul III. dispensed the members from their vows, and constituted them a chapter of secular canons. The chapter of Senez was monastic till 1647, and others perhaps even later, but the majority were secularized about the time of the Reformation.

In the case of monastic cathedral churches there were no dignitaries, the internal government was that of the order to which the chapter belonged, and all the members kept perpetual residence. The reverse of this was the case with the secular chapters; the dignities of provost, dean, precentor, chancellor, treasurer, &c., soon came into being, for the regulation and good order of the church and its services, while the non-residence of the canons, rather than their perpetual residence, became the rule, and led to their duties being performed by a body of "vicars," who officiated for them at the services of the church.

Abroad, the earliest head of a secular church seems to have been the provost (*praepositus*, *Probst*, &c.), who was charged, not only with the internal regulation of the church, and oversight of the members of the chapter and control of the services, but was also the steward or seneschal of the lands and possessions of the church. The latter often mainly engaged his attention,

to the neglect of his domestic and ecclesiastical duties, and complaints were soon raised that the provost was too much mixed in worldly affairs, and was too frequently absent from his spiritual duties. This led, in many cases, to the institution of a new officer called the "dean," who had charge of that portion of the provost's duties which related to the internal discipline of the chapter and the services of the church. In some cases the office of provost was abolished, but in others it was continued, the provost, who was also occasionally archdeacon as well, remaining head of the chapter. This arrangement was most commonly followed in Germany. In England the provost was almost unknown. Bishop Gisa introduced a provost as head of the chapter of Wells, but the office was afterwards subordinated to the other dignities, and the provost became simply the steward of certain of the prebendal lands. The provost of the collegiate church of Beverley was the most notable instance of such an officer in England, but at Beverley he was an external officer with no authority in the government of the church, no stall in the choir and no vote in chapter. The provost of Eton, introduced by Henry VI., occupied a position most nearly approaching that of a foreign cathedral provost. In Germany and in Scandinavia, and in a few of the cathedral churches in the south of France, the provost was the ordinary head of the cathedral chapter, but the office was not common elsewhere. As regards France, of one hundred and thirty-six cathedral churches existing at the Revolution, thirty-eight only, and those either on the borders of Germany or in the extreme south, had a provost as the head of the chapter. In others the provost existed as a subordinate officer. There were two provosts at Autun, and Lyons and Chartres had four each, all as subordinate officers.

The normal constitution of the chapter of a secular cathedral church comprised four dignitaries (there might be more), in addition to the canons. The dean (*decanus*) seems to have derived his designation from the Benedictine dean who had ten monks under his charge. The dean, as already noted, came into existence to supply the place of the provost in the internal management of the church and chapter. In England the dean was the head of all the secular cathedral churches, and was originally elected by the chapter and confirmed in office by the bishop. He is president of the chapter, and in church has charge of the due performance of the services, taking specified portions of them by statute on the principal festivals. He sits in the chief stall in the choir, which is usually the first on the right hand on entering the choir at the west. Next to the dean (as a rule) is the precentor (*primicerius*, *cantor*, &c.), whose special duty is that of regulating the musical portion of the services He presides in the dean's absence, and occupies the corresponding stall on the left side, although there are exceptions to this rule, where, as at St Paul's, the archdeacon of the cathedral city ranks second and occupies what is usually the precentor's stall. The third dignitary is the chancellor (*scholasticus*, *écolâtre*, *capiscol*, *magistral*, &c.), who must not be confounded with the chancellor of the diocese. The chancellor of the cathedral church is charged with the oversight of its schools, ought to read divinity lectures, and superintend the lections in the choir and correct slovenly readers. He is often the secretary and librarian of the chapter. In the absence of the dean and precentor he is president of the chapter. The easternmost stall, on the dean's side of the choir, is usually assigned to him. The fourth dignitary is the treasurer (*custos*, *sacrista*, *cheficier*). He is guardian of the fabric, and of all the furniture and ornaments of the church, and his duty was to provide bread and wine for the eucharist, and candles and incense, and he regulated such matters as the ringing of the bells. The treasurer's stall is opposite to that of the chancellor. These four dignitaries, occupying the four corner stalls in the choir, are called in many of the statutes the "*quatuor majores personae*" of the church. In many cathedral churches there were additional dignitaries, as the praelector, subdean, vice-chancellor, succentor-canonicorum, and others, who came into existence to supply the places of the other absent dignitaries, for non-residence was the fatal blot of the secular churches, and in this they contrasted very badly with the monastic churches, where all the members were in continuous residence. Besides the dignitaries there were the ordinary canons, each of whom, as a rule, held a separate prebend or endowment, besides receiving his share of the common funds of the church. For the most part the canons also speedily became non-resident, and this led to the distinction of residentiary and non-residentiary canons, till in most churches the number of resident canons became definitely limited in number, and the non-residentiary canons, who no longer shared in the common funds, became generally known as prebendaries only, although by their non-residence they did not forfeit their position as canons, and retained their votes in chapter like the others. This system of non-residence led also to the institution of vicars choral, each canon having his own vicar, who sat in his stall in his absence, and when the canon was present, in the stall immediately below, on the second form. The vicars had no place or vote in chapter, and, though irremovable except for offences, were the servants of their absent canons whose stalls they occupied, and whose duties they performed. Abroad they were often called demi-prebendaries, and they formed the *bas chœur* of the French churches. As time went on the vicars were themselves often incorporated as a kind of lesser chapter, or college, under the supervision of the dean and chapter.

There was no distinction between the monastic cathedral chapters and those of the secular canons, in their relation to the bishop or diocese. In both cases the chapter was the bishop's *consilium* which he was bound to consult on all important matters and without doing so he could not act. Thus, a judicial decision of a bishop needed the confirmation of the chapter before it could be enforced. He could not change the service books, or "use" of the church or diocese, without capitular consent, and there are many episcopal acts, such as the appointment of a diocesan chancellor, or vicar general, which still need confirmation by the chapter, but the older theory of the chapter as the bishop's council in ruling the diocese has become a thing of the past, not in England only, but on the continent also. In its corporate capacity the chapter takes charge *sede vacante* of a diocese. In England, however (except as regards Salisbury and Durham), this custom has never obtained, the two archbishops having, from time immemorial, taken charge of the vacant dioceses in their respective provinces. When, however, either of the sees of Canterbury or York is vacant, the chapters of those churches take charge, not only of the diocese, but of the province as well, and incidentally, therefore, of any of the dioceses of the province which may be vacant at the same time.

All the English monastic cathedral chapters were dissolved by Henry VIII., and, except Bath and Coventry, were refounded by him as churches of secular chapters, with a dean as the head, and a certain number of canons ranging from twelve at Canterbury and Durham to four at Carlisle, and with certain subordinate officers as minor canons, gospellers, epistolers, &c. The precentorship in these churches of the "New Foundation," as they are called, is not, as in the secular churches of the "Old Foundation," a dignity, but is merely an office held by one of the minor canons.

English cathedral churches, at the present day, may be classed under four heads: (1) the old secular cathedral churches of the "Old Foundation," enumerated in the earlier part of this article; (2) the churches of the "New Foundation" of Henry VIII., which are the monastic churches already specified, with the exception of Bath and Coventry; (3) the cathedral churches of bishoprics founded by Henry VIII., viz. Bristol, Chester, Gloucester, Oxford and Peterborough (the constitution of the chapters of which corresponds to those of the New Foundation); (4) modern cathedral churches of sees founded since 1836, viz. (*a*) Manchester, Ripon and Southwell, formerly collegiate churches of secular canons; (*b*) St Albans and Southwark, originally monastic churches; (*c*) Truro, Newcastle and Wakefield, formerly parish churches, (*d*) Birmingham and Liverpool, originally district churches. The ruined cathedral church of the diocese of Sodor (*i.e.* the Southern Isles) and Man, at Peel in the latter island, appears never to have had a chapter of clergy attached to it.

AUTHORITIES.—Frances, *De ecclesiis cathedralibus* (Venice, 1698); Bordenave, *L'Estat des églises cathédrales* (Paris, 1643); Van Espen, *Supplement III.*, cap. 5; Héricourt, *Les Loix ecclésiastiques de France* (Paris, 1756); *La France ecclésiastique* (Paris, 1790); Daugaard, *Om de Danske Klostre i Middelalderen* (Copenhagen, 1830); Hinschius, *Das Kirchenrecht der Katholiken u. Protestanten in Deutschland*, ii. (Berlin, 1878); Walcott, *Cathedralia* (London, 1865); Freeman, *Cathedral Church of Wells* (London, 1870); Benson, *The Cathedral* (London, 1878); Bradshaw and Wordsworth, *Lincoln Cathedral Statutes* (Camb., 1894). (T. M. F.)

Architecture.—From the architectural point of view there is no special treatment as regards dimensions or style for a cathedral other than that required for a church or abbey, as there are cases when the former are comparatively small buildings (like the old cathedral at Athens), and some parish churches and abbeys are larger than many cathedrals. In recent times, indeed, some English abbeys or minsters, such as those of Ripon, Manchester, St Albans and Southwell, partly on account of their dimensions, have been raised to the rank of cathedrals, in consequence of the demand for additional sees; others, such as those of Bristol, Gloucester, Oxford, Chester and Peterborough, became cathedrals only on the dissolution of the monasteries by Henry VIII.

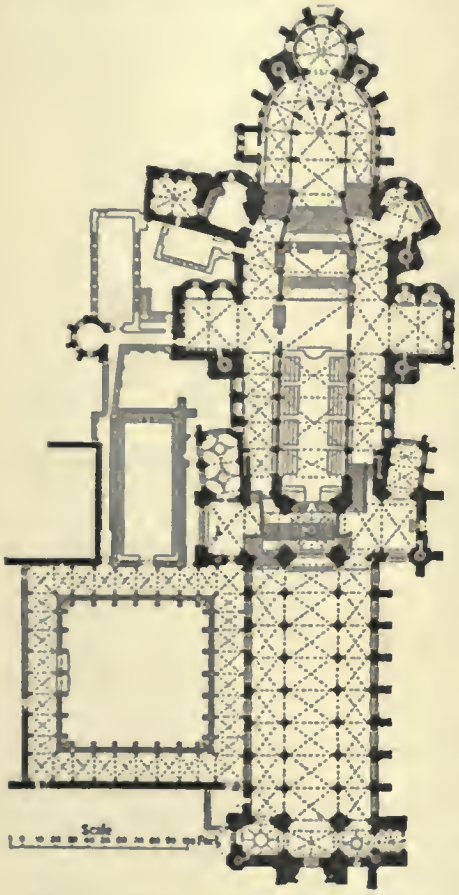


FIG. 1.—Plan of Canterbury Cathedral.

Under the headings NAVE, AISLE, CHOIR, APSE, CHEVET, and LADY-CHAPEL, the principal arrangements of the plan of a cathedral are dealt with, and its architectural features, such as TOWER and SPIRE, PORCH, TRIFORIUM, CLERESTORY and VAULT, are separately defined; while in the article ARCHITECTURE the evolution of the various styles in England, France, Germany, Italy and Spain, is set forth. It is only necessary here to deal with the development of the eastern end of English and foreign cathedrals, as it was in those that the greatest changes from the middle of the 11th century to the close of the 16th century took place.

The earliest extended development of the eastern end of the cathedral is that which was first set out in Edward the Confessor's church at Westminster, probably borrowed from the ancient church of St Martin at Tours; in this church, dating probably from the 10th century, two new elements are found, (1) the carrying of the choir aisle round a circular apse so as to provide a processional aisle round the eastern end of the church, and (2) five apsidal chapels, constituting the germ of the chevet, which transformed the eastern terminations of the French cathedrals in the 12th and 13th centuries. It is only within recent times that the foundations of the early church at Tours with its choir aisle and chapels have been traced under the existing church. In Edward the Confessor's church (1050) there were probably only three chapels and a processional aisle; in the next example at Gloucester (1089) were also three chapels, two of which, on the north and south sides of the aisle, still remain; the same is found in Canterbury (1096–1107) and Norwich (1089–1119), the eastern chapel in all three cases having been taken down to make way for the Lady-chapel in Gloucester and Norwich, and for the Trinity chapel in Canterbury cathedral (fig. 1). The semicircular aisle is said to have existed in the Anglo-Norman cathedral of Winchester, but the eastern end being square, two chapels were arranged filling the north and south ends, and an apsidal chapel projecting beyond the east wall. This semicircular processional aisle with chevet chapels was the favourite type of plan in the Anglo-Norman cathedrals, and was followed up to about the middle of the 12th century, when the English builders in some cases returned to the square east end instead of the semicircular apsidal termination. The earliest example of this exists in Romsey Abbey (*c.* 1130), where the processional

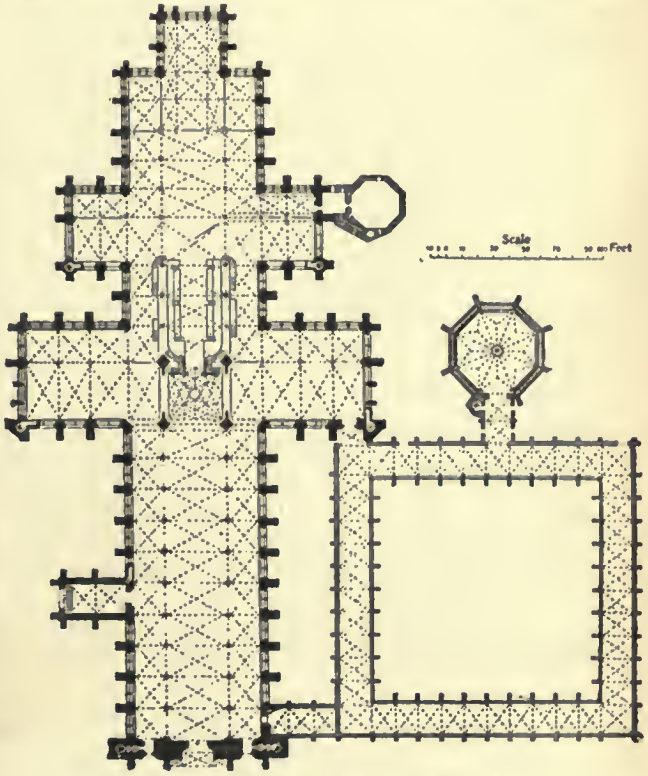
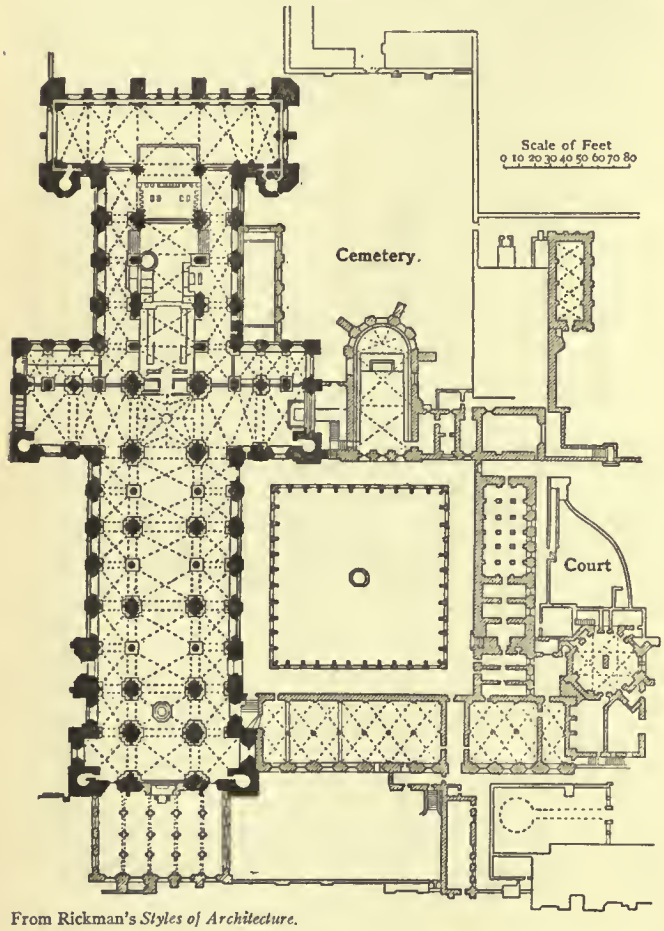


FIG. 2.—Plan of Salisbury Cathedral.

path crosses behind the presbytery, there being eastern apsidal chapels in the axis of the presbytery aisle and a central rectangular chapel beyond. A similar arrangement is found in Hereford cathedral, and exists in Winchester, Salisbury (fig. 2), Durham, St Albans, Exeter, Ely, Wells and Peterborough, except that in all those cases (except Wells) the eastern chapels are square ended; in Wells cathedral the most eastern chapel (the Lady-chapel) has a polygonal termination; in Durham (fig. 3), the eastern chapels are all in one line, constituting the chapel of the nine altars, which was probably borrowed from the eastern end of Fountains Abbey. It should be noted that in some of the above the original design has been transformed in rebuilding; thus in St Albans, Durham, York and Exeter cathedrals, there was no eastern ambulatory but three parallel apses, in some cases rectangular externally. In Southwell, Rochester, Ely and Chester, there was no processional path or ambulatory round the east end; in Carlisle no eastern chapels; and in Oxford only one central apse. In Ely cathedral (fig. 4) the great central tower built by the first Norman abbot (1082–1094) fell down in 1321, carrying with it portions of the adjoining bays of the nave, transept and choir; instead of attempting to rebuild the tower,

Alan of Walsingham conceived the idea of obtaining a much larger area in the centre of the cathedral, and instead of rebuilding the piers of the tower he took as the base of his design a central octagonal space, the width of which was equal to that of nave and aisles, with wide arches to nave, transepts and choir, and smaller arches across the octagonal sides; from shafts in the eight pier angles, ribs in wood project forward and carry a smaller octagon on which the lantern rests. Internally the effect of this central octagon is of great beauty and originality, and it is the only instance of such a feature in English Gothic architecture. (See ARCHITECTURE, Plate VIII., fig. 82.)

The earliest example of the chevet is probably to be found in the church of St Martin at Tours; this was followed by others



From Rickman's *Styles of Architecture.*

FIG. 3.—Plan of Durham Cathedral.

at Tournus, Clermont-Ferrand, Auxerre, Chartres, Le Mans and other churches built during the great church-building period of the 11th century. In the still greater movement in the 12th century, when the episcopacy, supported by the emancipated communes, undertook the erection of cathedrals of greater dimensions and the reconstruction of others, in some cases they utilized the old foundations, as in Chartres (fig. 5), Coutances and Auxerre cathedrals, while in others (as at Le Mans) they extended the eastern termination, much in the same way as in many of the early examples in England, with this important difference, that when the apsidal east end was given up (about the middle of the 12th century) in favour of the square east end in England, the French, on the other hand, developed it by doubling the choir aisles and adding to the number of extra chapels; thus in Canterbury, Norwich and Gloucester, there were only three apsidal chapels in the chevet, whereas in Noyon (1150), Soissons (1190), Reims (1212), Tours, Seez, Bayeux (1230), Clermont (1275), Senlis, Limoges, Albi and Narbonne cathedrals there were five; in Amiens, Le Mans and Beauvais, there were seven apsidal chapels, and in Chartres cathedral nine. Double aisles round the choir, of which there are no examples in England, are found in the cathedrals of Paris, Bourges and Le Mans; the cathedral of Sens (fig. 6) (1144–1168) possesses one feature which is almost unique, viz. the coupled columns of the alternate bays of nave and choir and of the apse; and these were introduced into the chapel of the Trinity in Canterbury cathedral, probably from the designs of William of Sens, by his successor William the Englishman. The square east end found no favour in France—Laon, Poiters and Dol being the only cathedral examples; and of the triapsal arrangement, viz. with apses in the axes of the choir aisle and a central apse, the only example is that of the cathedral of Autun. The immense development given to the eastern limb of the French

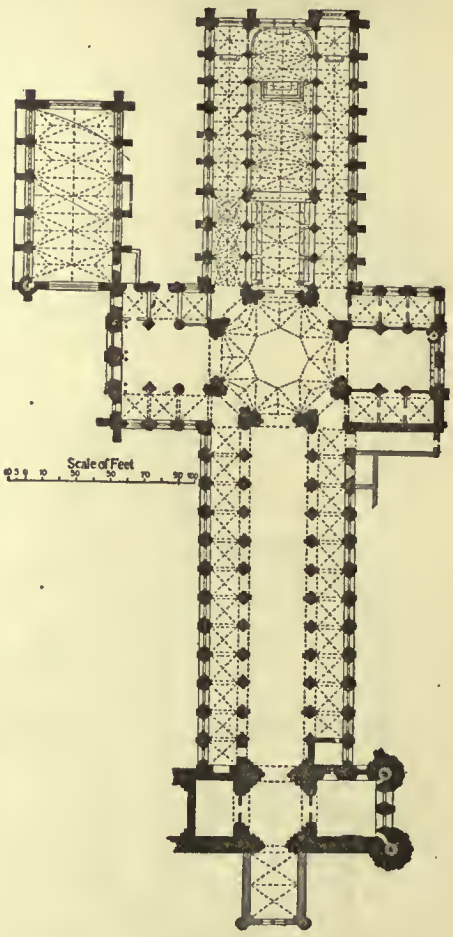


FIG. 4.—Plan of Ely Cathedral.

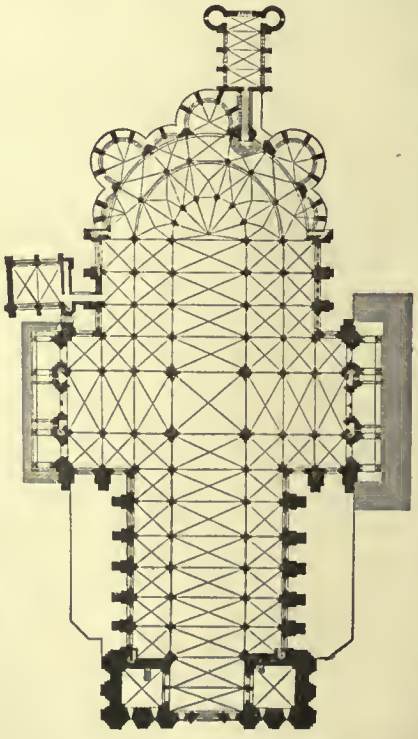


FIG. 5.—Plan of Chartres Cathedral.

cathedrals was sometimes obtained at the expense of the nave, so that, notwithstanding the much greater dimensions compared with English examples, in the latter the naves are much longer and consist of more bays than those in France.

In one of the French cathedrals, Bourges, there is no transept; on the other hand there are many examples in which this part of the church is emphasized by having aisles on each side, as at Laon, Soissons, Chartres, Reims, Amiens, Rouen and Clermont cathedrals. Transept aisles in England are found in Ely, York, Wells and Winchester cathedrals, in the last being carried round the south and north ends of the transept; aisles on the east side of the transept only, in some cases probably for

additional altars, exist in Durham, Salisbury, Lichfield, Peterborough and Ripon cathedrals; and on the north side only in Hereford cathedral. In Rouen cathedral, east of the transept aisles, there are apsidal chapels, which with the three chapels in the chevet make up the usual number. The cathedral of Poitiers has been referred to as an example of a square east end, but a sort of compromise has been made by the provision of three segmental apses, and there are no windows in the east front; the most remarkable divergence from the usual design is found here in the absence of any triforium or clerestory, owing to the fact that the vault of the aisles is nearly as high as that of the nave, so that it constitutes an example of what in Germany (where there are many) are called *Hallen Kirchen*; the light being obtained through the aisle windows only gives a gloomy effect to the nave. Another departure from the usual plan is that found in Albi cathedral (1350), in which there are no aisles, their place being taken by chapels between the buttresses which were required to resist the thrust of the nave vault, the widest in France. The cathedral is built in brick and externally has the appearance of a fortress. In the cathedrals of the south-west of France, where the naves are covered with a series of domes—as at Cahors, Angoulême and St Front de Périgueux—

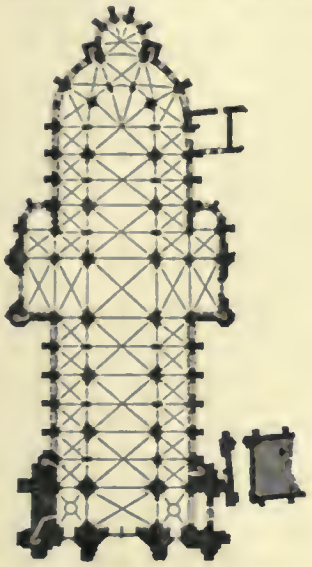


FIG. 6.—Plan of Sens Cathedral.

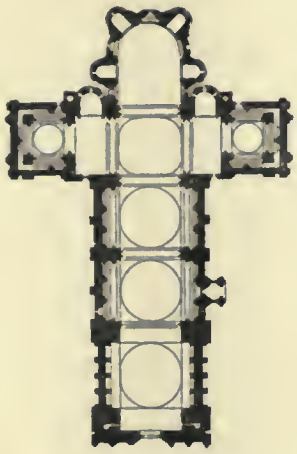


FIG. 7.—Plan of Angoulême Cathedral.

the immense piers required to carry them made it necessary to dispense with aisles. The cathedral of Angoulême (fig. 7) consists of a nave covered with three domes, a transept of great length with lofty towers over the north and south ends, and an apsidal choir with four chevet chapels. In St Front de Périgueux (1150), based on St Mark's at Venice, the plan consists of nave, transept and choir, all of equal dimensions, each of them, as well as the crossing, vaulted over with a dome, while originally there was a simple apsidal choir.

Returning now to the great cathedrals in the north of France, we give an illustration (fig. 8) of Amiens cathedral (from Viollet le Duc's *Dictionnaire raisonné*) which shows the disposition of a cathedral, with its nave-arches, triforium, clerestory windows and vault, the flying buttresses which were required to carry the thrust of the vault to the outer buttresses which flanked the aisle walls, and the lofty pinnacles which surmounted them. In this case there was no triforium gallery, owing to the greater height given to the aisles. In Notre Dame at Paris the triforium was nearly as high as the aisles; in large towns this feature gave increased accommodation for the congregation, especially on the occasion of great fêtes, and it is found in Noyon, Laon, Senlis and Soissons cathedrals, built in the latter part of the 12th century; later it was omitted, and a narrow passage in the thickness of the wall only represented the triforium; at a still later period the aisles were covered with a stone pavement of slight fall so as to allow of loftier clerestory windows.

The cathedrals in Spain follow on the same lines as those in France. The cathedral of Santiago de Compostela is virtually a copy of St Sernin at Toulouse, consisting of nave and aisles, transepts and aisles, and a choir with chevet of five chapels; at Leon there is a chevet with five apsidal chapels, and at Toledo an east end with double aisles round the apse with originally seven small apsidal chapels, two of them rebuilt at a very late period. At Leon, Barcelona and Toledo the processional passage round the apse with apsidal chapels recalls the French disposition, there being a double aisle around the latter, but in Leon and Toledo cathedrals the east end is masked externally by other buildings, so that the beauty of the chevet is entirely lost. At Avila and Salamanca (old cathedral) the triapsal arrangement is adopted, and the same is found in the German cathedrals, with one important exception, the cathedral of Cologne, which was based on that of Amiens, the comparative height of the former, however, being so exaggerated that scale has been lost, and externally it has the appearance of an overgrown monster.

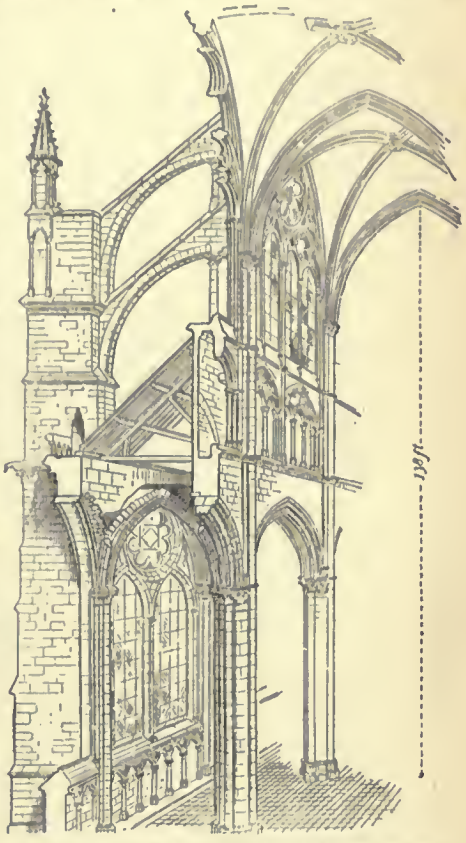


FIG. 8.—Perspective of Amiens Cathedral.

Under the headings VAULT, FLYING BUTTRESS, PINNACLE, CLERESTORY and TRIFORIUM, definitions are given of these chief components of a cathedral or church; but as their design varies materially in almost every example, without a very large number of drawings it would be impossible to treat them more in detail. The perspective view, taken from Viollet le Duc's dictionary, of the interior of the nave of Amiens cathedral illustrates the principal features, viz. the vault (in this case quadripartite, with flying buttresses and pinnacle), the triforium (in this case limited to a narrow passage in the thickness of the wall), and the nave-arches, with the side aisles, beneath the windows of which is the decorative arcade. (R. P. S.)

CATHELINEAU, JACQUES (1759–1793), French Vendean chieftain during the Revolution, was born at Tin-en-Manges, in the country now forming the department of Maine-et-Loire. He became well known in the country of Anjou, over which he travelled as a pedlar and dealer in contraband goods. His physical strength and his great piety gave him considerable ascendancy over the peasants, who surnamed him "the saint of Anjou." In the first years of the Revolution, Cathelineau listened to the exhortations of Catholic priests and royalist *émigrés*, and joined the insurrection provoked by them against the revolutionary government. Collecting a band of peasants and smugglers, he took the château of Gallais, where he captured a cannon, christened by the Vendeans the "Missionary"; he then took the towns of Chemillé, Cholet, Vihiers and Chalonnes (March 1793). His companions committed atrocities which brought upon them terrible reprisals on the part of the

Republicans. Meanwhile Cathelineau's troops increased, and he combined with the other Vendean chiefs, such as N. Stofflet and Gigot d'Elbée, taking the towns of Beaupréau, Fontenay and Saumur. The first successes of the Vendeans were due to the fact that the Republicans had not expected an insurrection. When the resistance to the insurgents became more serious, differences arose among their leaders. To avoid these rivalries, it is thought that Cathelineau was named generalissimo of the rebels, though his authority over the undisciplined troops was not increased by the new office. In 1793 all the Royalist forces tried to capture Nantes. Cathelineau entered the town in spite of the resistance of General J. B. C. Canclaux, but he was killed, and the Vendean army broke up. Numerous relatives of Cathelineau also perished in the war of La Vendée. His grandson, Henri de Cathelineau, figured in the war of 1870 between France and Germany (see also VENDÉE; CHOUANS).

See C. Port, *Vie de J. Cathelineau* (1882); "La Légende de Cathelineau" in the review *La Révolution française*, vol. xxiv.; *Les Origines de la Vendée* (Paris, 1888, 2 vols.); *Dictionnaire historique de Maine-et-Loire*; Cretineau-Joly, *Histoire de la Vendée militaire*; Th. Muret, *Vie populaire de Cathelineau* (1845). (R. A.*)

CATHERINE, SAINT. The Roman hagiology contains the record of six saints of this name. 1. ST CATHERINE OF ALEXANDRIA, Virgin and Martyr, whose day of commemoration recurs on the 25th of November, and in some places on the 5th of March. 2. ST CATHERINE OF SWEDEN, a daughter of St Bridget, who died abbess of Watzen in March 1381, and is commemorated on the 22nd of that month. 3. ST CATHERINE OF SIENA, 1347–1380, whose festal day is observed on the 30th of April. 4. ST CATHERINE OF BOLOGNA, 1413–1463, a visionary, abbess of the convent of the Poor Clares in Bologna, canonized by Pope Benedict XIII., and commemorated throughout the Franciscan order on the 9th of March. 5. ST CATHERINE OF GENOA,[1] who belonged to the noble family of Fieschi, was born about 1447, spent her life and her means in succouring and attending on the sick, especially in the time of the plague which ravaged Genoa in 1497 and 1501, died in that city in 1510, was beatified by Clement V. in 1675 and canonized by Clement XII. in 1737; her name was placed in the calendar on the 22nd of July by Benedict XIV. 6. ST CATHERINE DE' RICCI, of Florence, daughter of a wealthy merchant prince, was born in 1522, became a nun in the convent of the Dominicans at Prato in 1536, and died in 1589. She was famous during her life-time for the weekly ecstasy of the Passion, during which in a trance she experienced the sufferings of the Holy Virgin contemplating the Passion of her Son. She was canonized in 1746 by Benedict XIV., who fixed her festal day on the 13th of February. In Celtic and English martyrologies (November 25) there is also commemorated St Catherine Audley (*c.* 1400), a recluse of Ledbury, Hereford, who was reputed for piety and clairvoyance.

Of two of these saints, St Catherine of Alexandria, *the* St Catherine *par excellence*, and St Catherine of Siena, something more must be said. Of the former history has little or nothing to tell. The Maronite scholar, Joseph Simon Assemani (1687–1768), first identified her with the royal and wealthy lady of Alexandria (Eusebius, *Hist. Eccl.* viii. 14) who, for refusing the solicitations of the emperor Maximinus, was deprived of her property and banished. But Rufinus (*Hist. Eccl.* viii. 17) called this lady Dorothea, and the old Catherine legend, as recorded in the Roman martyrology and by Simeon Metaphrastes, has quite other features. According to it Catherine was the daughter of King Konetos, eighteen years old, beautiful and wise. During the persecution under Maximinus she sought an interview with the emperor, upbraided him for his cruelties, and adjured him to give up the worship of false gods. The angry tyrant, unable to refute her arguments himself, sent for pagan scholars to argue with her, but they were discomfited. Catherine was then scourged and cast into prison, and the empress was sent to reason with her; but the dauntless virgin converted not only the empress but the Roman general and his soldiers who had accompanied her. Maximinus now ordered her to be broken on the wheel; but the wheel was shattered by her touch. The headsman's axe proved more fatal, and the martyr's body was borne by angels to Mount Sinai, where Justinian I. built the famous monastery in her honour. Another development of the legend is that in which, having rejected many offers of marriage, she was taken to heaven in vision and betrothed to Christ by the Virgin Mary.

St Catherine, virgin and martyr.

Of all these marvellous incidents very little, by the universal admission of Catholic scholars, has survived the test of modern criticism. That St Catherine actually existed there is, indeed, no evidence to disprove; and it is possible that some of the elements in her legend are due to confusion with the story of Hypatia (*q.v.*), the neo-platonic philosopher of Alexandria, who was done to death by a Christian mob. To the men of the middle ages, in any case, St Catherine was very real; she was ranked with the fourteen most helpful saints in heaven, and was the constant theme of preachers and of poets. Her festival was celebrated in many places with the utmost splendour, and in certain dioceses in France was a holy day of obligation as late as the beginning of the 17th century. Numberless chapels were dedicated to her, and in nearly all churches her statue was set up, the saint being represented with a wheel, her instrument of torture, and sometimes with a crown and a book. The wheel being her symbol she was the patron saint of wheelwrights and mechanics; as the confounder of heathen sophistry she was invoked by theologians, apologists, preachers and philosophers, and was chosen as the patron saint of the university of Paris; as the most holy and illustrious of Christian virgins she became the tutelary saint of nuns and virgins generally. So late as the 16th century, Bossuet delivered a panegyric upon her, and it was the action of Dom Deforis, the Benedictine editor of his works, in criticizing the accuracy of the data on which this was based, that first discredited the legend. The saint's feast was removed from the Breviary at Paris about this time, and the devotion to St Catherine has since lost its earlier popularity. See Leon Clugnet's article in the *Catholic Encyclopaedia*, vol. iii. (London, 1908).

St Catherine of Siena was the youngest of the twenty-five children of Giacomo di Benincasa, a dyer, and was born, with a twin-sister who did not survive her birth, on the 25th of March 1347. A highly sensitive and imaginative child, she very early began to practise asceticism and see visions, and at the age of seven solemnly dedicated her virginity to Christ. She was attracted by what she had heard of the desert anchorites, and in 1363–1364, after much struggle, persuaded her parents to allow her to take the habit of the Dominican tertiaries. For a while she led at home the life of a recluse, speaking only to her confessor, and spending all her time in devotion and spiritual ecstasy. Her innate humanity and sound sense, however, led her gradually to return to her place in the family circle, and she began also to seek out and help the poor and the sick. In 1368 her father died, and she assumed the care of her mother Lapa. During the following years she became known to an increasingly wide circle, especially as a peacemaker, and entered into correspondence with many friends. Her peculiarities excited suspicion, and charges seem to have been brought against her by some of the Dominicans to answer which she went to Florence in 1374, soon returning to Siena to tend the plague-stricken. Here first she met the Dominican friar, Raimondo of Capua, her confessor and biographer.

St Catherine of Siena.

The year 1375 found Catherine entering on a wider stage. At the invitation of Piero Gambacorti, the ruler of the republic of Pisa, she visited that city and there endeavoured to arouse enthusiasm for the proposed crusade, urging princes and presidents, commanders and private citizens alike to join in "the holy passage." To this task was added that of trying to keep Pisa and Lucca from joining the Tuscan League against the pope. It was at Pisa, in the church of Santa Cristina, on the fourth Sunday in Lent (April 1), while rapt in ecstasy after the communion, that Catherine's greatest traditional glory befell her, viz. the *stigmata* or impression on her hands, feet and heart, of the wounds corresponding with those received by Christ at his

[1] See the study in Baron Fr. von Hügel's *Mystical Element in Religion* (1909).

crucifixion. The marks, however, were at her prayer not made visible. There is no need to doubt the reality of Catherine's exaltation, but it should be remembered that she and her circle were Dominicans, and that the stigmata of St Francis of Assisi were considered the crowning glory of the saint, and hitherto the exclusive boast of the Franciscans. The tendency observable in many of the austerities and miracles attributed to St Catherine to outstrip those of other saints, particularly Francis, is especially remarkable in this marvel of the stigmata, and so acute became the rivalry between the two orders that Pope Sixtus IV., himself a Franciscan, issued a decree asserting that St Francis had an exclusive monopoly of this particular wonder, and making it a censurable offence to represent St Catherine receiving the stigmata.

In the year 1376, the 29th of Catherine's life, Gregory XI. was living and holding the papal court at Avignon. He was the last of seven French popes in succession who had done so, and had perpetuated for seventy-three years what ecclesiastical writers are fond of terming "the Babylonian captivity of the church." To put an end to this absenteeism, and to bring back the papacy to Italy was the cherished and anxious wish of all good Italians, and especially of all Italian churchmen. Petrarch had urgently pressed Urban V., Gregory's immediate predecessor, to accomplish the desired change; and Dante had at an earlier date laboured to bring about the same object. But these and all the other influences which Italy had striven to bring to bear on the popes had hitherto failed to induce them to return. In these circumstances Catherine determined to try her powers of persuasion and argument, attempting first by correspondence to reconcile Gregory and the Florentines, who had been placed under an interdict, and then going in person as the representative of the latter to Avignon, where she arrived on the 18th of June. Gregory empowered her to treat for peace, but the Florentine ambassadors were first tardy and then faithless. Nothing daunted, Catherine herself besought Gregory, who, indeed, was himself so minded, to return, and he did so, in September (taking the sea route from Marseilles to Genoa), though perhaps intending only to make a temporary stay in Italy. Catherine went home by land and stayed for a month in Genoa with Madonna Orietta Scotti, a noble lady of that city, at whose house Gregory had a long colloquy with her, which encouraged him to push on to Rome. To this year, 1376, belongs the admission to Catherine's circle of disciples of Stefano di Corrado Maconi, a Sienese noble distinguished by a character full of charm and purity, and her healing of the bitter feud between his family and the Tolomei. Another family quarrel, that of the Salimbeni at Rocca D'Orcia, was ended by her intervention in 1377. This year also she turned the castle of Belcaro, which had been given to her, into a monastery.

Meanwhile the returned pope was not having an easy time. Besides perpetuating the strife with his enemies he was alienating his friends, and finding it increasingly difficult to pay his mercenaries. He vented his anger upon Catherine, who reproved him for minding temporal rather than spiritual things, but in the beginning of 1378 sent her on an embassy to Florence and especially to the Guelph party. While she was urging the citizens to make peace with the pope there came the news of his death. During the troubles that ensued in Florence Catherine nearly lost her life in a popular tumult, and sorely regretted not winning her heart's desire, "the red rose of martyrdom." Peace was signed with the new pope, Urban VI., and Catherine, having thus accomplished her second great political task, went home again to Siena. Thence on the outbreak of the schism Urban summoned her to Rome, whither, somewhat reluctantly, she journeyed with her now large spiritual family in November. Once arrived she gave herself heartily to Urban's cause, and wore her slender powers out in restraining his impatient temper, quieting the revolt of the people of Rome, and trying to win for Urban the support of Europe. After prolonged and continual suffering she died on the 29th of April 1380.

Catherine of Siena lived on not only in her writings but in her disciples. During her short course she gathered round her a devoted company of men and women trained to labour for the reformation of the individual, the church and the state. Her death naturally broke up the fellowship, but its members did not cease their activity and kept up what mutual correspondence was possible. Among them were Fra Raimondo, who became master-general of the Dominicans, William Flete, an ascetically-minded Englishman from Cambridge, Stefano Maconi, who joined the Carthusians and ultimately became prior-general, and the two secretaries, Neri di Landoccio and Francesco Malavolti. The last of her band, Tommaso Caffarini, died in 1434, but the work was taken up, though in other shape, by Savonarola, between Francis of Assisi and whom Catherine forms the connecting link.

Catherine's works consist of (1) a treatise occupying a closely-printed quarto volume, which Fra Raimondo describes as "a dialogue between a soul, which asked four questions of the Lord, and the same Lord, who made answer and gave instruction in many most useful truths," (2) letters, and (3) prayers. The dialogue is entitled, *The Book of Divine Doctrine, given in person by God the Father, speaking to the mind of the most glorious and holy virgin Catherine of Siena, and written down as she dictated it in the vulgar tongue, she being the while entranced, and actually hearing what God spoke in her.* The work is declared to have been dictated by the saint in her father's house in Siena, a little before she went to Rome, and to have been completed on the 13th of October 1378. The book opens with a passage on the essence of mysticism, the union of the soul with God in love, and the bulk of it is a compendium of the spiritual teachings scattered throughout her letters. There is more monologue than dialogue. The book has a significant place in the history of Italian literature. "In a language which is singularly poor in mystical works it stands with the *Divina Commedia* as one of the two supreme attempts to express the eternal in the symbolism of a day, to paint the union of the soul with the supra-sensible while still imprisoned in the flesh." The prayers (twenty-six in all) are mostly mystical outpourings repeating the aspirations found in her other writings. Of more interest are the letters, nearly four hundred in number, and addressed to kings, popes, cardinals, bishops, conventual bodies, political corporations and private individuals. Their historical importance, their spiritual fragrance and their literary value combine to put their author almost on a level with Petrarch as a 14th century letter-writer. Her language is the purest Tuscan of the golden age of the Italian vernacular, and with spontaneous eloquence she passes to and fro between spiritual counsel, domestic advice and political guidance.

AUTHORITIES.—The sources for the personal life of Catherine of Siena are (1) the *Vita* or *Legenda*, Fra Raimondo's biography written 1384–1395, first published in Latin at Cologne, 1553, and widely translated; (2) the *Processus*, a collection of testimonies and letters by those of her followers who survived in 1411, and had to justify the reverence paid to the memory of one yet uncanonized; (3) the *Supplementum* to Raimondo's *Vita*, compiled by Tommaso Caffarini in 1414; (4) the *Legenda abbreviata*, Caffarini's summary of the *Vita*, translated into beautiful Italian by Stefano Maconi; (5) the *Letters*, of which the standard edition is that of Girolamo Gigli (2 vols., Siena, 1713, Lucca, 1721). A selection of these has been published in English by V. D. Scudder (London, 1905). A complete bibliography is given in E. G. Gardner's *Saint Catherine of Siena* (London, 1907), a monumental study dealing with the religion, history and literature of the 14th century in Italy as they centre "in the work and personality of one of the most wonderful women that have ever lived."

CATHERINE I. (1683–1727), empress of Russia. The true character and origin of this enigmatical woman were, until quite recently, among the most obscure problems of Russian history. It now appears that she came of a Lithuanian stock, and was one of the four children of a small Catholic yeoman, Samuel Skovronsky; but her father died of the plague while she was still a babe, the family scattered, and little Martha was adopted by Pastor Glück, the Protestant superintendent of the Marienburg district. Frau Glück finally rid herself of the girl by marrying her to a Swedish dragoon called Johan. A few months later, the Swedes were compelled by the Russians to evacuate Marienburg, and Martha became one of the prisoners of war of Marshal Sheremetev, who sold her to Prince Menshikov, at whose house, in the German suburb of Moscow, Peter the Great first beheld and made love to her in his own peculiar fashion. After the birth of their first daughter Catherine, Peter made no secret of their relations. He had found, at last, the woman he wanted, and she soon became so indispensable to him that it was a torment to be without her. The situation was regulated by the reception of Martha into the Orthodox Church, when she was rechristened under the name of Catherine Alekseyevna, the tsarevich Alexius being her godfather, by the bestowal upon her of the title *Gosudaruinya* or sovereign (1710),

and, finally (1711), by her public marriage to the tsar, who divorced the tsaritsa Eudoxia to make room for her. Henceforth the new tsaritsa was her husband's inseparable companion. She was with him during the campaign of the Pruth, and Peter always attributed the successful issue of that disastrous war to the courage and sang-froid of his consort. She was with him, too, during his earlier Caspian campaigns, and was obliged on this occasion to shear off her beautiful hair and wear a close-fitting fur cap to protect her from the rays of the sun.

By the *ukaz* of 1722 Catherine was proclaimed Peter's successor, to the exclusion of the grand-duke Peter, the only son of the tsarevich Alexius, and on the 7th of May 1724 was solemnly crowned empress-consort in the Uspensky cathedral at Moscow, on which occasion she wore a crown studded with no fewer than 2564 precious stones, surmounted by a ruby, as large as a pigeon's egg, supporting a cross of brilliants. Within a few months of this culminating triumph, she was threatened with utter ruin by the discovery of a supposed *liaison* with her gentleman of the bedchamber, William Mons, a handsome and unscrupulous upstart, and the brother of a former mistress of Peter. A dangerously familiar but perfectly innocent flirtation is, however, the worst that can fairly be alleged against Catherine on this occasion. So Peter also seemed to have thought, for though Mons was decapitated and his severed head, preserved in spirits, was placed in the apartments of the empress, she did not lose Peter's favour, attended him during his last illness, and closed his eyes when he expired (February 28, 1725). She was at once raised to the throne by the party of progress, as represented by Prince Menshikov and Count Tolstoy, whose interests and perils were identical with those of the empress, before the reactionary party had time to organize opposition, her great popularity with the army powerfully contributing to her success. The arch-prelates of the Russian church, Theodosius, archbishop of Novgorod, and Theophanes, archbishop of Pskov, were also on her side for very much the same reason, both of them being unpopular innovators who felt that, at this crisis, they must stand or fall with Tolstoy and Menshikov.

The great administrative innovation of Catherine's reign was the establishment of the *Verkhovny Tainy Sovyet*, or supreme privy council, by way of strengthening the executive, by concentrating affairs in the hands of a few persons, mainly of the party of Reform (*Ukaz* of February 26, 1726). As to the foreign policy of Catherine I. (principally directed by the astute Andrei Osterman), if purely pacific and extremely cautious, it was, nevertheless, dignified, consistent and independent. Russia, by the mere force of circumstances, now found herself opposed to England, chiefly because Catherine protected Charles Frederick, duke of Holstein, and George I. found that the Schleswig-Holstein question might be reopened to the detriment of his Hanoverian possessions. Things came to such a pass that, in the spring of 1726, an English squadron was sent to the Baltic and cast anchor before Reval. The empress vigorously protested, and the fleet was withdrawn, but on the 6th of August Catherine acceded to the anti English Austro-Spanish league. Catherine died on the 16th of May 1727. Though quite illiterate, she was an uncommonly shrewd and sensible woman, and her imperturbable good nature under exceptionally difficult circumstances, testifies equally to the soundness of her head and the goodness of her heart.

See Robert Nisbet Bain, *The Pupils of Peter the Great*, chs. ii.-iii. (London, 1897); *The First Romanovs*, ch. xiv. (London, 1905).

(R. N. B.)

CATHERINE II. (1729–1796), empress of Russia, was the daughter of Christian Augustus, prince of Anhalt-Zerbst, and his wife, Johanna Elizabeth of Holstein-Gottorp. The exact date and place of her birth have been disputed, but there appears to be no reason to doubt that she was right in saying that she was born at Stettin on the 2nd of May 1729. Her father, who succeeded to the principality of Anhalt-Zerbst in 1746 and died in 1747, was a general in the Prussian service, and, at the time of her birth, was military commandant at Stettin. Her baptismal name was Sophia Augusta Frederica. In accordance with the custom then prevailing in German princely families, she was educated chiefly by French governesses and tutors. In 1744 she was taken to Russia, to be affianced to the grand-duke Peter, the nephew of the empress Elizabeth (*q.v.*), and her recognized heir. The princess of Anhalt-Zerbst was the daughter of Christian Albert, bishop of Lübeck, younger brother of Frederick IV., duke of Holstein-Gottorp, Peter's paternal grandfather. The choice of her daughter as wife of the future tsar was the result of not a little diplomatic management in which Frederick the Great took an active part, the object being to strengthen the friendship between Prussia and Russia, to weaken the influence of Austria and to ruin the chancellor Bestuzhev, on whom Elizabeth relied, and who was a known partisan of the Austrian alliance. The diplomatic intrigue failed, largely through the flighty intervention of the princess of Anhalt-Zerbst, a clever but very injudicious woman. But Elizabeth took a strong liking to the daughter, and the marriage was finally decided on. The girl had spared no effort to ingratiate herself, not only with the empress, but with the grand-duke and the Russian people. She applied herself to learning the language with such zeal that she rose at night and walked about her bedroom barefoot repeating her lessons. The result was a severe attack of congestion of the lungs in March 1744. During the worst period of her illness she completed her conquest of the good-will of the Russians by declining the religious services of a Protestant pastor, and sending for Simon Todorskiy, the orthodox priest who had been appointed to instruct her in the Greek form of Christianity. When she wrote her memoirs she represented herself as having made up her mind when she came to Russia to do whatever had to be done, and to profess to believe whatever she was required to believe, in order to be qualified to wear the crown. The consistency of her character throughout life makes it highly probable that even at the age of fifteen she was mature enough to adopt this worldly-wise line of conduct. Her father, who was a convinced Lutheran, was strongly opposed to his daughter's conversion, and supplied her with books of controversy to protect her Protestantism. She read them, and she listened to Todorskiy, and to other advisers who told her that the Russian crown was well worth a mass, or that the differences between the Greek and Lutheran churches were mere matters of form. On the 28th of June 1744 she was received into the Orthodox Church at Moscow, and was renamed Catherine Alexeyevna. On the following day she was formally betrothed, and was married to the archduke on the 21st of August 1745 at St Petersburg.

At that time Catherine was essentially what she was to remain till her death fifty-one years later. It was her boast that she was as "frank and original as any Englishman." If she meant that she had a compact character, she was right. She had decided on her line in life and she followed it whole-heartedly. It was her determination to become a Russian in order that she might the better rule in Russia, and she succeeded. She acquired a full command of all the resources of the language, and a no less complete understanding of the nature of the Russian people. It is true that she remained quite impervious to religious influences. The circumstances of her conversion may have helped to render her indifferent to religion, but their influence need not be exaggerated. Her irreligion was shared by multitudes of contemporaries who had never been called upon to renounce one form of Christianity and profess belief in another in order to gain a crown. Her mere actions were, like those of other and humbler people, dictated by the conditions in which she lived. The first and the most important of them was beyond all question the misery of her married life. Her husband was a wretched creature. Nature had made him mean, the smallpox had made him hideous, and his degraded habits made him loathsome. And Peter had all the sentiments of the worst kind of small German prince of the time. He had the conviction that his princeship entitled him to disregard decency and the feelings of others. He planned brutal practical jokes, in which blows had always a share. His most manly taste did not rise above the kind of military interest which has been defined as "corporal's

mania," the passion for uniforms, pipeclay, buttons, the "tricks of parade and the froth of discipline." He detested the Russians, and surrounded himself with Holsteiners. For ten years the marriage was barren, and the only reason for supposing that the future tsar Paul (*q.v.*), who was born on the 2nd of October 1754, was the son of Peter, is the strong similarity of their characters. Living in the grossly animal court of the empress Elizabeth, bound to a husband whom she could not but despise and detest, surrounded by suitors, and entirely uninfluenced by religion, Catherine became and remained perfectly immoral in her sexual relations to men. The scandalous chronicle of her life was the commonplace of all Europe. Her male favourites were as openly paraded as the female favourites of King Louis XV. It may be said once and for all that her most trusted agents while she was still grand-duchess, and her chief ministers when she became empress, were also her lovers, and were known to be so.

For some time after the marriage, the young couple were controlled by the empress Elizabeth, who appointed court officials to keep a watch on their conduct; but before long these custodians themselves had become the agents of Catherine's pleasures and ambition. After the birth of Paul she began to take an active part in political intrigues. Her abilities forced even her husband to rely on her judgment. When in difficulty he ran to her and flattered her with the name of Madame La Ressource—Madame Quick Wit—which did not prevent him from insulting and even kicking her when the immediate need of her help was over. In 1758 he endeavoured to turn the empress Elizabeth against her, and for a time Catherine was in danger. She faced the peril boldly, and reconquered her influence over the sovereign, but from this time she must have realized that when the empress was dead she would have to defend herself against her husband. That Peter both hated and dreaded her was notorious. The empress Elizabeth died on the 5th of January 1762. The grand duke succeeded without opposition as Peter III. His behaviour to his wife continued to be brutal and menacing, and he went on as before offending the national sentiment of the Russian people. In July he committed the insane error of retiring with his Holsteiners to Oranienbaum, leaving his wife at St Petersburg. On the 13th and 14th of that month a "pronunciamiento" of the regiments of the guard removed him from the throne and made Catherine empress. The history of this revolt is still obscure. It has naturally been said that she organized the mutiny from the first, and some plausibility is conferred on this belief by the fact that the guards were manipulated by the four Orlov brothers. The eldest, Gregory, was her recognized chief lover, and he was associated with his brother Alexis in the office of favourite. On the other hand, there does not appear to have been any need for organization. The hatred felt for Peter III. was spontaneous, and Catherine had no need to do more than let it be known that she was prepared to profit by her husband's downfall. Peter, who behaved with abject cowardice, was sent to a country house at Ropcha, where he died on the 15th or 18th of July of official "apoplexy." The truth is not known, and Frederick the Great at least professed long afterwards to believe that Catherine had no immediate share in the murder. She had no need to speak. Common-sense must have shown the leaders of the revolt that they would never be safe while Peter lived, and they had insults to avenge.

The mere fact that Catherine II., a small German princess without hereditary claim to the throne, ruled Russia from 1762 to 1796 amid the loyalty of the great mass of the people, and the respect and admiration of her neighbours, is sufficient proof of the force of her character. Her title to be considered a great reforming ruler is by no means equally clear. Voltaire and the encyclopaedists with whom she corresponded, and on whom she conferred gifts and pensions, repaid her by the grossest flattery, while doing their best to profit by her generosity. They made her a reputation for "philosophy," and showed the sincerity of their own love of freedom by finding excuses for the partition of Poland. There is a very great difference between Catherine II. as she appears in the panegyrics of the encyclopaedists and Catherine as she appears in her correspondence and in her acts. Her foreign admirers amused her, and were useful in spreading her reputation. The money they cost her was a small sum in comparison to the £12,000,000 she lavished on her long series of lovers, who began with Soltykov and Stanislaus Poniatowski (*q.v.*) before she came to the throne, and ended with the youthful Platon Zubov, who was tenant of the post at her death. She spent money freely on purchasing works of art and curios. Yet she confessed with her usual candour that she had no taste for painting, sculpture or music. Her supposed love of literature does not appear to have amounted to more than a lively curiosity, which could be satisfied by dipping into a great number of books. She had a passion for writing, and produced not only a mass of letters written in French, but pamphlets and plays, comic and serious, in French and Russian. One on the history of Oleg, the more or less legendary Varangian, who was guardian to the son of Rurik, was described by her as an "imitation of Shakespeare." The scheme is not unlike that of a "chronicle play." Her letters are full of vivacity, of colour, and at times of insight and wit, but she never learnt to write either French or German correctly. The letters to Voltaire attributed to her are not hers, and were probably composed for her by Andrei Shuvalov. The philosophers and encyclopaedists who, by the mouth of Diderot, complimented Catherine on being superior to such female affectations as modesty and chastity, flattered her to some extent even here. She enforced outward decency in her household, was herself temperate in eating and drinking, and was by no means tolerant of disorderly behaviour on the part of the ladies of her court. They flattered her much more when they dwelt on her philanthropy and her large share of the enlightenment of the age. She was kind to her servants, and was very fond of young children. She was rarely angry with people who merely contradicted her or failed to perform their service in her household. But she could order the use of the knout and of mutilation as freely as the most barbarous of her predecessors when she thought the authority of the state was at stake, and she did employ them readily to suppress all opinions of a heterodox kind, whether in matters of religion or of politics, after the beginning of the French Revolution. Her renowned toleration stopped short of allowing the dissenters to build chapels, and her passion for legislative reform grew cold when she found that she must begin by the emancipation of the serfs. There were exceptions even to her personal kindness to those about her. She dropped her German relations. She kept a son born to her shortly before the palace revolution of 1762, whose paternity could not be attributed to Peter, at a distance, though she provided for him. He was brought up in a private station under the name of Bobrinski. She was a harsh mother to her son Paul. It seems highly probable that she intended to exclude him from the succession, and to leave the crown to her eldest grandson Alexander, afterwards the emperor Alexander I. Her harshness to Paul was probably as much due to political distrust as to what she saw of his character. Whatever else Catherine may have been she was emphatically a sovereign and a politician who was in the last resort guided by the reason of state. She was resolved not to allow her authority to be disputed by her son, or shared by him.

As a ruler, Catherine professed a great contempt for system, which she said she had been taught to despise by her master Voltaire. She declared that in politics a capable ruler must be guided by "circumstances, conjectures and conjunctions." Her conduct was on the surface very unstable. In a moment of candour she confessed that she was a great *commenceuse*—that she had a mania for beginning innumerable enterprises which she never pursued. This, however, is chiefly true of her internal administration, and even there it should be qualified. Many of her beginnings were carried on by others and were not barren. Her foreign policy was as consistent as it could be considering the forces she had to contend against. It was steadily aimed to secure the greatness and the safety of Russia. There can be no question that she loved her adopted country sincerely, and had an affection for her people, and an opinion of their great qualities which she did not hesitate to express in hyperbolical terms. Her zeal for the reputation of the Russians

was almost comically shown by the immense trouble she took to compile an answer to the *Voyage en Sibérie* of the French astronomer Chappe d'Auteroche. The book is in three big quartos, and Catherine's answer—which was never finished—is still larger. Chappe d'Auteroche had discovered that Siberia was not a paradise, and had observed that the Russians were dirty in their habits, and that masters whipped their servants, male and female. Her patriotism was less innocently shown by her conquests. Yet it may be doubted whether any capable ruler of Russia could have abstained from aggressions at the expense of the rights of the Saxon family in Courland, of Poland, and of Turkey (see RUSSIA: *History*). It does seem now to be clearly proved that the partition of Poland was not suggested by her, as has been frequently asserted. Catherine would have preferred to control the country through a vassal sovereign of the type of Stanislaus Poniatowski, the old lover whose election she secured in 1763. Poland was incapable of maintaining its independence at the time of the first partition (1772), and the division of the unhappy country was forced on by Austria and Prussia. In the case of the second partition in 1793, she did show herself to be very unscrupulous. Her opposition to the reform of the Polish government was plainly due to a wish to preserve an excuse for further spoliation, but her conduct was less cruel and base than that of Prussia.

Catherine had adhered to her husband's policy of a Prussian alliance. While Frederick the Great lived she was impressed by his ability. But the Prussian alliance became hateful to her, and her later correspondence with Grimm overflows with contempt of his successor Frederick William II., who is always spoken of by her as "Brother Gu." Her exasperation with the affectations of the Prussian king was unquestionably increased by her discovery that he would not be induced to apply himself to a crusade against the French Revolution, which by employing all his forces would have left Russia free to annex the whole of what remained of Poland. But at least she did not enter into a solemn engagement to defend the Poles who were engaged in reforming their constitution, and then throw them over in order to share in the plunder of their country.

Catherine's Turkish policy was at first marked by a certain grandiosity. When the Turks declared war in 1768 in order to support Poland, which they looked upon as a necessary buffer state, she retaliated by the great Greek scheme. For a time it was a pet idea with her to revive the Greek empire, and to plant the cross,with the double-headed Russian eagle at Constantinople. She formed a corps of Greek cadets, caused her younger grandson to be christened Constantine, and began the policy of presenting Russia to the Christian subjects of the Porte as their deliverer. In pursuit of this heroic enterprise, which excited the loud admiration of Voltaire, she sent a fleet under Alexis Orlov into the Mediterranean in 1770. Orlov tempted the Greeks of the Morea to take up arms, and then left them in the lurch. When Catherine found herself opposed by the policy of France and England, and threatened by the jealousy of Prussia and Austria, she dropped the Greek design, observing to Voltaire that the descendants of the Spartans were much degenerated. The introduction into the treaty of Kuchuk-Kainarji of 1774 of a clause by which the Porte guaranteed the rights of its Christian subjects, and of another giving Russia the right to interfere on behalf of a new Russian church in Constantinople, advertised the claim of the tsars to be the natural protectors of the Orthodox in the Ottoman dominions; but when she took up arms again in 1788 in alliance with Joseph II. (*q.v.*), it was to make a mere war of conquest and partition. The Turkish wars show the weak side of Catherine as a ruler. Though she had mounted the throne by a military revolt and entered on great schemes of conquest, she never took an intelligent interest in her army. She neglected it in peace, allowed it to be shamefully administered in war, and could never be made to understand that it was not in her power to improvise generals out of her favourites. It is to her credit that she saw the capacity of Suvarov, yet she never had as much confidence in him as she had in Potemkin, who may have been a man of genius, but was certainly no general. She took care never to have to deal with a disciplined opponent, except the Swedes, who beat her, but who were very few.

It was the misfortune of Catherine that she lived too long. She disgraced herself by living with her last lover, Zubov, when she was a woman of sixty-seven, trusting him with power and lavishing public money on him. The outbreak of the French Revolution stripped off the varnish of philosophy and philanthropy which she had assumed in earlier years. She had always entertained a quiet contempt for the French writers whom she flattered and pensioned, and who served her as an advertising agency in the west. When the result of their teaching was seen in Paris, good-natured contempt was turned to hatred. She then became a persecutor in her own dominions of the very ideas she had encouraged in former years. She scolded and preached a crusade, without, however, departing from the steady pursuit of her own interests in Poland, while endeavouring with transparent cunning to push Austria and Prussia into an invasion of France with all their forces. Her health began to break down, and it appears to be nearly certain that towards the end she suffered from hysteria of a shameful kind. It is plain that her intellect had begun to fail just before her death, for she allowed the reigning favourite, Platon Zubov, to persuade her to despatch his brother Valerian, with the rank of field marshal and an army of 20,000 men, on a crack-brained scheme to invade India by way of Persia and Tibet. The refusal of the king of Sweden to marry into her family unless the bride would become a Lutheran is said to have thrown her into a convulsion of rage which hastened her death. On the 9th of November 1796, she was seized by a fit of apoplexy, and died on the evening of the 10th.

All other accounts of Catherine II. have been superseded by Waliszewski's two volumes, *Le Roman d'une impératrice* (Paris, 1893) and *Autour d'un Trône: Catherine II., ses collaborateurs, ses amis, ses favoris* (Paris, 1894). The original sources for the history of her policy and her character are to be found in the publications of the Imperial Russian Historical Society, vols. i.-cix. (St Petersburg), begun in 1867; her private and official correspondence will be found in vols. i., ii., iv., v., vi., vii., viii., ix., x., xiii., xiv., xv., xvii., xx., xxiii., xxxii., xxxiii., xxxvi., xlii., xliii., xlvii., xlviii., li., lvii., lxvii., lxviii., lxxxvii., xcvii., xcviii., cvii., cxv., cxviii.

CATHERINE DE' MEDICI (1519–1589), queen of France, the wife of one French king and the mother of three, was born at Florence in 1519. She was a daughter of Lorenzo II. de' Medici and a French princess, Madeleine de la Tour d'Auvergne. Having lost both her parents at an early age, Catherine was sent to a convent to be educated; and she was only fourteen when she was married (1533) at Marseilles to the duke of Orleans, afterwards Henry II. It was her uncle, Pope Clement VII., who arranged the marriage with Francis I. Francis, still engaged in his lifelong task of making head against Charles V., was only too glad of the opportunity to strengthen his influence in the Italian peninsula, while Clement, ever needful of help against his too powerful protector, was equally ready to hold out a bait. During the reign of Francis, Catherine exercised no influence in France. She was young, a foreigner, a member of a state that had almost no weight in the great world of politics, had not given any proof of great ability, and was thrown into the shade by more important persons. For ten years after her marriage she had no children. In consequence, a divorce began to be talked of at court; and it seemed not impossible that Francis, alarmed at the possible extinction of the royal house, might listen to such a proposal. But Catherine had the happiness of bringing him grandchildren ere he died. During the reign of her husband, too (1547–1559), Catherine lived a quiet and passive, but observant life. Henry being completely under the influence of his mistress, Diane de Poitiers, she had little authority. In 1552, when the king left the kingdom for the campaign of Metz, she was nominated regent, but with very limited powers. This continued even after the accession of her son Francis II. Francis was under the spell of Mary Stuart, and she, little disposed to meddle with politics on her own account, was managed by her uncles, the cardinal of Lorraine and the duke of Guise. The queen-mother, however, soon grew weary of the domination of the Guises, and entered upon a course of secret opposition. On the 1st of April 1560 she placed in the

chancellorship Michel de l'Hôpital (*q.v.*), who advocated the policy of conciliation.

On the death of Francis (5th of December 1560), Catherine became regent during the minority of her second son, Charles IX., and now found before her a career worthy of the most soaring ambition. She was then forty-one years old, but, although she was the mother of nine children, she was still very vigorous and active. She retained her influence for more than twenty years in the troubled period of the wars of religion. At first she listened to the moderate counsels of l'Hôpital in so far as to avoid siding definitely with either party, but her character and the habits of policy to which she had been accustomed, rendered her incapable of any noble aim. She had only one virtue, and that was her zeal for the interests of her children, especially of her favourite third son, the duke of Anjou. Like so many of the Italians of that time, who were almost destitute of a moral sense, she looked upon statesmanship in particular as a career in which finesse, lying and assassination were the most admirable, because the most effective weapons. By habit a Catholic, but above all things fond of power, she was determined to prevent the Protestants from getting the upper hand, and almost equally resolved not to allow them to be utterly crushed, in order to use them as a counterpoise to the Guises. This trimming policy met with little success: rage and suspicion so possessed men's minds, that she could no longer control the opposing parties, and one civil war followed another to the end of her life. In 1567, after the "Enterprise of Meaux," she dismissed l'Hôpital and joined the Catholic party. But, having failed to crush the Protestant rebellion by arms, she resumed in 1570 the policy of peace and negotiation. She conceived the project of marrying her favourite son, the duke of Anjou, to Queen Elizabeth of England, and her daughter Margaret to Henry of Navarre. To this end she became reconciled with the Protestants, and allowed Coligny to return to court and to re-enter the council. Of this step she quickly repented. Charles IX. conceived a great affection for the admiral and showed signs of taking up an independent attitude. Catherine, thinking her influence menaced, sought to regain it, first by the murder of Coligny, and, when that had failed, by the massacre of St Bartholomew (*q.v.*). The whole of the responsibility for this crime, therefore, rests with Catherine; unlike the populace, she had not even the excuse of fanaticism. This responsibility, however, weighed but lightly on her; while her son was overwhelmed with remorse, she calmly enjoyed her short-lived triumph. After the death of Charles in 1574, and the succession of Anjou under the name of Henry III., Catherine pursued her old policy of compromise and concessions; but as her influence is lost in that of her son, it is unnecessary to dwell upon it. She died on the 5th of January 1589, a short time before the assassination of Henry, and the consequent extinction of the House of Valois. In her taste for art and her love of magnificence and luxury, Catherine was a true Medici; her banquets at Fontainebleau in 1564 were famous for their sumptuousness. In architecture especially she was well versed, and Philibert de l'Orme relates that she discussed with him the plan and decoration of her palace of the Tuileries. Catherine's policy provoked a crowd of pamphlets, the most celebrated being the *Discours merveilleux de la vie, actions et déportemens de la reine Catherine de Médicis*, in which Henri Estienne undoubtedly collaborated.

See *Lettres de Catherine de Médicis*, edited by Hector de la Ferrière (Paris, 1880, seq.), in the *Collection de documents inédits sur l'histoire de France*; A. von Reumont, *Die Jugend Caterinas de' Medici* (1854; French translation by A. Baschet, 1866); H. Bouchot, *Catherine de Médicis* (Paris, 1899). For a more complete bibliography see Ernest Lavisse, *Histoire de France* (vol. v., by H. Lemonnier, and vol. vi., by J. H. Mariéjol, 1904–1905). See also Miss E. Sichel's books, *Catherine de' Medici and the French Reformation* (1905), and *The Later Years of Catherine de' Medici* (1908).

CATHERINE OF ARAGON (1485–1536), queen of Henry VIII. of England, daughter of Ferdinand and Isabella of Spain, was born on the 15th or 16th of December 1485. She left Spain in 1501 to marry Arthur, prince of Wales, eldest son of King Henry VII., and landed at Plymouth on the 2nd of October. The wedding took place on the 14th of November in London, and soon afterwards Catherine accompanied her youthful husband to Wales, where, in his sixteenth year, the prince died on the 2nd of April 1502. On the 25th of June 1503, she was formally betrothed to the king's second son, Henry, now prince of Wales, and a papal dispensation for the alliance was obtained. The marriage, however, did not take place during the lifetime of Henry VII. Ferdinand endeavoured to cheat the English king of the marriage portion agreed upon, and Henry made use of the presence of the unmarried princess in England to extort new conditions, and especially to secure the marriage of his daughter Mary to the archduke Charles, grandson of Ferdinand, and afterwards Charles V. Catherine was thus from the first the unhappy victim of state politics. Writing to Ferdinand on the 9th of March 1509, she describes the state of poverty to which she was reduced, and declares the king's unkindness impossible to be borne any longer.[1] On the old king's death, however, a brighter prospect opened, for Henry VIII. decided immediately on marrying her, the wedding taking place on the 11th of June and the coronation on the 24th. Catherine now enjoyed a few years of married happiness; Henry showed himself an affectionate husband, and the alliance with Ferdinand was maintained against France. She was not without some influence in state affairs. During Henry's invasion of France in 1513 she was made regent; she showed great zeal and ardour in the preparations for the Scottish expedition, and was riding towards the north to put herself at the head of the troops when the victory of Flodden Field ended the campaign. The following year an affectionate meeting took place between the king and queen at Richmond on the return of the former. Ferdinand's treachery, however, in making a treaty with France roused Henry's wrath, and his angry reproaches fell upon his unfortunate wife; but she took occasion in 1520, during the visit of her nephew Charles V. to England, to urge the policy of gaining his alliance rather than that of France. Immediately on his departure, on the 31st of May 1520, she accompanied the king to France, on the celebrated visit to Francis I., called from its splendour the Field of the Cloth of Gold; but in 1522 war was declared against France and the emperor again welcomed to England. In 1521 she is represented by Shakespeare as pleading for the unfortunate duke of Buckingham.

These early years of happiness and of useful influence and activity had, however, been gradually giving way to gloom and disappointment. Between January 1510 and November 1518 Catherine gave birth to six children (including two princes), who were all stillborn or died in infancy except Mary, born in 1516, and rumour did not fail to ascribe this series of disasters to the curse pronounced in Deuteronomy on incestuous unions. In 1526 the condition of Catherine's health made it highly improbable that she would have more children. No woman had ever reigned in England, alone and in her own right, and to avoid a fresh dispute concerning the succession, and the revival of the civil war, a male heir to the throne was a pressing necessity. The act of marriage, which depended for its validity on the decision of the ecclesiastical courts, had, on account of the numerous dissolutions and dispensations granted, not then attained the security since assured to it by the secular law. For obtaining dissolutions of royal marriages the facilities were especially great. Pope Clement VII. himself permitted such a dissolution in the case of Henry's own sister Margaret, in 1528, proposed later as a solution of the problem that Henry should be allowed two wives,[2] and looked not unfavourably, with the same aim, on the project for marrying the duke of Richmond to Mary, a brother to a sister.[3] In Henry's case also the irregularity of a union, which is still generally reprobated and forbidden in Christendom, and which it was very doubtful that the pope had the power to legalize, provided a moral justification for a dissolution which in other cases did not exist. It was not therefore the immorality of the plea which obstructed the papal decree in

[1] *Cal. of State Pap., England and Spain*, i. 469.
[2] *Letters and Papers*, iv. 6627, 6705, and app. 261.
[3] *Ib.* iv. 5072.

Henry's favour, but the unlucky imprisonment at this time of Clement VII. at the hands of Charles V., Catherine's nephew, which obliged the pope, placed thus "between the hammer and the anvil," to pursue a policy of delay and hesitation. Nor was the immorality of Henry's own character the primary cause of the project of divorce. Had this been so, a succession of mistresses would have served as well as a series of single wives. The real occasion was the king's desire for a male heir. But, however clear this may be, the injustice done to Catherine was no less cruel and real. Rumours, probably then unfounded, of an intended divorce had been heard abroad as early as 1524. But the creation in 1525 of the king's illegitimate son Henry, as duke of Richmond—the title borne by his grandfather Henry VII—and the precedence granted to him over all the peers as well as the princess Mary, together with the special honour paid at this time by the king to his own half-sister Mary, were the first real indications of the king's thoughts. In 1526, and perhaps earlier, Wolsey had been making tentative inquiries at Rome on the subject. In May 1527 a collusive and secret suit was begun before the cardinal, who, as legate, summoned the king to defend himself from the charge of cohabitation with his brother's wife; but these proceedings were dropped. On the 22nd of June Henry informed Catherine that they had been living in mortal sin and must separate. During Wolsey's absence in July at Paris, where he had been commissioned to discuss vaguely the divorce and Henry's marriage with Renée, daughter of Louis XII., Anne Boleyn is first heard of in connexion with the king, his affection for her having, however, begun probably as early as 1523, and the cardinal on his return found her openly installed at the court. In October 1528 the pope issued a commission to Cardinal Campeggio and Wolsey to try the cause in England, and bound himself not to revoke the case to Rome, confirming his promise by a secret decretal commission which, however, was destroyed by Campeggio. But the trial was a sham. Campeggio was forbidden to pronounce sentence without further reference to Rome, and was instructed to create delays, the pope assuring Charles V. at the same time that the case should be ultimately revoked to Rome.[1]

The object of all parties was now to persuade Catherine to enter a nunnery and thus relieve them of further embarrassment. While Henry's envoys were encouraged at Rome in believing that he might then make another marriage, Henry himself gave Catherine assurances that no other union would be contemplated in her lifetime. But Catherine with courage and dignity held fast to her rights, demanded a proper trial, and appealed not only to the bull of dispensation, the validity of which was said to be vitiated by certain irregularities, but to a brief granted for the alliance by Pope Julius II. Henry declared the latter to be a forgery, and endeavoured unsuccessfully to procure a declaration of its falsity from the pope. The court of the legates accordingly opened on the 31st of May 1529, the queen appearing before it on the 18th of June for the purpose of denying its jurisdiction. On the 21st both Henry and Catherine presented themselves before the tribunal, when the queen threw herself at Henry's feet and appealed for the last time to his sense of honour, recalling her own virtue and helplessness. Henry replied with kindness, showing that her wish for the revocation of the cause to Rome was unreasonable in view of the paramount influence then exercised by Charles V. on the pope. Catherine nevertheless persisted in making appeal to Rome, and then withdrew. After her departure Henry, according to Cavendish, Wolsey's biographer, praised her virtues to the court. "She is, my lords, as true, as obedient, as conformable a wife as I could in my phantasy wish or desire. She hath all the virtues and qualities that ought to be in a woman of her dignity or in any other of baser estate." On her refusal to return, her plea was overruled and she was adjudged contumacious, while the sittings of the court continued in her absence. Subsequently the legates paid her a private visit of advice, but were unable to move her from her resolution. Finally, however, in July 1529, the case was, according to her wish, and as the result of the treaty of Barcelona and the pope's complete surrender to Charles V., revoked by the pope to Rome: a momentous act, which decided Henry's future attitude, and occasioned the downfall of the whole papal authority in England. On the 7th of March 1530 Pope Clement issued a brief forbidding Henry to make a second marriage, and ordering the restitution of Catherine to her rights till the cause was determined; while at the same time he professed to the French ambassador, the bishop of Tarbes, his pleasure should the marriage with Anne Boleyn have been already made, if only it were not by his authority.[2] The same year Henry obtained opinions favourable to the divorce from the English, French and most of the Italian universities, but unfavourable answers from Germany, while a large number of English peers and ecclesiastics, including Wolsey and Archbishop Warham, joined in a memorial to the pope in support of Henry's cause.

Meanwhile, Catherine, while the great question remained unsolved, was still treated by Henry as his queen, and accompanied him in his visits in the provinces and in his hunting expeditions. On the 31st of May 1531 she was visited by thirty privy councillors, who urged the trial of the case in England, but they met only with a firm refusal. On the 14th of July Henry left his wife at Windsor, removing himself to Woodstock, and never saw her again. In August she was ordered to reside at the Moor in Hertfordshire, and at the same time separated from the princess Mary, who was taken to Richmond. In October she again received a deputation of privy councillors, and again refused to withdraw the case from Rome. In 1532 she sent the king a gold cup as a new year's gift, which the latter returned, and she was forbidden to hold any communication with him. Alone and helpless in confronting Henry's absolute power, her cause found champions and sympathizers among the people, among the court preachers, and in the House of Commons, while Bishop Fisher had openly taken her part in the legatine trial. Subsequently Catherine was removed to Bishops Hatfield, while Henry and Anne Boleyn visited Francis I. Their marriage, anticipating any sentence of the nullity of the union with Catherine, took place after their return about the 25th of January 1533, in consequence of Anne's pregnancy. On the 10th of May Cranmer, for whose consecration as archbishop of Canterbury Henry had obtained bulls from Rome, opened his court, and declared on the 23rd the nullity of Catherine's marriage and the validity of Anne's. On the 10th of August the king caused proclamation to be made forbidding her the style of queen; but Catherine refused resolutely to yield the title for that of princess-dowager. Not long afterwards she was removed to Buckden in Huntingdonshire. Here her household was considerably reduced, and she found herself hemmed in by spies, and in fact a prisoner. In July she had refused Henry the loan of a certain rich cloth, which had done service at the baptism of her children, for the use of Anne Boleyn's expected infant; and on the birth of Elizabeth and the refusal of Mary to give up the title of princess, the latter's household was entirely dismissed and she herself reduced to the position of attendant in Elizabeth's retinue. A project for removing Catherine from Buckden to Somersham, an unhealthy solitude in the isle of Ely, with a still narrower maintenance, was only prevented by her own determined resistance. The attempt in November to incriminate the queen in connexion with Elizabeth Barton failed. She passed her life now in religious devotions, taking strict precautions against the possibility of being poisoned. On the 23rd of March 1534 the pope pronounced her marriage valid, but by this time England had thrown off the papal jurisdiction, the parliament had transferred Catherine's jointure to Anne Boleyn, and the decree had no effect on Catherine's fortunes. She refused to swear to the new act of succession, which declared her marriage null and Anne's infant the heir to the throne, and soon afterwards she was removed to Kimbolton, where she was well treated. On the 21st of May she was visited by the archbishop of York and Tunstall, bishop of Durham, who threatened her with death if she persisted in her refusal, but only succeeded in confirming her resolution. She was kept in strict seclusion, separated from Mary

[1] *Cal. of State Pap., England and Spain*, iii. pt. ii. 779.

[2] *Cal. of State Pap., Foreign and Dom.*, iv. 6290.

and from all outside communications, and in December 1535 her health gave way, her death taking place on the 8th of January 1536, not without suspicions of poison, which, however, may be dismissed. She was buried by the king's order in Peterborough cathedral. Before her death she dictated a last letter to Henry, according to Polydore Vergil, expressing her forgiveness, begging his good offices for Mary, and concluding with the astounding assurance—"I vow that mine eyes desire you above all things." The king himself affected no sorrow at her death, and thanked God there was now no fear of war.

Catherine is described as "rather ugly than otherwise; of low stature and rather stout; very good and very religious; speaks Spanish, French, Flemish, English; more beloved by the islanders than any queen that has ever reigned." She was a woman of considerable education and culture, her scholarship and knowledge of the Bible being noted by Erasmus, who dedicated to her his book on *Christian Matrimony* in 1526. She endured her bitter and undeserved misfortunes with extraordinary courage and resolution, and at the same time with great womanly forbearance, of which a striking instance was the compassion shown by her for the fallen Wolsey.

BIBLIOGRAPHY.—See the article in *Dict. of Nat. Biog.* by J. Gairdner, and those on Henry VIII. and Wolsey, where the case is summed up very adversely to Henry, and *The Divorce of Catherine of Aragon*, by J. A. Froude (1891), where it is regarded from the contrary aspect; *Henry VIII.*, by A. F. Pollard (1905); *Cambridge Mod. History* (1903), ii. 416 et seq. and bibliographies, p. 789; *The Wives of Henry VIII.*, by M. Hume (1905). (P. C. Y.)

CATHERINE OF BRAGANZA (1638–1705), queen consort of Charles II. of England, daughter of John IV. of Portugal, and of Louisa de Gusman, daughter of the duke of Medina Sidonia, was born on the 15/25 of November 1638 at Villia Viçosa. She was early regarded as a useful medium for contracting an alliance with England, more necessary than ever to Portugal after the treaty of the Pyrenees in 1659 whereby Portugal was ostensibly abandoned by France. Negotiations for the marriage began during the reign of Charles I., were renewed immediately after the Restoration, and on the 23rd of June, in spite of Spanish opposition, the marriage contract was signed, England securing Tangier and Bombay, with trading privileges in Brazil and the East Indies, religious and commercial freedom in Portugal and two million Portuguese crowns (about £300,000); while Portugal obtained military and naval support against Spain and liberty of worship for Catherine. She reached England on the 13th of May 1662, but was not visited by Charles at Portsmouth till the 20th. The next day the marriage was solemnized twice, according to the Roman Catholic and Anglican usages. Catherine possessed several good qualities, but had been brought up in a conventual seclusion and was scarcely a wife Charles would have chosen for himself. Her personal charms were not potent enough to wean Charles away from the society of his mistresses, and in a few weeks after her arrival she became aware of her painful and humiliating position as the wife of the selfish and licentious king. On the first presentation to her of Lady Castlemaine, Charles's mistress *en titre*, whom he insisted on making lady of her bedchamber, she fainted away. She withdrew from the king's society, and in spite of Clarendon's attempts to moderate her resentment, declared she would return to Portugal rather than consent to a base compliance. To overcome her resistance nearly the whole of her Portuguese retinue was dismissed. She was helpless, and the violence of her grief and anger soon changed to passive resistance, and than to a complete forbearance and complaisance which gained the king's regard and favour. In the midst of Charles's debauched and licentious court, she lived neglected and retired, often deprived of her due allowance, having no ambitions and taking no part in English politics, but keeping up rather her interest in her native country.

As the prospect diminished of her bearing children to Charles, several schemes were set on foot for procuring a divorce on various pretexts. As a Roman Catholic and near to the king's person Catherine was the special object of attack by the inventors of the Popish Plot. In 1678 the murder of Sir Edmund Berry Godfrey was ascribed to her servants, and Titus Oates accused her of a design to poison the king. These charges, of which the absurdity was soon shown by cross-examination, nevertheless placed the queen for some time in great danger. On the 28th of November Oates accused her of high treason, and the Commons passed an address for her removal and that of all the Roman Catholics from Whitehall. A series of fresh depositions were sent in against her, and in June 1679 it was decided that she must stand her trial; but she was protected by the king, who in this instance showed unusual chivalry and earned her gratitude. On the 17th of November Shaftesbury moved in the House of Lords for a divorce to enable the king to marry a Protestant and have legitimate issue; but he received little support, and the bill was opposed by Charles, who continued to show his wife "extraordinary affection." During the winter the calumnies against the queen were revived by Fitzharris, who, however, before his execution in 1681 confessed to their falsity; and after the revival of the king's influence subsequent to the Oxford parliament, the queen's position was no more assailed.

During Charles's last illness in 1685 she showed great anxiety for his reconciliation with the Romish Church, and it was probably effected largely through her influence. She exhibited great grief at his death. She afterwards resided at Somerset House and at Hammersmith, where she had privately founded a convent. She interceded with great generosity, but ineffectually, for Monmouth the same year. On the 10th of June 1688 she was present at the birth of the prince of Wales and gave evidence before the council in favour of the genuineness of the child. She was still in England at the Revolution, having delayed her return to Portugal to prosecute a lawsuit against the second earl of Clarendon, formerly her chamberlain. She maintained at first good terms with William and Mary; but the practice of her religion aroused jealousies, while her establishment at Somerset House was said to be the home of cabals against the government; and in 1691 she settled for a short time at Euston. She left England finally with a train of one hundred persons in March 1692, travelling through France and arriving at Lisbon on the 20th of January 1693. She took up her residence at the palace of Bemposta, built by herself, near Lisbon. In 1703 she supported the Methuen Treaty, which cemented still further the alliance between Portugal and England, and in 1704 she was appointed regent of Portugal during the illness of her brother King Pedro II., her administration being distinguished by several successes gained over the Spaniards. She died on the 31st of December 1705, bequeathing her great wealth, the result of long hoarding, after the payment of divers charitable legacies, to King Pedro; and was buried with great ceremony and splendour at Belem.

See L. C. Davidson, *Catherine of Braganza* (1908).

CATHERINE OF VALOIS (1401–1437), queen of Henry V. of England, daughter of Charles VI. of France by his wife Isabel of Bavaria, was born in Paris on the 27th of October 1401. The lunacy of her father and the depravity of her mother were serious drawbacks to Catherine, and her only education was obtained in a convent at Poissy. About 1408 a marriage was suggested between the princess and Henry, prince of Wales, afterwards Henry V., who renewed this proposal after he became king in March 1413. In addition to the hand of Catherine, however, the English king asked for a large dowry both in money and lands, and when these demands were rejected war broke out. Once or twice during short intervals of peace the marriage project was revived, and was favoured by Queen Isabel. When peace was eventually made at Troyes in May 1420 Henry and Catherine were betrothed, and the marriage took place at Troyes on the 2nd of June 1420. Having crossed to England with Henry, the queen was crowned in Westminster Abbey on the 23rd of February 1421, and in the following December gave birth to a son, afterwards King Henry VI. She joined Henry in France in May 1422, returning to England after his death in the succeeding August. Catherine's name soon began to be coupled with that of Owen Tudor, a Welsh gentleman, and in 1428 Humphrey, duke of Gloucester, secured the passing of an act to prevent her from marrying without the

consent of the king and council. It appears, however, that by this time Catherine and Tudor were already married. They lived in obscurity till 1436, when Tudor was imprisoned, and Catherine retired to Bermondsey Abbey, where she died on the 3rd of January 1437. Her body was buried in the Lady chapel of Westminster Abbey, and when the chapel was pulled down during the reign of Henry VII., was placed in Henry V.'s tomb. It lay afterwards under the Villiers monument, and in 1878 was re-buried in Henry V.'s chantry. By Tudor Catherine had three sons and a daughter. Her eldest son by this marriage, Edmund, was created earl of Richmond in 1452, and was the father of Henry VII.

See Agnes Strickland, *Lives of the Queens of England*, vol. iii. (London, 1877).

CATHETUS (Gr. *κάθετος*, a perpendicular line), in architecture the eye of the volute, so termed because its position is determined, in an Ionic or voluted capital, by a line let down from the point in which the volute generates.

CATHOLIC (Gr. *καθολικός*, general, universal), a designation adopted in the 2nd century by the Christian Church to indicate Christendom as a whole, in contrast with individual churches. With this idea went the notions that Christianity had been diffused throughout the whole earth by the apostles, and that only what was found everywhere throughout the church could be true. The term thus in time became full of dogmatic and political meaning, connoting, when applied to the church, a universal authoritative and orthodox society, as opposed to Gnostic and other "sects" (*cf.* the famous canon of Vincent of Lerins A.D. 434; *quod ubique, quod semper, quod ab omnibus creditum est*). The term "Catholic" does not occur in the old Roman symbol; but Professor Loofs includes it in his reconstruction, based on typical phrases in common use at the time of the ante-Nicene creeds of the East. In the original form of the Nicene creed itself it does not occur; but in the creed of Jerusalem (348), an amplification of the Nicene symbol, we find "one Holy Catholic Church," and in the revision by Cyril of Alexandria (362) "Catholic and Apostolic Church" (see CREEDS). Thus, though the word "Catholic" was late in finding its way into the formal symbols of the church, it is clear that it had long been in use in the original sense defined above. It must be borne in mind, however, that the designation "Catholic" was equally claimed by all the warring parties within the church at various times; thus, the followers of Arius and Athanasius alike called themselves Catholics, and it was only the ultimate victory of the latter that has reserved for them in history the name of Catholic, and branded the former as Arian.

With the gradual development and stereotyping of the creed it was inevitable that the term "Catholic" should come to imply a more narrowly defined orthodoxy. In the Eastern churches, indeed, the conception of the church as the guardian of "the faith once delivered to the saints" soon overshadowed that of interpretation and development by catholic consent, and, though they have throughout claimed the title of Catholic, their chief glory is that conveyed in the name of the Holy Orthodox Church. In the West, meanwhile, the growth of the power of the papacy had tended more and more to the interpretation of the word "catholic" as implying communion with, and obedience to, the see of Rome (see PAPACY); the churches of the East, no less than the heretical sects of the West, by repudiating this allegiance, had ceased to be Catholic. This identification of "Catholic" with "Roman" was accentuated by the progress of the Reformation. The Reformers themselves, indeed, like other dissidents and reformers before them, did not necessarily repudiate the name of Catholic; they believed, in fact, in catholicism, *i.e.* the universal sanction of their beliefs, as firmly as did the adherents of "the old religion"; they included the Catholic creeds, definitions formulated by the universal church, in their service books; they too appealed, as the fathers of Basel and Constance had done, from the papal monarchy to the great ecclesiastical republic. The Church of England at least, emphasizing her own essential catholicity, retained in her translations of the ancient symbols the word "catholic" instead of replacing it by "universal." But the appeal to the verbally inspired Bible was stronger than that to a church hopelessly divided; the Bible, and not the consent of the universal church, became the touchstone of the reformed orthodoxy; in the nomenclature of the time, "evangelical" arose in contradistinction to "Catholic," while, in popular parlance, the "protest" of the Reformers against the "corruptions of Rome" led to the invention of the term "Protestant," which, though nowhere assumed in the official titles of the older reformed churches, was early used as a generic term to include them all.

"Catholic" and "Catholicism" thus again changed and narrowed their meaning; they became, by universal usage, identified definitely with "Romanist" and the creed and obedience of Rome. Even in England, where the church retained most strongly the Catholic tradition, this distinction of "Protestant" and "Catholic" was clearly maintained, at least till the "Catholic revival" in the Church of England of the 19th century. On the continent of Europe the equivalent words (*e.g.* Ger. *Katholik, Katholizismus*; Fr. *catholique, catholicisme*) are even more definitely associated with Rome; they have lost the sense which they still convey to a considerable school of Anglicans. The dissident "Catholic" churches are forced to qualify their titles: they are "Old Catholics" (*Alt-Katholiken*) or "German Catholics" (*Deutsch-Katholiken*). The Church of Rome alone, officially and in popular parlance, is "the Catholic Church" (*katholische Kirche, église catholique*), a title which she proudly claims as exclusively her own, by divine right, by the sanction of immemorial tradition, and by reason of her perpetual protest against the idea of "national" churches, consecrated by the Reformation (see CHURCH HISTORY, and ROMAN CATHOLIC CHURCH). The additional qualification of "Roman" she tolerates, since it proclaims her doctrine of the see of Rome as the keystone of Catholicism; but to herself she is "the Catholic Church," and her members are "Catholics."

Yet to concede this claim and surrender without qualification the word "Catholic" to a connotation which is at best only universal in theory, is to beg several very weighty questions. The doctrine of the Catholic Church, *i.e.* the essential unity and interdependence of "all God's faithful people scattered throughout the world," is common to all sections of Christians. The creed is one; it is the interpretation that differs. In a somewhat narrower sense, too, the Church of England at least has never repudiated the conception of the Catholic Church as a divinely instituted organization for the safe-guarding and proclamation of the Christian revelation. She deliberately retained the Catholic creeds, the Catholic ministry and the appeal to Catholic antiquity (see ENGLAND, CHURCH OF). A large section of her members, accordingly, laying stress on this side of her tradition, prefer to call themselves "Catholics." But, though the invention of the terms "Roman Catholic" and "Roman Catholicism" early implied the retention by the English Church of her Catholic claim, her members were never, after the Reformation, called Catholics; even the Caroline divines of the 17th century, for all their "popish practices," styled themselves Protestants, though they would have professed their adherence to "the Catholic faith" and their belief in "the Holy Catholic Church."

Clearly, then, the exact meaning of the term varies according to those who use it and those to whom it is applied. To the Romanist "Catholic" means "Roman Catholic"; to the high Anglican it means whatever is common to the three "historic" branches into which he conceives the church to be divided—Roman, Anglican and Orthodox; to the Protestant pure and simple it means either what it does to the Romanist, or, in expansive moments, simply what is "universal" to all Christians. In a yet broader sense it is used adjectivally of mere wideness or universality of view, as when we speak of a man as "of catholic sympathies" or "catholic in his tastes."

The name of *Catholic Epistles* is given to those letters (two of Peter, three of John, one of James, one of Jude) incorporated in the New Testament which (except 2 and 3 John) are not, like

those of St Paul, addressed to particular individuals or churches, but to a larger and more indefinite circle of readers. (See BIBLE: *New Testament, Canon.*)

The title of *Catholicus* (καθολικός) seems to have been used under the Roman empire, though rarely, as the Greek equivalent of *consularis* and *praefectus*. Thus Eusebius (*Hist. eccl.* viii. 23) speaks of the catholicus of Africa (καθολικὸν τῆς Ἀφρικῆς). As an ecclesiastical title it was used to imply, not universal (ecumenical), but a great and widespread jurisdiction. Thus the bishop of the important see of Seleucia (Bagdad), though subordinate to the patriarch of Antioch, had the title of Catholicus and power to consecrate even archbishops; and on the division of the see there were two *Catholici* under the patriarch of Antioch. In Ethiopia, too, there were *Catholici* with less extensive powers, subject to the patriarch of Alexandria. The title now survives, however, only as that of the head of the Armenian Church (*q.v.*). A bishop's cathedral church is, however, in Greek the *Catholicon*.

An isolated use of the word "catholic" as a secular legal term survives in Scots law; a *catholic creditor* is one whose debt is secured over several or over all of the subjects belonging to the debtor.

CATHOLIC APOSTOLIC CHURCH, THE, a religious community often called "Irvingites," though neither actually founded nor anticipated by Edward Irving (*q.v.*). Irving's relation to this community was, according to its members, somewhat similar to that of John the Baptist to the early Christian Church, *i.e.* he was the forerunner and prophet of the coming dispensation, not the founder of a new sect; and indeed the only connexion which Irving seems to have had with the existing organization of the Catholic Apostolic body was in "fostering spiritual persons who had been driven out of other congregations for the exercise of their spiritual gifts." Shortly after Irving's trial and deposition (1831), certain persons were, at some meetings held for prayer, designated as "called to be apostles of the Lord" by certain others claiming prophetic gifts. In the year 1835, six months after Irving's death, six others were similarly designated as "called" to complete the number of the "twelve," who were then formally "separated," by the pastors of the local congregations to which they belonged, to their higher office in the universal church on the 14th of July 1835. This separation is understood by the community not as "in any sense being a schism or separation from the one Catholic Church, but a separation to a special work of blessing and intercession on behalf of it." The twelve were afterwards guided to ordain others—twelve prophets, twelve evangelists, and twelve pastors, "sharing equally with them the one Catholic Episcopate," and also seven deacons for administering the temporal affairs of the church catholic. The apostles were the channels of the Holy Ghost and the mysteries of God, and the authoritative interpreters of "prophetic utterance"; their teaching was brought home to the people by the "evangelists." The function of the prophets was to explain scripture and exhort to holiness, that of the "pastors" is explained by their title. The central episcopacy of forty-eight was regarded as "indicated by prophecy," being foreshown in the forty-eight boards of the Mosaic tabernacle. For ecclesiastical purposes the church universal is under their charge in twelve tribes; for Christendom is considered to be divided into twelve portions or tribes, each tribe being under the special charge of an apostle and his co-ministers, and the seat of the Apostolic College being at Albury, near Guildford. This is an ideal outline which has never been fulfilled. There has never been a "central episcopacy" of forty-eight. The "apostles" alone always held the supreme authority, though, as their number dwindled, "coadjutors" were appointed to assist the survivors, and to exercise the functions of the "apostolate." The last "apostle" died on the 3rd of February 1901.

For the service of the church a comprehensive book of liturgies and offices was provided by the "apostles." It dates from 1842 and is based on the Anglican, Roman and Greek liturgies. Lights, incense, vestments, holy water, chrism, and other adjuncts of worship are in constant use. The ceremonial in its completeness may be seen in the church in Gordon Square, London, and elsewhere. The daily worship consists of "matins" with "proposition" (or exposition) of the sacrament at 6 A.M., prayers at 9 A.M. and 3 P.M., and "vespers" with "proposition" at 5 P.M. On all Sundays and holy days there is a "solemn celebration of the eucharist" at the high altar; on Sundays this is at 10 A.M. On other days "low celebrations" are held in the side-chapels, which with the chancel in all churches correctly built after apostolic directions are separated or marked off from the nave by open screens with gates. The community has always laid great stress on symbolism, and in the eucharist, while rejecting both transubstantiation and consubstantiation, holds strongly to a real (mystical) presence. It emphasizes also the "phenomena" of Christian experience and deems miracle and mystery to be of the essence of a spirit-filled church.

Each congregation is presided over by its "angel" or bishop (who ranks as angel-pastor in the Universal Church); under him are four-and-twenty priests, divided into the four ministries of "elders, prophets, evangelists and pastors," and with these are the deacons, seven of whom regulate the temporal affairs of the church—besides whom there are also "sub-deacons, acolytes, singers, and door-keepers." The understanding is that each elder, with his co-presbyters and deacons, shall have charge of 500 adult communicants in his district; but this has been but partially carried into practice. This is the full constitution of each particular church or congregation as founded by the "restored apostles," each local church thus "reflecting in its government the government of the church catholic by the angel or high priest Jesus Christ, and His forty-eight presbyters in their fourfold ministry (in which apostles and elders always rank first), and under these the deacons of the church catholic." The priesthood is supported by tithes; it being deemed a duty on the part of all members of the church who receive yearly incomes to offer a tithe of their increase every week, besides the free-will offering for the support of the place of worship, and for the relief of distress. Each local church sends "a tithe of its tithes" to the "Temple," by which the ministers of the Universal Church are supported and its administrative expenses defrayed; by these offerings, too, the needs of poorer churches are supplied. It claims to have among its clergy many of the Roman, Anglican and other churches, the orders of those ordained by Greek, Roman and Anglican bishops being recognized by it with the simple confirmation of an "apostolic act." The community has not changed recently in general constitution or doctrine. It does not publish statistics, and its growth during late years is said to have been more marked in the United States and in certain European countries, such as Germany, than in Great Britain. There are nine congregations enumerated in *The Religious Life of London* (1904).

For further details of doctrines, ritual, &c., see R. N. Bosworth, *Restoration of Apostles and Prophets, Readings on the Liturgy, The Church and Tabernacle*, and *The Purpose of God in Creation and Redemption* (6th ed., 1888); G. Miller, *History and Doctrines of Irvingism* (1878).

CATILINE [LUCIUS SERGIUS CATILINA] (*c.* 108–62 B.C.), a member of an ancient but impoverished patrician family of Rome, the prime mover in the conspiracy known by his name. He appears in history first as a supporter of Sulla, and during the proscription he was conspicuous for his greed and cruelty. He slew his inoffensive brother-in-law with his own hand, and tortured and mutilated the much-loved Marius Gratidianus. He was believed to have made away with his wife and his son to win the profligate and wealthy Aurelia Orestilla; it was even suspected that he had been guilty of an intrigue with the Vestal Fabia. In 77 he was quaestor, in 68 praetor, and in 67-66 governor of Africa. His extortions and subsequent impeachment by P. Clodius Pulcher having disqualified him as a candidate for the consulship, he formed a conspiracy, in which he was joined by young men of all classes, even Crassus and Caesar, according to rumour, being implicated. The new consuls were to be murdered on the 1st of January; but the plot—the

execution of which was deferred till the 5th of February—failed in consequence of the impatience of Catiline, who gave the signal too hastily. Soon after, Catiline, having bribed both judges and accuser, was acquitted in the trial for extortion. His scheme was forthwith immensely widened. The city was to be fired, and those who opposed the revolution were to be slain; all debts were to be cancelled; and there was to be a proscription of all the wealthy citizens. Among the conspirators were many men of the first rank and influence. Arms and money were collected, soldiers were enlisted, and the assistance of the slaves was sought. But Catiline's hopes were again disappointed; once more he failed to obtain the consulship (64); and, moreover, it soon became apparent that one of the new consuls, Cicero, was mysteriously able to thwart all the schemes of the conspirators. He was, in fact, informed of every detail, through Fulvia, the mistress of Curius, one of the plotters, who was himself soon persuaded to turn informer. The other consul, C. Antonius, in whom Catiline hoped to find a supporter, was won over and got out of the way by Cicero, who resigned the province of Macedonia in his favour. Before the next *comitia consularia* assembled, the orator had given so impressive a warning of the danger which was impending, that Catiline was once more rejected (63), and the consuls were invested with absolute authority. Catiline now resolved upon open war; preparations were set on foot throughout Italy, especially in Etruria, where the standard of revolt was raised by the centurion C. Manlius (or Mallius), one of Sulla's veterans. A plan to murder Cicero in his own house on the morning of the 7th of November was frustrated. On the next day Cicero attacked Catiline so vigorously in the senate (in his first Catilinarian oration) that he fled to his army in Etruria: Next day Cicero awoke the terror of the people by a second oration delivered in the forum, in consequence of which Catiline and Manlius were declared public enemies, and the consul Antonius was despatched with an army against them. Meanwhile the imprudence of the conspirators in Rome brought about their own destruction. Some deputies from the Allobroges, who had been sent to Rome to obtain redress for certain grievances, were approached by P. Lentulus Sura, the chief of the conspirators, who endeavoured to induce them to join him. After considerable hesitation, the deputies decided to turn informers. The plot was betrayed to Cicero, at whose instigation documentary evidence was obtained, implicating Lentulus and others. They were arrested, proved guilty, and on the 5th of December condemned to death and strangled in the underground dungeon on the slope of the Capitol. This act, which was opposed by Julius Caesar and advocated by Cato Uticensis (and, indirectly, by Cicero), was afterwards vigorously attacked as a violation of the constitution, on the ground that the senate had no power of life and death over a Roman citizen. Thus a heavy blow was dealt to the cause of Catiline, who, in the beginning of 62, saw his legions, only partially armed and diminished by desertion, shut in between those of Metellus Celer and C. Antonius. Near Pistoria he hazarded battle with the forces of the latter, but was completely defeated in a desperate encounter. He himself, fighting with the utmost bravery, rushed into the ranks of the enemy and met his death.

Such was the conspiracy of Catiline and the character of its author, as we find them in the speeches of Cicero, and the histories of Sallust and Dio Cassius (see also Plutarch, *Cicero*; Vell. Pat. ii. 35; Florus iv. 1; Appian, *B.C.* ii. 6; Eutropius vi. 15). It must not be forgotten, however, that our authorities were all members of the aristocratic party. Some of the incidents given as facts by Dio Cassius are manifest absurdities; and Cicero paid more regard to the effect than to the truthfulness of an accusation. We find him at one time admitting that Catiline had almost persuaded him of his honesty and merit, and even seeking a political union with him; at another, when his alliance had been rejected and an election was at hand, declaiming against him as a murderer and a profligate. Lastly, though Sallust's vivid narrative is consistent throughout, it is obvious that he cherished very bitter feelings against the democratic party. Nevertheless, we cannot regard Catiline as an honest enemy of the oligarchy, or as a disinterested champion of the provincials. It is held by some historians that there was at the time on the part of many of the Roman nobles a determination to raise themselves to power, despite the opposition of the senate; others with greater probability maintain that Catiline's object was simply the cancelling of the huge debts which he and his friends had accumulated. Catiline, by his bravery, his military talents, his vigorous resolution, and his wonderful power over men, was eminently qualified as a revolutionary leader. He is the subject of tragedies by Ben Jonson and P. Crébillon, and of the *Rome sauvée* of Voltaire.

See P. Mérimée, *Études sur la guerre sociale et la conjuration de Catiline* (1844); E. Hagen, *Catilina* (1854), with introductory discussion of the authorities; E. S. Beesley, "Catiline as a Party Leader" (*Fortnightly Review*, June 1865), in defence of Catiline; C. John, *Die Entstehungsgeschichte der catilinarischen Verschwörung* (1876), a critical examination of Sallust's account; E. von Stern, *Catilina und die Parteikämpfe in Rom* 66-63 (1883), with bibliography in preface; C. Thiaucourt, *Étude sur la conjuration de Catiline* (1887), a critical examination of Sallust's account and of his object in writing it; J. E. Blondel, *Histoire économique de la conjuration de Catiline* (1893), written from the point of view of a political economist; Gaston Boissier, *La Conjuration de Catiline* (1905), and *Cicero and his Friends* (Eng. trans.); Tyrrell and Purser's ed. of Cicero's *Letters* (index vol. *s.v.* "Sergius Catilina"); J. L. Strachan Davidson, *Cicero* (1894), ch. v.; Warde Fowler's *Caesar* (1892); see also art. Rome: *History, The Republic.*

CATINAT, NICOLAS (1637–1712), marshal of France, entered the Gardes Françaises at an early age and distinguished himself at the siege of Lille in 1667. He became a brigadier ten years later, *maréchal de camp* in 1680, and lieutenant-general 1688. He served with great credit in the campaigns of 1676–1678 in Flanders, was employed against the Vaudois in 1686, and after taking part in the siege of Philipsburg at the opening of the War of the League of Augsburg, he was appointed to command the French troops in the south-eastern theatre of war. In 1690 he conquered Savoy, and in 1691 Nice; the battle of Staffarda, won by him over the duke of Savoy in 1690, and that of Marsaglia in 1693, were amongst the greatest victories of the time. In 1696 Catinat forced the duke to make an alliance with France. He had in 1693 been made a marshal of France. At the beginning of the war of the Spanish Succession, Catinat was placed in charge of operations in Italy, but he was much hampered by the orders of the French court and the weakness of the forces for their task. He suffered a reverse at Carpi (1701) and was soon afterwards superseded by Villeroy, to whom he acted as second-in-command during the campaign of Chiari. He died at St Gratien in 1712. His memoirs were published in 1819.

See E. de Broglie, *Catinat, 1637–1712* (Paris, 1902).

CATLIN, GEORGE (1796–1872), American ethnologist, was born at Wilkesbarre, Pennsylvania, in 1796. He was educated as a lawyer and practised in Philadelphia for two years; but art was his favourite pursuit, and forsaking the law he established himself at New York as a portrait painter. In 1832, realizing that the American Indians were dying out, he resolved to rescue their types and customs from oblivion. With this object he spent many years among the Indians in North and South America. He lived with them, acquired their languages, and studied very thoroughly their habits, customs and mode of life, making copious notes and many studies for paintings. In 1840 he came to Europe with his collection of paintings, most of which are now in the National Museum, Washington, as the Catlin Gallery; and in the following year he published the *Manners, Customs and Conditions of the North American Indians* in two volumes, illustrated with 300 engravings. This was followed in 1844 by *The North American Portfolio*, containing 25 plates of hunting scenes and amusements in the Rocky Mountains and the prairies of America, and in 1848 by *Eight Years' Travels and Residence in Europe*. In 1861 he published a curious little volume, in "manugraph," entitled *The Breath of Life*, on the advantage of keeping one's mouth habitually closed, especially during sleep; and in 1868, *Last Rambles amongst the Indians of the Rocky Mountains and the Andes*. He died in Jersey City, New Jersey, on the 22nd of December 1872.

CATO, DIONYSIUS, the supposed author of the *Dionysii Catonis Disticha de Moribus ad Filium.* The name usually given is simply Cato, an indication of the wise character of the maxims inculcated, but Dionysius is added on the authority of a MS. declared by Scaliger to be of great antiquity. This MS. also contains Priscian's translation of the Periegesis of the geographer Dionysius Periegetes; this has probably led to the *Disticha* also being attributed to him. In the middle ages the author on the *Disticha* was supposed to be Cato the Elder, who wrote a *Carmen de Moribus*, but extracts from this in Aulus Gellius show that it was in prose. Nothing is really known of the author or date of the *Disticha*; it can only be assigned to the 3rd or 4th century A.D. It is a small collection of moral apophthegms, each consisting of two hexameters, in four books. They are monotheistic in character, not specially Christian. The diction and metre are fairly good. The book had a great reputation in the middle ages, and was translated into many languages; it is frequently referred to by Chaucer, and in 1483 a translation was issued from Caxton's press at Westminster.

Editions by F. Hauthal (1869), with full account of MSS. and early editions, and G. Némethy (1895), with critical notes; see also F. Zarncke, *Der deutsche Cato* (1852), a history of middle age German translations; J. Nehab, *Der altenglische Cato* (1879); E. Bischoff, *Prolegomena zum sogenannten Dionysius Cato* (1893), in which the name is discussed; F. Plessis, *Poésie latine* (1909), 663; for medieval translations and editions see Teuffel, *Hist. of Roman Lit.* § 398, 3.

CATO, MARCUS PORCIUS (234–149 B.C.), Roman statesman, surnamed "The Censor," *Sapiens*, *Priscus*, or *Major* (the Elder), to distinguish him from Cato of Utica, was born at Tusculum. He came of an ancient plebeian family, noted for some military services, but not ennobled by the discharge of the higher civil offices. He was bred, after the manner of his Latin forefathers, to agriculture, to which he devoted himself when not engaged in military service. But, having attracted the notice of L. Valerius Flaccus, he was brought to Rome, and became successively quaestor (204), aedile (199), praetor (198), and consul (195) with his old patron. During his term of office he vainly opposed the repeal of the lex Oppia, passed during the Second Punic War to restrict luxury and extravagance on the part of women. Meanwhile he served in Africa, and took part in the crowning campaign of Zama (202). He held a command in Sardinia, where he first showed his strict public morality, and again in Spain, which he reduced to subjection with great cruelty, and gained thereby the honour of a triumph (194). In the year 191 he acted as military tribune in the war against Antiochus III. of Syria, and played an important part in the battle of Thermopylae, which finally delivered Greece from the encroachments of the East. His reputation as a soldier was now established; henceforth he preferred to serve the state at home, scrutinizing the conduct of the candidates for public honours and of generals in the field. If he was not personally engaged in the prosecution of the Scipios (Africanus and Asiaticus) for corruption, it was his spirit that animated the attack upon them. Even Africanus, who refused to reply to the charge, saying only, "Romans, this is the day on which I conquered Hannibal," and was absolved by acclamation, found it necessary to retire self-banished to his villa at Liternum. Cato's enmity dated from the African campaign when he quarrelled with Scipio for his lavish distribution of the spoil amongst the troops, and his general luxury and extravagance.

Cato had, however, a more serious task to perform in opposing the spread of the new Hellenic culture which threatened to destroy the rugged simplicity of the conventional Roman type. He conceived it to be his special mission to resist this invasion. It was in the discharge of the censorship that this determination was most strongly exhibited, and hence that he derived the title (the Censor) by which he is most generally distinguished. He revised with unsparing severity the lists of senators and knights, ejecting from either order the men whom he judged unworthy of it, either on moral grounds or from their want of the prescribed means. The expulsion of L. Quinctius Flamininus for wanton cruelty was an example of his rigid justice. His regulations against luxury were very stringent. He imposed a heavy tax upon dress and personal adornment, especially of women, and upon young slaves purchased as favourites. In 181 he supported the lex Orchia (according to others, he first opposed its introduction, and subsequently its repeal), which prescribed a limit to the number of guests at an entertainment, and in 169 the lex Voconia, one of the provisions of which was intended to check the accumulation of an undue proportion of wealth in the hands of women. Amongst other things he repaired the aqueducts, cleansed the sewers, prevented private persons drawing off public water for their own use, ordered the demolition of houses which encroached on the public way, and built the first basilica in the forum near the curia. He raised the amount paid by the publican for the right of farming the taxes, and at the same time diminished the contract prices for the construction of public works.

From the date of his censorship (184) to his death in 149, Cato held no public office, but continued to distinguish himself in the senate as the persistent opponent of the new ideas. He was struck with horror, along with many other Romans of the graver stamp, at the licence of the Bacchanalian mysteries, which he attributed to the fatal influence of Greek manners; and he vehemently urged the dismissal of the philosophers (Carneades, Diogenes and Critolaus), who came as ambassadors from Athens, on account of the dangerous nature of the views expressed by them. He had a horror of physicians, who were chiefly Greeks. He procured the release of Polybius, the historian, and his fellow-prisoners, contemptuously asking whether the senate had nothing more important to do than discuss whether a few Greeks should die at Rome or in their own land. It was not till his eightieth year that he made his first acquaintance with Greek literature. Almost his last public act was to urge his countrymen to the Third Punic War and the destruction of Carthage. In 157 he was one of the deputies sent to Carthage to arbitrate between the Carthaginians and Massinissa, king of Numidia. The mission was unsuccessful and the commissioners returned home. But Cato was so struck by the evidences of Carthaginian prosperity that he was convinced that the security of Rome depended on the annihilation of Carthage. From this time, in season and out of season, he kept repeating the cry: "Delenda est Carthago."

To Cato the individual life was a continual discipline, and public life was the discipline of the many. He regarded the individual householder as the germ of the family, the family as the germ of the state. By strict economy of time he accomplished an immense amount of work; he exacted similar application from his dependents, and proved himself a hard husband, a strict father, a severe and cruel master. There was little difference apparently, in the esteem in which he held his wife and his slaves; his pride alone induced him to take a warmer interest in his sons. To the Romans themselves there was little in this behaviour which seemed worthy of censure; it was respected rather as a traditional example of the old Roman manners. In the remarkable passage (xxxix. 40) in which Livy describes the character of Cato, there is no word of blame for the rigid discipline of his household.

Cato perhaps deserves even more notice as a literary man than as a statesman or a soldier. He was the first Latin prose writer of any importance, and the first author of a history of Rome in Latin. His treatise on agriculture (*De Agricultura* or *De Re Rustica*) is the only work by him that has been preserved; it is not agreed whether the work we possess is the original or a later revision. It contains a miscellaneous collection of rules of good husbandry, conveying much curious information on the domestic habits of the Romans of his age. His most important work, *Origines*, in seven books, related the history of Rome from its earliest foundations to his own day. It was so called from the second and third books, which described the rise of the different Italian towns. His speeches, of which as many as 150 were collected, were principally directed against the young free-thinking and loose-principled nobles of the day. He also wrote a set of maxims for the use of his son (*Praecepta ad Filium*), and some rules for everyday life in verse (*Carmen de Moribus*). The collection of proverbs in hexameter verse,

extant under the name of Cato, probably belongs to the 4th century A.D. (See CATO, DIONYSIUS.)

AUTHORITIES.—There are lives of Cato by Cornelius Nepos, Plutarch and Aurelius Victor, and many particulars of his career and character are to be gathered from Livy and Cicero. See also F. D. Gerlach, *Marcus Porcius Cato der Censor* (Basel, 1869); G. Kurth, *Caton l'ancien* (Bruges, 1872); J. Cortese, *De M. Porcii Catonis vita, operibus, et lingua* (Turin, 1883); F. Marcucci, *Studio critico sulle Opere di Catone il Maggiore* (1902). The best edition of the *De Agricultura* is by H. Keil (1884–1891), of the fragments of the *Origines* by H. Peter (1883) in *Historicorum Romanorum Fragmenta*, of the fragments generally by H. Jordan (1860); see also J. Wordsworth, *Fragments and Specimens of Early Latin* (1874); M. Schanz, *Geschichte der römischen Litteratur* (1898); article in Smith's *Dictionary of Greek and Roman Biography*; Mommsen, *Hist. of Rome* (Eng. trans.), bk. iii. ch. xi and xiv.; Warde Fowler, *Social Life at Rome* (1909).

CATO, MARCUS PORCIUS (95–46 B.C.), Roman philosopher, called *Uticensis* to distinguish him from his great-grandfather, "the Censor." On the death of his parents he was brought up in the house of his uncle, M. Livius Drusus. After fighting with distinction in the ranks against Spartacus (72 B.C.), he became a military tribune (67), and served a campaign in Macedonia, but he never had any enthusiasm for the military profession. On his return he became quaestor, and showed so much zeal and integrity in the management of the public accounts that he obtained a provincial appointment in Asia, where he strengthened his reputation. Though filled with disgust at the corruption of the public men with whom he came in contact, he saw much to admire in the discipline which Lucullus had enforced in his own eastern command, and he supported his claims to a triumph, while he opposed the inordinate pretensions of Pompey. When the favour of the nobles gained him the tribuneship, he exerted himself unsuccessfully to convict L. Licinius Murena (2), one of their chief men, of bribery. Cicero, who defended Murena, was glad to have Cato's aid when he urged the execution of the Catilinarian conspirators. Cato's vote on this matter drew upon him the bitter resentment of Julius Caesar, who did his utmost to save them.

Cato had now become a great power in the state. Though possessed of little wealth and no family influence, his unflinching resolution in the cause of the ancient free state rendered him a valuable instrument in the hands of the nobles. He vainly opposed Caesar's candidature for the consulship in 59, and his attempt, in conjunction with Bibulus, to prevent the passing of Caesar's proposed agrarian law for distributing lands amongst the Asiatic veterans, proved unsuccessful. Nevertheless, although his efforts were ineffectual, he was still an obstacle of sufficient importance for the triumvirs to desire to get rid of him. At the instigation of Caesar he was sent to Cyprus (58) with a mission to depose its king, Ptolemy (brother of Ptolemy Auletes), and annex the island. On his return two years later he continued to struggle against the combined powers of the triumvirs in the city, and became involved in scenes of violence and riot. He succeeded in obtaining the praetorship in 54, and strenuously exerted himself in the hopeless and thankless task of suppressing bribery, in which all parties were equally interested. He failed to attain the consulship, and had made up his mind to retire from the arena of civic ambition when the civil war broke out in 49. Feeling that the sole chance for the free state lay in conceding an actual supremacy to Pompey, whom he had formerly vigorously opposed, he did not scruple to support the unjust measures of the nobles against Caesar. At the outset of the war he was entrusted with the defence of Sicily, but finding it impossible to resist the superior forces of C. Scribonius Curio, who had landed on the island, he joined Pompey at Dyrrhachium. When his chief followed Caesar to Thessaly he was left behind in charge of the camp, and thus was not present at the battle of Pharsalus. After the battle, when Pompey abandoned his party, he separated himself from the main body of the republicans, and conducted a small remnant of their forces into Africa. After his famous march through the Libyan deserts, he shut himself up in Utica, and even after the decisive defeat at Thapsus (46), in spite of the wishes of his followers, he determined to keep the gates closed till he had sent off his adherents by sea. While the embarkation was in progress he continued calm and dignified; when the last of the transports had left the port he cheerfully dismissed his attendants, and soon afterwards stabbed himself.

He had been reading, we are told, in his last moments Plato's dialogue on the immortality of the soul, but his own philosophy had taught him to act upon a narrow sense of immediate duty without regard to the future. He conceived that he was placed in the world to play an active part, and when disabled from carrying out his principles, to retire gravely from it. He had lived for the free state, and it now seemed his duty to perish with it. In politics he was a typical doctrinaire, abhorring compromise and obstinately blind to the fact that his national ideal was a hopeless anachronism. From the circumstances of his life and of his death, he has come to be regarded as one of the most distinguished of Roman philosophers, but he composed no works, and bequeathed to posterity no other instruction than that of his example. The only composition by him which we possess is a letter to Cicero (*Ad Fam.* xv. 5), a polite refusal of the orator's request that he would endeavour to procure him the honour of a triumph. The school of the Stoics, which took a leading part in the history of Rome under the earlier emperors, looked to him as its saint and patron. It continued to wage war against the empire, hardly less openly than Cato himself had done, for two centuries, till at last it became actually seated on the imperial throne in the person of Marcus Aurelius. Immediately after his death Cato's character became the subject of discussion; Cicero's panegyric *Cato* was answered by Caesar in his *Anticato*. Brutus, dissatisfied with Cicero's work, produced another on the same subject; in Lucan Cato is represented as a model of virtue and disinterestedness.

See *Life* by Plutarch, and compare Addison's tragedy. Modern biographies by H. Wartmann (Zürich, 1859), and F. D. Gerlach (Basel, 1866); C. W. Oman, *Seven Roman Statesmen of the Later Republic, Cato* ... (1902); Mommsen, *Hist. of Rome* (Eng. trans.), bk. v. ch. v.; article in Smith's *Dictionary of Classical Biography*; Gaston Boissier, *Cicero and his Friends* (Eng. trans., 1897), esp. pp. 277 foll.; Warde Fowler, *Social Life at Rome* (1909).

CATO, PUBLIUS VALERIUS, Roman poet and grammarian, was born about 100 B.C. He is of importance as the leader of the "new" school of poetry (*poetae novi*, *νεώτεροι*, as Cicero calls them). Its followers rejected the national epic and drama in favour of the artificial mythological epics and elegies of the Alexandrian school, and preferred Euphorion of Chalcis to Ennius. Learning, that is, a knowledge of Greek literature and myths, and strict adherence to metrical rules were regarded by them as indispensable to the poet. The *νεώτεροι* were also determined opponents of Pompey and Caesar. The great influence of Cato is attested by the lines:—

> "Cato grammaticus, Latina Siren,
> Qui solus legit ac facit poetas."[1]

Our information regarding his life is derived from Suetonius (*De Grammaticis*, 11). He was a native of Cisalpine Gaul, and lost his property during the Sullan disturbances before he had attained his majority. He lived to a great age, and during the latter part of his life was in very reduced circumstances. He was at one time possessed of considerable wealth, and owned a villa at Tusculum which he was obliged to hand over to his creditors. In addition to grammatical treatises, Cato wrote a number of poems, the best-known of which were the *Lydia* and *Diana*. In the *Indignatio* (perhaps a short poem) he defended himself against the accusation that he was of servile birth. It is probable that he is the Cato mentioned as a critic of Lucilius in the lines by an unknown author prefixed to Horace, *Satires*, i. 10.

Among the minor poems attributed to Virgil is one called *Dirae* (or rather two, *Dirae* and *Lydia*). The *Dirae* consists of imprecations against the estate of which the writer has been deprived, and where he is obliged to leave his beloved Lydia; in the *Lydia*, on the other hand, the estate is regarded with envy as the possessor of his charmer. Joseph Justus Scaliger was the first to attribute the poem (divided into two by F. Jacobs) to Valerius Cato, on the ground

[1] "Cato, the grammarian, the Latin siren, who alone reads aloud the works and makes the reputation of poets."

that he had lost an estate and had written a *Lydia*. The question has been much discussed; the balance of opinion is in favour of the *Dirae* being assigned to the beginning of the Augustan age, although so distinguished a critic as O. Ribbeck supports the claims of Cato to the authorship. The best edition of these poems is by A. F. Näke (1847), with exhaustive commentary and excursuses; a clear account of the question will be found in M. Schanz's *Geschichte der römischen Litteratur*; for the "new" school of poetry see Mommsen, *Hist. of Rome*, bk. v. ch. xii.; F. Plessis, *Poésie latine* (1909), 188.

CATS, JACOB (1577–1660), Dutch poet and humorist, was born at Brouwershaven in Zeeland on the 10th of November 1577. Having lost his mother at an early age, and being adopted with his three brothers by an uncle, Cats was sent to school at Zierikzee. He then studied law at Leiden and at Orleans, and, returning to Holland, he settled at the Hague, where he began to practise as an advocate. His pleading in defence of a wretched creature accused of witchcraft brought him many clients and some reputation. He had a serious love affair about this time, which was broken off on the very eve of marriage by his catching a tertian fever which defied all attempts at cure for some two years. For medical advice and change of air Cats went to England, where he consulted the highest authorities in vain. He returned to Zeeland to die, but was cured mysteriously by a strolling quack. He married in 1602 a lady of some property, Elisabeth von Valkenburg, and thenceforward lived at Gryps-kerke in Zeeland, where he devoted himself to farming and poetry. His best works are: *Emblemata* or *Minnebeelden* with *Maegdenplicht* (1618); *Spiegel van den ouden en nieuwen Tijt* (1632); *Houwelijck* . . . (1625); *Selfstrijt* (1620); *Ouderdom, Buitem leven* . . . *en Hofgedachten op Sorgvliet* (1664); and *Gedachten op slapelooze nachten* (1661). In 1621, on the expiration of the twelve years' truce with Spain, the breaking of the dykes drove him from his farm. He was made pensionary (stipendiary magistrate) of Middelburg; and two years afterwards of Dort. In 1627 Cats came to England on a mission to Charles I., who made him a knight. In 1636 he was made grand pensionary of Holland, and in 1648 keeper of the great seal; in 1651 he resigned his offices, but in 1657 he was sent a second time to England on what proved to be an unsuccessful mission to Cromwell. In the seclusion of his villa of Sorgvliet (Fly-from-Care), near the Hague, he lived from this time till his death, occupied in the composition of his autobiography (*Eighty-two Years of My Life*, first printed at Leiden in 1734) and of his poems. He died on the 12th of September 1660, and was buried by torchlight, and with great ceremony, in the Klooster-Kerk at the Hague. He is still spoken of as "Father Cats" by his countrymen.

Cats was contemporary with Hooft and Vondel and other distinguished Dutch writers in the golden age of Dutch literature, but his Orangist and Calvinistic opinions separated him from the liberal school of Amsterdam poets. He was, however, intimate with Constantin Huygens, whose political opinions were more nearly in agreement with his own. For an estimate of his poetry see DUTCH LITERATURE. Hardly known outside of Holland, among his own people for nearly two centuries he enjoyed an enormous popularity. His diffuseness and the antiquated character of his matter and diction, have, however, come to be regarded as difficulties in the way of study, and he is more renowned than read. A statue to him was erected at Brouwershaven in 1829.

See Jacob Cats, *Complete Works* (1790–1800, 19 vols.), later editions by van Vloten (Zwolle, 1858–1866; and at Schiedam, 1869–1870); Pigott, *Moral Emblems, with Aphorisms, &c., from Jacob Cats* (1860); and P. C. Witsen Gejisbek, *Het Leven en de Verdiensten van Jacob Cats* (1829). Southey has a very complimentary reference to Cats in his "Epistle to Allan Cunningham."

CAT'S-EYE, a name given to several distinct minerals, their common characteristic being that when cut with a convex surface they display a luminous band, like that seen by reflection in the eye of a cat. (1) Precious cat's-eye, oriental cat's-eye or chrysoberyl cat's-eye. This, the rarest of all, is a chatoyant variety of chrysoberyl (*q.v.*), showing in the finest stones a very sharply defined line of light. One of the grandest known specimens was in the Hope collection of precious stones, exhibited for many years at the Victoria and Albert Museum. (2) Quartz cat's-eye. This is the common form of cat's-eye, in which the effect is due to the inclusion of parallel fibres of asbestos. Like the chrysoberyl, it is obtained chiefly from Ceylon, but though coming from the East it is often called "occidental cat's-eye"—a term intended simply to distinguish it from the finer or "oriental" stone. It is readily distinguished by its inferior density, its specific gravity being only 2·65, whilst that of oriental cat's-eye is as high as 3·7. A greenish fibrous quartz, cut as cat's-eye, occurs at Hof and some other localities in Bavaria. (3) Crocidolite cat's-eye, a beautiful golden brown mineral, with silky fibres, found in Griqualand West, and much used in recent years as an ornamental stone, sometimes under the name of "South African cat's-eye." It consists of fibrous quartz, coloured with oxide of iron, and results from the alteration of crocidolite (*q.v.*). It is often distinguished as "tiger's-eye" (or more commonly "tiger-eye"), whilst a blue variety, less altered, is known as "hawk's-eye." By the action of hydrochloric acid the colour of tiger's-eye may to a large extent be removed, and a greyish cat's-eye obtained. (4) Corundum cat's-eye. In some asteriated corundum (see ASTERIA) the star is imperfect and may be reduced to a luminous zone, producing an indistinct cat's-eye effect. According to the colour of the corundum the stone is known as sapphire cat's-eye, ruby cat's-eye, topaz cat's-eye, &c. (F. W. R.*)

CATSKILL, a village and the county-seat of Greene county, New York, U.S.A., on the W. bank of the Hudson river, 33 m. S. of Albany. Pop. (1890) 4920; (1900) 5484; of whom 657 were foreign-born; (1910) 5296. It is served by the West Shore railway, by several lines of river steamboats, and by the Catskill Mountain railway, connecting it with the popular summer resorts in the Catskill mountains. A ferry connects with Catskill station (Greendale) on the east side of the Hudson. The village is in a farming country, and manufactures woollen goods and bricks, but it is best known as a summer resort, and as the principal gateway to the beautiful Catskill Mountain region. The *Recorder*, a weekly newspaper, was established here in 1792 as the *Packet*. The first settler on the present site of Catskill was Derrick Teunis van Vechten, who built a house here in 1680. The village was not incorporated until 1806.

See J. D. Pinckney, *Reminiscences of Catskill* (Catskill, 1868).

CATSKILL (formerly KAATSKIL) **MOUNTAINS,** a group of moderate elevation pertaining to the Alleghany Plateau, and not properly included in the Appalachian system of North America because they lack the internal structures and the general parallelism of topographic features which characterize the Appalachian ranges. The group contains many summits above 3000 ft. elevation and half a dozen approaching 4000, Slide Mountain (4205 ft.), and Hunter Mountain (4025 ft.), being the only ones exceeding that figure. The bottom lands along the creeks which drain the mountains, together with rolling uplands rising to elevations of from 1500 to 2000 ft., are under cultivation, the mountain slopes being forested or devoted to grazing. The pure and cool atmosphere attracts summer visitors, for whose accommodation many hotels have been built, some of which have become celebrated. Stoney Clove and Kaaterskill Clove are picturesque gorges, the former being traversed by a railway, and the latter containing three cascades having a total fall of about 300 ft. The growing need of New York City for an increased water-supply has driven her engineers to the Catskills, where several great reservoirs have been projected to supplement those of the Croton watershed.

CATTANEO, CARLO (1801–1869), Italian philosopher and patriot. A republican in his convictions, during his youth he had taken part in the Carbonarist movement in Lombardy. He devoted himself to the study of philosophy, hoping to regenerate the Italian people by withdrawing them from romanticism and rhetoric, and turning their attention to the positive sciences. He expounded his ideas in a review founded by him at Milan in 1837, called *Il Politecnico*. But when the revolution of 1848 broke out he threw himself heart and soul into the fray, and became one of the leading spirits of the insurrection against the Austrians, known as the Five Days of Milan (March 18–22, 1848). Together with Terzaghi, Cernuschi and Clerici he formed a

council of war which, having its headquarters at Casa Taverna, directed the operations of the insurgents. He was second to none in self-sacrificing energy and heroic resolution. When on the 18th of March Field Marshal Radetzky, feeling that the position of the Austrian garrison was untenable, sounded the rebels as to their terms, some of the leaders were inclined to agree to an armistice which would give time for the Piedmontese troops to arrive (Piedmont had just declared war), but Cattaneo insisted on the complete evacuation of Lombardy. Again on the 21st, Radetzky tried to obtain an armistice, and Durini and Borromeo were ready to grant it, for it would have enabled them to reorganize the defences and replenish the supplies of food and ammunition, which could only last another day. But Cattaneo replied: "The enemy having furnished us with munitions thus far, will continue to furnish them. Twenty-four hours of victuals and twenty-four hours of hunger will be many more hours than we shall need. This evening, if the plans we have just arranged should succeed, the line of the bastions will be broken. At any rate, even though we should lack bread, it is better to die of hunger than on the gallows." On the expulsion of the Austrians the question arose as to the future government of Milan and Italy. Cattaneo was an uncompromising republican and a federalist; so violent was his dislike of the Piedmontese monarchy that when he heard that King Charles Albert had been defeated by the Austrians, and that Radetzky was marching back to reoccupy Milan, he exclaimed: "Good news, the Piedmontese have been beaten. Now we shall be our own masters; we shall fight a people's war, we shall chase the Austrians out of Italy, and set up a Federal Republic." When the Austrians returned Cattaneo had to flee, and took refuge at Lugano, where he gave lessons, wrote his *Storia della Rivoluzione del 1848*, the *Archivio triennale delle cose d' Italia* (3 vols., 1850–1855), and then early in 1860 he started the *Politecnico* once more. He bitterly attacked Cavour for his unitarian views, and for the cession of Nice and Savoy. In 1860 Garibaldi summoned him to Naples to take part in the government of the Neapolitan provinces, but he would not agree to the union with Piedmont without local autonomy. After the union of Italy he was frequently asked to stand for parliament, but always refused because he could not conscientiously take the oath of allegiance to the monarchy. In 1868 the pressure of friends overcame his resistance, and he agreed to stand, but at the last moment he drew back, still unable to take the oath, and returned to Lugano, where he died in 1869. As a writer Cattaneo was learned and brilliant, but far too bitter a partisan to be judicious, owing to his narrowly republican views; his ideas on local autonomy were perhaps wise, but, at a moment when unity was the first essential, inopportune.

Bibliography.—A. and J. Mario, *Carlo Cattaneo* (Florence, 1884); E. Zanoni, *Carlo Cattaneo nella vita e nelle opere* (Rome, 1898); see also his own *Opere edite ed inedite* (7 vols., Florence, 1881–1892), *Scritti politici ed epistolari* (3 vols., Florence, 1892–1901), *Scritti storici, letterari* (Milan, 1898, &c.).

CATTARO (Serbo-Croatian *Kotor*), the chief town of an administrative district in Dalmatia, Austria. Pop. (1900) of town, 3021; of commune, 5418. Cattaro occupies a narrow ledge between the Montenegrin Mountains and the Bocche di Cattaro, a winding and beautiful inlet of the Adriatic Sea. This inlet expands into five broad gulfs, united by narrower channels, and forms one of the finest natural harbours in Europe. Teodo, on the outermost gulf, is a small naval port. Cattaro is strongly fortified, and about 3000 troops are stationed in its neighbourhood. On the seaward side, the defensive works include Castelnuovo (*Erceg Novi*), which guards the main entrance to the Bocche. On the landward side, the long walls running from the town to the castle of San Giovanni, far above, form a striking feature in the landscape; and the heights of the Krivoscie or Crevoscia (*Krivošije*), a group of barren mountains between Montenegro, Herzegovina and the sea, are crowned by small forts. Cattaro is divided almost equally between the Roman Catholic and Orthodox creeds. It is the seat of a Roman Catholic bishop, with a small cathedral, a collegiate church and several convents. The transit trade with Montenegro is impeded by high tariffs on both sides of the frontier. Foreign visitors to Montenegro usually land at Cattaro, which is connected by steamer with Trieste and by road with Cettigne. The railway from Ragusa terminates at Zelenika, near Castelnuovo.

There are many interesting places on the shores of the Bocche. Castelnuovo is a picturesque town, with a dismantled 14th-century citadel, which has, at various times, been occupied by Bosnians, Turks, Venetians, Spaniards, Russians, French, English and Austrians. The orthodox convent of St Sava, standing amid beautiful gardens, was founded in the 16th century, and contains many fine specimens of 17th-century silversmiths' work. There is a Benedictine monastery on a small island opposite to Perasto (*Perast*), 8 m. east of Castelnuovo. Perasto itself was for a time an independent state in the 14th century. Rhizon, the modern hamlet of Risano, close by, was a thriving "Illyrian" city as early as 229 B.C., and gave its name to the Bocche, then known as *Rhizonicus Sinus*. Rhizon submitted to Rome in 168 B.C., and about the same time Ascrivium, or Ascruvium, the modern Cattaro, is first mentioned as a neighbouring city. Justinian built a fortress above Ascrivium in A.D. 535, after expelling the Goths, and a second town probably grew up on the heights round it, for Constantine Porphyrogenitus, in the 10th century, alludes to "Lower Cattaro" (τὸ κάτω Δεκάτερα). The city was plundered by the Saracens in 840, and by the Bulgarians in 1102. In the next year it was ceded to Servia by the Bulgarian tsar Samuel, but revolted, in alliance with Ragusa, and only submitted in 1184, as a protected state, preserving intact its republican institutions, and its right to conclude treaties and engage in war. It was already an episcopal see, and, in the 13th century, Dominican and Franciscan monasteries were established to check the spread of Bogomilism. In the 14th century the commerce of Cattaro rivalled that of Ragusa, and provoked the jealousy of Venice. The downfall of Servia in 1389 left the city without a guardian, and, after being seized and abandoned by Venice and Hungary in turn, it passed under Venetian rule in 1420. It was besieged by the Turks in 1538 and 1657, visited by plague in 1572, and nearly destroyed by earthquakes in 1563 and 1667. By the treaty of Campo-Formio in 1797 it passed to Austria; but in 1805, by the treaty of Pressburg, it was assigned to Italy, and was united in 1810 with the French empire. In 1814 it was restored to Austria by the congress of Vienna. The attempt to enforce compulsory military service, made and abandoned in 1869, but finally successful in 1881, led to two short-lived revolts among the Krivoscians, during which Cattaro was the Austrian headquarters.

See G. Gelcich (Gelčić), *Memorie storiche sulle Bocche di Cattaro* (Zara, 1880).

CATTEGAT, or Kattegat (Scand. "cat's-throat"), a strait forming part of the connexion between the Baltic and the North Seas. It lies north and south between Sweden and Denmark, and connects north with the Skagerrack and south through the Sound, the Great Belt and the Little Belt with the Baltic Sea. Its length is about 150 m. and its extreme breadth about 90 m.

CATTERMOLE, GEORGE (1800–1868), English painter, chiefly in water-colours, was born at Dickleburgh, near Diss, Norfolk, in August 1800. At the age of sixteen he began working as an architectural and topographical draughtsman; afterwards he contributed designs to be engraved in the annuals then so popular; thence he progressed into water-colour painting, becoming an associate of the Water-Colour Society in 1822, and a full member in 1833. In 1850 he withdrew from active connexion with this society, and took to painting in oil. His most fertile period was between 1833 and 1850. At the Paris exhibition of 1855 he received one of the five first-class gold medals awarded to British painters. He also enjoyed professional honours in Amsterdam and in Belgium. He died on the 24th of July 1868. Among his leading works are "The Murder of the Bishop of Liége" (15th century), "The Armourer relating the Story of the Sword," "The Assassination of the Regent Murray by Hamilton of Bothwellhaugh," and (in oil) "A Terrible Secret."

He was largely employed by publishers, illustrating the *Waverley Novels* and the *Historical Annual* of his brother the Rev. Richard Cattermole (his scenes from the wars of Cavaliers and Roundheads in this series are among his best engraved works), and many other volumes besides. Cattermole was a painter of no inconsiderable gifts, and of great facility in picturesque resource; he was defective in solidity of form and texture, and in realism or richness of colour. He excelled in rendering scenes of chivalry, of medievalism, and generally of the romantic aspects of the past.

CATTLE (Norman Fr. *catel*, from Late Lat. *capitale*, wealth or property, a word applied in the feudal system to movable property and particularly to live stock, and surviving in its wider meaning as "chattel" or "chattle"), a general term for the cows and oxen of agricultural use. For the zoological account, see BOVIDAE, and the subordinate articles there referred to; for details concerning dairy-farming, see DAIRY.

Oxen appear to have been among the earliest of domesticated animals, as they undoubtedly were among the most important agents in the growth of early civilization. They are mentioned in the oldest written records of the Hebrew and Hindu peoples, and are figured on Egyptian monuments raised over 3000 years B.C.; while remains of domesticated specimens have been found in Swiss lake-dwellings along with the stone implements and other relics of Neolithic man. In infant communities a man's wealth was measured by the number and size of his herds—Abraham, it is said, was rich in cattle—and oxen for a long period formed, as they still do among many savage or semi-savage tribes, the favourite medium of exchange between individuals and communities. After the introduction of a metal coinage into ancient Greece, this method of exchange was commemorated by stamping the image of an ox on the new money; while the connexion between cattle and coin as symbols of wealth has left its mark on the languages of Europe, as is seen in the Latin word *pecunia* and the English "pecuniary," derived from *pecus*, cattle. The value attached to cattle in ancient times is further shown by the Bull figuring among the signs of the zodiac; in its worship by the ancient Egyptians under the title of Apis; in the veneration which has always been paid to it by the Hindus, according to whose sacred legends it was the first animal created by the three divinities directed by the supreme Deity to furnish the earth with animated beings; and in the important part it played in Greek and Roman mythology. The Hindus were not allowed to shed the blood of the ox, and the Egyptians could only do so in sacrificing to their gods. Both Hindus and Jews were forbidden to muzzle it when treading out the corn; to destroy it wantonly was a crime among the Romans, punishable with exile.

Breeds.—There exist in Britain four interesting remnants of what were at one time numerous enclosed herds of ancient forest cattle,[1] with black or red points, in parks at Chillingham, Cadzow, Vaynol (near Bangor, North Wales) and Chartley. A few of the last have been removed to Woburn. Other representatives of old stock are—a resuscitated white Welsh breed with black points, derived from white specimens born of black Welsh cows; several herds of a white polled breed with black points; a herd of the ancient Polled Suffolk Dun, an excellent milking breed; a White Belted Galloway and a White Belted Welsh breed; the old Gloucester breed at Badminton, with a white rump, tail and underline, related to the now extinct Glamorgan breed; the Shetland breed; and a few herds of Dutch cattle preserved for their superior milking powers.

The prominent breeds of cattle in the British Isles[2] comprise the Shorthorn, Lincolnshire Red Shorthorn, Hereford, Devon, South Devon, Sussex, Welsh, Longhorn, Red Polled, Aberdeen-Angus, Galloway, West Highland, Ayrshire, Jersey, Guernsey, Kerry and Dexter.

The Shorthorn, Lincolnshire Red Shorthorn, Hereford, Devon, South Devon, Sussex, Longhorn and Red Polled breeds are native to England; the Aberdeen-Angus, Galloway, Highland and Ayrshire breeds to Scotland; and the Kerry and Dexter breeds to Ireland. The Jersey and Guernsey breeds—often spoken of as Channel Islands cattle—belong to the respective islands whose names they bear, and great care is taken to keep them isolated from each other. The term Alderney is obsolete, the cattle of Alderney being mainly a type of the Guernsey breed.

Among breeds well known in the United States[3] and not mentioned above, the more important are the Holsteins, large black and white cattle highly valued for their abundant milk production, and the Dutch Belted breed, black with a broad white band round the body, also good milkers.

The *Shorthorn*[3] is the most widely distributed of all the breeds of cattle both at home and abroad. No census of breeds has ever been taken in the United Kingdom, but such an enumeration would show the Shorthorn far to exceed in numbers any other breed, whilst the great majority of cross-bred cattle contain Shorthorn blood. During the last quarter of the 18th century the brothers Charles Colling (1751–1836) and Robert Colling (1749–1820), by careful selection and breeding, improved the cattle of the Teeswater district in the county of Durham. If the Shorthorn did not originate thus, it is indisputable that the efforts of the Collings[4] had a profound influence upon the fortunes of the breed. It is still termed the Durham breed in most parts of the world except the land of its birth, and the geographical name is far preferable, for the term "shorthorn" is applicable to a number of other breeds. Other skilled breeders turned their attention to the Shorthorns and established famous strains, the descendants of which can still be traced. By Thomas Booth, of Killerby and Warlaby in Yorkshire (1777), the "Booth" strains of Shorthorns were originated; by Thomas Bates, of Kirklevington in Yorkshire, the "Bates" families[5] (1800).

The Shorthorn is sometimes spoken of as the ubiquitous breed, its striking characteristic being the ease with which it adapts itself to varying conditions of soil, climate and management. It is also called the "red, white and roan." The roan colour is very popular, and dark red has its supporters, as in the case of the *Lincolnshire Red Shorthorns*; white is not in favour, especially abroad. The Shorthorn breed is more noted for its beef-making than for its milk-yielding properties, although the non-pedigree milking Shorthorn of the north of England is an excellent cow with dual-purpose qualifications of the first order. An effort is being made to restore milking qualities to certain strains of pedigree blood.

The culmination of what may be termed the Booth and Bates period was in the year 1875, when the sales took place of Lord Dunmore's and William Torr's herds, which realized extraordinary prices. In that black year of farming, 1879, prices were declining, and they continued to do so till within the last few years of the close of the 19th century, when there set in a gradual revival, stimulated largely by the commercial prosperity of the country. The result of extremely high prices when line-bred animals were in fashion was a tendency to breed from all kinds of animals that were of the same tribe, without selection. A deterioration set in, which was aggravated by the overlooking of the milking properties. Shorthorn breeders came to see that change of blood was necessary. Meanwhile, for many years breeders in Aberdeenshire had been holding annual sales of young bulls and heifers from their herds. The late Amos Cruickshank began his annual sales in the 'forties, and the late W. T. Talbot-Crosbie had annual sales from his Shorthorn herd in the south-west of Ireland for a number of years. Many Aberdeen farmers emigrated to Canada, and bought Shorthorn calves in their native county to take with them. The Cruickshanks held their bull sales at that time, and many of their animals were bought by the small breeders in Canada. This continued until 1875, when the Cruickshanks had so much private demand that they discontinued their public sales. Subsequently, when Cruickshank sold his herd privately

[1] Rev. J. Storer, *The Wild White Cattle of Great Britain* (1879).

[2] See Wallace's *Farm Live Stock of Great Britain* (1907), Low's *Breeds of the Domestic Animals of the British Isles* (1842, illustrated, and 1845), and E. V. Wilcox's *Farm Animals* (1907), an American work.

[3] Shorthorn Society of Great Britain and Ireland (1822). Sec. E. J. Powell, 12 Hanover Square, London, W.

[4] C. J. Bates, "The Brothers Colling," *Jour. Roy. Agric. Soc.* (1899).

[5] C. J. Bates, *Thomas Bates and the Kirklevington Shorthorns: a Contribution to the History of Pure Durham Cattle* (Newcastle-upon-Tyne, 1897).

to James Nelson & Sons for exportation, the animals could not all be shipped, and W. Duthie, of Collynie, Aberdeenshire, bought some of the older cows, whilst J. Deane Willis, of Bapton Monar, Wilts, bought the yearling heifers. Duthie thereupon resumed the sales that the Cruickshanks had relinquished, his averages being £30 in 1892, about £50 in 1893–1894, and £80 in 1895. These prices advanced through English breeders requiring a little change of blood, and also through the increasing tendency to exhibit animals of great substance, or rather to feed animals for show. The success of this movement strengthened the demand, whilst an inquiry for his line of blood arose in the United States and Canada. A faithful contemporary history of the Shorthorn breed is to be found in *Thornton's Circular*, published quarterly since 1868; see also J. Sinclair, *History of Shorthorn Cattle* (1907); R. Bruce, *Fifty Years among Shorthorns* (1907); A. H. Sanders, *Shorthorn Cattle* (Chicago, 1901).

The *Lincolnshire Red Shorthorns* are the best dual-purpose cattle—for milk and meat—that possess a pedigree record, in the United Kingdom, and their uniform cherry red colour has brought them into high favour in tropical countries for crossing with the native breeds.

The *Hereford* breed is maintained chiefly in Herefordshire and the adjoining counties. Whilst a full red is the general colour of the body, the Herefords are distinguished by their white face, white chest and abdomen, and white mane. The legs up to the knee or hock are also often white. As a protection against the sun in a hot climate dark spots on the eyelids or round the orbits are valuable. The horns are moderately long. Herefords, though they rear their own calves, have acquired but little fame as dairy cattle. They are very hardy, and produce beef of excellent quality. Being docile, they fatten easily and readily, and as graziers' beasts they are in high favour.

When the Bates' Shorthorn bubble burst in America about 1877, the Hereford gradually replaced the Shorthorn of the western ranches, and it is now the most numerous ranch animal in the United States and Canada. The bulls beat the bulls of all other breeds in "rustling" capacity.

In America the ranch-bred Herefords have got too small in the bone in recent years, and Shorthorns, chiefly of the Scottish type, are being introduced to increase their size by crossing. In the "feed lot" a well-bred Hereford steer feeds more quickly than either a Shorthorn or an Aberdeen-Angus.

In Queensland, Hereford cattle bred from the "Lord Wilton" strain by Robert Christison of Lammermoor have for years been triumphant as beef-producers in competition with the Shorthorn. When these are quartered in the ordinary butchers' fashion, the hind-quarters outweigh the fore-quarters, which is a reversal of the prevailing rule.

North Devons.—The "Rubies of the West," as they are termed from their hue, are reared chiefly in Devon and Somerset. The colour is a whole red, its depth or richness varying with the individual, and in summer becoming mottled with darker spots. The Devons stand somewhat low; they are neat and compact, and possess admirable symmetry. Although a smaller breed than the Shorthorn or the Hereford, they weigh better than either. The horns of the female are somewhat slender, and often curve neatly upwards. Being fine-limbed, active animals, they are well adapted for grazing the poor pastures of their native hills, and they turn their food to the best account, yielding excellent beef. They have not yet attained much celebrity as milch kine, for, though their milk is of first-class quality, with a few notable exceptions, its quantity is small. Latterly, however, the milking qualities have received more attention from breeders, whose object is to qualify the Devon as a dual-purpose breed.

The *South Devon* or *South Hams* cattle are almost restricted to that southern part of the county of Devon known as the Hams, whence they are also called "Hammers." With a somewhat ungainly head, lemon-yellow hair, yellow skin, and large but hardly handsome udder, the South Devon breed more resembles the Guernsey, with which it is supposed to be connected, than the trim-built cattle of the hills of North Devon. The cows are large, heavy milkers, and produce excellent butter. They are rarely seen outside their locality except when they appear in the showyards.

The *Sussex* breed resembles the North Devon in many respects, but it is bigger, less refined in appearance, less graceful in outline, and of a deeper brown-chestnut colour than the "dainty Devon," as the latter may well be called when compared with them. As a hardy race, capable of thriving on poor rough pastures, the Sussex are highly valued in their native districts, where they were rapidly improved before the end of the 19th century. They are essentially a beef-producing breed, the cows having little reputation as milkers. By stall-feeding they can be ripened for the butcher at an early age. Sussex cattle are said to "die well," that is, to yield a large proportion of meat in the best parts of the carcase.

In the *Welsh* breed of cattle black is the prevailing colour, and the horns are fairly long. They do not mature very rapidly, but some of them grow eventually into great ponderous beasts, and their beef is of prime quality. The cows often possess considerable reputation as milkers. As graziers' beasts Welsh cattle are well known in the midland counties of England, where, under the name of "Welsh runts," large herds of bullocks are fattened on the pastures or "topped up" in the yards in winter.

All the remaining strains of Welsh cattle were recognized as one breed in 1904, when the Welsh Black Cattle Society united into one register the Herd Books of North and South Wales.

The *Longhorn* or "Dishley" breed of cattle is one of the most interesting historically. It was with Longhorns that Robert Bakewell, of Dishley, Leicestershire (1726–1795), showed his remarkable skill as an improver of cattle in the middle of the 18th century.[1] At one period Longhorns spread widely over England and Ireland, but, as the Shorthorns extended their domain, the Longhorns made way for them. They are big, rather clumsy animals, with long drooping horns, which are very objectionable in these days of cattle transport by rail and sea. They are slow in coming to maturity, but are very hardy. The bullocks feed up to heavy weights, and the cows are fair milkers. No lover of cattle can view these quaint creatures without a feeling of satisfaction that the efforts made to resuscitate a breed which has many useful qualities to commend it have been successful, and that the extinction which threatened it in the 'eighties of last century is no longer imminent. In 1907 there were twenty-two Longhorn herds containing about four hundred registered cattle located mainly in the English midlands and Man.

The *Red Poll* breed, though old, has only come into prominence within recent years. They were known as the East Anglian Polls, and later as the Norfolk and Suffolk Polled cattle, being confined chiefly to these two counties. They are symmetrically built, of medium size, and of uniformly red colour. They have a tuft of hair on the poll. As dairy cattle, they are noted for the length of the period during which they continue in milk. Not less are they valued as beef-producers, and, as they are hardy and docile, they fatten readily and mature fairly early. Hence, like the Lincolnshire Red Shorthorn, they may claim to be a dual-purpose breed. As beef cattle they are always seen to advantage at the Norwich Christmas cattle show, held annually in November.

The *Aberdeen-Angus*, a polled, black breed, the cows of which are often termed "Doddies," belongs to Aberdeenshire and adjacent parts of Scotland, but many herds are maintained in England and some in Ireland. The steers and heifers fed for the butcher attain great weight, make first-class show beasts, and yield beef of excellent quality. The cross between the Shorthorn and the Aberdeen-Angus is a favourite in the meat markets and at fat-stock competitions.

The *Galloways* are named from the district, Kirkcudbright and Wigtonshire, in the south-west of Scotland, to which they are native. Like the Aberdeen-Angus cattle, they are hornless, and normally of a black colour. But, with a thicker hide and shaggy hair, suited to a wet climate, they have a coarser appearance than the Aberdeen-Angus, the product of a less humid region, though

[1] Housman, "Robert Bakewell," *Jour. Roy. Agric. Soc.* (1894).

SHORTHORN BULL.

DEVON BULL.

HEREFORD BULL.

SOUTH DEVON BULL.

BREEDS OF ENGLISH CATTLE.

(From photographs by F. Babbage.)

LONGHORN BULL

RED POLLED BULL

WELSH BULL

SUSSEX BULL

BREEDS OF ENGLISH AND WELSH CATTLE.

(From photographs by F. Babbage.)

ABERDEEN-ANGUS BULL.

GALLOWAY BULL.

AYRSHIRE COW.

HIGHLAND BULL.

BREEDS OF SCOTCH CATTLE.

(From photograph by F. Babbage.)

CATTLE

KERRY COW.

JERSEY COW.

DEXTER BULL.

GUERNSEY COW.

BREEDS OF IRISH AND CHANNEL ISLANDS CATTLE.

(From photographs by F. Babbage.)

The comparative sizes of the animals are indicated by the scale of reproduction of the photographs.

it approaches the latter in size. Galloways yield superior beef, but mature less rapidly than the Aberdeen-Angus. They make admirable beasts for the grazier, and the cross between the Galloway and the white Shorthorn bull, known as a "Blue Grey," is much sought after by the grazier and the butcher.

The *West Highland* or Kyloe breed are perhaps the most hardy and picturesque of British cattle. Their home is amidst the wild romantic scenery of the Highlands and the Western Isles of Scotland, though Highland bullocks with long, spreading curved horns may be seen in English parks. They have not made much progress towards early maturity, but their slowly ripened beef is of the choicest quality. The colour of their thick shaggy hair varies from white and light dun to tawny yellow of many shades, and black.

The *Ayrshires* are the dairy breed of Scotland, where they have considerably overstepped the limits of the humid western county whence they take their name. They are usually of a white and brown colour, the patches being well defined. The neat, shapely, upstanding horns are characteristic. The Ayrshires are under medium size and move gracefully, and the females display the wedge-shape typical of dairy cows. They are a hardy breed, and, even from poor pastures, give good yields of milk, especially useful for cheese-making purposes. The milking powers of the breed are being improved under a system of milk-testing and records supported by the Highland and Agricultural Society.

The *Jerseys* are graceful, deer-like cattle, whose home is in the island of Jersey, where, by means of stringent regulations against the importation of cattle, the breed has been kept pure for many generations. As its milk is especially rich in fat (so rich that it requires to be diluted with a little water before it can be safely fed to calves), the Jersey has attained a wide reputation as a butter-producing breed. It is a great favourite in England, where many pure-bred herds exist. The colours most preferred are "whole" fawns of many shades. The light silver-grey, which was in high repute in England in the early 'seventies of the 19th century, is out of favour. Browns and brindles are rarely seen. The grey zone surrounding the black muzzle gives the appearance designated "mealy-mouthed." The horns are short, and generally artificially curved inwards; the bones are fine. The best milch cows have a yellowish circle round the eye, and the skin at the extremity of the tail is of a deep yellow, almost orange colour. The cows are gentle and docile when reared in close contact with human beings, but the bulls, despite their small size, are often fierce.

Guernsey cattle are native to the islands of Guernsey, Alderney, Sark and Herm. They are kept pure by importation restrictions. Herds of pure-bred Guernseys also exist in the Isle of Wight and in various counties of England and Scotland. They have not the refined and elegant appearance of the Jerseys, which, however, they exceed in size. They are usually of a rich yellowish-brown colour, patched with white, in some cases their colour almost meriting the appellation of "orange and lemon." The yellow colour inside the ears is a point always looked for by judges. The cows, large-bellied and narrow in front, are truly wedge-shaped, the greatly developed udder adding to the expanse of the hinder part of the body. They yield an abundance of milk, rich in fat, and are excellent butter-producers. The horns are yellow at the base, curved, and not coarse. The nose is flesh-coloured and free from black markings.

The *Canadian* breed, black with a narrow brown stripe down the back and a light ring round the muzzle, are descended from old Brittany cattle imported into Canada by French settlers three hundred years ago, and are in consequence related to the Channel Islands cattle. They are remarkably hardy and good milkers, and it is claimed they produce butter fat at 2 c. a lb less cost than any other breed.

The *Kerry* is a breed of small black cattle belonging to the south-west of Ireland, whence they have spread into many parts, not only of their native land, but of England as well. Although they are able to subsist on the roughest and scantiest of fare, and are exceedingly hardy, the cows are, nevertheless, excellent milkers, and have acquired celebrity as a dairy breed. The colour is black, but the cows sometimes have a little white on the udder. The horns are white, with black tips, and are turned upwards. The Kerry is active and graceful, long and lithe in body, and light-limbed. On the rich pastures of England it has increased considerably in size.

The *Dexter* breed is reputed to take its name from one Dexter, agent of Maude, Lord Hawarden, who is credited with having established it by selection and breeding from the best mountain types of the Kerry. Until recently it was called the Dexter-Kerry. It is smaller and more compact than the Kerry, shorter in the leg, and intoed before and behind. Whilst valuable as a beef-making animal, it is equally noted for its milk-producing capacity. Black is the usual colour, but red is also recognized, with, in either case, a little white. When of a red colour, the appearance of the animal has been aptly compared to that of a grand Shorthorn viewed through the wrong end of a telescope. The Kerry and the Dexter are readily distinguishable. The Kerry has a gay, light, deer-like head and horn, light limbs and thin skin. The Dexter has coarser limbs, a square body, flat back, thick shoulder, short neck, and head and horn set on low.

A herd of *Dexter-Shorthorns* was founded by Major Barton at Straffan, Ireland, in 1860, in which prominent characteristics of the two breeds have been permanently blended so that they breed true to type.

As milk-producers, and therefore as dairy cattle, certain strains of the Shorthorn (registered as well as non-pedigree), the Lincolnshire Red Shorthorn, South Devon, Longhorn, Red Polled, Ayrshire, Jersey, Guernsey, Kerry and Dexter breeds have acquired eminence. Such breeds as the Shorthorn, Lincolnshire Red Shorthorn, South Devon, Welsh, Red Polled and Dexter are claimed as useful beef-makers as well as milk-producers, and are classified as dual-purpose animals. The others belong to the beef-producers. As regards colour, red is characteristic of the Lincolnshire Shorthorn, the Hereford, Devon, Sussex and Red Polled. Black is the dominating colour of the Welsh, Aberdeen-Angus, Galloway, Kerry and Dexter. A yellowish hue is seen in the West Highland, Guernsey and South Devon breeds. Various shades of fawn colour are usual in Jersey cattle and also appear among Highlanders. The Herefords, though with red bodies, have white faces, manes, and dewlaps, whilst white prevails to a greater or less extent in the Shorthorn, Longhorn and Ayrshire breeds. The Shorthorn breed is exceedingly variable in colour; pure-bred specimens may be red, or white, or roan, or may be marked with two or more of these colours, the roan resulting from a blending of the white and red. Black is not seen in a pure-bred Shorthorn. The biggest and heaviest cattle come from the beef-making breeds, and are often cross-bred. Very large or heavy beasts, if pure-bred, usually belong to one or other of the Shorthorn, Hereford, Sussex, Welsh, West Highland, Aberdeen-Angus and Galloway breeds. The Devon, Red Polled and Guernsey are medium-sized cattle; the Ayrshires are smaller, although relatively the bullocks grow larger than bulls or cows. The Jerseys are small, graceful cattle, but the smaller type of Kerries, the Dexters and the Shetlanders furnish the smallest cattle of the British Isles.

See generally the *Herd Books* of the various breed societies.

(W. Fr.; R. W.)

Rearing and Feeding.[1]—A calf at birth scales from one-twelfth to one-fourteenth the weight of the dam. A sucking calf of one of the large breeds should gain 3 lb per day for the first month, 2·5 lb for the second, and 2 lb during the later calf period. Colostrum, or first-day milk after calving, contains more than five times the albuminoid compounds found in average cows' milk. In the course of three or four days it gradually becomes normal in composition, although the peculiar flavour remains a few days longer. Nature has specially prepared it for the young

[1] See E. Wolff, *Farm Foods*, by H. H. Cousins (1895); A. D. Hall, *Rothamsted Experiments* (1905); R. Warington, *Chemistry of the Farm* (15th ed., 1902); W. A. Henry, *Feeds and Feeding* (1907); H. W. Mumford, *Beef Production* (1907); H. P. Armsby, *Animal Nutrition* (2nd ed., 1906); T. Shaw, *Animal Breeding* (1903); R. Wallace, *Farm Live Stock of Great Britain* (4th ed., 1907).

calf with extremely nourishing and also laxative properties, and it is of practically no value for any other purpose. Normal cows' milk has an albuminoid ratio slightly narrower than 1 : 4–colostrum 1 : ·71. [The ratio is arrived at by adding to the percentage of milk-sugar, possessing about the food equivalent of starch, the fat multiplied by 2·268, and dividing by the total albuminoids—all digestible.]

Common nutrient ratios for older animals are stated in the following table of food standards by Dr Emil Wolff:—

	Food Consumed per Day.					
	Dry.			Digestible.		
	Live Weight.	Organic Matter.	Albuminoid.	Fats.	Carbo-Hydrates.	Albuminoid Ratio.
	lb	lb	lb	lb	lb	lb
Calves, growing, 2 to 3 months	150	3·3	0·6	0·30	2·1	1 : 4·7
Young cattle ,, 3 to 6 ,,	300	7·0	1·0	0·30	4·1	1 : 5
,, ,, 6 to 12 ,,	500	12·0	1·2	0·30	6·8	1 : 6
,, ,, 12 to 18 ,,	700	16·8	1·4	0·28	9·1	1 : 7
,, ,, 18 to 24 ,,	850	20·4	1·4	0·26	10·3	1 : 8
Oxen in complete rest	1000	27·5	0·7	0·15	8·0	1 : 12
,, fattening, 1st period . . .	1000	27·0	2·5	0·50	15·0	1 : 65
,, ,, 2nd period . . .	1000	26·0	3·0	0·70	14·8	1 : 5·5
,, ,, 3rd period . . .	1000	25·0	2·7	0·60	14·8	1 : 6
Milch cows	1000	24·0	2·5	0·40	12·5	1 : 5·4

Digestible albuminoid nitrogen is the scarcest and consequently the costliest ingredient in food-stuffs, but, since the introduction of vegetable proteid made by Mitchell's process from the castor bean, an easy and inexpensive means of balancing cattle food ratios is available. By this means the manurial value of the excrement is increased. The calculations necessary in arriving at a ratio are simplified by the employment of Jeffers's calculator (Plainsboro, N. J.).

There are three common methods of rearing calves. (1) The calf sucks its mother or foster-mother. This is the natural method and the best for the show-yard and for early fattening purposes; but it is the most expensive, and the calves, if not handled, grow up wild and dangerous. Store stock may be also raised by putting two calves to one cow and weaning at three months old; a second pair in turn yielding place to a single calf. (2) Full milk from the cow at about 90° F. is given alone until the latter part of the milk period; then the calf is trained to eat supplementary foods to preserve the calf-fat after weaning. A large calf at first receives daily three quarts of milk at three meals. The amount is increased to 2 gallons by the end of the fourth week, and to 2½ gallons at 3 months, when gradual weaning begins. Linseed cake meal is specially suitable for such calves. (3) The calf receives full milk from the mother for one to two weeks, or better, for three to four weeks; then it is slowly transferred to fortified separated milk or milk substitutes. Cod-liver oil, 2 oz. daily, is a good substitute for butter fat. In America cotton-seed oil, ½ oz. to the quart of milk, or an equivalent of oleomargarine heated to 110° F. and churned with separated milk, has produced a live-weight-increase of 2 lb daily. Linseed simmered to a jelly and added to separated milk gives good results. Moderate amounts are easily digested. Oatmeal or maize meal containing 10% of linseed meal does well, later, at less cost. Milk substitutes and calf meals require close attention in preparation, and would not fetch the prices they do if feeders possessed the technical knowledge necessary to select and mix common foods. Ground cake or linseed meal is, after a time, better given dry than cooked, being then better masticated and not so liable to produce indigestion.

Grass or fine hay in racks is provided when the calf can chew the cud. As cattle get older, live-weight-increase grows less. Smithfield weights[1] show that a good bullock up to a year old will increase 2 lb daily, a two-year-old 1¾ lb, and a three-year-old a little over 1½ lb.

Cattle feeding on a farm consume crude produce that is inconvenient to market, and make farmyard manure; but there is frequently no profit left. To secure the balance on the right side the inlaid price per live cwt. requires to be 5s. less than the sale price—say 32s. per cwt. for lean cattle, and 37s. per cwt. for the animal when sold fat and capable of producing 60% of dressed beef. The ordinary animal yields only about 57%. A well-bred fattening bullock begins with 2 lb of cake and meal per day, increasing to 8 lb at the end of five months (6 lb on an average), and receives ¾ cwt. of roots and 12 lb of straw; at an average cost of about 4s. 3d. per imperial stone or 50s. per cwt. of dressed carcase. Heifers feed faster than bullocks, and age tells on the rate at which an animal will mature: a three-year-old will develop into prime beef more quickly and easily than a two-year-old. It is difficult to produce "baby beef" at a profit, and it can only be done with picked animals of the best flesh-producing breeds, which cannot be bought at a price per cwt. below the finished sale price, for animals producing baby beef must from start to finish (under two years old) be at all times fit to go to the fat market. It is true that a very young animal can give a better account of food than an older one, but this advantage is counterbalanced by the tendency to grow rather than to fatten. (See also AGRICULTURE.)

In cold and stormy districts cattle thrive best in covered courts, but in a mild climate they do equally well in open yards with shelter-sheds. The more air they get the less liable they are to tuberculosis—example Lincolnshire and the drier south-eastern counties. The ideal method of house-feeding cattle is singly in boxes 10 ft. square, where they are undisturbed, and where the best manure is made because it is not washed by rain.

On the finest British grazing lands two lots of cattle are fed in one season. The first is finished early in July, having, without artificial feeding, laid on eight to nine stones of beef. The second lot requires three or four pounds of undecorticated cotton cake each towards the end of September and in October when grass begins to fail. (R. W.)

CATULLUS, GAIUS VALERIUS (?84–54 B.C.), the greatest lyric poet of Rome. As regards his names and the dates of his birth and death, the most important external witness is that of Jerome, in the continuation of the Eusebian *Chronicle*, under the year 87 B.C., "Gaius Valerius Catullus, scriptor lyricus Veronae nascitur," and under 57 B.C., "Catullus xxx. aetatis anno Romae moritur." There is no controversy as to the gentile name, *Valerius*. Suetonius, in his *Life of Julius Caesar* (ch. 73), mentions the poet by the names "Valerium Catullum." Other persons who had the *cognomen* Catullus belonged to the Valerian gens, *e.g.* M. Valerius Catullus Messalinus, a *delator* in the reign of Domitian, mentioned in the fourth satire of Juvenal (l. 113):—

"Et cum mortifero prudens Veiento Catullo."

Inscriptions show, further, that *Valerius* was a common name in the native province of Catullus, and belonged to other inhabitants of Verona besides the poet and his family (Schwabe, *Quaestiones Catullianae*, p. 27). Scholars have been divided in opinion as to whether his *praenomen* was *Gaius* or *Quintus*, and in the best MSS. the volume is called simply *Catulli Veronensis liber*. For *Gaius* we have the undoubted testimony, not only of Jerome, which rests on the much earlier authority of Suetonius, but also that of Apuleius. In support of *Quintus* a passage was quoted from the *Natural History* of Pliny (xxxvii. 6, 81). But the *praenomen* Q. is omitted in the best MSS., and in other passages of the same author the poet is spoken of as "Catullus Veronensis." The mistake may have arisen from confusion with Q. Catulus, the colleague of Marius in the Cimbric War, himself also the author of lyrical poems. Allusions in the poems show that the date of his death given by Jerome (57 B.C.) is wrong, and that Catullus survived the second consulship of Pompey (55 B.C.) (cf. lv. 6, cxiii. 2), and was present in August of the

[1] E. J. Powell, *History of the Smithfield Club from 1798 to 1900* (1902).

following year at the prosecution of Vatinius by Licinius Calvus (cf. liii.). The allusion in lii. 3—

"Per consulatum peierat Vatinius,"

does not prove that Catullus must have lived to see the consulship bestowed on Vatinius in the end of 47 B.C. but only that Vatinius, after being praetor in 55 B.C., was in the habit of boasting of the certainty of his attaining the consulship, as Cleopatra was in the habit of confirming her most solemn declarations by appealing to her hope of one day administering justice in the Capitol (cf. Haupt, "Quaestiones Catullianae," *Opuscula*, vol. i. 1875). There is then nothing to prove that Catullus lived beyond the month of August 54 B.C. Some of the poems (as xxxvii. and lii.) may have been written during his last illness. If he died in 54 B.C. or early in 53 B.C., Catullus must either have been born later than 87 B.C., or have lived to a greater age than thirty. Catullus is described by Ovid as "hedera iuvenalia cinctus Tempora" (*Amor.* iii. 9. 61),—a description somewhat more suitable to a man who dies in his thirtieth year than to one who dies three or four years later. Further, the age at which a man dies is more likely to be accurately remembered than the particular date either of his death or of his birth, and the common practice of recording the age of the deceased in sepulchral inscriptions must have rendered a mistake about this less likely to occur. It seems, therefore, on the whole, most likely that Jerome's words "xxx. aetatis anno" are correct, and that Catullus was born in 84 B.C.

The statement that he was born at Verona is confirmed by passages in Ovid and Martial. Pliny the elder, who was born at Como, speaks of Catullus in the preface to his *Natural History*, as his "countryman" (*conterraneus*), and the poet speaks of Verona as his home, or at least his temporary residence, in more than one place. His occasional residence in his native place is further attested by the statement of Suetonius (*Julius Caesar*, 73), that "Julius Caesar accepted the poet's apology for his scurrilous verses upon him, invited him to dine with him on the same day, and continued his intimacy with his father as before." As this incident could only have happened during the time that Julius Caesar was pro-consul, the scene of it must have been in the Cisalpine province, and at the house of the poet's father, in or near Verona. The verses apologized for were those contained in poems xxix. and lvii., the former of which must have been written after Caesar's invasion of Britain, so that this interview probably took place in the winter of 55–54 B.C. The fact that his father was the host of the great pro-consul, and lived on terms of intimacy with him, justifies the inference, that he was, in wealth and rank, one of the principal men of the province. The only other important statement concerning the poet's life which rests on external authority is that of Apuleius, that the real name of the Lesbia of the poems was Clodia. Another, which concerns the reputation which he enjoyed after his death, is given in the *Life of Atticus* by Cornelius Nepos (12. 4). It is to the effect that he regarded Lucretius and Catullus as the two greatest poets of his own time.

The poems of Catullus consist of 116 pieces, varying in length from 2 to 408 lines, the great mass of them being, however, short pieces, written in lyric, iambic or elegiac metre. The arrangement cannot be the poet's; it is neither chronological nor in accordance with the character of the topics. The shorter poems, lyric or iambic, are placed first, next the longer epithalamia, (most being written in hexameters) amongst which the *Attis* is inserted and then those written in the elegiac metre. But, though no chronological order is observed, yet internal evidence enables us to determine the occasions on which many of the poems were written, and the order in which they followed one another. They give a very vivid image of various phases of the poet's life, and of the strong feelings with which persons and things affected him. They throw much light also on the social life of Rome and of the provincial towns of Italy in the years preceding the outbreak of the second civil war. In this respect they may be compared with the letters of Cicero.

The poems extend over a period of seven or eight years, from 61 or 62 till 54 B.C. Among the earliest are those which record the various stages of the author's passion for Lesbia. It is in connexion with this passion that he is generally mentioned, or alluded to, by the later Roman poets, such as Propertius, Ovid, Juvenal and Martial. Her real name, as we learn from Apuleius, was Clodia. The admiration of Catullus for Sappho, the Lesbian poetess, which is clearly indicated by the imitation of her language in his fifty-first and sixty-second poems, affords an obvious explanation of the Greek name which he gave to his Roman mistress. Clodia was the notorious sister of Publius Clodius Pulcher, and in the year 56 she charged M. Caelius Rufus, after tiring of him, as she had of Catullus, with an attempt to poison her. It was in defence of Rufus that Cicero described the spell she exercised over young men, in language which might have been applied to her previous relations with the youthful poet, as well as those with the youthful orator and politician.

Poems concerning Lesbia occur among both the earliest and the latest of those contained in the series. They record the various stages of passion through which Catullus passed, from absolute devotion and a secure sense of returned affection, through the various conditions of distrust and jealousy, attempts at renunciation, and short-lived "amoris integrationes," through the "odi et amo" state, and the later state of savage indignation against both Lesbia and his rivals, and especially against Caelius Rufus, till he finally attains, not without much suffering and loss, the last state of scornful indifference. Among the earliest of the poems connected with Lesbia, and among those written in the happiest vein, are ii. and iii., and v. and vii. The 8th, "Miser Catulle, desinas ineptire," perhaps the most beautiful of them all, expresses the first awakening of the poet to a sense of her unworthiness, before the gentler have given place to the fiercer feelings of his nature. His final renunciation is sent in a poem written after his return from the East, with a union of imaginative and scornful power, to his two butts, Furius and Aurelius (xi., "Furi et Aureli, comites Catulli"), who, to judge by the way Catullus writes of them, appear to have been hangers-on upon him, who repaid the pecuniary and other favours they received by giving him grounds for jealousy, and making imputations on his character (cf. xv., xvi., xviii., xxiii.).

The intrigue of Caelius Rufus with Lesbia began in 59 or 58 B.C. It was probably in the earlier stages of this liaison that the 68th poem was written, from which it appears that Catullus, at the time living at Verona, and grieving for the recent death of his brother in the Troad, had heard of Lesbia's infidelity, and, in consideration of her previous faithlessness in his favour, was not inclined to resent it very warmly. Two other poems in the series express the grief which Catullus felt for the death of his brother,—one, the 65th, addressed to the orator Hortensius, who is there, as in some of Cicero's letters, called Hortalus or Ortalus, and sent to him along with the *Coma Berenices* (lxvi.), a translation of a famous elegy of Callimachus. The other poem referring to this event (ci.) must have been composed some years later, probably in 56 B.C., when Catullus visited his brother's tomb in the Troad, on his return from Bithynia. Between 59 and 57 B.C. most of the lampoons on Lesbia and her numerous lovers must have been written (*e.g.* xxxvii., xxxix., &c.). Some, too, of the poems expressive of his more tender feelings to her, such as viii. and lxxvi. belong also to these years; and among the poems written either during this period or perhaps in the early and happier years of his liaison, some of the most charming of his shorter pieces, expressing the affection for his young friends Verannius and Fabullus (ix., xii., xiii.), may be included.

In the year 57 the routine of his life was for a short time broken by his accompanying the propraetor C. Memmius, the friend to whom Lucretius dedicates his great poem, as one of his staff, to the province of Bithynia. His object was probably to better his fortunes by this absence from Rome, as humorous complaints of poverty and debt (xiii., xxvi.) show that his ordinary means were insufficient for his mode of life. He frankly acknowledges the disappointment of these hopes, and still more frankly his disgust with his chief (x., xxviii.). Some of the most charming and perfect among the shorter poems express the delight with which the poet changed the dulness and sultry climate of the

province for the freedom and keen enjoyment of his voyage home in his yacht, built for him at Amastris on the Euxine, and for the beauty and peace of his villa on the shores of Lake Benacus, which welcomed him home "wearied with foreign travel." To this period and to his first return to Rome after his visit to his native district belong the poems xlvi., ci., iv., xxxi. and x., all showing by their freshness of feeling and vivid truth of expression the gain which the poet's nature derived from his temporary escape from the passions, distractions and animosities of Roman society. Two poems, written in a very genial and joyous spirit, and addressed to his younger friend Licinius Calvus (xiv. and l.), who is ranked as second only to himself among the lyrical poets of the age, and whose youthful promise pointed him out as likely to become one of the greatest of Roman orators, may, indeed, with most probability be assigned to these later years (xiv.). From the expression "Odissem te odio Vatiniano," in the third line of xiv., it may be inferred that the poem was written not earlier than December (the "Saturnalia") of the year 56 B.C., as it was early in that year, as we learn from a letter of Cicero to his brother Quintus (ii. 4. 1), that Calvus first announced his intention of prosecuting Vatinius. The short poem numbered liii. would be written in August 54 B.C. The poems which have left the greatest stain on the fame of Catullus—those "referta contumeliis Caesaris," the licentious abuse of Mamurra, and probably some of those personal scurrilities addressed to women as well as men, or too frank confessions, which posterity would willingly have let die, may well have been written in the last years of his life, under the influence of the bitterness and recklessness induced by his experience. It cannot be determined with certainty whether the longer and more artistic pieces, which occupy the middle of the volume—the *Epithalamium* in celebration of the marriage of Manlius Torquatus, the 62nd poem, written in imitation of the Epithalamia of Sappho, "Vesper adest: iuvenes, consurgite"; the *Attis*, and the Epic Idyll representing the marriage festival of Peleus and Thetis —belong to the earlier or the later period of the poet's career. If the person addressed in the first part of the 68th is the Manlius of the *Epithalamium*, and the lines from 3 to 8—

"Naufragum ut eiectum ... pervigilat,"

refer to the death of Vinia, it would follow that the first Epithalamium was written some time before that poem, and thus belongs to the earlier time. While the translations of Sappho,—

"Ille mi par esse deo videtur,"

and of Callimachus (lxvi.),—

"Omnia qui magni dispexit lumina mundi,"

belong to the earlier period, the *Attis* and the *Peleus and Thetis*; although perhaps suggested by the treatment of the same or similar subjects in Greek authors, are executed with such power and originality as declare them to be products of the most vigorous stage in the development of the poet's genius. That his genius came soon to maturity is a reason for hesitation in assigning any particular time between 62 and 54 B.C. for the composition of the *Attis* and of that part of the *Epithalamium* ("Peliaco quondam prognatae vertice pinus") which deals with the main subject of the poem. But the criticism of Munro in his edition of Lucretius, which shows similarities of expression that cannot be mere casual coincidences, between the Ariadne-episode in the *Epithalamium* of Catullus (from line 52 to 266) and the poem of Lucretius, leaves little doubt that that portion at least of the poem was written after the publication of the *De rerum natura*, in the winter of 55–54 B.C.

No ancient author has left a more vivid impression of himself on his writings than Catullus. Coming to Rome in early youth from a distant province, not at that time included within the limits of Italy, he lived as an equal with the men of his time of most intellectual activity and refinement, as well as of highest social and political eminence. Among those to whom his poems are addressed, or who are mentioned in them, we find the names of Hortensius, Cicero, Cornelius Nepos, Licinius Calvus, Helvius Cinna and Asinius Pollio, then only a youth (xii. 8). Catullus brought into this circle the genius of a great poet, the social vivacity of a vigorous nature, the simplicity and sincerity of an unambitious, and the warmth of an affectionate disposition. He betrays all the sensitiveness of the poetic temperament, but it is never the sensitiveness of vanity, for he is characterized by the modesty rather than the self-confidence which accompanies genius, but the sensitiveness of a heart which gives and expects more sympathy and loyalty in friendship than the world either wants or cares to give in return. He shows also in some of his lighter pieces the fastidiousness of a refined taste, intolerant of all boorishness, pedantry, affectation and sordid ways of life. The passionate intensity of his temperament displays itself with similar strength in the outpourings of his animosity as of his love and affection. It was, unfortunately, the fashion of the time to employ in the expression of these animosities a licence of speech and of imputation which it is difficult for men living under different social conditions to understand, still more difficult to tolerate. Munro has examined the 29th poem—

"Quis hoc potest videre, quis potest pati,"

the longest and most important of the lampoons on Caesar and Mamurra, and shown with much learning and acuteness the motives and intention of Catullus in writing them. Had Julius Caesar really believed, as Suetonius, writing two hundred years afterwards, says he did, that "an eternal stigma had been cast upon him by the verses concerning Mamurra," we should scarcely apply the word magnanimity to his condonation of the offence. But these verses survive as a memorial not of any scandal affecting Julius Caesar which could possibly have been believed by his contemporaries, but of the licence of speech which was then indulged in, of the jealousy with which the younger members of the Roman aristocracy, who a little later fought on the side of Pompey, at that time regarded the ascendancy both of the "father-in-law and the son-in-law," and the social elevation of some of their instruments, and also, to a certain extent, of the deterioration which the frank and generous nature of Catullus underwent from the passions which wasted, and the faithlessness which marred his life.

The great age of Latin poetry extends from about the year 60 B.C. till the death of Ovid in 17 A.D. There are three marked divisions in this period, each with a distinct character of its own: the first represented by Lucretius and Catullus, the second by Virgil and Horace, the last by Ovid. Force and sincerity are the great characteristics of the first period, maturity of art of the second, facility of the last. The educating influence of Greek art on the Roman mind was first fully experienced in the Ciceronian age, and none of his contemporaries was so susceptible of that influence as Catullus. With the susceptibility to art he combined a large share of the vigorous and genial qualities of the Italian race. Like most of his younger contemporaries, he studied in the school of the Alexandrine poets, with whom the favourite subjects of art were the passion of love, and stories from the Greek mythology, which admitted of being treated in a spirit similar to that in which they celebrated their own experiences. It was under this influence that Catullus wrote the *Coma Berenices*, the 68th poem, which, after the manner of the Alexandrines, interweaves the old tale of Protesilaus and Laodamia with the personal experiences of the poet himself, and the *Epithalamium* of Peleus and Thetis, which combines two pictures from the Greek mythology, one of the secure happiness of marriage, the other of the passionate despair of love betrayed. In this last poem Catullus displays a power of creative pictorial imagination far transcending that displayed in any of the extant poetry of Alexandria. We have no means of determining what suggested the subject of the *Attis* to Catullus, whether the previous treatment of the subject by some Greek writer, some survival of the myth which he found still existing during his residence among the "Phrygii Campi," or the growth of various forms of Eastern superstition and fanaticism, at Rome, in the last age of the Republic. Whatever may have been its origin, it is the finest specimen we possess, in either Greek or Latin literature, of that kind of short poem more common in modern than ancient times, in which some situation or passion entirely alien to the writer, and to his own age, is realized with dramatic intensity.

But the genius of Catullus is, perhaps, even happier in the direct expression of personal feeling than in artistic creation, or the reproduction of tales and situations from mythology. The warmth, intensity and sincerity of his own nature are the sources of the inspiration in these poems. The most elaborate and one of the finest of them is the *Epithalamium* in honour of the marriage of a member of the old house of Manlius Torquatus with Vinia Aurunculeia, written in the glyconic in combination with the pherecratean metre. To this metre Catullus imparts a peculiar lightness and grace by making the trochee, instead of the spondee as in Horace's glyconics and pherecrateans, the first foot in the line. His elegiac metre is constructed with less smoothness and regularity than that of Ovid and Tibullus or even of Propertius, but as employed by him it gives a true echo to the serious and plaintive feelings of some of his poems, while it adapts itself, as it did later in the hands of Martial, to the epigrammatic terseness of his invective. But the perfection of the art of Catullus is seen in his employment of those metres which he adapted to the Latin tongue from the earlier poets of Greece, the pure iambic trimeter, as in iv.—

" Phaselus ille quem videtis hospites,"

the scazon iambic, employed in viii. and xxxi.—

" Paeninsularum, Sirmio, insularumque,"

and the phalecian hendecasyllabic, a slight modification of the Sapphic line, which is his favourite metre for the expression of his more joyful moods, and of his lighter satiric vein. The Latin language never flowed with such ease, freshness and purity as in these poems. Their perfection consists in the entire absence of all appearance of effort or reflection, and in the fulness of life and feeling, which gives a lasting interest and charm to the most trivial incident of the passing hour. In reference to these poems Munro has said with truth and force: " A generation had yet to pass before the heroic attained to its perfection; while he (Catullus) had already produced glyconics, phalecians and iambics, each 'one entire and perfect chrysolite,' 'cunningest patterns' of excellence, such as Latium never saw before or after,—Alcaeus, Sappho, and the rest then and only then having met their match."

The work of Catullus has not come down to us intact, as is shown by lacunae and quotations in ancient writers which cannot now be found in his poems. Out of the MSS. only three have claims to intrinsic importance. The oldest and best appears to be the Bodleian (Canon. 30). But little inferior is the *Sangermanensis* (Par. 14137). Of the third, the *Romanus*, we shall be better able to judge when its discoverer, Prof. W. G. Hale, has published his collation. None of these MSS. are older than the 14th century. One poem, 62, is, however, preserved in a MS. of the 9th century (the *Thuaneus*, Par. 8071). Prof. R. Ellis's discovery of the Bodleian MS. and E. Baehrens's recognition of its value opened a new chapter in the history of the text. Ellis's contributions comprise an indispensable commentary (ed. 2, 1889), an elaborate critical edition (ed. 2, 1878) and an English translation (1871) in the metres of the original. The text in the Oxford series, published in 1905, is inferior to those specified below. Baehrens's edition, 2 volumes (text 1876, the second edition by K. P. Schulze is a misnomer; and Latin commentary 1885) is still of value. Amongst other editions with critical or explanatory notes or both may be mentioned those of A. Riese (1884), L. Schwabe (1886, with *index verborum*), B. Schmidt (1887), J. P. Postgate (1889, text differing little from that in the new *Corpus Poetarum*), E. Benoist and E. Thomas, with French translation by Rostand (2 vols., 1882–1890), S. G. Owen (1893, an *édition de luxe*), W. T. Merrill (1893, Boston, U.S.A., with succinct English notes), A. Palmer (1896, one of the best of this scholar's works); M. Haupt's text of the three poets Catullus, Tibullus and Propertius, edited by J. Vahlen, reached its sixth edition in 1904. Of the numerous contributions to the textual and literary criticism of the poems may be named the papers in M. Haupt's *Opuscula*, L. Schwabe's *Quaestiones Catullianae* (1862), B. Schmidt's *Prolegomena*, H. A. J. Munro's *Criticisms and Elucidations of Catullus* (1878; second edition by J. D. Duff, 1905). Translations into English verse by J. Cranstoun (1867), Sir T. Martin (1861, 1876), R. Ellis (above); a recent version in prose with the Latin text by F. W. Cornish (1904). For further information see Teuffel's *History of Roman Literature* (tr. by Warre), § 214, or the more recent accounts by M. Schanz, *Geschichte der römischen Litteratur*, i. §§ 102-106, and Frédéric Plessis, *La Poésie latine* (1909), pp. 143-173. (W. Y. S.; X.)

CATULUS, the name of a distinguished family of ancient Rome of the gens Lutatia. The following are its most important members.

1. Gaius Lutatius Catulus, Roman commander during the First Punic War, consul 242 B.C. He was sent with a fleet of 200 ships to Sicilian waters, and almost without opposition occupied the harbours of Lilybaeum and Drepanum. A hurriedly equipped fleet sent out from Carthage under Hanno was intercepted by the praetor Publius Valerius Falto and totally defeated (battle of the Aegates Islands, March 10, 241). Catulus, who had been wounded at Drepanum, took no part in the operations, but on his return to Rome was accorded the honour of a triumph, which against his will he shared with Valerius. (See Punic Wars: First, *ad fin.*).

2. Quintus Lutatius Catulus, Roman general and consul with Marius in 102 B.C. In the war against the Cimbri and Teutones he was sent to defend the passage of the Alps but found himself compelled to retreat over the Po, his troops having been reduced to a state of panic (see Marius, Gaius). In 101 the Cimbri were defeated on the Raudine plain, near Vercellae, by the united armies of Catulus and Marius. The chief honour being ascribed to Marius, Catulus became his bitter opponent. He sided with Sulla in the civil war, was included in the proscription list of 87, and when Marius declined to pardon him, committed suicide. He was distinguished as an orator, poet and prose writer, and was well versed in Greek literature. He is said to have written the history of his consulship and the Cimbrian War after the manner of Xenophon; two epigrams by him have been preserved, one on Roscius the celebrated actor (Cicero, *De Nat. Deorum*, i. 28), the other of an erotic character, imitated from Callimachus (Gellius xix. 9). He was a man of great wealth, which he spent in beautifying Rome. Two buildings were known as " Monumenta Catuli ": the temple of *Fortuna hujusce diei*, to commemorate the day of Vercellae, and the Porticus Catuli, built from the sale of the Cimbrian spoils.

See Plutarch, *Marius*, *Sulla*; Appian, *B.C.* i. 74; Vell. Pat. ii. 21; Florus iii. 21; Val. Max. vi. 3, ix. 13; Cicero, *De Oratore*, iii. 3. 8, *Brutus*, 35.

3. Quintus Lutatius Catulus (*c.* 120–61 B.C.), sometimes called Capitolinus, son of the above, consul in 102. He inherited his father's hatred of Marius, and was a consistent though moderate supporter of the aristocracy. In 78 he was consul with Marcus Aemilius Lepidus, who after the death of Sulla proposed the overthrow of his constitution, the re-establishment of the distribution of grain, the recall of the banished, and other democratic measures. Catulus vigorously opposed this, and a temporary compromise was effected. But Lepidus, having levied troops in his province of Transalpine Gaul, returned to Rome at the head of an army. Catulus defeated him at the Mulvian bridge and near Cosa in Etruria, and Lepidus made his escape to Sardinia, where he died soon afterwards. In 67 and 66 Catulus unsuccessfully opposed, as prejudicial to constitutional freedom, the Gabinian and Manilian laws, which conferred special powers upon Pompey (*q.v.*). He consistently opposed Caesar, whom he endeavoured to implicate in the Catilinarian conspiracy. Caesar, in return, accused him of embezzling public money during the reconstruction of the temple on the Capitol, and proposed to obliterate his name from the inscription and deprive him of the office of commissioner for its restoration. Catulus's supporters rallied round him, and Caesar dropped the charge. Catulus was the last *princeps senatus* of republican times; he held the office of censor also, but soon resigned, being unable to agree with his colleague Licinius Crassus. Although not a man of great abilities, Catulus exercised considerable influence through his political consistency and his undoubted solicitude for the welfare of the state.

See Sallust, *Catilina*, 35. 49; Dio Cassius xxxvi. 13; Plutarch, *Crassus*; Suetonius, *Caesar*, 15.

CAUB, or Kaub, a town of Germany, in the Prussian province of Hesse-Nassau, on the right bank of the Rhine, 28 m. N.W. from Wiesbaden, on the railway from Frankfort-on-Main to Cologne. Pop. 2200. It has a Roman Catholic and an Evangelical church, and a statue of Blücher. The trade mainly consists of the wines of the district. On a crag above the town stands the

imposing ruin of Gutenfels, and facing it, on a rock in the middle of the Rhine, the small castle Pfalz, or Pfalzgrafenstein, where, according to legend, the Palatine countesses awaited their confinement, but which in reality served as a toll-gate for merchandise on the Rhine.

Caub, first mentioned in the year 983, originally belonged to the lords of Falkenstein, passed in 1277 to the Rhenish Palatinate, and attained civic rights in 1324. Here Blücher crossed the Rhine with the Prussian and Russian armies, on New Year's night 1813–1814, in pursuit of the French.

CAUCA, till 1909 a coast department of Colombia, South America, lying between the departments of Bolivar, Antioquia, Caldas and Tolima on the E., and the Pacific Ocean and Panama on the W., and extending from the Caribbean Sea S. to the department of Nariño. Pop. (1905, estimate) 400,000; area 26,930 sq. m. Although Cauca was deprived of extensive territories on the upper Caquetá and Putumayo, and of a large area bordering on Ecuador in the territorial redistribution of 1905, it remained the largest department of the republic. The Western Cordillera, traversing nearly its whole length from south to north, and the Central Cordillera, forming a part of its eastern frontier, give a very mountainous character to the region. It includes, besides, the fertile and healthful valley of the upper Cauca, the hot, low valley of the Atrato, and a long coastal plain on the Pacific. The region is rich in mines and valuable forests, but its inhabitants have made very little progress in agriculture because there are not adequate transportation facilities. The capital of the department was Popayán at its southern extremity, with an estimated population in 1905 of 10,000, and the principal towns are Cali (16,000), Buga, Cartago and Buenaventura.

CAUCASIA, or Caucasus, a governor-generalship of Russia, occupying the isthmus between the Black Sea and the Sea of Azov on the west and the Caspian Sea on the east, as well as portions of the Armenian highlands. Its northern boundary is the Kuma-Manych depression, a succession of narrow, half-desiccated lakes and river-beds, only temporarily filled with water and connecting the Manych, a tributary of the Don, with the Kuma, which flows into the Caspian. This depression is supposed to be a relic of the former post-Pliocene connexion between the Black Sea and the Caspian, and is accepted by most geographers as the natural frontier between Europe and Asia, while others make the dividing-line coincide with the principal water-parting of the Caucasus mountain system. The southern boundary of Caucasia is in part coincident with the river Aras (Araxes), in part purely conventional and political. It was shifted several times during the 19th century, but now runs from a point on the Black Sea, some 20 m. south of Batum, in a south-easterly and easterly direction to Mt. Ararat, and thence along the Aras to within 30 m. of its confluence with the Kura, where it once more turns south-east, and eventually strikes the Caspian at Astara (30° 35′ N.). This large territory, covering an area of 180,843 sq. m., and having in 1897 9,248,695 inhabitants (51 per sq. m.), may be divided into four natural zones or sections: —(i.) the plains north of the Caucasus mountains, comprising the administrative division of Northern Caucasia; (ii.) the Caucasus range and the highlands of Daghestan; (iii.) the valleys of the Rion and the Kura, between the Caucasus range and the highlands of Armenia; and (iv.) the highlands of Armenia.

(i.) The *plains of Northern Caucasia*, which include most of the provinces of Kubañ and Terek and of the government of Stavropol, slope gently downwards from the foot of the Caucasus range towards the Kuma-Manych depression. It is only in their centre that they reach altitudes of as much as 2000-2500 ft. *e.g.* in the Stavropol "plateau," which stretches northwards, separating the tributaries of the Kubañ from those of the Terek and the Kuma. Towards the foothills of the Caucasus they are clothed with thick forests, while in the west they merge into the steppes of south Russia or end in marshy ground, choked with reeds and rushes, in the delta of the Kubañ. In the north and east they give place, as the Manych and the coasts of the Caspian are approached, to arid, sandy, stony steppes. The soil of these plains is generally very fertile and they support a population of nearly 2,800,000 Russians, composed of Cossacks and peasant immigrants, settled chiefly along the rivers and grouped in large, wealthy villages. They carry on agriculture—wheat-growing on a large scale—with the aid of modern agricultural machines, and breed cattle and horses. Vines are extensively cultivated on the low levels, and a variety of domestic trades are prosecuted in the villages. The higher parts of the plains, which are deeply trenched by the upper tributaries of the rivers, are inhabited by various Caucasian races—Kabardians and Cherkesses (Circassians) in the west, Ossetes in the middle, and several tribal elements from Daghestan, described under the general name of Chechens, in the east; while nomadic Nogai Tatars and Turkomans occupy the steppes.

(ii.) The *Caucasus range* runs from north-west to south-east from the Strait of Kerch to the Caspian Sea for a length of 900 m., with a varying breadth of 30 to 140 m., and covers a surface of 12,000 sq. m. The orographical characteristics of the Caucasus are described in detail under that heading.

(iii.) The combined *valleys of the Rion and the Kura*, which intervene between the Caucasus and the Armenian highlands, and stretch their axes north-west and south-east respectively, embrace the most populous and most fertile parts of Caucasia. They correspond roughly with the governments of Kutais, Tiflis, Elisavetpol and Baku, and have a population of nearly 3,650,000. The two valleys are separated by the low ridge of the Suram or Meskes mountains.

Spurs from the Caucasus and from the Armenian highlands fill up the broad latitudinal depression between them. Above (*i.e.* west of) Tiflis these spurs so far intrude into the valley that it is reduced to a narrow strip in breadth. But below that city it suddenly widens out, and the width gradually increases through the stretch of 350 m. to the Caspian, until in the Mugan steppe along that sea it measures 100 m. in width. The snow-clad peaks of the main Caucasus, descending by short, steep slopes, fringe the valley on the north, while an abrupt escarpment, having the characteristics of a border ridge of the Armenian highlands, fronts it on the south. The floor of the valley slopes gently eastwards, from 1200 ft. at Tiflis to 500 ft. in the middle, and to 85 ft. *below* normal sea-level beside the Caspian. But the uniformity of the slope is interrupted by a plateau (2000-3000 ft. in altitude) along the southern foothills of the east central Caucasus, in the region known as Kakhetia, drained by the Alazan, a left-hand tributary of the Kura. The deep, short gorges and glens which seam the southern slopes of the Caucasus are inhabited by Ossetes, Tushes, Pshavs and Khevsurs in the west, and by various tribes of Lesghians in the east. In these high and stony valleys every available patch of ground is utilized for the cultivation of barley, even up to altitudes of 7000 and 8000 ft. above the level of the sea; but cattle-breeding is the principal resource of the mountaineers, whose little communities are often separated from one another by passes, few of which are lower than 10,000 ft. The steppes along the bottom of the principal valley are for the most part too dry to be cultivated without irrigation. It is only in Kakhetia, where numerous mountain streams supply the fields and gardens of the plateau of Alazan, that wheat, millet and maize are grown, and orchards, vineyards and mulberry plantations are possible. Lower down the valley cattle-breeding is the chief source of wealth, while in the small towns and villages of the former Georgian kingdom various petty trades, exhibiting a high development of artistic taste and technical skill, are widely diffused. The slopes of the Armenian highlands are clothed with fine forests, and the vine is grown at their base, while on the wide-stretching steppes the Turko-Tatars pasture cattle, horses and sheep. The lower part of the Kura valley assumes the character of a dry steppe, the rainfall not reaching 14 in. annually at Baku, and it is still less in the Mugan steppe, though quite abundant in the adjacent region of Lenkoran. The vegetation of the steppe is on the whole scanty. Trees are generally absent, except for thickets of poplars, dwarf oaks and tamarisks along the course of the Kura, the delta of which is smothered under a jungle of reeds and rushes. The Mugan steppe is, however, in spite of its dryness, a more fertile region in virtue of the irrigation practised; but the Kura has excavated its bed too deeply to admit of that being done along its course. The Lenkoran district, sometimes called Talysh, on the western side of the Kizil-Agach bay, is blessed with a rich vegetation, a fertile soil, and a moist climate.

The inhabitants of the Kura valley consist principally of Iranian Tates and Talyshes, of Armenians and Lesghians, with Russians, Jews and Arabs. This conjoint valley of the Rion-Kura was in remote antiquity the site of several Greek colonial settlements, later the seat of successive kingdoms of the Georgians, and for centuries it has formed a bulwark against hostile invasions from the south and east. It is still inhabited chiefly by Georgian tribes—Gurians, Imeretians, Mingrelians, Svanetians—in the basin of the Rion, and by Georgians intermingled with Armenians in the valley of the Kura, while the steppes that stretch away from the lower course of the latter river are ranged over by Turko-Tatars. Mingrelia and Imeretia (valley of Rion) are the gardens of Caucasia, but the high valleys of Svanetia, farther north on the south slopes of the Caucasus mountains, are wild and difficult of access. In the cultivated parts the land is so exceedingly fertile and productive that it sells for almost fabulous prices, and its value is still further enhanced by the discovery of manganese and copper mines in the basin of the Rion, and of the almost inexhaustible supplies of naphtha and petroleum at Baku in the Apsheron peninsula. The principal products of the soil are mentioned lower down, while the general

character of the vegetation is indicated under CAUCASUS: *Western Caucasus*. In the basin of the Rion, in that of the Chorokh (which runs off the Pontic highlands into the Black Sea south of Batum), and on the Black Sea littoral from Batum northwards to Sukhum-kaleh, and beyond, the climate is extremely hot and the rainfall heavy (see under *Climate* below). It is in this valley that the principal towns (except Vladikavkaz at the north foot of the Caucasus) of Caucasia are situated, namely, Baku (179,133 inhabitants in 1900), Tiflis (160,645 in 1897), Kutais (32,492), and the two Black Sea ports of Batum (28,512) and Poti (7666).

(iv.) The *highlands of Armenia* are sometimes designated the Minor Caucasus, Little Caucasus and Anti-Caucasus. But to use such terms for what is not only an independent, but also an older, orographical formation than the Caucasus tends to perpetuate confusion in geographical nomenclature. The Armenian highlands, which run generally parallel to the Caucasus, though at much lower elevations (5000-6000 ft.), are a plateau region, sometimes quite flat, sometimes gently undulating, clothed with luxuriant meadows and mostly cultivable. From it rise double or triple ranges connected by cross-ridges and spined with outer spurs. These double and triple ranges, which have a general elevation of 8500-10,000 ft., stretch from the south-east angle of the Black Sea, 400 m. south-eastwards to the Kara-dagh and Salavat mountains in north Persia, and the latter link them on to the Elburz mountains that skirt the southern end of the Caspian Sea. Various names are given to the different parts of the constituent ranges, or, perhaps more correctly, elongated groups of mountains. The Ajar, Akhalt-sikh and Meskes or Trialety groups in the west are succeeded farther east by the Somkhet, Murguz, Ganji and Karabakh sections, forming the southern rim of the Kura basin, while parallel with them, but farther south, run the Mokry, Miskhan, Akmangan and Paltapin ranges, marking the northern edge of the Aras drainage area. These two sets of parallel ranges are linked together transversely by the cross-ridges of Bezobdal, Pambak, Shah-dagh and Gok-cha. From this last branches off the highest range in the entire series, namely, the Zangezur, which soars up to 10,000 ft. above the left bank of the Aras. From it again there shoot away at right angles, one on each side, the ranges of the Dar-alagöz and Bergushet. These highlands exhibit very considerable evidences of volcanic activity both in remote geological periods and also since the Tertiary epoch. Large areas are overlain with trachyte, basalt, obsidian, tuff and pumice. The most conspicuous features of the entire region, Mount Ararat (16,930 ft.) and Mount Alagöz (13,440 ft.), are both solid masses of trachyte; and both rise above the limits of perpetual snow. Extinct volcanoes are numerous in several of the ranges, *e.g.* Akmangan, Mokry, Karabakh and Egri-dagh (see below). It is in this region of the Armenian highlands that the largest lakes of Caucasia are situated, namely, the Gok-cha or Sevanga (540 sq. m. in area) at an altitude of 6340 ft., the Chaldir-gol (33 sq. m.) at 6520 ft., and several smaller ones, such as the *gols* of Khozapin, Khopchalu, Arpa, Topo-ravan and Tabiztskhur, all situated between 6500 and 7000 ft. above sea-level. The principal water-divide in this highland region is, however, the range of Egri-dagh (Ararat), which just south of 40° S. forms for 100 m. the boundary between Russian and Turkish Armenia, having Ararat at its eastern extremity and the extinct volcano of Kessa-dagh (11,260 ft.) at its western. Its importance lies in the fact that it divides the streams which flow into the Black Sea and Caspian from those which make their way into the Persian Gulf. The Egri-dagh possesses a sharply defined crest, ranges at a general elevation of 8000 ft., is bare of timber, scantily supplied with water, and rugged and deeply fissured.

The transverse water-parting between the Black Sea and the Caspian begins on the south side of the main range of the Caucasus, at Mount Zikara (12,560 ft.), a little south-west of Kasbek, and runs south-west along the sinuous crests of the Racha, Suram or Meskes (3000-5000 ft.), Vakhan (10,000-11,000 ft.), Arzyan (7000-10,000 ft.), and its continuation the Soganluk, thus linking the Caucasus ranges with those of the Armenian highlands. This line of heights separates the basins of the Chorokh and the Rion (Black Sea) from those of the Aras and the Kura (Caspian Sea). North of the Caucasus ranges the water-divide between these two seas descends from Mount Elbruz along the Sadyrlar Mountains (11,000 ft.), and finally sinks into the Stavropol "plateau" (1600 ft.). But the main axis of the transverse upheavals would appear to be continued in a north-eastern direction in the Andi and other parallel ranges of Daghestan, as stated under CAUCASUS.

The population in this region consists principally of Armenians, Tatars, Turks, Kurds, Ossetes, Greeks, with Persians, Tates and a few Russians (see particulars below).

Climate.—Owing in part to the great differences in altitude in different regions of Caucasia and in part to the directions in which the mountain ranges run, and consequently the quarters towards which their slopes face, the climate varies very greatly according to locality. Generally speaking, it may be characterized as a climate of extremes on the Armenian highlands, in the Kura valley and in northern Caucasia, and as maritime and genial in Lenkoran, on the Black Sea coastlands, and in the valley of the Rion. The greatest recorded range of temperature is at Erivan (altitude 3230 ft.), namely, of 64° between a January average of 14·9° and an August average of 78·8° F. At Sukhum-kaleh, on the Black Sea, the corresponding range is only 27·3°, between a January average of 48·8° and an August average of 76·1°. The highest mean temperatures for the whole year are those of Lenkoran (60·3°) and of Sukhum-kaleh and Poti (about 58°), and the lowest at Ardahan (5840 ft.), in the province of Kars, namely, 37·9°, and at Gudaur (7245 ft.), a few miles south of Kasbek, namely, 38·6°. The following table gives particulars of temperature averages at a few typical places:—

Place.	Altitude.	Annual Mean.	January Mean.	July Mean.
Stavropol	2030	47·0°	24·0°	70·0°
Vladikavkaz	2345	47·3°	23·4°	68·0°
Gudaur	7245	38·6°	20·3°	57·2°
Baku	on Caspian	58·0°	38·3°	80·0°
Tiflis	1490	55·0°	32·0°	76·5°
Batum	on Black Sea	59·0°	42·0°	75·0°
Sochi	on Black Sea	56·3°	40·3°	76·1°
Lenkoran	on Caspian	60·3°	39·0°	80·6°
Erivan	3170	51·0°	15·0°	75·0°

In respect of precipitation the entire region of Caucasia may be divided into two strikingly contrasted regions, a wet and a dry. To the former belong the Black Sea littoral, where the rainfall averages 59 to 93 in. annually, and the valleys that open upon it or are exposed to winds blowing off it, in which the rainfall varies, however, from 20 in. (Abbas-tuman, Borzhom) to 60 (Kutais). In Lenkoran also the rainfall averages 40 to 50 in. in the year. Between 16 and 40 in. fall as a rule at the northern foot of the Caucasus (Mozdok, Pyatigorsk) and in the Kura valley (Tiflis, Novo-bayazet). On the Armenian highlands and on the steppes north of Pyatigorsk the rainfall is less than 12 in. annually, and even in some places less than 8 in., *e.g.* at the foot of Ararat. Most rain falls at Batum and at Lenkoran in the autumn, in northern Caucasia and in Transcaucasia in spring and summer, but in the vicinity of the Sea of Azov in winter.

Flora and Fauna.—Plant-life, in such a mountainous country as Caucasia, being intimately dependent upon aspect and altitude, is treated under CAUCASUS. The wild animals of Caucasia are for the most part the same as those which frequent the mountainous parts of central Europe, though there is also an irruption of Asiatic forms, *e.g.* the tiger (in Lenkoran only), panther, hyaena and jackal. The more important of the carnivores which haunt the forests, valleys and mountain slopes are the bear (*Ursus arctos*), wolf, lynx, wild cat and fox (*Vulpes melanotus*). The wild boar occurs around Borzhom. The aurochs (*Bos urus*) appears to exist still in the forests of the western Caucasus. Of interest for sportsmen, as well as serving as prey for the carnivores, are red deer, goats (*Capra pallasit* and *C. aegagrus*), chamois, roebuck, moufflon (*Ovis musimon*), argali or Asiatic wild sheep (*O. Ammon*), another species of sheep in *O. gmelini*, and fallow deer (*Capreolus pigargus*) in northern Caucasus only. Rodents are numerous, the mouse (*Mus sylvaticus*) is very destructive, and beavers are met with in places. The birds of prey are the same as those of central Europe, and include the sea eagle, alpine vulture (*Gyps fulvus*), buzzard, kites (*Gypaëtus barbatus* and *Milvus ater*), hawks (*e.g. Astur nisus*), goshawk (*A. palumbarius*), fish-hawk (*Pandion haliaëtus*) and owls. Among the smaller birds may be enumerated finches, the siskin, bullfinch, pipit, titmouse, wagtail, lark, fine-crested wren, hedge-sparrow, corn-wren, nut-hatch, starling, swallow, martin, swift, thrush, butcher bird, shrike, dipper, yellow-hammer, ortolan and a warbler (*Accentor alpinus*). The game birds consist of grouse, blackcock, moorhen, quail and partridge. The pheasant derives its name from the ancient name (*Phasis*) of the Rion.

In the seas and rivers about 190 species of fishes have been enumerated. Of these, 115 species are Mediterranean, 30 are common to the Caspian Sea, and the remaining species are peculiar to the Black Sea. The most useful economically are several species of sturgeon and of herring, trout, barbel, chubb, bream, ray, sea-dace,

carp, anchovy. Insects abound, especially Coleoptera. Flies, lice, gadflies and mosquitoes are the worst of the insect plagues. There are several snakes, including the viper (*Pelias berus*).

Ethnology.—The population of Caucasia is increasing rapidly. In 1897 it numbered 9,291,090, of whom 4,886,230 were males and 4,404,867 were females. The most densely-peopled provinces were Kutais and Tiflis, each with 80 inhabitants to the square mile; the thinnest the Black Sea government (20½ per sq. m.), Terek (31), and Kars (39). Of the total population 3,725,543 lived in northern Caucasia and 5,564,547 in Transcaucasia (including Daghestan). In the latter territorial division there exists a great disproportion between the sexes, namely, to every 100 males only 86 females; indeed in the Black Sea government there are only 65·5 females to every 100 males. Ethnologically the population belongs to a great variety of races. The older authorities asserted that these numbered as many as 150, or even 300; the more recent researches of Baron P. V. Uslar, F. Anton von Schiefner, Zagursky, and others have greatly reduced this number; but even then there are not less than fifty represented.

According to the languages spoken the populations of Caucasia admit of being classified as follows,[1] according to Senator N. Trointsky, president of the Russian Census Committee for 1897.

ARYANS	4,901,412	
Slavs	3,183,870	
Great Russians		1,829,793
Little Russians		1,305,463
White Russians		19,642
Poles		25,117
Germans	47,391	
Greeks	100,299	
Rumanians	7,232	
French and Italians	1,435	
Lithuanians	6,687	
Lithuanians proper		5,121
Letts		1,511
Iranians	315,695	
Persians		13,929
Talyshes		34,994
Tates		95,056
Ossetes		171,716
Kurds	99,836	
Armenians	1,116,461	
Gypsies	3,041	
SEMITES	46,739	
Jews	40,498	
Chaldaeans (Aisors)	5,353	
URAL-ALTAIANS	1,902,142	
Finns	7,422	
Esthonians		4,281
Turko-Tatars	1,879,908	
Tatars		1,509,785
Osmanli Turks		139,419
Nogai Tatars		64,048
Turkomans		24,522
Bashkirs		953
Chuvashes		411
Kirghiz		98
Sarts		158
Karachais		27,222
Kumyks		83,408
Kara-papaks		29,902
Kalmucks		14,409
CAUCASIANS	2,439,071	
Georgians (including Imeretians, Gurians, Svanetians, Lazes, Mingrelians, &c.)	1,352,455	
Circassians		
Cherkesses (Adigheh) and Kabardians		144,847
Abkhasians		72,103
Chechens	274,318	
Chechens proper		226,496
Ingushes[2]		47,409
Kistines		413
Lesghians	600,514	
Avaro-Andians		212,692
Darghis		130,209
Kurins		159,213
Udins		7,100
Others		91,300

[1] *Premier Recensement général de la population de l'empire de Russie*, ed. N. Trointsky (St Petersburg, 1905, 2 vols.), in Russian and French.

[2] Although the Ingushes speak a Chechen dialect, they have recently been proved to be, anthropologically, quite a distinct race.

Religion.—Most of the Russians and the Georgians belong to the Orthodox Greek Church (over 4,000,000 in all); but considerable numbers (estimated at nearly 122,000, though in reality probably a good many more) are Nonconformists of different denominations. The Georgian Lazes are, however, Mussulmans. The Armenians are Christians, mostly of the national Gregorian Church (979,566), though 34,000 are Roman Catholics. The Caucasian races (except the Gregorians), together with the Turks and Tatars, are Mussulmans of the Sunnite sect (2,021,300), and the Iranian races mostly Mussulmans of the Shiite sect (884,100). The Kalmucks and other Mongolic tribes are Lamaists (20,300), and some of the Kurds profess the peculiar tenets of the Yezids.

Industries.—The principal occupation of the settled inhabitants is agriculture and of the nomadic the breeding of live stock, including camels. The cultivation of the soil is, however, attended in many parts with great difficulties owing to the scanty rainfall and the very primitive implements still in use, and in the valley of the Kura heavy losses are frequently incurred from depredations by locusts. But where irrigation is employed the yield of crops is excellent. Rye and wheat are the most important crops harvested in northern Caucasia, but oats, barley and maize are also cultivated, whereas in Transcaucasia the principal crops are maize, rice tobacco and cotton. The rice is grown chiefly in the valley of the Kura and in Lenkoran; the tobacco in the Rion valley and on the Black Sea coastlands, also to some extent in Kubañ; and the cotton in the eastern provinces. Various kinds of fodder crops are grown in Transcaucasia, such as hay, rye-grass and lucerne. It is estimated that nearly 54,000 acres are under vineyards in northern Caucasia and some 278,000 acres in Transcaucasia, the aggregate yield of wine being 30 million gallons annually. The best wine grows in Kakhetia, a district lying north-east and east of Tiflis; this district alone yields nearly 8 million gallons annually. Large numbers of mulberry trees are planted for rearing silkworms, especially in Kutais, Erivan, Elisavetpol (Nukha) and Baku (Shemakha); the groves occupy nearly 150,000 acres, and the winding of the silk gives employment to large numbers of the population. Melons and water-melons are also important objects of cultivation. Sunflowers are very extensively grown for oil in the government of Kubañ and elsewhere, and also some flax. Liquorice is an article of export. Many varieties of fruit are grown, especially good being the apricots, peaches, walnuts and hazel nuts. A limited area (not more than 1150 acres) of the Black Sea coast between Sukhum-kaleh and Batum is planted with the tea-shrub, which succeeds very well. In the same district bamboos, ramie-fibre and attar (otto) of roses are cultivated.

The *mining* industry is growing rapidly in importance in spite of costly and deficient means of communication, want of capital, and lack of general initiative. So far the principal developments of the industry have been in the governments of Kutais, Batum, Elisavetpol and Kubañ. Copper ore is extracted above the Murgul river (some 30 m. south of Batum), at Akhtala south of Tiflis, and at Kedabek in Elisavetpol; manganese to a considerably greater extent (over 400,000 tons annually) at Chiaturi in the Kvirila valley in Kutais. Steam coal of good quality is reported to exist about 30 m. inland from the open roadstead of Ochemchiri in Kutais, but it is not mined. About 50,000 tons of coal of very poor quality are, however, extracted annually, and the same quantity of salt in the Armenian highlands and in Kubañ. Small quantities of quicksilver, sulphur and iron are obtained. But all these are insignificant in comparison with the mineral oil industry of Baku, which in normal times yields annually between ten and eleven million tons of crude oil (naphtha). A good deal of this is transported by gravitation from Baku to Batum on the Black Sea by means of a pipe laid overland. The refined oil is exported as kerosene or petroleum, the heavier refuse (*mazut*) is used as fuel. Naphtha is also obtained, though in much smaller quantities, in Terek and Kubañ, in Tiflis and Daghestan. Numerous mineral springs (chalybeate and sulphurous) exist both north and south of the Caucasus ranges, *e.g.* at Pyatigorsk,

Zhelesnovodsk, Essentuki, and Kislovodsk in Terek, and at Tiflis, Abbastuman and Borzhom in the government of Tiflis.

Manufacturing industry is confined to a few articles and commodities, such as cement, tea, tin cans (for oil), cotton goods, oil refineries, tobacco factories, flour-mills, silk-winding mills (especially at Shusha and Jebrail in the south of Elisavetpol), distilleries and breweries. On the other hand, the domestic industries are extensively carried on and exhibit a high degree of technical skill and artistic taste. Carpets (especially at Shusha), silk, cotton and woollen goods, felts and fur cloaks are made, and small arms in Daghestan and at Tiflis, Nukha and Sukhum-kaleh; silversmiths' work at Tiflis, Akhaltsikh and Kutais; pottery at Elisavetpol and Shusha; leather shoe-making at Alexandropol, Nukha, Elisavetpol, Shusha and Tiflis; saddlery at Sukhum-kaleh and Ochemchiri on the Black Sea and at Temir-khan-shura in Daghestan; and copper work at Derbent and Alexandropol. But industries of every description were most seriously crippled by the spirit of turbulence and disorder which manifested itself throughout Transcaucasia in the years 1904–1906, accentuated as they were further by the outbreak of the long-rooted racial enmities between the Armenians and the Tatars, especially at Baku in 1905.

Commerce.—The exports through the Black Sea ports of Batum, Poti and Novo-rossiysk average in value a little over £10,000,000 annually, though showing a tendency to increase slightly. By far the most important commodity is petroleum, fully one-half of the total value. In addition large quantities are shipped at Baku direct for the Volga and the Transcaspian port of Krasnovodsk. The export that comes next in value is silk, and after it may be named wheat, barley, manganese ore, maize, wool, oilcake, carpets, rye, oats, liquorice and timber. The import trade reaches nothing like the same value, and what there is is confined almost entirely to Batum. The annual average value may be put at not quite £2,000,000, machinery and tin-plate being a long way the most important items. There is further a small transit trade through Transcaucasia from Persia to the value of less than half a million sterling annually, and chiefly in carpets, cocoons and silk, wool, rice and boxwood; and further a sea-borne trade between Persia and Caucasian ports (Baku and Petrovsk) to the value of over 1½ millions sterling in all. The very extensive internal trade with Russia can only be mentioned.

Railways.—The principal approach to Caucasia from Russia by rail is the line that runs from Rostov-on-Don to Vladikavkaz at the foot of the central Caucasus range. Thence, or rather from the junction of Beslan, 14 m. north of Vladikavkaz, the main line proceeds east of Petrovsk on the Caspian, and from Petrovsk skirts the shore southwards as far as Baku, the distance from Vladikavkaz to Baku being 414 m. This railway, together with the driving roads over the Caucasus mountains via the Mamison pass (the Ossetic military road) and the Darial pass (the Georgian military road), and the route across the Black Sea to Poti or Batum are the chief means of communication between southern Russia and Transcaucasia. Baku and Batum (also Poti) are connected by another main line, 560 m. long, which traverses the valleys of the Kura and the Rion, south of the Caucasus. From Tiflis, nearly midway on this last line, a railway proceeds south as far as Erivan (234 m.), with a branch to Kars (48 m.). The Erivan line is being continued into Persia, namely, to Tabriz via Julfa on the Aras.

History.—To the ancient Greeks Caucasia, and the mighty range which dominates it, were a region of mystery and romance. It was there that they placed the scene of the sufferings of Prometheus (*vide* Aeschylus, *Prometheus Vinctus*), and there, in the land of Colchis, which corresponds to the valley of the Rion, that they sent the Argonauts to fetch the golden fleece. Outside the domain of myth, the earliest connexion of the Greeks with that part of the world would appear to have been through the maritime colonies, such as Dioscurias, which the Milesians founded on the Black Sea coast in the 7th century B.C. For more than two thousand years the most powerful state in Caucasia was that of Georgia (*q.v.*), the authentic history of which begins with its submission to Alexander the Great in 323 B.C. The southern portion of Transcaucasia fell during the 1st century B.C. under the sway of Armenia, and with that country passed under the dominion of Rome, and so eventually of the Eastern empire. During the 3rd century A.D. Georgia and Armenia were invaded and in great part occupied by the Khazars, and then for more than a thousand years the mountain fastnesses of this borderland between Europe and Asia were the refuge, or the resting-place, of successive waves of migration, as people after people and tribe after tribe was compelled to give way to the pressure of stronger races harassing them in the rear. The Huns, for instance, and the Avars appeared in the 6th century, and the Mongols in the 13th. In the 10th century bands of Varangians or Russified Scandinavians sailed out of the Volga and coasted along the Caspian until they had doubled the Apsheron peninsula, when they landed and captured Barda, the chief town of Caucasian Albania.

But, apart from Georgia, historical interest in Caucasia centres in the long and persistent attempts which the Russians made to conquer it, and the heroic, though unavailing, resistance offered by the mountain races, more especially the Circassian and Lesghian tribes. Russian aggression began somewhat early in the 18th century, when Peter the Great, establishing his base at Astrakhan on the Volga, and using the Caspian for bringing up supplies and munitions of war, captured Derbent from the Persians in 1722, and Baku in the following year. But these conquests, with others made at the expense of Persia, were restored to the latter power after Peter's death, a dozen years later. At that period the Georgians were divided into various petty principalities, the chief of which were Imeretia and Georgia (Kharthlia), owing at times a more or less shadowy allegiance to the sultan of the Ottoman Turks at Constantinople. In 1770, during the course of a war between Russia and Turkey, the Russians crossed over the Caucasus and assisted the Imeretians to resist the Turks, and from the time of the ensuing peace of Kuchuk-kainarji the Georgian principalities looked to their powerful northern neighbour as their protector against the southern aggressors the Turks. In 1783 George XIII., prince of Georgia and Mingrelia, formally put himself under the suzerainty of Russia, and after his death Georgia was converted (1801) into a Russian province. The same fate overtook Imeretia nine years later. Meanwhile the Russians had also subdued the Ossetes (1802) and the Lesghian tribes (1803) of the middle Caucasus. By the peace of Gulistan in 1813 Persia ceded to Russia several districts in eastern Caucasia, from Lenkoran northwards to Derbent. Nevertheless the mountain tribes who inhabited the higher parts of the Caucasus were still independent, and their subjugation cost Russia a sustained effort of thirty years, during the course of which her military commanders were more than once brought almost to the point of despair by the tenacity, the devotion and the adroitness and daring which the mountaineers displayed in a harassing guerilla warfare. The animating spirit of their resistance was Shamyl (Samuel), a chief and priest of the Lesghians, who, a Mahommedan, proclaimed a "holy war" against the "infidel" aggressors. At first the Russians were able to continue their policy of conquest and annexation without serious check. After acquiring the northern edge of the Armenian plateau, partly from Persia in 1828 and partly from Turkey in 1829, Russia crushed a rising which had broken out in the Caspian coast districts of Daghestan on the north of the Caucasus. This took place during the years 1831–1832. The next seven years were occupied with the subjugation of the Abkhasians along the Black Sea coast, and of other Circassian tribes in the west. Meanwhile Shamyl had roused the Lesghian tribes farther east and begun his twenty years' struggle for freedom, a struggle which called forth the sympathy and admiration of nearly the whole of Europe. More than once he escaped, in a manner that seemed little short of marvellous, out of the hands of the Russians when they held him closely invested in some mountain fastness, as at Himry in 1831, at Akhulgo in 1839, and again at the same stronghold in 1849.

The general who at last broke the back of the long opposition of the prophet-chief of the Lesghians was Prince Baryatinsky, who after three years of strenuous warfare succeeded in capturing Shamyl's stronghold of Weden, and then in surrounding that chieftain himself on the inaccessible rocky platform of Gunib in the heart of Daghestan. There the hitherto indomitable champion of Caucasian independence was forced to surrender to the Russians on the 6th of September 1859. Nevertheless the spirit of resistance in these stubborn mountaineers was not finally broken until 1864, when the Russians eventually stifled all opposition in the difficult valleys and glens of the western Caucasus. But this was followed, during the next fourteen years, by the wholesale emigration of thousands upon thousands of Circassians, who sought an asylum in Turkish territory, leaving their native region almost uninhabited and desolate, a condition from which it has not recovered even at the present day. During the Russo-Turkish War of 1877–78 the self-exiled Circassians and other Caucasian mountaineers, supported by a force of 14,000 Turks, made a determined attempt to wrest their native glens from the power of Russia; but, after suffering a severe defeat at the hands of General Alkhazov, the Turks withdrew, and were accompanied by some 30,000 Abkhasians, who settled in Asia Minor. A few months later the Lesghians in Daghestan, who had risen in revolt, were defeated and their country once more reduced to obedience. By the ensuing peace of Adrianople, Russia still further enlarged her Transcaucasian territories by the acquisition of the districts of Kars, Batum and Ardahan. After a peaceful period of a quarter of a century the Armenian subjects of Russia in Transcaucasia were filled with bitterness and discontent by the confiscation of the properties of their national (Gregorian) church by the Russian treasury. Nor were their feelings more than half allayed by the arrangement which made their ecclesiastics salaried officers of the Russian state. This ferment of unrest, which was provoked in the years 1903–1904, was exacerbated in the winters that followed by the renewed outbreak of the century-long racial feud between the Tatars and the Armenians at Baku and other places. In fact, nearly the whole of the region between the Caucasus and the Perso-Turkish frontier on the south, from the Caspian Sea on the one side to the Black Sea on the other, was embroiled in a civil war of the most sanguinary and ruthless character, the inveterate racial animosities of the combatants being in both cases inflamed by religious fanaticism. Complete anarchy prevailed at the worst centres of disorder, as Baku and Batum, the imperial authorities being more powerless to preserve even the semblance of order than they were in the interior of Russia. Many of the oil wells at Baku were burned, and massacres took place at that town, at Shusha, at Erivan, at Tiflis, at Batum, at Jebrail and at other places. An end was put to these disorders only by the mutual agreement of the two contestants, alike horrified and exhausted by the fierce outburst of passion, in September 1905. (J. T. Be.)

CAUCASUS, a mountain range of Asia, wholly within the Russian empire, stretching north-west to south-east from the Strait of Kerch (between the Black Sea and Sea of Azov) to the Caspian Sea, over a length of 900 m., with a breadth varying from 30 to 140 m. In its general character and conformation the Caucasus presents a closer analogy with the Pyrenees than with the Alps. Its general uniformity of direction, its comparatively narrow width, and its well-defined limits towards both south and north are all features which it has in common with the former. The range of the Caucasus, like that of the Pyrenees, maintains for considerable distances a high average elevation, and is not cleft by deep trenches, forming natural passes across the range, such as are common in the Alps. In both ranges, too, some of the highest summits stand on spurs of the main range, not on the main range itself; as Mont Perdu and Maladetta lie south of the main backbone of the Pyrenees, so Mount Elbruz and Kasbek, Dykh-tau, Koshtan-tau, Janga-tau and Shkara—all amongst the loftiest peaks of the Caucasus—stand on a subsidiary range north of the principal range or on spurs connecting the two. On the other hand, it is interesting to compare the arrangement of the drainage waters of the Caucasus with those of the Alps. In both orographical systems the principal rivers start nearly all together from a central nucleus, and in both cases they radiate to opposite quarters of the compass; but whereas in the Alps the Rhone and the Rhine, flowing south-west and north-east respectively, follow longitudinal valleys, and the Aar and the Ticino, flowing north-west and south-east respectively, follow transverse valleys, in the Caucasus the streams which flow south-west and north-east, namely, the headwaters of the Rion and the Terek, travel along transverse valleys, and those of the Kura and the Kubañ, flowing south-east and north-west respectively, traverse longitudinal valleys. For purposes of description it is convenient to consider the range in four sections, a western, a middle with two subsections, and an eastern.

1. Western Caucasus. This section, extending from the Strait of Kerch to Mount Elbruz in 42° 40′ E., is over 420 m. long, and runs parallel to the north-east coast of the Black Sea and at only a short distance from it. Between the main range and the sea there intervene at least two parallel ranges separated by deep glens, and behind it a third subsidiary parallel range, likewise separated by a deep trough-like valley, and known as the Bokovoi Khrebet. All these ranges are shorn through transversely by numerous glens and gorges, and, the rainfall being heavy and the exposure favourable, they are densely clothed with vegetation. Many of the spurs or broken segments of ranges thus formed abut steeply upon the Black Sea, so that this littoral region is on the whole very rugged and not readily accessible, especially as the general elevations are considerable. The seaward flanking ranges run up to 4000 ft. and more, and in many places shoot out cliffs which overhang the coast some 2000-3000 ft. sheer, while the main range gradually ascends to 10,000-12,000 ft. as it advances eastwards, the principal peaks being Fisht (8040 ft.), Oshten (9210 ft.), Shuguz (10,640 ft.), and Psysh (12,425 ft.). And whereas the main range is built up of hard eruptive or crystalline rocks, the subsidiary chains are composed of softer (Cretaceous and Tertiary) laminated formations, which easily become disintegrated and dislocated. The snow-line runs here at about 9000 ft. on the loftiest summits, and east of Oshten the crest of the main range is capped with perpetual snow and carries many hanging glaciers, while larger glaciers creep down the principal valleys. The passes lie at relatively great altitudes and are few in number, so that although the northern versants of the various ranges all have a tolerably gentle slope, communication between the Black Sea and the valley of the Kubañ, and the low steppe country beyond, is the reverse of easy. The more important passes, proceeding from west to east, are Pshekh (5435 ft.) west of Oshten, and Shetlib (6060 ft.) east of Oshten, Pseashka (6880 ft.) east of Shuguz, Sanchar (7990 ft.) west of Psysh; and between the last-named mountain and Elbruz, facilitating communication between Sukhum-Kaleh (and the coast as far as Poti) and the upper valley of the Kubañ, are the passes of Marukh (11,500 ft.), Klukhor (9450 ft.) and Nakhar (9615 ft.).

Flora.—The southern exposure of this littoral region, the shelter afforded against the bitter winds of the north by the lofty Caucasus range, and the copious rainfall all combine to foster a luxuriant and abundant vegetation. The most distinguishing feature of the flora of this region is the predominance of arborescent growths; forests cover in fact 56% of the area, and are not only dense but laced together with climbing and twining plants. The commonest species of trees are such as grow in central Europe, namely, ash, fir, pine, beech, acacia, maple, birch, box, chestnut, laurel, holm-oak, poplar, elm, lime, yew, elder, willow, oak. The common box is especially prevalent, but the preponderating species are *Coniferae*, including the Caucasian species *Pinus halepensis* and *P. insignis*. The commonest firs are *Abies nordmannia* and *A. orientalis*. There are two native oaks, *Quercus ponticus* and *Q. sessiliflora*. A great variety of shrubs grow on these slopes of the western Caucasus, chiefly the following species, several of which are indigenous—*Rhododendron ponticum, Azalea pontica, Aristotelia maqui, Agave*

americana, *Cephalaria tatarica*, *Cotoneaster pyracantha*, *Citrus aurantium*, *Diospyros ebenum*, *Ficus carica*, *Illicium anisatum*, *Ligustrum caucasicum*, *Punica granatum*, *Philadelphus coronarius*, *Pyrus salicifolia*, *Rhus cotinus* and six species of *Viburnum*. Aquatic plants thrive excellently and occur in great variety. The following purely Caucasian species also grow on the coast—five species of spearwort, three of saxifrage, *Aster caucasica*, *Dioscorea caucasica*, *Echinops raddeanus*, *Hedera colchica*, *Helleborus caucasica* and *Peucedanum caucasicum*. Here too are found many of the more beautiful open-air flowering plants of a shrubby character, e.g. magnolia, azalea, camellia, begonia and paulownia. Among the cultivated trees and shrubs the most valuable economically are the vine, peach, pomegranate, fig, olive (up to 1500 ft. above sea-level), chestnut, apricot, apple, pear, plum, cherry, melon, tea (on the coast between Sukhum-Kaleh and Batum), maize (yielding the staple food of the inhabitants), wheat (up to 6000 ft.), potatoes, peas, currants, cotton, rice, colza and tobacco. Before the Russian conquest the native inhabitants of this region were Kabardians, Circassians (Adigheh) and Abkhasians, also a Circassian race. But half a million of these people being Mahommedans, and refusing to submit to the yoke of Christian Russia, emigrated into Turkish territory between 1864 and 1878, and the country where they had lived remained for the most part unoccupied until after the beginning of the 20th century. Then, however, the Russian government held out inducements to settlers, and these have been responded to by Russians, Greeks, Armenians and Rumanians, but the process of repeopling the long deserted territory is slow and difficult. The coast-line is remarkably regular, there being no deep bays and few seaports. The best accommodation that these latter afford consists of more or less open roadsteads, *e.g.* Novo-rossiysk, Gelenjik, Anapa, Sukhum-Kaleh, Poti and Batum. Along the coast a string of summer bathing resorts is springing up similar to those that dot the south-east coast of the Crimea. The most promising of these little seaside places are Anapa, Gelenjik and Gagry.

2. Middle Caucasus: (*a*) *Western Half.*—This sub-section, with a length of 200 m., reaches from Mount Elbruz to Kasbek and the Pass of Darial. It contains the loftiest summits of the entire range, fully a dozen exceeding Mont Blanc in altitude (see table below).

In addition to the peaks enumerated in the table, the following also exist between Elbruz and Kasbek all exceeding 13,000 ft. in altitude: Dong-osenghi, 14,265 ft.; Kurmychi, 13,310 ft.; Ullukara-tau, 14,070 ft.; Jailyk, 17,780 ft.; Sarikol-bashi, 13,965 ft.; Dumala-tau, 14,950 ft.; Sugan-tau, 14,730 ft.; Tiutiu-bashi, 14,500 ft.; Nuamkuam, 13,975 ft.; Zurungal, 13,915 ft.; Mala-tau, 14,950 ft.; Tiutiun-tau, 15,115 ft.; Khrumkol-tau, 14,653 ft.; Bubis-khokh, 14,500 ft.; Giulchi, 14,680 ft.; Doppakh, 14,240 ft.; Nakhashbita-khokh, 14,405 ft.; Shankhokh, 14,335 ft.; Mishirghi-tau (W. peak), 16,410 ft.; Fytnargyn-tau, 13,790 ft.; Gezeh-tau, 14,140 ft.; and Kaltber, 14,460 ft.

List of Peaks in the west central Caucasus, with their altitudes, names and dates of mountaineers who have climbed them.

Name of Peak.	Altitude in Feet.	By whom ascended.	Date.
Elbruz, E. peak	18,345	D. W. Freshfield, A. W. Moore and C. Tucker	1868
Elbruz, W. peak	18,465	F. C. Grove, H. Walker and F. Gardiner	1874
,, ,,	,,	C. P. Woolley	1889
Donguz-orun	14,600	G. Merzbacher and L. Purtscheller	1890
,,	,,	Donkin and H. Fox	1888
,,	,,	Helbling, Reichert and Weber	1903
Shtavler	13,105	Ficker, W. R. Rickmers, Scheck and Wigner	1903
Ledosht-tau	12,580	Schuster and Wigner	1903
Hevai	13,055	Schuster and Wigner	1903
Lakra-tau	12,185	Rolleston and Longstaff	1903
Ushba, N.E. peak	15,400	Cockin	1888
Ushba, S.W. peak	15,410	Helbling, Schulze, Reichert, Schuster and Weber	1903
Ushba, both peaks	..	Distel, Leuchs and Pfann	1903
Sultran-kol-bashi	12,495	Grove, Walker and Gardiner	1874
Bak	11,739	Collier, Solly and Newmarch	1894
Gulba	12,500	Freshfield	1887
Salynan-bashi	14,700	Cockin and H. W. Holder	1888
Shikildi-tau	14,170	Helbling, Reichert, Schulze and Weber	1903
Bshedukh	14,010	Distel, Leuchs and Pfann	1903
Ullu-tau-chana	13,800	Rolleston and Longstaff	1903
Adyr-su-bashi	14,335	Holder, Cockin and Woolley	1896
Sullu-kol-bashi	13,970	Merzbacher and Purtscheller	1890
Tikhtengen	15,135	Rolleston and Longstaff	1903
Gestola	15,940	C. T. Dent and Donkin	1886
Tetnuld	15,920	Freshfield	1887
,,	,,	Merzbacher and Purtscheller	1890
Adish or Katuyn-tau	16,295	Holder and Woolley	1888
Janga-tau, E. peak	16,525	Cockin	1888
,, ,,	,,	Merzbacher and Purtscheller	1890
Janga-tau, E. and W. peaks	W. peak, 16,660	Helbling, Reichert, Schulze and Weber	1903
Shkara	17,040	Cockin	1888
Ailama	14,855	Woolley	1889
Ullu-auz	15,350	V. Sella	1888
Dykh-tau[1]	17,050	Cockin, Holder and Woolley	1888
Koshtan-tau[2]	16,875	Woolley	1888
Mishirghi-tau, E. peak	16,350	Woolley	1889
Laboda	14,170	Dent and Woolley	1895
Tsikhvarga, E. peak	13,575	V. Sella	1890
,, W. peak	13,575	Holder and Cockin	1890
Karagom-khokh or Burdshula	14,295	Holder and Cockin	1890
Adai-khokh	15,275	Holder and Cockin	1890
Tepli	14,510	V. Sella	1896
Kasbek	16,545	Freshfield, Moore and Tucker	1868
,,	,,	Woolley	1889
,,	,,	Merzbacher	1890
,,	,,	V. Sella	1896
Gimarai-khokh	15,670	Merzbacher	1890
Laila, N. peak	13,045	Freshfield and Powell	1889
Laila, middle peak	13,155	V. Sella	1889
Laila, S. peak	13,105	Merzbacher and Purtscheller	1890
Khamkhakhi-khokh	14,065	M. de Déchy	1884

[1] Formerly the Koshtan-tau.

[2] Formerly the Dykh-tau.

The crest of the main range runs continuously at an altitude exceeding 10,000 ft., but even it is surpassed in elevation by the secondary range to the north, the Bokovoi Khrebet. These two ranges are connected by more than half a dozen short transverse spurs or necks, inclosing as many cirques or high cauldron glens. Besides the Bokovoi Khrebet several other short subsidiary ranges branch off from the main range at acute angles, lifting up high montane glens between them; for instance, the two ranges in Svanetia, which divide, the one the river (glen) Ingur from the river (glen) Tskhenis-Tskhali, and the other the river (glen) Tskhenis-Tskhali from the rivers (glens) Lechkhum and Racha. Down all these glens glacier streams descend, until they find an opportunity to pierce through the flanking ranges, which they do in deep and picturesque gorges, and then race down the northern slopes of the mountains to enter the Terek or the Kuhañ, or down the southern versant to join the Rion or the Kura. Amongst all these high glens there is a remarkable absence of lakes and waterfalls; nor are there down in the lower valleys at the foot of the mountains, as one would naturally expect in a region so extensively glaciated, any sheets of water corresponding to the Swiss lakes. In this section of the Caucasus the loftiest peaks do not

as a rule rise on the main range, but in many cases on the short spurs that link it with the Bokovoi Khrebet and other subsidiary ranges.

"The central chain of the Caucasus," writes Mr Douglas W. Freshfield,[1] "consists of a number of short parallel or curved horse-shoe ridges, crowned with rocky peaks and enclosing basins filled by the *névés* of great glaciers. . . . On either side of the main chain the same succession is repeated, with one important difference. On the north the schists come first, sometimes rising into peaks and ridges in a state of ruin . . . but more often worn to rolling downs; then the limestone range—writing-desk mountains that turn their steep fronts to the central snows; lastly low Cretaceous foothills, that sink softly into the steppe. But on the south side the crystalline rocks are succeeded by a broad belt of slates, as to the age of which the evidence is at present conflicting and the opinion of geologists divided. East of Adai-khokh, by what seems a strange freak of nature, the granitic [main] range is rent over and over again to its base by gorges, the watershed being transferred to the parallel chain of clay slates . . . which has followed it from the Black Sea, attaining on its way the height of 13,400 ft. in the Laila, and limiting the great parallel basins of the Rion, Ingur and Skenis Shali [=Tskhenis-Tskhali] . . ." "At the base of the central core of the chain spread (to the north) broad, smooth, grassy downs, the pastures of the Turk and the Ossete. . . . Their ridges attain to 9000 to 10,000 ft. They are composed of friable crystalline schists. . . . Beyond these schists rises a broken wall of limestone, cleft to the base by gorges, through which flow the mountain torrents, and capped by pale precipitous battlements, which face the central chain at a height of 11,000 to 12,000 ft. Beyond, again, lies a broad furrow, or 'longitudinal fold,' as geologists call it, parallel to the ridges, and then rises the last elevation, a belt of low calcareous hills, on which, here and there among the waves of beech forest, purple or blue with distance, a white cliff retains its local colour and shines like a patch of fresh snow. Beyond, once more beyond, spreads the Scythian steppe, not the dead level of Lombardy, but an expanse of long low modulations, which would be reckoned hills in our home counties, seamed by long shining ribbons, which mark the courses of the tributaries of the Terek. . . . Southwards too, immediately under the snows, we find 'crystalline schists,' smooth grassy heights, separated by shallow trenches, which form the lesser undulations of the three basins, the *drei Langenhochthäler Imeritiens* of Dr Radde. These basins or 'longitudinal folds' are enclosed on the south by the long high ridge of dark slates, which extends parallel to the crystalline [main] chain from the neighbourhood of Sukhum-Kale to the Krestovaya Gora [pass of Darial.] Behind this slate crest spreads a confused multitude of hills, Jurassic and Cretaceous in their formation. . . . Their outer edge, distant some 30 to 40 m. from the snows, is marked by a limestone belt, lower and less continuous than that on the north, which frames the gorges of the Rion, and rises in the Kuamli (6352 ft.) and Nakarala (4774 ft.) near Kutais, its best known elevations."[2] It may be added that, south of the central watershed, the strata, both Mesozoic and Palaeozoic, are compressed, crumpled, faulted and frequently overfolded, with their apices pointing to the south.

Glaciers.—As a rule the snow-line runs at 9500 to 10,000 ft. on the northern face and 1000 ft. higher on the southern face. It is estimated that there are in all over nine hundred glaciers in this section of the range, and although they often rival those of the Alps in size, they do not descend generally to such low altitudes as the latter. The best known are the Bezingi or Ullu, between Dykh-tau and Janga-tau, 10½ m. long, covering an area of 31 sq. m., and descending to 6535 ft. above sea-level; Leksyr, situated south of Adyr-su-bashi, 7½ m. long, 19 sq. m. in area, and creeping down to as low as 5690 ft., this being the lowest point to which any glacier descends on the south side of the range; Tseya or Zea, descending 6 m. from the Adai-khokh to an altitude of 6730 ft.; Karagom, from the same mountain, 9½ m. long, 14 sq. m. in area and reaching down to 5790 ft., the lowest on the north side; Dyevdorak or Devdorak, from Kasbek, 2½ m. long, its lower end at 7530 ft.; Khaldeh or Geresho 4¼ m. long, from Shkara and Janga-tau; Tuyber from Tetnuld, 6½ m. long, area 21 sq. m., and reaching down to 6565 ft.; Tsanner or Zanner, the same length and the same area, but stopping short 240 ft. higher, likewise given off by Tetnuld; while between that peak, Adish and Gestola originates the Adish or Lardkhat glacier, 5 m. long and terminating at 7450 ft. The total area covered by glaciers in the central Caucasus is estimated at 625 to 650 sq. m., the longest being the Maliev on Kasbek, 36 m. long; but according to the investigations of M. Rossikov several of the largest glaciers are shrinking or retreating, the Tseya at the rate of something like 40-45 ft. per annum.

Passes.—It is in this section that the entire mountain system is narrowest, and here it is that (apart from the "gate" at Derbent close beside the Caspian) the principal means of communication exist between north and south, between the steppes of southern Russia and the highlands of Armenia and Asia Minor. These means of communication are the passes of Darial and Mamison. Over the former, which lies immediately east of Kasbek, runs the Georgian military road (made 1811–1864) from Vladikavkaz to Tiflis, cutting through the mountains by a gorge (8 m. long) of singular beauty, shut in by precipitous mountain walls nearly 6000 ft. high, and so narrow that there is only just room for the carriage-road and the brawling river Terek side by side. The pass by which this road crosses the main range, farther south, is known as the Krestovaya Gora (Mountain of the Cross) and lies 7805 ft. above sea-level. The Mamison Pass, over which runs the Ossetic military road (made passable for vehicles in 1889) from the Terek (below Vladikavkaz) to Kutais in the valley of the Rion, skirting the eastern foot of the Adai-khokh, lies at an altitude of 9270 ft. and is situated a little south of the main range. Scarce any of the remaining passes in this west-central region are better than mountain paths; horses can traverse the best of them only during a few weeks in the height of summer. They mostly range at altitudes of 9000-12,500 ft., and between the pass of Nakhar in the west and that of Mamison in the east there is not a single pass below 10,000 ft. The best known in this section are the three Baksan passes of Chiper (10,800 and 10,720 ft.), Bassa (9950 ft.) and Donguz-orun (10,490 ft.), south of Elbruz; those of Becho (11,070 ft.), Akh-su (12,465 ft.), Bak (10,220 ft.), Adyr-su (12,305 ft.) and Bezingi (10,090 ft.), between Elbruz and Dykh-tau; and those of Shari-vizk (11,560 ft.), Edena, Pasis-mta or Godivizk (11,270 ft.), Shtulu-vizk (10,860 ft.), Fytnargyn (11,130 ft.), between Dykh-tau and Adai-khokh; the Bakh-fandak (9570 ft.), between Adai-khohk and Kasbek; and the two Karaul passes (11,680 and 11,270 ft.) and Gurdzi-vizk (10,970 ft.), connecting the valley of the Urukh with that of the Rion. The most frequented pass in Svanetia is that of Latpari (9260 ft.), situated in the first of the southern subsidiary ranges mentioned above, and thus connecting the valley of the Ingur with the valley of the Tskhenis-Tskhali.

Flora.—In this section of the range again the southern slopes are clothed with vegetation of remarkable luxuriance and richness, more especially in the region of Svanetia (42°-43° E.). Not only are the plants bigger than they grow in the Alps, but the blossoms are more abundant. Here again forests of *Coniferae* predominate, especially on the northern and eastern slopes; and the other distinguishing features of the flora are gigantic male ferns (*Aspidium filix-mas*), *Paris incompleta* (a member of the Trilliaceae), *Usnea* or tree-moss, box, holly (*Ilex aquifolium*), *Lilium monadelphum* and many of the familiar herbaceous plants which flower in English gardens, though here they grow to an altogether extraordinary size—"monkshoods, *Cephalaria*, *Mulgedia* and groundsels, among which men on horseback might play at hide and seek without stooping" (E. Levier). Other prominent species are *Campanula*, *Pyrethrum*, aconite, *Cephaëlis*, speedwell, *Alchemilla sericea*, *Centaurea macrocephala*, *Primula grandis* and a species of primrose. And the great height (13,000 ft.) at which the flowering plants blossom is not less remarkable than the great beauty and abundance of the flowers. Species which grow on both the northern and the southern slopes ascend 2000 ft. higher on the latter than on the former. Walnuts grow up to an altitude of 5400 ft., the vine and mulberry up to 3250 ft., the lime and ash to 4000 ft. The forests extend to the upper end of the limestone gorges. Above that the crystalline schists are bare of tree vegetation. The upper limit of arborescent vegetation is considered to run at 7000-7500 ft., of shrubs such as rhododendrons at 8500 ft., and of pasture-lands up to 9000 ft. The principal cultivated varieties of plants in this section are wheat, rye, oats, barley, beans, millet and tobacco.

3. MIDDLE CAUCASUS: (*b*) *Eastern Part.*—In this sub-section, which stretches from Kasbek and the Darial gorge eastwards to

[1] *Exploration of the Caucasus* (2nd ed., 1902), i. 30-31.
[2] *Op. cit.* i. 35-36.

the Baba-dagh in 48° 25′ E., a distance of 230 m., the Caucasus attains its greatest breadth. For the whole of that distance the main range keeps at an average elevation of 10,000 ft., though the peaks in many instances tower up 2000 to nearly 5000 ft. higher, the altitudes increasing towards the east. As the main range approaches the Caspian its granite core gradually disappears, giving place to Palaeozoic schists, which spread down both the northern and the southern slopes. The glaciers too decrease in the same proportion both in magnitude and in extent. Here the principal peaks, again found for the most part on the spurs and subsidiary ranges, are the Tsmiakom-khokh (13,570 ft.), Shan-tau (14,530 ft.), Kidenais-magali (13,840 ft.), Zilga-khokh (12,645 ft.), Zikari (12,565 ft.), Choukhi (12,110 ft.), Julti-dagh (12,430 ft.), Alakhun-dagh (12,600 ft.) and Maghi-dagh (12,445 ft.). On the main range itself stand Borbalo (10,175 ft.), Great Shavi-kildeh (12,325 ft.), Murov (11,110 ft.), Ansal (11,740 ft.), Ginor-roso (11,120 ft.), while farther east come Trfan-dagh (13,765 ft.) and Bazardyuz or Kichen (14,727 ft.). In the same direction, but again outside the main range, lie Shah-dagh (13,955 ft.), Shalbuz (13,675 ft.) and Malkamud (12,750 ft.).

But the most noteworthy feature of this section is the broad *highland region of Daghestan*, which flanks the main range on the north, and sinks down both eastwards to the Black Sea and northwards to the valley of the Terek. On the north-west this rugged highland region is well defined by the distinctive transverse ridge of Andi, which to the east of Kasbek strikes off from the Caucasus range almost at right angles. The rest of the Daghestan region consists of a series of roughly parallel folds, of Jurassic or Cretaceous age, ranging in altitudes from 7500 up to 12,500 ft., separated from one another by deep gorge-like river glens which cut it up into a number of arid, treeless plateaus which have something of the appearance of independent ranges, or rather elongated tablelands of a mountainous character. The most prominent of these tablelands is Bash-lam, which stretches east and west between the Chanti Argun and the Andian Koisu, both tributaries of the Terek. Upon it rise the conspicuous peaks of Tebulos-mta (14,775 ft.), Tugo-mta (13,795 ft.), Komito-tavi or Kachu (14,010 ft.), Donos-mta (13,560 ft.), Diklos-mta (13,740 ft.), Kvavlos-mta or Kolos-mta (13,080 ft.), Motshekh-tsferi (13,140 ft.) and Galavanas-tsferi (13,260 ft.). Farther east come the Bogos tableland, stretching from south-south-west to east-north-east between the Andian Koisu and the Avarian Koisu and rising to over 13,400 ft. in several peaks, *e.g.* Antshovala (13,440 ft.), Botshokh-meër (13,515 ft.), Kosara-ku (13,420 ft.) and Addala-shuogchol-meër (13,580 ft.); and the Dyulty tableland, reaching 12,400 ft. between the Kara Koisu and the Kazikumukh Koisu. On some of these peaks again there is a considerable amount of glaciation, more particularly on the slopes of Diklos-mta, where the glaciers descend to 7700 ft. on the north side and to 8350 ft. on the south side. In this section of the Caucasus the passes run somewhat lower than those between Elbruz and Kasbek, though still at appreciable heights, fully equal to those that lead up from the Black Sea to the valley of the Kubañ in the western section of the range. The best known are the Krestovaya Gora (7805 ft.) on the Georgian military road, south of Darial; Kodor (9300 ft.) and Satskheni, leading up from Telav in the upper valley of the Alazan; and Gudur (10,120 ft.) and Salavat (9280 ft.), carrying the Akhty military road from the valley of the Samur up past the Shah-dagh and the Bazar-dyusi to the valley of the Alazan.

The *flora* of this section bears a general resemblance to that farther west. Ample details will be found in Dr G. Radde's (1831–1903) monographs on Daghestan, quoted at the end of the present article.

4. The Eastern Section of the Caucasus gradually dies away east of Baba-dagh (11,930 ft.) towards the Caspian, terminating finally in the peninsula of Apsheron. It is, however, continued under the waters of the Caspian, as stated in the article on that sea, and reappears on its eastern side in the Kopet-dagh, which skirts the north-east frontier of Persia. In this section of the Caucasus no peak exceeds 9000 ft. in altitude and the crest of the main range retains no snow. The most frequented pass, that of Alty-agach, necessitates a climb of not more than 4355 ft.

Slopes of Range.—Between the northern and the southern sides of the range there is quite as great a difference in climate, productions and scenery as there is between the Swiss and the Italian sides of the Alps. In the south-western valleys and on the south-western slopes of the Caucasus, where a heavy rainfall is combined with a warm temperature, magnificent forests clothe the mountain-sides and dip their skirts into the waters of the Black Sea. There not only the littoral from (say) Sukhum-Kaleh to Batum but the inland parts of the basin of the Rion will bear comparison with any of the provinces of Italy in point of fertility, and in richness and variety of products. But farther inland, upon proceeding eastwards towards Tiflis, a great change becomes noticeable on the other side of the transverse ridge of the Suram or Meskes mountains. Arid upland plains and parched hillsides take the place of the rich verdure and luxuriant arborescent growth of Imeretia, Svanetia and Mingrelia, the districts which occupy the valleys of the Ingur and Rion and the tributaries of the latter. A very similar change likewise becomes noticeable in the higher regions of the Caucasus Mountains upon proceeding north of the pass of Mamison, which separates the head-waters of the Rion from those of the Ardon, an important tributary of the Terek. The valleys of the two streams last mentioned, and of others that flow in the same direction, are almost wholly destitute of trees, but where the bare rock does not prevail, the mountain slopes are carpeted with grass. Freshfield's description of the valley of the Terek above Kasbek will apply pretty generally to all the valleys that descend on that face of the range: "treeless valleys, bold rocks, slopes of forbidding steepness (even to eyes accustomed to those of the Alps), and stonebuilt villages, scarcely distinguishable from the neighbouring crags." But, austere and unattractive though these valleys are, the same epithets cannot be applied to the deep gorges by which in most cases the streams make their escape through the northern subsidiary range. These defiles are declared to be superior in grandeur to anything of the kind in the Alps. That of Darial (the Terek) is fairly well known, but those of the Cherek and the Urukh, farther west, are stated to be still more magnificent. And not only do the snow-clad ranges and the ice-panoplied peaks which tower up above them surpass the loftiest summits of the Alps in altitude; they also in many cases excel them in boldness and picturesqueness of outline, and equal the most difficult of them in steepness and relative inaccessibility.

Hydrography.—Nearly all the larger rivers of Caucasia have their sources in the central parts of the Caucasus range. The short, steep, torrential streams of Mdzimta, Pzou, Bzyb and Kodor drain the country west of Elbruz. The Ingur, Tskhenis-Tskhali, Rion and its tributaries (*e.g.* the Kvirila) are longer, but also in part torrential; they drain the great glacier region between Elbruz and Kasbek. The Rion is the *Phasis* of the ancients and flows through the classic land of Colchis, associated with the legends of Medea and the Argonauts. The Lyakhva and Aragva, tributaries of the Kura, carry off the waters of the main range south of Kasbek, and other tributaries, such as the Yora and the Alazan, collect the surplus drainage of the main Caucasus range farther east. The other large river of this region, the Aras, has its sources, not in the Caucasus range, but on the Armenian highlands a long way south-west of Ararat. The rivers which go down from the central Caucasus northwards have considerably longer courses than those on the south side of the range, partly as a consequence of the gentler versant and partly also because of the great distances to which the steppes extend across which they make their way to the sea. The most important of these are the Kubañ and the Terek; but it is the latter that picks up most of the streams which have their sources among the central glaciers, *e.g.* the Malka, Baksan, Chegem, Cherek, Urukh, Ardon, all confined to deep narrow glens until they quit the mountains. The Kuma, which alone pursues an independent course through the steppes, farther north than the

Terek, has its sources, not in the main ranges of the Caucasus, but in an outlying group of mountains near Pyatigorsk, the highest summit of which, Besh-tau, does not exceed 4600 ft. But its waters become absorbed in the sands of the desert steppes before they reach the Caspian. Of the streams that carve into chequers the elevated plateau or highland region of Daghestan four are known by the common name of the Koisu, being distinguished *inter se* as the Andian Koisu, the Avarian Koisu, the Kara Koisu and the Kazikumukh Koisu, which all unite to form the Sulak. The only other stream deserving of mention in this province is the Samur. Both rivers discharge their waters into the Caspian; as also does the Zumgail, a small stream which drains the eastern extremity of the Caucasus range in the government of Baku.

Volcanic Evidences.—Ancient, but now extinct, volcanic upheavals are pretty common at the intersections of the main range with the transverse ranges; of these the most noteworthy are Elbruz and Kasbek. The town of Shemakha, near the eastern end of the system, was the scene of volcanic outbreaks as late as 1859, 1872 and 1902; while in the adjacent peninsula of Apsheron mud volcanoes exist in large numbers. All along the northern foot of the system hot mineral springs gush out at various places, such as Pyatigorsk, Zhelesnovodsk, Essentuki and Kislovodsk; and the series is continued along the north-eastern foot of the highlands of Daghestan, *e.g.* Isti-su, Eski-endery, Akhta. In this connexion it may also be mentioned that similar evidences of volcanic activity characterize the northern border of the Armenian highlands on the southern side of the Rion-Kura depression, in the mountains of Ararat, Alagöz, Akmangan, Samsar, Godoreby, Great and Little Abull, and in the mineral springs of Borzhom, Abbas-tuman, Sleptzov, Mikhailovsk and Tiflis. (J. T. Be.; P. A. K.)

Geology.—The general structure of the Caucasus is comparatively simple. The strata are folded so as to form a fan. In the centre of the fan lies a band of crystalline rocks which disappears towards the east. Beneath it, on both sides, plunge the strongly folded Palaeozoic and Jurassic schists. On the northern flank the folded beds are followed by a zone of Jurassic and Cretaceous beds which rapidly assume a gentle inclination towards the plain. On the south the corresponding zone is affected by numerous secondary folds which involve the Sarmatian or Upper Miocene deposits. In the eastern part of the chain the structure is somewhat modified. The crystalline band is lost. The northern Mesozoic zone is very much broader, and is thrown into simple folds like those of the Jura. The southern Mesozoic zone is absent, and the Palaeozoic zone sinks abruptly in a series of faulted steps to the plain of the Kura, beneath which no doubt the continuation of the Mesozoic zone is concealed.

The geological sequence begins with the granite and schists of the central zone, which form a band extending from Fisht on the west to a point some distance beyond Kasbek on the east. Then follow the Palaeozoic schists and slates. Fossils are extremely rare in these beds; *Buthotrephis* has long been known, and doubtful traces of *Calamites* and ferns have been found, but it was not until 1897 that undoubted Palaeozoic fossils were obtained. They appear to indicate a Devonian age. Upon the Palaeozoic beds rest a series of Mesozoic deposits, beginning with the Lias and ending with the Upper Cretaceous. Whether the series is continuous or not is a matter of controversy. F. Loewinson-Lessing states that there is a more or less marked discordance between the Lias and the Upper Jurassic and between the latter and the Cretaceous; E. Fournier asserts that there exists a very strongly marked unconformity at the base of the Tithonian, and other writers have expressed other views. In general the Upper Jurassic beds are much more calcareous on the north flank of the chain than they are on the south. The Mesozoic beds are followed by the Tertiary deposits, which on the north are nearly horizontal but on the south are in part included in the folds—the Eocene and Miocene being folded, while the later beds, though sometimes elevated, are not affected by the folding. The final folding of the chain undoubtedly occurred at the close of the Miocene period. That there were earlier periods of folding is almost equally certain, but there is considerable difference of opinion as to their dates. The difference in character of the Jurassic beds on the two sides of the chain appears to indicate that a ridge existed

in that period. The last phase in the history of the Caucasus was marked by the growth of the great volcanoes of Elbruz and Kasbek, which stand upon the old rocks of the central zone, and by the outflow of sheets of lava upon the sides of the chain. The cones themselves are composed largely of acid andesites, but many of the lavas are augite andesites and basalts. There seem to have been two periods of eruption, and as some of the lavas have flowed over Quaternary gravels, the latest outbursts must have been of very recent date.

Near the northern foot of the Caucasus, especially in the neighbourhood of the hot mineral springs of Pyatigorsk, a group of hills of igneous rocks rises above the plain. They are laccolites of trachytic rock, and raised the Tertiary beds above them in the form of blisters. Subsequent denudation has removed the sedimentary covering and exposed the igneous core. (P. La.)

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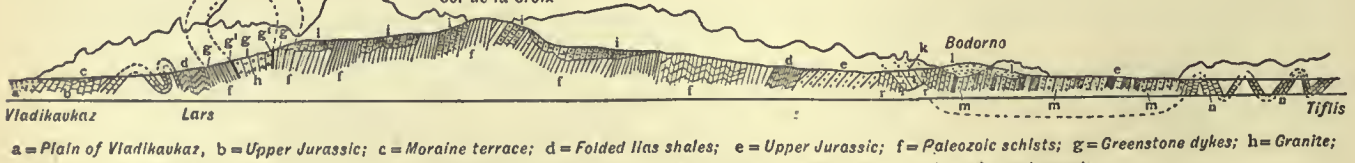


a = Plain of Vladikavkaz, b = Upper Jurassic; c = Moraine terrace; d = Folded lias shales; e = Upper Jurassic; f = Paleozoic schists; g = Greenstone dykes; h = Granite; g' = Gneiss; i = Andesites; k = Jurassic?; l = Pliocene (Nagelfluh); m = Miocene; n = Oligocene; r = Nulliporc limestone & conglomerate.

F. Loewinson-Lessing Horizontal Scale 1:560,000. Vertical Scale 1:210,000.

1900); V. Sella and D. Vallino, *Nel Caucaso Centrale* (Turin, 1890); K. Koch, *Der Kaukasus* (Berlin, 1882); C. Phillipps Woolley, *Savage Svanetia* (2 vols., London, 1883); E. Levier, *A travers le Caucase* (Paris, ed. 1905), especially valuable for botany; G. Merzbacher, *Aus den Hochregionen des Kaukasus* (2 vols., Leipzig, 1901); A. Fischer, *Zwei Kaukasische Expeditionen* (Berne, 1891); E. Fournier, *Description géologique du Caucase central* (Marseilles, 1896); G. Radde, *Reisen an der persisch-russischen Grenze. Talysch und seine Bewohner* (Leipzig, 1886), *Die Fauna und Flora des südwestlichen Kaspigebiets* (Leipzig, 1886), *Karabagh* (Gotha, 1890), and *Aus den daghestanischen Hochalpen* (Gotha, 1887); and Count J. Zichy, *Voyages au Caucase* (2 vols., Budapest, 1897). F. Loewinson-Lessing has an account of the geology of the district along the military road from Vladikavkaz to Tiflis in the *Guide des Excursions du VIIe Congrès géol. internat.* (St Petersburg, 1897). N. Y. Dinnik writes on the fauna in *Bull. Soc. Impériale des Naturalistes de Moscou* (1901); J. Mourier on the folk-tales in *Contes et légendes du Caucase* (1888); and on modern history G. Baumgarten, *Sechzig Jahre des kaukasischen Krieges* (Leipzig, 1861). But a very great amount of most valuable information about the Caucasus is preserved in articles in encyclopaedias and scientific periodicals, especially the *Izvestia* and *Zapiski* of the Russian and Caucasian geographical societies, in P. P. Semenov's *Geographical Dictionary* (in Russian, 5 vols., St Petersburg, 1863–1884), and in the *Russkiy encyklopedicheskiy slovar* (1894), and in the *Kavkazskiy kalendar* (annually at Tiflis). See also G. Radde and E. Koenig, "Der Nordfuss des Daghestan und das vorlagernde Tiefland bis zur Kuma" (Ergänzungsheft No. 117 to *Petermanns Mitteilungen*), and "Das Ostufer des Pontus und seine kulturelle Entwickelung im Verlaufe der letzten 30 Jahre" (Ergänzungsheft No. 112 of the same); by V. Dingelstedt in *Scot. Geog. Mag.*—"Geography of the Caucasus (July 1889); "The Caucasian Highlands" (June 1895); "The Hydrography of the Caucasus" (June 1899); "The Riviera of Russia" (June 1904), "The Small Trades of the Caucasus" (March 1892); and "Caucasian Idioms" (June 1888). The best map is that of the Russian General Staff on the scale of 1 : 210,000 (ed. 1895–1901). (J. T. Bɛ.; P. A. K.)

CAUCHOIS-LEMAIRE, LOUIS FRANÇOIS AUGUSTE (1789–1861), French journalist, was born in Paris on the 28th of August 1789. Towards the end of the First Empire he was proprietor of the *Journal de la littérature et des arts*, which he transformed at the Restoration into a political journal of Liberal tendencies, the *Nain jaune*, in which Louis XVIII. himself had little satirical articles secretly inserted. After the return from Elba the *Nain jaune* became Bonapartist and fell into discredit. It was suppressed at the second Restoration. Cauchois-Lemaire then threw himself impetuously into the Liberal agitation, and had to take refuge in Brussels in 1816, and in the following year at the Hague, whence he was expelled for publishing an *Appel à l'opinion publique et aux États Généraux en faveur des patriotes français*. Returning to France in 1819, he resumed the struggle against the ultra-royalist party with such temerity that he was condemned to one year's imprisonment in 1821 and fifteen months' imprisonment in 1827. After the revolution of July 1830 he refused a pension of 6000 francs offered to him by King Louis Philippe, on the ground that he wished to retain his independence even in his relations with a government which he had helped to establish. He made a bitter attack upon the Périer ministry in his journal *Bon sens*, and in 1836 was one of the founders of a new opposition journal, the *Siècle*. He soon, however, abandoned journalism for history and, having no private means, in 1840 accepted the post of head of a department in the Royal Archives. Of a *Histoire de la Révolution de Juillet*, which he then undertook, he published only the first volume (1842), which contains a historical summary of the Restoration and a preliminary sketch of the democratic movement. He died in Paris on the 9th of August 1861.

CAUCHON, PIERRE (d. 1442), French bishop, was born near Reims in the latter half of the 14th century. We find him rector of the university of Paris in October 1397. In 1413 he joined the Burgundian faction, and was exiled by the parlement of Paris. But on the triumph of his party this decree was annulled, and Philip the Good, duke of Burgundy, gave him a canonry at Beauvais, sent him to the council of Constance, procured him the post of *maître des requêtes* in 1418, and finally in 1420 had him made bishop of Beauvais. But the people were hostile to him, and he was driven from his bishopric in 1429; whereupon he attached himself to the English court, and in 1431 endeavoured to procure the surrender of Reims to the English, so that Henry VI. might be crowned there. In this he failed, and Henry was crowned in Paris on the 17th of December 1431 by Henry Beaufort, cardinal bishop of Winchester, assisted by the bishops of Beauvais and Noyon. On the 24th of May 1430, Joan of Arc having been taken prisoner at Compiègne, within the limits of his diocese, Cauchon acted as her accuser, and demanded the right of judging her. Joan was taken to Rouen, whither Cauchon followed her, having been driven from Beauvais. He conducted the trial with marked partiality and malevolence, condemned the maid to imprisonment for life, and then, under pressure from the populace and the English, had recourse to fresh perfidies, declared Joan a relapsed heretic, excommunicated her, and handed her over to the secular arm on the 30th of May 1431. As, in consequence of this, it was impossible for him to return to his own diocese, he obtained the bishopric of Lisieux in 1432 by favour of the king of England. He assisted at the council of Basel in 1435, and died suddenly on the 18th of December 1442. Excommunicated posthumously by Pope Calixtus IV., his body was exhumed and thrown in the common sewer.

See Cerf, "Pierre Cauchon de Sommièvre, chanoine de Reims et de Beauvais, évêque de Beauvais et de Lisieux, son origine, ses dignités, sa mort et sa sépulture," in the *Transactions* of the Academy of Reims (1896–1898).

CAUCHY, AUGUSTIN LOUIS, Baron (1789–1857), French mathematician, was born at Paris on the 21st of August 1789, and died at Sceaux (Seine) on the 23rd of May 1857. Having received his early education from his father Louis François Cauchy (1760–1848), who held several minor public appointments and counted Lagrange and Laplace among his friends, Cauchy entered École Centrale du Panthéon in 1802, and proceeded to the École Polytechnique in 1805, and to the École des Ponts et Chaussées in 1807. Having adopted the profession of an engineer, he left Paris for Cherbourg in 1810, but returned in 1813 on account of his health, whereupon Lagrange and Laplace persuaded him to renounce engineering and to devote himself to mathematics. He obtained an appointment at the École Polytechnique, which, however, he relinquished in 1830 on the accession of Louis Philippe, finding it impossible to take the necessary oaths. A short sojourn at Freiburg in Switzerland was followed by his appointment in 1831 to the newly-created chair of mathematical physics at the university of Turin. In 1833 the deposed king Charles X. summoned him to be tutor to his grandson, the duke of Bordeaux, an appointment which enabled Cauchy to travel and thereby become acquainted with the favourable impression which his investigations had made. Charles created him a baron in return for his services. Returning to Paris in 1838, he refused a proffered chair at the Collège de France, but in 1848, the oath having been suspended, he resumed his post at the École Polytechnique, and when the oath was reinstituted after the *coup d'état* of 1851, Cauchy and Arago were exempted from it. A profound mathematician, Cauchy exercised by his perspicuous and rigorous methods a great influence over his contemporaries and successors. His writings cover the entire range of mathematics and mathematical physics.

Cauchy had two brothers: Alexandre Laurent (1792–1857), who became a president of a division of the court of appeal in 1847, and a judge of the court of cassation in 1849; and Eugène François (1802–1877), a publicist who also wrote several mathematical works.

The genius of Cauchy was promised in his simple solution of the problem of Apollonius, *i.e.* to describe a circle touching three given circles, which he discovered in 1805, his generalization of Euler's theorem on polyhedra in 1811, and in several other elegant problems. More important is his memoir on wave-propagation which obtained the *Grand Prix* of the Institut in 1816. His greatest contributions to mathematical science are enveloped in the rigorous methods which he introduced. These are mainly embodied in his three great treatises, *Cours d'analyse de l'École Polytechnique* (1821); *Le Calcul infinitésimal* (1823); *Leçons sur les applications du calcul infinitésimal à la géométrie* (1826–1828); and also in his courses of mechanics (for the École Polytechnique), higher algebra (for the Faculté des Sciences), and of mathematical physics (for the Collège de France). His treatises and contributions to scientific journals (to the number of 789) contain investigations on the theory of series (where he developed with perspicuous skill the notion of convergency), on the theory of numbers and complex quantities, the theory of groups and

substitutions, the theory of functions, differential equations and determinants. He clarified the principles of the calculus by developing them with the aid of limits and continuity, and was the first to prove Taylor's theorem rigorously, establishing his well-known form of the remainder. In mechanics, he made many researches, substituting the notion of the continuity of geometrical displacements for the principle of the continuity of matter. In optics, he developed the wave theory, and his name is associated with the simple dispersion formula. In elasticity, he originated the theory of stress, and his results are nearly as valuable as those of S. D. Poisson. His collected works, *Œuvres complètes d'Augustin Cauchy*, have been published in 27 volumes.

See C. A. Valson, *Le Baron Augustin Cauchy: sa vie et ses travaux* (Paris, 1868).

CAUCUS, a political term used in America of a special form of party meeting, and in Great Britain of a system of party organization. The word originated in Boston, Massachusetts, in the early part of the 18th century, when it was used as the name of a political club, the "Caucus" or "Caucas" club. Here public matters were discussed, and arrangements made for local elections and the choosing of candidates for offices. The first mention of the club in contemporary documents occurs in the diary of John Adams in 1763, but William Gordon (*History of the Independence of the United States of America*, 1788) speaks of the Caucus as having been in existence some fifty years before the time of writing (1774), and describes the methods used for securing the election of the candidates the club had selected. The derivation of the word has been much disputed. It was early connected with "caulkers," and it was supposed referred to meetings of the caulkers in the dockyard at Boston in 1770, to protest against the action of the British troops, or with a contemptuous allusion to the lower class of workmen frequenting the club. This is, however, a mere guess, and does not agree with the earlier date at which the club is known to have existed, nor with the accounts given of it. That it was a fanciful classical name for a convivial club, derived from the late Greek καῦκος, a cup, is far-fetched, and the most plausible origin is an Algonquin word *kaw-kaw-was*, meaning to talk. Indian words and names have been popular in America as titles for societies and clubs; cf. "Tammany" (see *Notes and Queries*, sixth series, vols. xi. and xii.). In the United States "caucus" is used strictly of a meeting either of party managers or of party voters. Such might be a "nominating caucus," either for nominating candidates for office or for selecting delegates for a nominating convention. The caucus of the party in Congress nominated the candidates for the offices of president and vice-president from 1800 till 1824, when the convention system was adopted, and the place of the local "nominating caucus" is taken by the "primaries" and conventions. The word is used in America of the meetings of a party in Congress and other legislative bodies and elsewhere which decide matters of policy and plan campaigns. "Caucus" came first into use in Great Britain in 1878. The Liberal Association of Birmingham (see Liberal Party) was organized by Mr Joseph Chamberlain and Mr F. Schnadhorst on strict disciplinary lines, more particularly with a view to election management and the control of voters on the principle of "vote as you are told." This managing body of the association, known locally as the "Six Hundred," became the model for other Liberal associations throughout the country, and the Federation of Liberal Associations was organized on the same plan. It was to this supposed imitation of the American political "machine" that Lord Beaconsfield gave the name "caucus," and the name came to be used, not in the American sense of a meeting, but of a closely disciplined system of party organization, chiefly used as a stock term of abuse applied by opponents to each other's party machinery.

CAUDEBEC-EN-CAUX, a town of France, in the department of Seine-Inférieure, 27 m. W.N.W. of Rouen by the Ouest-État railway. Pop. (1906) 2141. It is situated on the right bank of the Seine, the tidal wave of which (*mascaret*) can be well seen at this point. The chief interest of the town lies in its church, a building of the 15th and the early 16th centuries. Round its top run balustrades formed of Gothic letters, which read as part of the Magnificat. Its west portal, the decoration of the spire of the tower, and its stained glass are among the features which make it one of the finest churches of the Rouen diocese. The town also possesses several old houses. Its industries include tanning and leather-currying, and there is trade in grain. The port has a small trade in coal, live-stock and farm produce.

CAUDINE FORKS (*Furculae Caudinae*), a pass in Samnium, famous for the disaster which befell the Roman army in the second Samnite War (321 B.C.). Livy (ix. 2) describes it as formed by two narrow wooded gorges, between which lay a plain, grassy and well-watered, but entirely enclosed by mountains. Through this plain the road (later the Via Appia) led. The Romans, marching from Calatia to the relief of Luceria, entered the valley unopposed, but found the exit blocked by the enemy; on marching back they saw that the entrance and the hills surrounding the plain were also occupied, and there was no way of escape. The plain which lies west of Caudium (Montesarchio) seems, despite the older views, to be the only possible site for such a disaster to an army of as many as 40,000 men; and there is no doubt that the Romans wished to leave it by the defile on the east, through which later ran the Via Appia to Beneventum. The existence of three ancient bridges on the line of the modern road renders it impossible to suppose that its course can be essentially different from that of the ancient, though Hülsen makes the two diverge considerably after passing Montesarchio. There are, however, two possible entrances—one on the north by Moiano, and one on the west by Arpaia; the former seems to answer better to Livy's description (*via alia per cavam rupem*), while the latter is the shortest route, having been, later on, followed by the Via Appia, and bore the name Furculae Caudinae in the middle ages.

See C. Hülsen in Pauly-Wissowa, *Realencyclopädie*, iii. (1802).

(T. As.)

CAUDLE (through the O. Fr. *caudel*, from the Med. Lat. *caldellum*, a diminutive of *caldum*, a warm drink, from *calidus*, hot), a drink of warm gruel, mixed with spice and wine, formerly given to women in childbed.

CAUL (from O. Eng. *calle*, Fr. *cale*, a cap), a close-fitting woman's cap, especially one made of network worn in the 16th and 17th centuries; hence the membranous covering to the heart or brain, the *omentum*, or the similar covering to the intestines, and particularly, a portion of the *amnion*, which is sometimes found remaining round the head of a child after birth. To this, called in Scotland "sely how," holy or lucky hood, many superstitions have been attached; it was looked on as a sign of good luck, and when preserved, was kept as a protection against drowning.

CAULAINCOURT, ARMAND AUGUSTIN LOUIS, Marquis de (1773–1827), French general and diplomatist, was born of a noble family. He early entered the army, did not emigrate in the revolution, but was deprived of his grade as captain in 1793 and served in the ranks. In 1795, through the protection of L. Hoche, he became captain again, was colonel in the Army of the Rhine in 1799–1800, and after the peace of Lunéville (1801) was sent to St Petersburg to negotiate an understanding between Russia and France. On his return he was named aide-de-camp of the First Consul. He was employed to seize some agents of the English government in Baden in 1804, which led to the accusation that he was concerned in the arrest of the duc d'Enghien, an accusation against which he never ceased to protest. After the establishment of the empire he received various honours and the title of duke of Vicenza (1808). Napoleon sent him in 1807 as ambassador to St Petersburg, where Caulaincourt tried to maintain the alliance of Tilsit, and although Napoleon's ambition made the task a difficult one, Caulaincourt succeeded in it for some years. In 1811 he strongly advised Napoleon to renounce his proposed expedition to Russia. During the war he accompanied the emperor, and was one of those whom Napoleon took along with him when he suddenly abandoned his army in Poland to return to Paris (December 1812). During the last years of the empire, Caulaincourt was charged with all the diplomatic negotiations. He signed the armistice of Pleswitz, June 1813, represented France at the congress of Prague, in August 1813, at the congress of Chatillon, in February 1814, and concluded the

treaty of Fontainebleau on the 10th of April 1814. During the first Restoration, Caulaincourt lived in obscure retirement. When Napoleon returned from Elba, he became minister of foreign affairs, and tried to persuade Europe of the emperor's peaceful intentions. After the second Restoration, Caulaincourt's name was on the list of those proscribed, but it was erased on the personal intervention of Alexander I. with Louis XVIII.

Caulaincourt's memoirs appeared under the title *Souvenirs du duc de Vicence* in 1837–1840. See A. Vandal, *Napoléon et Alexandre* (Paris, 1891–1895); Tatischeff, *Alexandre Ier et Napoléon* (Paris, 1892); H. Houssaye, *1814* (Paris, 1888), and *1815* (Paris, 1893).

CAULICULUS (from Lat. *caulis*, a stalk), in architecture, the stalks (eight in number) with two leaves from which rise the helices or spiral scrolls of the Corinthian capital to support the abacus.

CAULON (Gr. Καυλωνία), a town of the district of the Bruttii, Italy, on the east coast. Its exact site is uncertain (though the name has been given to a modern village), and depends on the identification of the river Sagras. It was the southernmost of the Achaean colonies, founded either by Croton or direct from Greece itself. In the 7th century it was allied with Croton and Sybaris, and its coins, which go back to 550 B.C., prove its importance. It took the side of Athens in the Peloponnesian War. In 388 B.C. it was destroyed by Dionysius, but soon afterwards restored. It was captured during the invasion of Pyrrhus by Campanian troops. Strabo speaks of it as deserted in his time. The erection of the lighthouse at Capo Stilo, on the site of one of the medieval guard towers of the coast, led to the discovery of a wall of Greek origin, and close by of a number of terra-cottas, belonging perhaps to a temple erected in honour of the deities of the sea. Other remains were found at Fontanelle, 2½ m. away, including the fragment of a capital of an archaic Greek temple (P. Orsi in *Notizie degli Scavi*, 1891, 61). These buildings may be connected with the Caulon or a village dependent on it. (T. As.)

CAUSATION or CAUSALITY (Lat. *causa*, derived perhaps from the root *cav-*, as in *caveo*, and meaning something taken care of; corresponding to Gr. *αἰτία*), a philosophical term for the operation of causes and for the mental conception of cause as operative throughout the universe. The word "cause" is correlative to "effect." Thus when one thing B is regarded as taking place in consequence of the action of another thing A, then A is said to be the cause of B, and B the effect of A. The philosophical problems connected with causation are both metaphysical and psychological. The metaphysical problem is part of the whole theory of existence. If everything is to be regarded as causally related with simultaneous and prior things or actions, it follows logically that the investigation of existence must, by hypothesis, be a regress to infinity, *i.e.* that we cannot conceive a beginning to existence. This explanation has led to the postulate of a First Cause, the nature of which is variously explained. The empirical school sees no difficulty in assuming a single event; but such a theory seems to deny the validity of the original hypothesis. Theologians assert a divine origin in the form of a personal self-existent creator, while some metaphysical schools, preferring an impersonal First Cause, substitute the doctrine of the Absolute (*q.v.*). All the explanations are alike in this respect, that at a certain point they pass from the sphere of the senses, the physical world, to a metaphysical sphere in which the data and the intellectual operation of cognizing them are of a totally different quality. For example, the causal connexion between drunkenness and alcohol is not of the same observable character as that which is inferred between the infinite First Cause and the whole domain of sense-given phenomena.

A second metaphysical problem connected with causation arises when we consider the nature of necessity. It is generally assumed when two things are spoken of as cause and effect that their relation is a necessary one, or, in other words, that given the cause the effect must follow. The arguments connected with this problem belong to psychological discussions of causation. It is sufficient here to state that, in so far as causation is regarded as necessary connexion, it can form no part of a purely empirical theory of existence. The senses can say only that in all observed cases B has followed A, and this does not establish necessary connexion. The idea of causation is a purely intellectual (a priori) one.

The psychological problems connected with causation refer (1) to the origin of the conception in our minds; (2) to the validity of the conception. As regards the origin of the conception modern psychological analysis does not carry us beyond the doctrine of Locke contained in his chapter on "Power" (*Essay*, bk. ii. ch. 21), wherein he shows that the idea of power is got from the knowledge of our own activity. "Bodies by their causes," he says, "do not afford us so clear and distinct an idea of active power as we have from reflection on the operation of our minds." Putting Locke's doctrine into modern language, we may say that a man has the conception of cause primarily because he himself is a cause. The conception thus obtained we "project," that is, transfer to external objects, so far as we may find it useful to do so. Thus it is by a sort of analogy that we say that the sun is the "cause" of daylight. The rival theory to Locke's is that of Hume (*Treatise*, bk. i.), who derives the conception from the unaided operation of custom. When one object, A, has been noticed frequently to precede another object, B, an association between A and B is generated; and by virtue of this association, according to Hume, we say that A is the cause of B. The weakness of this account is that many invariable successions, such as day and night, do not make us regard the earlier members of the successions as causing the later; while in numberless cases we assert a causal connexion between two objects from a single experience of them.

We may proceed now to consider the validity of the conception of causation, which has been attacked from two sides. From the side of absolute idealism it is argued that the conception of cause, as involving a transition in time, cannot be ultimately valid, since the time-relation is not ultimately real. Upon this view (ably stated in Professor Bosanquet's *Logic*, bk. i. ch. 6) the more we know of causes and effects the less relevant becomes the time-relation and the nearer does the conception of cause and effect approach to another conception which is truly valid, the conception of ground and consequence. This means that, viewed from the standpoint of science, a draught of alcohol *causes* intoxication in no other sense than the triangularity of a triangle causes the interior angles to be equal to two right angles. This argument ceases to have cogency so soon as we deny its fundamental proposition that the time-relation is not ultimately real, but is irrelevant from the standpoint of science. This is a sheer assertion, contrary to all ordinary experience, which we have as much right to deny as the absolute idealists to affirm. It is only plausible to those who are committed to the Hegelian view of reality as consisting of a static system of universals, a view which has long been discredited in Germany, its native land, and is fast losing ground in England. Against the Hegelians we must maintain that the common distinction between "ground" and "cause" is perfectly justifiable. Whereas "ground" is an appropriate term for the relations within a static, simultaneous system, "cause" is appropriate to the relations within a dynamic, successive system.

From the other side the validity of causation has been attacked in the interests of the naturalism of the mechanical sciences. J. S. Mill argues that, scientifically, the cause of anything is the total assemblage of the conditions that precede its appearance, and that we have no right to give the name of cause to one of them exclusively of the others. The answer to this is that Mill fails to recognize that cause is a conception which we find useful in our dealings with nature, and that whatever conceptions we find useful we are justified in using. Among the conditions of an event there are always one or two that stand in specially close relation to it from our point of view; *e.g.* the draught of alcoholic liquor is more closely related to the man's drunkenness than is the attraction of the earth's gravity, though that also must co-operate in producing the effect. Such closely related conditions we find it convenient to single out by a term which expresses their analogy to the cause of causes, human volition.

These are the questions respecting causation which are matters of present controversy; there are in addition many other points which belong to the controversies of the past. Among the most important are Aristotle's classification of causes into material, formal, efficient and final, set forth in his *Physics* and elsewhere, and known as his doctrine of the Four Causes; Geulincx's Occasional Causes, meant as a solution of certain difficulties in the cosmology of Descartes; Leibnitz's law of Sufficient Reason; and Kant's explanation of cause and effect as an a priori category of the understanding, intended as an answer to Hume's scepticism, but very much less effective than the line of explanation suggested by Locke.

The following is a list of the various technical terms connected with causation which have been distinguished by logicians and psychologists.

The four Aristotelian causes are: (1) *Material cause* (ὕλη), the material out of which a thing is made; the material cause of a house is the bricks and mortar of which it is composed. (2) *Formal cause* (εἶδος, λόγος, τὸ τί ἦν εἶναι), the general external appearance, shape, form of a thing; the formal cause of a triangle is its triangularity. (3) *Efficient cause* (ἀρχὴ τῆς κινήσεως), the alcohol which makes a man drunk, the pistol-bullet which kills. This is the cause as generally understood in modern usage. (4) *Final cause* (τέλος, τὸ οὗ ἕνεκα), the object for which an action is done or a thing produced; the final cause of a commercial man's enterprise is to make his livelihood (see TELEOLOGY). This last cause was rejected by Bacon, Descartes and Spinoza, and indeed in ordinary usage the cause of an action in relation to its effect is the desire for, and expectation of, that effect on the part of the agent, not the effect itself. The *Proximate cause* of a phenomenon is the immediate or superficial as opposed to the *Remote* or *Primary cause*. Plurality of Causes is the much criticized doctrine of J. S. Mill that a fact may be the uniform consequent of several different antecedents. *Causa essendi* means the cause whereby a change is what it is, as opposed to the *causa cognoscendi*, the cause of our knowledge of the event; the two causes evidently need not be the same. An object is called *causa immanens* when it produces its changes by its own activity; a *causa transiens* produces changes in some other object. *Causa sui* is a term applied to God by Spinoza to denote that he is dependent on nothing and has no need of any external thing for his existence. *Vera causa* is a term used by Newton in his *Principia*, where he says, "No more causes of natural things are to be admitted than such as are both true and sufficient to explain the phenomena of those things"; *verae causae* must be such as we have good inductive grounds to believe do exist in nature, and do perform a part in phenomena analogous to those we would render an account of.

CAUSEWAY, a path on a raised dam or mound across marshes or low-lying ground; the word is also used of old paved highways, such as the Roman military roads. "Causey" is still used dialectically in England for a paved or cobbled footpath. The word is properly "causey-way," from *causey*, a mound or dam, which is derived, through the Norman-French *caucie* (cf. modern *chaussée*), from the late Latin *via calciata*, a road stamped firm with the feet (*calcare*, to tread).

CAUSSES (from Lat. *calx* through local Fr. *caous*, meaning "lime"), the name given to the table-lands lying to the south of the central plateau of France and sloping westward from the Cévennes. They form parts of the departments of Lozère, Aveyron, Gard, Hérault, Lot and Tarn-et-Garonne. They are of limestone formation, dry, sterile and treeless. These characteristics are most marked in the east of the region, where the Causse de Sauveterre, the Causse Méjan, the Causse Noir and the Larzac flank the Cévennes. Here the Causse Méjan, the most deserted and arid of all, reaches an altitude of nearly 4200 ft. Towards the west the lesser causses of Rouergue and Quercy attain respectively 2950 ft. and 1470 ft. Once an uninterrupted table-land, the causses are now isolated from one another by deep rifts through which run the Tarn, the Dourbie, the Jonte and other rivers. The summits are destitute of running water, since the rain as it falls either sinks through the permeable surface soil or runs into the fissures and chasms, some of great depth, which are peculiar to the region. The inhabitants (*Caussenards*) of the higher causses cultivate hollows in the ground which are protected from the violent winds, and the scanty herbage permits of the raising of sheep, from the milk of which Roquefort cheeses are made. In the west, where the rigours of the weather are less severe, agriculture is more easily carried on.

CAUSSIN DE PERCEVAL, ARMAND-PIERRE (1795–1871), French orientalist, was born in Paris on the 13th of January 1795. His father, Jean Jacques Antoine Caussin de Perceval (1759–1835), was professor of Arabic in the Collège de France. In 1814 he went to Constantinople as a student interpreter, and afterwards travelled in Asiatic Turkey, spending a year with the Maronites in the Lebanon, and finally becoming dragoman at Aleppo. Returning to Paris, he became professor of vulgar Arabic in the school of living Oriental languages in 1821, and also professor of Arabic in the Collège de France in 1833. In 1849 he was elected to the Academy of Inscriptions. He died at Paris during the siege on the 15th of January 1871.

Caussin de Perceval published (1828) a useful *Grammaire arabe vulgaire*, which passed through several editions (4th ed., 1858), and edited and enlarged Élie Bocthor's[1] *Dictionnaire français-arabe* (2 vols., 1828; 3rd ed., 1864); but his great reputation rests almost entirely on one book, the *Essai sur l'histoire des Arabes avant l'Islamisme, pendant l'époque de Mahomet* (3 vols., 1847–1849), in which the native traditions as to the early history of the Arabs, down to the death of Mahommed and the complete subjection of all the tribes to Islam, are brought together with wonderful industry and set forth with much learning and lucidity. One of the principal MS. sources used is the great *Kitâb al-Aghâni* (Book of Songs) of Abu Faraj, which has since been published (20 vols., Boulak, 1868) in Egypt; but no publication of texts can deprive the *Essai*, which is now very rare, of its value as a trustworthy guide through a tangled mass of tradition.

CAUSTIC (Gr. καυστικός, burning), that which burns. In surgery, the term is given to substances used to destroy living tissues and so inhibit the action of organic poisons, as in bites, malignant disease and gangrenous processes. Such substances are silver nitrate (lunar caustic), the caustic alkalis (potassium and sodium hydrates), zinc chloride, an acid solution of mercuric nitrate, and pure carbolic acid. In mathematics, the "caustic surfaces" of a given surface are the envelopes of the normals to the surface, or the loci of its centres of principal curvature.

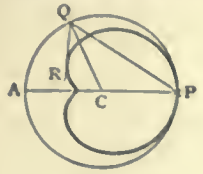
In optics, the term *caustic* is given to the envelope of luminous rays after reflection or refraction; in the first case the envelope is termed a catacaustic, in the second a diacaustic. Catacaustics are to be observed as bright curves when light is allowed to fall upon a polished riband of steel, such as a watch-spring, placed on a table, and by varying the form of the spring and moving the source of light, a variety of patterns may be obtained. The investigation of caustics, being based on the assumption of the rectilinear propagation of light, and the validity of the experimental laws of reflection and refraction, is essentially of a geometrical nature, and as such it attracted the attention of the mathematicians of the 17th and succeeding centuries, more notably John Bernoulli, G. F. de l'Hôpital, E. W. Tschirnhausen and Louis Carré.

Caustics by reflection.

The simplest case of a caustic curve is when the reflecting surface is a circle, and the luminous rays emanate from a point on the circumference. If in fig. 1 AQP be the reflecting circle having C as centre, P the luminous point, and PQ any incident ray, and we join CQ, it follows, by the law of the equality of the angles of incidence and reflection, that the reflected ray QR is such that the angles RQC and CQP are equal; to determine the caustic, it is necessary to determine the envelope of this line. This may be readily accomplished geometrically or analytically, and it will be found that the envelope is a cardioid (*q.v.*), *i.e.* an epicycloid in which the radii of the fixed and rolling circles are equal. When the rays are parallel, the reflecting surface

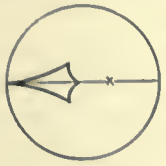
[1] Élie Bocthor (1784–1821) was a French orientalist of Coptic origin. He was the author of a *Traité des conjugaisons* written in Arabic, and left his Dictionary in MS.

remaining circular, the question can be similarly treated, and it is found that the caustic is an epicycloid in which the radius of the fixed circle is twice that of the rolling circle (fig. 2). The geometrical method is also applicable when it is required to determine the caustic



c = a
FIG. 1.

c = ∞
FIG. 2.

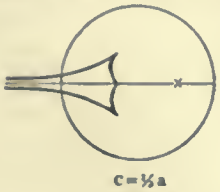

c = ½a
FIG. 3.

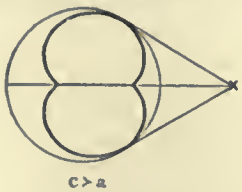
after any number of reflections at a spherical surface of rays, which are either parallel or diverge from a point on the circumference. In both cases the curves are epicycloids; in the first case the radii of the rolling and the fixed circles are $a(2n-1)/4n$ and $a/2n$, and in the second, $an/(2n+1)$ and $a/(2n+1)$, where a is the radius of the mirror and n the number of reflections.

The Cartesian equation to the caustic produced by reflection at a circle of rays diverging from any point was obtained by Joseph Louis Lagrange; it may be expressed in the form

$$\{(4c^2-a^2)(x^2+y^2)-2a^2cx-a^2c^2\}^3=27a^4c^2y^2(x^2+y^2-c^2)^2,$$

where a is the radius of the reflecting circle, and c the distance of the luminous point from the centre of the circle. The polar form is $\{(u+p)\cos\frac{1}{2}\theta\}^{\frac{2}{3}}+\{(u-p)\sin\frac{1}{2}\theta\}^{\frac{2}{3}}=(2k)^{\frac{2}{3}}$, where p and k are the reciprocals of c and a, and u the reciprocal of the radius vector of any point on the caustic. When $c=a$ or $=\infty$ the curve reduces to the cardioid or the two cusped epicycloid previously discussed. Other


c = ⅓a
FIG. 4.


c > a
FIG. 5.

forms are shown in figs. 3, 4, 5, 6. These curves were traced by the Rev. Hammet Holditch (*Quart. Jour. Math.* vol. i.).

Secondary caustics are orthotomic curves having the reflected or refracted rays as normals, and consequently the proper caustic curve, being the envelope of the normals, is their evolute. It is usually the case that the secondary caustic is easier to determine than the caustic, and hence, when determined, it affords a ready means for deducing the primary caustic. It may be shown by geometrical considerations that the secondary caustic is a curve similar to the first positive pedal of the reflecting curve, of twice the linear dimensions, with respect to the luminous point. For a circle, when the rays emanate from any point, the secondary caustic is a limaçon, and hence the primary caustic is the evolute of this curve.

The simplest instance of a caustic by refraction (or diacaustic) is when luminous rays issuing from a point are refracted at a straight line. It may be shown geometrically that the secondary caustic, if the second medium be less refractive than the first, is an ellipse having the luminous point for a focus, and its centre at the foot of the perpendicular from the luminous point to the refracting line. The evolute of this ellipse is the caustic required. If the second medium be more highly refractive than the first, the secondary caustic is a hyperbola having the same focus and centre as before, and the caustic is the evolute of this curve. When the refracting curve is a circle and the rays emanate from any point, the locus of the secondary caustic is a Cartesian oval, and the evolute of this curve is the required diacaustic. These curves appear to have been first discussed by Gergonne. For the caustic by refraction of parallel rays at a circle reference should be made to the memoirs by Arthur Cayley.

Caustics by refraction.

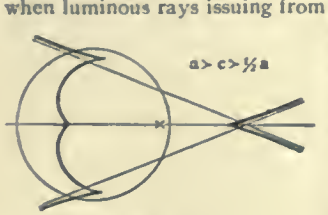


FIG. 6.

REFERENCES.—Arthur Cayley's "Memoirs on Caustics" in the *Phil. Trans.* for 1857, vol. 147, and 1867, vol. 157, are especially to be consulted. Reference may also be made to R. S. Heath's *Geometrical Optics* and R. A. Herman's *Geometrical Optics* (1900).

CAUTERETS, a watering-place of south-western France in the department of Hautes-Pyrénées, 20 m. S. by W. of Lourdes by rail. Pop. (1906) 1030. It lies in the beautiful valley of the Gave de Cauterets, and is well known for its copious thermal springs. They are chiefly characterized by the presence of sulphur and silicate of soda, and are used in the treatment of diseases of the respiratory organs, rheumatism, skin diseases and many other maladies. Their temperature varies between 75° and 137° F. The springs number twenty-four, and there are nine bathing establishments. Cauterets is a centre for excursions, the Monné (8935 ft.), the Cabaliros (7655 ft.), the Pic de Chabarrou (9550 ft.), the Vignemale (10,820 ft.), and other summits being in its neighbourhood.

CAUTIN, a province of southern Chile, bounded N. by Arauco, Malleco and Bio-Bio, E. by Argentina, S. by Valdivia, and W. by the Pacific. Its area is officially estimated at 5832 sq. m. Cautin lies within the temperate agricultural and forest region of the south, and produces wheat, cattle, lumber, tan-bark and fruit. The state central railway from Santiago to Puerto Montt crosses the province from north to south, and the Cautin, or Imperial, and Tolten rivers (the latter forming its southern boundary) cross from east to west, both affording excellent transportation facilities. The province once formed part of the territory occupied by the Araucanian Indians, and its present political existence dates from 1887. Its population (1895) was 78,221, of whom a large percentage were European immigrants, principally Germans. The capital is Temuco, on the Rio Cautin; pop. (1895) 7078. The principal towns besides Temuco are Lautaro (3139) and Nueva Imperial (2179), both of historic interest because they were fortified Spanish outposts in the long struggle with the Araucanians.

CAUTLEY, SIR PROBY THOMAS (1802–1871), English engineer and palaeontologist, was born in Suffolk in 1802. After some years' service in the Bengal artillery, which he joined in 1819, he was engaged on the reconstruction of the Doab canal, of which, after it was opened, he had charge for twelve years (1831–1843). In 1840 he reported on the proposed Ganges canal, for the irrigation of the country between the rivers Ganges, Hindan and Jumna, which was his most important work. This project was sanctioned in 1841, but the work was not begun till 1843, and even then Cautley found himself hampered in its execution by the opposition of Lord Ellenborough. From 1845 to 1848 he was absent in England owing to ill-health, and on his return to India he was appointed director of canals in the North-Western Provinces. After the Ganges canal was opened in 1854 he went back to England, where he was made K.C.B., and from 1858 to 1868 he occupied a seat on the council of India. He died at Sydenham, near London, on the 25th of January 1871. In 1860 he published a full account of the making of the Ganges canal, and he also contributed numerous memoirs, some written in collaboration with Dr Hugh Falconer, to the *Proceedings* of the Bengal Asiatic Society and the Geological Society of London on the geology and fossil remains of the Sivalik Hills.

CAUVERY, or KAVERI, a river of southern India. Rising in Coorg, high up amid the Western Ghats, in 12° 25′ N. lat. and 75° 34′ E. long., it flows with a general south-eastern direction across the plateau of Mysore, and finally pours itself into the Bay of Bengal through two principal mouths in Tanjore district. Its total length is 472 m., the estimated area of its basin 27,700 sq. m. The course of the river in Coorg is very tortuous. Its bed is generally rocky; its banks are high and covered with luxuriant vegetation. On entering Mysore it passes through a narrow gorge, but presently widens to an average breadth of 300 to 400 yds. Its bed continues rocky, so as to forbid all navigation; but its banks are here bordered with a rich strip of cultivation. In its course through Mysore the channel is interrupted by twelve anicuts or dams for the purpose of irrigation. From the most important of these, known as the Madadkatte, an artificial channel is led to a distance of 72 m., irrigating an area of 10,000 acres, and ultimately bringing a water-supply into the town of Mysore. In Mysore state the Cauvery forms the two islands of Seringapatam and Sivasamudram, which vie in sanctity with the island of Seringam lower down in Trichinopoly district. Around the island of Sivasamudram are the celebrated falls of the Cauvery, unrivalled for romantic beauty. The river here branches into two channels, each of which makes a descent of about 200 m.

in a succession of rapids and broken cascades. After entering the Madras presidency, the Cauvery forms the boundary between the Coimbatore and Salem districts, until it strikes into Trichinopoly district. Sweeping past the historic rock of Trichinopoly, it breaks at the island of Seringam into two channels, which enclose between them the delta of Tanjore, the garden of southern India. The northern channel is called the Coleroon (Kolidam); the other preserves the name of Cauvery. On the seaward face of its delta are the open roadsteads of Negapatam and French Karikal. The only navigation on any portion of its course is carried on in boats of basket-work. It is in the delta that the real value of the river for irrigation becomes conspicuous. This is the largest delta system, and the most profitable of all the works in India. The most ancient irrigation work is a massive dam of unhewn stone, 1080 ft. long, and from 40 to 60 ft. broad, across the stream of the Cauvery proper, which is supposed to date back to the 4th century, is still in excellent repair, and has supplied a model to British engineers. The area of the ancient system was 669,000 acres, the modern about 1,000,000 acres. The chief modern work is the anicut across the Coleroon, 2250 ft. long, constructed by Sir Arthur Cotton between 1836 and 1838. The Cauvery Falls have been utilized for an electric installation, which supplies power to the Kolar gold-mines and light to the city of Mysore.

The Cauvery is known to devout Hindus as Dakshini Ganga, or the Ganges of the south, and the whole of its course is holy ground. According to the legend there was once born upon earth a girl named Vishnumaya or Lopamudra, the daughter of Brahma; but her divine father permitted her to be regarded as the child of a mortal, called Kavera-muni. In order to obtain beatitude for her adoptive father, she resolved to become a river whose waters should purify from all sin. Hence it is that even the holy Ganges resorts underground once in the year to the source of the Cauvery, to purge herself from the pollution contracted from the crowd of sinners who have bathed in her waters.

CAVA DEI TIRRENI, a town and episcopal see of Campania, Italy, in the province of Salerno, 6 m. N.W. by rail from the town of Salerno. Pop. (1901) town, 7611; commune, 23,415. It lies fairly high in a richly cultivated valley, surrounded by wooded hills, and is a favourite resort of foreigners in spring and autumn, and of the Neapolitans in summer. A mile to the south-west is the village of Corpo di Cava (1970 ft.), with the Benedictine abbey of La Trinità della Cava, founded in 1025 by St Alferius. The church and the greater part of the buildings were entirely modernized in 1796. The old Gothic cloisters are preserved. The church contains a fine organ and several ancient sarcophagi. The archives, now national property, include documents and MSS. of great value (*e.g.* the *Codex Legum Longobardorum* of 1004) and fine *incunabula*. The abbot is keeper, and also head of a boarding school.

See M. Morcaldi, *Codex Diplomaticus Cavensis* (Naples and Milan, 1873–1893).

CAVAEDIUM, in architecture, the Latin name for the central hall or court within a Roman house, of which five species are described by Vitruvius. (1) The *Tuscanicum* responds to the greater number apparently of those at Pompeii, in which the timbers of the roof are framed together, so as to leave an open space in the centre, known as the compluvium; it was through this opening that all the light was received, not only in the hall itself, but in the rooms round. The rain from the roof was collected in gutters round the compluvium, and discharged from thence into a tank or open basin in the floor called the impluvium. (2) In the *tetrastylon* additional support was required in consequence of the dimensions of the hall; this was given by columns placed at the four angles of the impluvium. (3) *Corinthian* is the term given to the species where additional columns were required. (4) In the *displuviatum* the roofs, instead of sloping down towards the compluvium, sloped outwards, the gutters being on the outer walls; there was still an opening in the roof, and an impluvium to catch the rain falling through. This species of roof, Vitruvius states, is constantly in want of repair, as the water does not easily run away, owing to the stoppage in the rain-water pipes. (5) The *testudinatum* was employed when the hall was small and another floor was built over it; no example of this type has been found at Pompeii, and only one of the cavaedium displuviatum.

CAVAGNARI, SIR PIERRE LOUIS NAPOLEON (1841–1879), British military administrator, the son of a French general by his marriage with an Irish lady, was born at Stenay, in the department of the Meuse, on the 4th of July 1841. He nevertheless obtained naturalization as an Englishman, and entered the military service of the East India Company. After passing through the college at Addiscombe, he served through the Oudh campaign against the mutineers in 1858 and 1859. In 1861 he was appointed an assistant commissioner in the Punjab, and in 1877 became deputy commissioner of Peshawar and took part in several expeditions against the hill tribes. In 1878 he was attached to the staff of the British mission to Kabul, which the Afghans refused to allow to proceed. In May 1879, after the death of the amir Shere Ali, Cavagnari negotiated and signed the treaty of Gandamak with his successor, Yakub Khan. By this the Afghans agreed to admit a British resident at Kabul, and the post was conferred on Cavagnari, who also received the Star of India and was made a K.C.B. He took up his residence in July, and for a time all seemed to go well, but on the 3rd of September Cavagnari and the other European members of the mission were massacred in a sudden rising of mutinous Afghan troops. (See AFGHANISTAN.)

CAVAIGNAC, JEAN BAPTISTE (1762–1829), French politician, was born at Gourdon (Lot). He was sent by his department as deputy to the Convention, where he associated himself with the party of the Mountain and voted for the death of Louis XVI. He was constantly employed on missions in the provinces, and distinguished himself by his rigorous repression of opponents of the revolution in the departments of Landes, Basses-Pyrénées and Gers. With his colleague Jacques Pinet (1754–1844) he established at Bayonne a revolutionary tribunal with authority in the neighbouring towns. Charges of cruelty were preferred against him by a local society before the Convention in 1795, but were dismissed. He had represented the Convention in the armies of Brest and of the Eastern Pyrenees in 1793, and in 1795 he was sent to the armies of the Moselle and the Rhine. He filled various minor administrative offices, and in 1806 became an official at Naples in Murat's government. During the Hundred Days he was prefect of the Somme. At the restoration he was proscribed as a regicide, and spent the last years of his life at Brussels, where he died on the 24th of March 1829. His second son was General Eugène Cavaignac (*q.v.*).

The eldest son, ELÉONORE LOUIS GODEFROI CAVAIGNAC (1801–1845), was, like his father, a republican of the *intransigeant* type. He was bitterly disappointed at the triumph of the monarchical principle after the revolution of July 1830, in which he had taken part. He took part in the Parisian risings of October 1830, 1832 and 1834. On the third occasion he was imprisoned, but escaped to England in 1835. When he returned to France in 1841 he worked on the staff of *La Réforme*, and carried on an energetic republican propaganda. In 1843 he became president of the Society of the Rights of Man, of which he had been one of the founders in 1832. He died on the 5th of May 1845. The recumbent statue (1847) of Godefroi Cavaignac on his tomb at Montmartre (Paris) is one of the masterpieces of the sculptor François Rude.

Jean Baptiste's brother, JACQUES-MARIE, VICOMTE CAVAIGNAC (1773–1855), French general, served with distinction in the army under the republic and successive governments. He commanded the cavalry of the XI. corps in the retreat from Moscow, and eventually became Vicomte Cavaignac and inspector-general of cavalry.

CAVAIGNAC, LOUIS EUGÈNE (1802–1857), French general, son of J. B. Cavaignac, was born at Paris on the 15th of October 1802. After going through the usual course of study for the military profession, he entered the army as an engineer officer in 1824, and served in the Morea in 1828, becoming captain in the following year. When the revolution of 1830 broke out

he was stationed at Arras, and was the first officer of his regiment to declare for the new order of things. In 1831 he was removed from active duty in consequence of his declared republicanism, but in 1832 he was recalled to the service and sent to Algeria. This continued to be the main sphere of his activity for sixteen years, and he won especial distinction in his fifteen months' command of the exposed garrison of Tlemçen, a command for which he was selected by Marshal Clausel (1836–1837), and in the defence of Cherchel (1840). Almost every step of his promotion was gained on the field of battle, and in 1844 the duc d'Aumale himself asked for Cavaignac's promotion to the rank of *maréchal de camp*. This was made in the same year, and he held various district commands in Algeria up to 1848, when the provisional government appointed him governor-general of the province with the rank of general of division. The post of minister of war was also offered to Cavaignac, but he refused it owing to the unwillingness of the government to quarter troops in Paris, a measure which the general held to be necessary for the stability of the new régime. On his election to the National Assembly, however, Cavaignac returned to Paris. When he arrived on the 17th of May he found the capital in an extremely critical state. Several *émeutes* had already taken place, and by the 22nd of June 1848 a formidable insurrection had been organized. The only course now open to the National Assembly was to assert its authority by force. Cavaignac, first as minister of war and then as dictator, was called to the task of suppressing the revolt. It was no light task, as the national guard was untrustworthy, regular troops were not at hand in sufficient numbers, and the insurgents had abundant time to prepare themselves. Variously estimated at from 30,000 to 60,000 men, well armed and organized, they had entrenched themselves at every step behind formidable barricades, and were ready to avail themselves of every advantage that ferocity and despair could suggest to them. Cavaignac failed perhaps to appreciate the political exigencies of the moment; as a soldier he would not strike his blow until his plans were matured and his forces sufficiently prepared. When the troops at last advanced in three strong columns, every inch of ground was disputed, and the government troops were frequently repulsed, till, fresh regiments arriving, he forced his way to the Place de la Bastille and crushed the insurrection in its headquarters. The contest, which raged from the 23rd to the morning of the 26th of June, was without doubt the bloodiest and most resolute the streets of Paris have ever seen, and the general did not hesitate to inflict the severest punishment on the rebels.

Cavaignac was censured by some for having, by his delay, allowed the insurrection to gather head; but in the chamber he was declared by a unanimous vote to have deserved well of his country. After laying down his dictatorial powers, he continued to preside over the Executive Committee till the election of a regular president of the republic. It was expected that the suffrages of France would raise Cavaignac to that position. But the mass of the people, and especially the rural population, sick of revolution, and weary even of the moderate republicanism of Cavaignac, were anxious for a stable government. Against the five and a half million votes recorded for Louis Napoleon, Cavaignac received only a million and a half. Not without chagrin at his defeat, he withdrew into the ranks of the opposition. He continued to serve as a representative during the short remainder of the republic. At the *coup d'état* of the 2nd December 1851 he was arrested along with the other members of the opposition; but after a short imprisonment at Ham he was released, and, with his newly-married wife, lived in retirement till his death, which took place at Ourne (Sarthe) on the 28th of October 1857.

His son, JACQUES MARIE EUGÈNE GODEFROI CAVAIGNAC (1853–1905), French politician, was born in Paris on the 21st of May 1853. He made public profession of his republican principles as a schoolboy at the Lycée Charlemagne by refusing in 1867 to receive a prize at the Sorbonne from the hand of the prince imperial. He received the military medal for service in the Franco-Prussian War, and in 1872 entered the École Polytechnique. He served as a civil engineer in Angoulême until 1881, when he became master of requests in the council of state. In the next year he was elected deputy for the arrondissement of Saint-Calais (Sarthe) in the republican interest. In 1885–1886 he was under-secretary for war in the Henri Brisson ministry, and he served in the cabinet of Émile Loubet (1892) as minister of marine and of the colonies. He had exchanged his moderate republicanism for radical views before he became war minister in the cabinet of Lêon Bourgeois (1895–1896). He was again minister of war in the Brisson cabinet in July 1898, when he read in the chamber a document which definitely incriminated Captain Alfred Dreyfus. On the 30th of August, however, he stated that this had been discovered to be a forgery by Colonel Henry, but he refused to concur with his colleagues in a revision of the Dreyfus prosecution, which was the logical outcome of his own exposure of the forgery. Resigning his portfolio, he continued to declare his conviction of Dreyfus's guilt, and joined the Nationalist group in the chamber, of which he became one of the leaders. He also was an energetic supporter of the Ligue de la Patrie Française. In 1899 Cavaignac was an unsuccessful candidate for the presidency of the republic. He had announced his intention of retiring from political life when he died at his country-seat near Flée (Sarthe) on the 25th of September 1905. He wrote an important book on the *Formation de la Prusse contemporaine* (2 vols., 1891–1898), dealing with the events of 1806–1813.

CAVAILLON, a town of south-eastern France in the department of Vaucluse, 20 m. S.E. of Avignon by rail. Pop. (1906) town, 5760; commune, 9952. Cavaillon lies at the southern base of Mont St Jacques on the right bank of the Durance above its confluence with the Coulon. It has a hôtel de ville of the 18th century, a church of the 12th century, dedicated to St Véran, and the mutilated remains of a triumphal arch of the Roman period. The town is an important railway junction and the commercial centre of a rich and well-irrigated plain, which produces melons and other fruits, early vegetables (artichokes, tomatoes, celery, potatoes), and other products in profusion. Silk-worms are reared, and silk is an important article of trade. The preparation of preserved vegetables, fruits and other provisions, distilling, and the manufacture of straw hats and leather are carried on. Numerous minor relics of the Roman period have been found to the south of the present town, on the site of the ancient *Cabellio*, a place of some note in the territory of the Cavares. In medieval and modern history the town has for the most part followed the fortunes of the Comtat Venaissin, in which it was included. Till the time of the Revolution it was the see of a bishop, and had a large number of monastic establishments.

CAVALCANTI, GUIDO (*c.* 1250–1300), Italian poet and philosopher, was the son of a philosopher whom Dante, in the *Inferno*, condemns to torment among the Epicureans and Atheists; but he himself was a friend of the great poet. By marriage with Beatrice, daughter of Farinata Uberti, he became head of the Ghibellines; and when the people, weary of continual brawls, aroused themselves, and sought peace by banishing the leaders of the rival parties, he was sent to Sarzana, where he caught a fever, of which he died. Cavalcanti has left a number of love sonnets and canzoni, which were honoured by the praise of Dante. Some are simple and graceful, but many are spoiled by a mixture of metaphysics borrowed from Plato, Aristotle and the Christian Fathers. They are mostly in honour of a French lady, whom he calls Mandetta. His *Canzone d'Amore* was extremely popular, and was frequently published; and his complete poetical works are contained in Giunti's collection (Florence, 1527; Venice, 1531–1532). He also wrote in prose on philosophy and oratory.

See D. G. Rossetti, *Dante and his Circle* (1874).

CAVALIER, JEAN (1681–1740), the famous chief of the Camisards (*q.v.*), was born at Mas Roux, a small hamlet in the commune of Ribaute near Anduze (Gard), on the 28th of November 1681. His father, an illiterate peasant, had been compelled by persecution to become a Roman Catholic along

with his family, but his mother brought him up secretly in the Protestant faith. In his boyhood he became a shepherd, and about his twentieth year he was apprenticed to a baker. Threatened with prosecution for his religious opinions he went to Geneva, where he passed the year 1701; he returned to the Cévennes on the eve of the rebellion of the Camisards, who by the murder of the Abbé du Chayla at Pont-de-Monvert on the night of the 24th of July 1702 raised the standard of revolt. Some months later he became their leader. He showed himself possessed of an extraordinary genius for war, and Marshal Villars paid him the high compliment of saying that he was as courageous in attack as he was prudent in retreat, and that by his extraordinary knowledge of the country he displayed in the management of his troops a skill as great as that of the ablest officers. Within a period of two years he was to hold in check Count Victor Maurice de Broglie and Marshal Montrevel, generals of Louis XIV., and to carry on one of the most terrible partisan wars in French history.

He organized the Camisard forces and maintained the most severe discipline. As an orator he derived his inspiration from the prophets of Israel, and raised the enthusiasm of his rude mountaineers to a pitch so high that they were ready to die with their young leader for the sake of liberty of conscience. Each battle increased the terror of his name. On Christmas day 1702 he dared to hold a religious assembly at the very gates of Alais, and put to flight the local militia which came forth to attack him. At Vagnas, on the 10th of February 1703, he routed the royal troops, but, defeated in his turn, he was compelled to find safety in flight. But he reappeared, was again defeated at Tour de Bellot (April 30), and again recovered himself, recruits flocking to him to fill up the places of the slain. By a long series of successes he raised his reputation to the highest pitch, and gained the full confidence of the people. It was in vain that more rigorous measures were adopted against the Camisards. Cavalier boldly carried the war into the plain, made terrible reprisals, and threatened even Nîmes itself. On the 16th of April 1704 he encountered Marshal Montrevel himself at the bridge of Nages, with 1000 men against 5000, and, though defeated after a desperate conflict, he made a successful retreat with two-thirds of his men. It was at this moment that Marshal Villars, wishing to put an end to the terrible struggle, opened negotiations, and Cavalier was induced to attend a conference at Pont d'Avène near Alais on the 11th of May 1704, and on the 16th of May he made submission at Nîmes. These negotiations, with the proudest monarch in Europe, he carried on, not as a rebel, but as the leader of an army which had waged an honourable war. Louis XIV. gave him a commission as colonel, which Villars presented to him personally, and a pension of 1200 livres. At the same time he authorized the formation of a Camisard regiment for service in Spain under his command.

Before leaving the Cévennes for the last time he went to Alais and to Ribaute, followed by an immense concourse of people. But Cavalier had not been able to obtain liberty of conscience, and his Camisards almost to a man broke forth in wrath against him, reproaching him for what they described as his treacherous desertion. On the 21st of June 1704, with a hundred Camisards who were still faithful to him, he departed from Nîmes and came to Neu-Brisach (Alsace), where he was to be quartered. From Dijon he went on to Paris, where Louis XIV. gave him audience and heard his explanation of the revolt of the Cévennes. Returning to Dijon, fearing to be imprisoned in the fortress of Neu-Brisach, he escaped with his troop near Montbéliard and took refuge at Lausanne. But he was too much of a soldier to abandon the career of arms. He offered his services to the duke of Savoy, and with his Camisards made war in the Val d'Aosta. After the peace he crossed to England, where he formed a regiment of refugees which took part in the Spanish expedition under the earl of Peterborough and Sir Cloudesley Shovel in May 1705. At the battle of Almansa the Camisards found themselves opposed to a French regiment, and without firing the two bodies rushed one upon the other. Cavalier wrote later (July 10, 1707): "The only consolation that remains to me is that the regiment I had the honour to command never looked back, but sold its life dearly on the field of battle. I fought as long as a man stood beside me and until numbers overpowered me, losing also an immense quantity of blood from a dozen wounds which I received." Marshal Berwick never spoke of this tragic event without visible emotion.

On his return to England a small pension was given him and he settled at Dublin, where he published *Memoirs of the Wars of the Cévennes under Col. Cavalier*, written in French and translated into English with a dedication to Lord Carteret (1726). Though Cavalier received, no doubt, assistance in the publication of the Memoirs, it is none the less true that he provided the materials, and that his work is the most valuable source for the history of his life. He was made a general on the 27th of October 1735, and on the 25th of May 1738 was appointed lieutenant-governor of Jersey. Writing in the following year (August 26, 1739) he says: "I am overworked and weary; I am going to take the waters in England so as to be in a fit condition for the war against the Spaniards if they reject counsels of prudence." He was promoted to the rank of major-general on the 2nd of July 1739, and died in the following year. In the parochial register of St Luke's, Chelsea, there is an entry: "Burial A.D. 1740, May 18, Brigadier John Cavalier."

There is a story which represents him as the fortunate rival of Voltaire for the hand of Olympe, daughter of Madame Dunoyer, author of the *Lettres galantes*. During his stay in England he married the daughter of Captain de Ponthieu and Marguerite de la Rochefoucauld, refugees living at Portarlington. Malesherbes, the courageous defender of Louis XVI., bears the following eloquent testimony to this young hero of the Cévennes:—"I confess," he says, "that this warrior, who, without ever having served, found himself by the mere gift of nature a great general,—this Camisard who was bold to punish a crime in the presence of a fierce troop which maintained itself by little crimes—this coarse peasant who, when admitted at twenty years of age into the society of cultivated people, caught their manners and won their love and esteem, this man who, though accustomed to a stormy life, and having just cause to be proud of his success, had yet enough philosophy in him by nature to enjoy for thirty-five years a tranquil private life—appears to me to be one of the rarest characters to be found in history."

For a more detailed account see F. Puaux, *Vie de Jean Cavalier* (1868); David C. A. Agnew, *Protestant Exiles from France*, ii. 54-66 (Lond., 1871); Charvey, *Jean Cavalier: nouveaux documents inédits* (1884). Eugène Sue popularized the name of the Camisard chief in *Jean Cavalier ou les fanatiques des Cévennes* (1840). (F. Px.)

CAVALIER, a horseman, particularly a horse-soldier or one of gentle birth trained in knightly exercises. The word is taken from one of the French words which derived ultimately from the Late Lat. *caballarius*, a horseman, from Lat. *caballus*, properly a pack-horse, which gave the Fr. *cheval*, a *chevalier*. This last word is the regular French for "knight," and is chiefly used in English for a member of certain foreign military or other orders, particularly of the Legion of Honour. Cavalier in English was early applied in a contemptuous sense to an overbearing swashbuckler—a roisterer or swaggering gallant. In Shakespeare (*2 Henry IV.* v. iii. 62) Shallow calls Bardolph's companions "cavaleros." "Cavalier" is chiefly associated with the Royalists, the supporters of Charles I. in the struggle with the Parliament in the Great Rebellion. Here again it first appears as a term of reproach and contempt, applied by the opponents of the king. Charles in the *Answer to the Petition* (June 13, 1642) speaks of cavaliers as a "word by what mistake soever it seemes much in disfavour." Further quotations of the use of the word by the Parliamentary party are given in the *New English Dictionary*. It was soon adopted (as a title of honour) by the king's party, who in return applied Roundhead to their opponents, and at the Restoration the court party preserved the name, which survived till the rise of the term Tory (see WHIG AND TORY). The term "cavalier" has been adopted from the French as a term in fortification for a work of great command constructed in the

interior of a fort, bastion or other defence, so as to fire over the main parapet without interfering with the fire of the latter. A greater volume of fire can thus be obtained, but the great height of the cavalier makes it an easy target for a besieger's guns.

CAVALIERE, EMILIO DEL, 16th-century Italian musical composer, was born in Rome about 1550 of a noble family. He held a post at the court of Ferdinand I. of Tuscany from 1588 to 1597, and during his residence at Florence was on terms of intimacy with J. Peri, O. Rinuccini, G. Caccini and the rest of the Bardi circle. In 1597 he returned to Rome, and became connected with the Congregation of the Oratory founded by St Philip Neri. Here in 1600 was performed Cavaliere's contribution to the musical reformation initiated by his circle of friends in Florence—*La Rappresentazione di Anima e di Corpo*, a sacred drama, which is regarded as the first example of what is now called oratorio. It is generally supposed that he was no longer living when the work was performed, but some authorities assign 1602 as the date of his death.

Cavaliere's style is more facile than that of Peri and Caccini, but he is inferior to them in depth of musical expression. He is, however, important as being the first to apply the new monodic style to sacred music, and as the founder of the Roman school of the 17th century which included Mazzocchi, Carissimi and Alessandro Scarlatti.

See also H. Goldschmidt, *Studien zur Geschichte der italienischen Oper im 17. Jahrhundert*, Band i.

CAVALLI, FRANCESCO (1599?–1676), Italian musical composer, was born at Crema in 1599 or 1600. His real name was Pier Francesco Caletti-Bruni, but he is better known by that of Cavalli, the name of his patron, a Venetian nobleman. He became a singer at St Mark's in Venice in 1617, second organist in 1639, first organist in 1665, and in 1668 *maestro di cappella*. He is, however, chiefly important for his operas. He began to write for the stage in 1639 (*Le Nozze di Teti e di Peleo*), and soon established so great a reputation that he was summoned to Paris in 1660 to produce an opera (*Serse*) at the Louvre in honour of the marriage of Louis XIV. He visited Paris again in 1662, bringing out his *Ercole Amante*. His death occurred in Venice on the 14th of January 1676. Twenty-seven operas of Cavalli are still extant, most of them being preserved in the library of St Mark at Venice. Monteverde had found opera a musico-literary experiment, and left it a magnificent dramatic spectacle. Cavalli succeeded in making opera a popular entertainment. He reduced Monteverde's extravagant orchestra to more practical limits, introduced melodious arias into his music and popular types into his *libretti*. His operas have all the characteristic exaggerations and absurdities of the 17th century, but they have also a remarkably strong sense of dramatic effect as well as a great musical facility, and a grotesque humour which was characteristic of Italian grand opera down to the death of Alessandro Scarlatti.

CAVALLINI, PIETRO (*c.* 1279–1364), Italian painter, born in Rome, was an artist of the earliest epoch of the modern Roman school, and was taught painting and mosaic by Giotto while employed at Rome; it is believed that he assisted his master in the mosaic of the Navicella or ship of St Peter, in the porch of the church of that saint. He also studied under the Cosmati. Lanzi describes him as an adept in both arts, and mentions with approbation his grand fresco of a Crucifixion at Assisi, still in tolerable preservation; he was, moreover, versed in architecture and in sculpture. According to George Vertue, it is highly probable that Cavallini executed, in 1279, the mosaics and other ornaments of the tomb of Edward the Confessor in Westminster Abbey. He would thus be the "Petrus Civis Romanus" whose name is inscribed on the shrine; but a comparison of dates invalidates this surmise. He died in 1344, at the age of eighty-five, in the odour of sanctity, having in his later years been a man of eminent piety. He is said to have carved for the Basilica of San Paolo fuori le Mura, close to Rome, a crucifix which spoke in 1370 to a female saint. Some highly important works by Cavallini in the church of Santa Cecilia in Trastevere, Rome, have been recently discovered.

CAVALLO, TIBERIUS (1749–1809), Anglo-Italian electrician and natural philosopher, was born on the 30th of March 1749 at Naples, where his father was a physician. In 1771 he came to England with the intention of pursuing a mercantile career, but he soon turned his attention to scientific work. Although he made several ingenious improvements in scientific instruments, his mind was rather imitative and critical than creative. He published numerous works on different branches of physics, including *A Complete Treatise on Electricity* (1777), *Treatise on the Nature and Properties of Air and other permanently Elastic Fluids* (1781), *History and Practice of Aerostation* (1785), *Treatise on Magnetism* (1787), *Elements of Natural and Experimental Philosophy* (1803), *Theory and Practice of Medical Electricity* (1780), and *Medical Properties of Factitious Air* (1798). He died in London on the 21st of December 1809.

CAVALLOTTI, FELICE (1842–1898), Italian politician, poet and dramatic author, was born at Milan on the 6th of November 1842. In 1860 and 1866 he fought with the Garibaldian Corps, but first attained notoriety by his anti-monarchical lampoons in the *Gazzetta di Milano* and in the *Gazzettina Rosa* between 1866 and 1872. Elected to parliament as deputy for Corteolona in the latter year, he took the oath of allegiance after having publicly impugned its validity. Eloquence and turbulent combativeness in and out of parliament secured for him the leadership of the extreme Left on the death of Bertani in 1886. During his twelve years' leadership his party increased in number from twenty to seventy, and at the time of his death his parliamentary influence was greater than ever before. Though ambitious and addicted to defamatory methods of personal attack which sometimes savoured of political blackmail, Cavallotti's eloquent advocacy of democratic reform, and apparent generosity of sentiment, secured for him a popularity surpassed by that of no contemporary save Crispi. Services rendered in the cholera epidemic of 1885, his numerous lawsuits and thirty-three duels, his bitter campaign against Crispi, and his championship of French interests, combined to enhance his notoriety and to increase his political influence. By skilful alliances with the marquis di Rudini he more than once obtained practical control of the Italian government, and exacted notable concessions to Radical demands. He was killed on the 6th of March 1898 in a duel with Count Macola, editor of the conservative *Gazetta di Venezia*, whom he had assailed with characteristic intemperance of language. By his death the house of Savoy lost a relentless foe, and the revolutionary elements in Italy a gifted, if not entirely trustworthy, leader. (H. W. S.)

CAVALRY (Fr. *cavalerie*, Ger. *Kavallerie* or *Reiterei*, derived ultimately from late Lat. *caballus*, horse), a word which came into use in military literature about the middle of the 16th century as applied to mounted men of all kinds employed for combatant purposes, whether intended primarily for charging in masses, in small bodies, or for dismounted fighting. By degrees, as greater refinement of terminology has become desirable, the idea has been narrowed down until it includes only "horsemen trained to achieve the purpose of their commander by the combined action of man and horse," and this definition will be found to cover the whole field of cavalry activity, from the tasks entrusted to the cavalry "corps" of 10,000 sabres down to the missions devolving on isolated squadrons and even troops.

History.—The evolution of the cavalry arm has never been uniform at any one time over the surface of the globe, but has always been locally modified by the conditions of each community and the stage of intellectual development to which at any given moment each had attained. The first condition for the existence of the arm being the existence of the horse itself, its relative scarcity or the reverse and its adaptability to its environment in each particular district have always exercised a preponderating influence on the development of cavalry organization and tactics. The indigenous horses of Europe and Asia being very small, the first application of their capabilities for war purposes seems everywhere to have been as draught animals for chariots, the construction of which implies not only the

Early use of mounted warriors.

existence of level surfaces, perhaps of actual roads, but a very considerable degree of mechanical skill in those who designed and employed them. The whole of the classical and Oriental mythologies, together with the earliest monuments of Egypt, Assyria and India, are convincing on this point. Nowhere can we find a trace either of description or delineation of animals physically capable of carrying on their backs the armed men of the period. All the earliest allusions to the use of the horse in war either point directly to the employment as a draught animal, or where not specific, as in the description of the war-horse in Job, they would apply equally well to one harnessed to a chariot as to one ridden under the saddle.

The first trace of change is to be found, according to Prof. Wm. Ridgeway (*Origin and Influence of the Thoroughbred Horse*, p. 243), in an Egyptian relief showing Nubians mounted on horses of an entirely different breed, taller and more powerful than any which had gone before them. These horses appear to have come from the vicinity of Dongola, and the strain still survives in the Sudan. The breed is traced into Arabia, where only second-rate horses had been reared hitherto, and thence to different parts of Europe, where eventually centres of cavalry activity developed. The first detailed evidence of the existence of organized bodies of mounted men is to be found in Xenophon, whose instructions for the breaking, training and command of a squadron remain almost as a model for modern practice. Their tactical employment, however, seems still to have been relatively insignificant, for the horses were still far too small and too few to deliver a charge with sufficient momentum to break the heavy armed and disciplined hoplites. The strain of ancient battle was of an entirely different order to that of modern fighting. In the absence of projectiles of sufficient range and power to sweep a whole area, the fighting was entirely between the front ranks of the opposing forces. When a front rank fighter fell, his place was immediately taken by his comrade in the rear, who took up the individual combat, excited by his comrade's fate but relatively fresh in mind and muscle. This process of feeding the fight from the rear could be protracted almost indefinitely. If then, as a consequence of a charge, a few mounted men did penetrate the ranks, they encountered such a crowd of well-protected and fresh swordsmen that they were soon pulled off their ponies and despatched. Now and again great leaders, Alexander, Hannibal and Scipio Africanus, for instance, succeeded in riding down their opponents, but in the main, and as against the Roman infantry in particular, mounted troops proved of very little service on the battlefield.

It was, however, otherwise in the sphere of strategy. There, information was of even greater importance, because harder to obtain, than it is nowadays, and the army which could push out its feelers to the greater distance, surround its enemy and intercept his communications, derived nearly the same advantages as it does at present. Hence both sides provided themselves with horsemen, and when these met, each in the performance of their several duties, charges of masses naturally ensued. This explains the value attaching in the old days to the possession of horse-flesh and the rapid spread of the relatively new Dongola or African strain over the then known world.

The primitive instinct of aboriginal man is to throw stones or other missiles for purposes of defence (apes will throw anything they can find, but they never use sticks); hence, as the Romans penetrated ever farther amongst the barbarian tribes, their horsemen in first line found ever-increasing need for protection against projectiles. But the greater the weight of armour carried, the greater the demands upon the endurance of the horse. Then, as the weight-carrying breed was expensive and, with the decay of the Roman Empire, corruption and peculation spread, a limit was soon placed on the multiplication of charging cavalry, and it became necessary to fall back on the indigenous pony, which could only carry a rider from place to place, not charge. Thus there was a gradual levelling down of the mounted arms, the heavy cavalry becoming too heavy to gallop and the light not good enough for united action. Against such opponents, the lighter and better mounted tribesmen of Asia found their task easy. They cut off the supplies of the marching infantry, filled up or destroyed the wells, &c., and thus demonstrated the strategic necessity of superior mobility.

With the decay of civilization discipline also disappeared, and, as discipline consists essentially in the spirit of self-sacrifice for the good of the community, its opposite, self-preservation, became the guiding principle. This in turn led to the increase of armour carried, and thence to the demand for heavier horses, and this demand working through several centuries led ultimately to the breeding of the great weight-carrying animals on whose existence that of medieval chivalry depended. These horses, however, being very costly and practically useless for general purposes, could only become the property of the wealthy, who were too independent to feel the need of combination, and preferred to live on the spoliation and taxation of the weak. This spoliation eventually impelled the weaker men to combine, and at first their combination took the form of the construction of fortified places, against which mounted men were powerless. On the other hand, expense put a limit to the area which fortifications could enclose, and this again limited the supplies for the garrison. Horsemen sweeping the country for miles around had no difficulty in feeding themselves, and the surrender of all beleaguered places through starvation was ultimately inevitable, unless food could be introduced from allied towns in the vicinity. It was of no use to introduce fighting men only into a place which primarily required food (cf. Lucknow, 1857) to protract its resistance. Hence some means had to be found to surround the supply-convoys with a physically impenetrable shield, and eighteen-foot pikes in the hands of powerful disciplined soldiers met the requirements. Against eight to ten ranks of such men the best cavalry in the world, relying only on their swords, were helpless, and for the time (towards the close of the 15th century) infantry remained masters of the field on the continent of Europe.

England meanwhile had developed on lines of her own. Thanks to her longbowmen and the military genius of her leaders, she might have retained indefinitely the command of the continent had it not been for the invention of gunpowder, which, though readily accepted by the English for sieges in France, proved the ultimate cause of their undoing. It was the French who developed the use of siege artillery most rapidly, and their cavalry were not slow to take the hint; unlike the longbow and the crossbow, the pistol could be used effectively from horseback, and presently the knights and their retainers, having the deepest purses, provided themselves with long pistols in addition to their lances and swords. These weapons sent a bullet through any armour which a foot-soldier could conveniently carry, or his commander afford, and if anything went wrong with their mechanism (which was complicated and uncertain) the speed of his horse soon carried the rider out of danger. A new form of attack against infantry, introduced by the French at Cerisoles, 1544, thus developed itself. A troop or squadron, formed in from twelve to sixteen ranks, trotted up to within pistol shot of the angle of the square to be attacked and halted; then each rank in succession cantered off man by man to the left, discharging his pistol at the square as he passed, and riding back to his place behind the column to reload. This could be prolonged indefinitely, and against such tactics the infantry were powerless. The stakes carried by English archers to check the direct charge of horsemen became useless, as did also *chevaux de frise*, though the latter (which originated in the 14th century) continued to be employed by the Austrians against the swiftly-charging Turks till the close of the 17th century. Thus it became necessary to devise some new impediment which, whilst remaining mobile, would also give cover and an advantage in the final hand-to-hand shock. The problem was solved in Bohemia, Poland and Moravia (Hussite wars, about 1420), where, distances being great and the country open, greater mobility and capacity in the convoys became essential. Great trains of wagons were placed in charge of an infantry escort, of which a part had become possessed of firearms, and these moved across country in as many as twelve parallel lines drilled to form *laagers*, as nowadays

In South Africa. Again the cavalry proved helpless, and for nearly a century in central Europe the word "*Wagenburg*" (wagon-fortress) became synonymous with "army." Then an unfortunate inspiration came to the wagon-men. A large gun was relatively cheaper to manufacture, and more effective than a small one. To keep their assailants at a distance, they mounted wall-pieces of about one-inch bore on their wagons. For a moment the balance inclined in their favour, but the cavalry were quick to see their advantage in this new idea, and they immediately followed suit. They, too, mounted guns on wheels, and, as their mobility gave them choice of position, they were able to concentrate their fire against any side of the laager, and again ultimate surrender was the only way out of the defenders' dilemma.

The interesting problem thus raised was never finally solved, for the scene of action now shifted to western Europe, to the valley of the Po, and more particularly to the Netherlands, where fortresses were closer together and the clayey nature of the Rhine delta had already made paved roads necessary. Then, the *Wagenburg* being no longer needed for the short transits between one fortified town and another, the infantry reasserted themselves. Firearms having been much improved in the interval the spearmen (pikemen) had already (about 1515) learnt to protect themselves by musketeers trained to take advantage of cover and ground somewhat in the same fashion as the modern skirmisher. These musketeers kept light guns at a distance from their pikemen, but dared not venture far out, as their fire was altogether inadequate to stop a rush of horsemen; when the latter threatened to intervene, they had to run for safety to the squares of pikemen, whom they assisted in turn by keeping the cavalry beyond pistol range. Hence the horsemen had to fall back upon more powerful guns, and these, being slow and requiring more train, could be most economically protected by infantry (see also ARTILLERY).

Thus about the close of the 16th century western armies differentiated themselves out into the still existing three types—cavalry, artillery and infantry. Moreover, each type was subdivided, the cavalry becoming heavy, medium and dragoons. At this period there was nothing to disturb the equilibrium of two contending forces except the characters of their respective leaders. The mercenary element had triumphed everywhere over the feudal levies. The moral qualities of all were on the same indifferent level, and battles in the open followed one recognized course. Neither army being able to outmarch the other, both drew up masses of pikes in parallel lines. The musketeers covered the deployment of the heavy guns on either side, the cavalry drew up on the wings and a strictly parallel fight ensued, for in the absence of a common cause for which men were willing to die, plunder was the ruling motive, and all control and discipline melted in the excitement of the contest.

17th-century progress.

It is to the growth of Protestantism that cavalry owes its next great forward leap. To sweep the battlefield, it was absolutely essential that men should be ready to subordinate selfish considerations to the triumph of their cause. The Roman Catholicism of the day gave many loopholes for the evasion of clear duty, but from these the reformed faith was free, and it is to the reawakened sense of duty that Gustavus Adolphus appealed. This alone rendered combination amongst his subordinate leaders possible, and on this power of combination all his victories depended. Other cavalry soldiers, once let loose in the charge, could never be trusted to return to the field, the prospective plunder of the enemy's baggage being too strong a temptation; but the king's men could be depended on, and once brought back in formed bodies, they rode over the enemy's skirmishers and captured his batteries. Then the equilibrium of force was destroyed, and all arms combined made short work of the opposing infantry alone (Breitenfeld, 1631). But the Swedish king perished with his work half done, and matters reverted to their former condition until the appearance of Cromwell, another great leader capable of animating his men with the spirit of devotion, again rendered the cavalry arm supreme. The essence of his success lay in this, that his men were ready everywhere and always to lay down their lives for their common cause. Whether scouting 70 m. to the front of their army, or fighting dismounted to delay the enemy at defiles or to storm fortified strongholds, or charging home on the battlefield, their will power, focused on, and in turn dependent on, the personality of their great leader, dominated all human instincts of fear, rapacity or selfishness. It is true that they had not to ride against the modern rifle, but it is equally true that there was no quick-firing artillery to carry terror through the enemy's army, and it was against masses of spearmen and musketeers, not then subjected to bursting shells or the lash of shrapnel and rifle bullets, that the final charges had always to be ridden home.

Each succeeding decade thereafter has seen a steady diminution in the ultimate power of resistance of the infantry, and a corresponding increase in the power of fire preparation at the disposal of the supreme leader; and the chances of cavalry have fluctuated with the genius of that leader in the employment of the means at his disposal, and the topographical conditions existing within each theatre of war. During the campaigns in Flanders, with its multiplicity of fortresses and clayey soil, cavalry rapidly degenerated into mounted infantry, throwing aside sword and lance-proof armour, and adopting long muskets and heavier ammunition. Presently they abandoned the charge at a gallop and reverted to an approach at the trot, and if (as at Blenheim) their influence proved decisive on the field of battle, this was because the conditions were common to both combatants, and the personal influence of "Corporal John," as his soldiers called Marlborough, ensured greater steadiness and better co-operation.

When Frederick II. became king of Prussia (1740), he found his cavalry almost at the nadir of efficiency; even his cuirassiers drilled principally on foot. "They can manœuvre," on foot, "with the same precision as my grenadiers, but unfortunately they are equally slow." His enemies the Austrians, thanks to their wars against the Turks who always charged at a gallop, had maintained greater dash and mobility, and at Mollwitz the Prussians only escaped disaster by the astounding rapidity of their infantry fire. In disgust the king then wrote, "Die Cavallerie is nicht einmal werth dasz sie der Teufel weck holet," and he immediately set about their reform with his usual energy and thoroughness. Three years after Mollwitz, the result of his exertions was apparent in the greatly increased importance the arm acquired on the battlefield, and the charge of the Bayreuth dragoons at Hohenfriedberg (June 4, 1745), who with 1500 horses rode over and dispersed 20 Austrian battalions, bringing in 2500 prisoners and 67 colours, will always rank as one of the most brilliant feats in military history.[1] The following years of peace (1745–1756) were devoted to the methodical preparation of the cavalry to meet the requirements that Frederick's methods of war would make upon them, and it is to this period that the student should devote special attention. From the very outbreak of the Seven Years' War (1756) this training asserted its influence, and Rossbach (1757) and Zorndorf (1758) are the principal examples of what cavalry handled in masses can effect. At Rossbach General v. Seydlitz, at the head of 38 squadrons, practically began and ended the destruction of the French army, and at Zorndorf he saved the day for the Prussians by a series of the most brilliant charges, which successively destroyed the Russian right wing and centre. These battles so conclusively demonstrated the superiority of the Prussian cavalry that their enemies completely altered their tactical procedure. They now utilized their enormous numerical superiority by working in two separate armies, each almost as strong as the whole Prussian force. When the latter moved against either, the one threatened immediately threw up heavy entrenchments, against which cavalry were, of course, ineffective, whilst the other pursued its march. When Frederick, having more or less beaten his immediate opponent,

Frederick II.; reform of the Prussian cavalry.

[1] The loss of the regiment was twenty-eight killed and sixty-six wounded.

began to threaten the other army it entrenched likewise. Against these methods the Prussian army soon wore itself out, and though from time to time the cavalry locally distinguished itself, no further opportunities for great decisive blows presented themselves.

The increased demands made upon the mobility of the Prussian horsemen naturally resulted in the gradual rejection of everything which was not essential to their striking power. The long muskets and bayonets were laid aside, but the cuirass was retained for the mêlée, and by the close of the great struggle the various branches of the arm had differentiated themselves out into the types still adhered to, heavy cavalry, dragoons, hussars, whose equipment as regards essentials thenceforward hardly varied up to the latter years of the 19th century. The only striking difference lies in the entire rejection of the lance in the armament of the charging squadrons, and the reason is characteristic of the principles of the day. The Prussian cavalry had realized that success was decided, not primarily by actual collision, but by the moral effect of the appearance of an absolutely closed wall of horsemen approaching the adversary at full speed. If the necessary degree of cohesion was attained, the other side was morally beaten before collision took place, and either turned to flight, or met the shock with so little resolution that it was ridden over without difficulty. In the former case any weapon was good enough to kill a flying enemy; in the latter, in the mêlée which then ensued, the crush in the ranks of the victors was still so great that the lance was a hindrance rather than a help.

In the years succeeding the war the efficiency of the Prussian cavalry sank very rapidly, the initial cause being the death of Seydlitz at the early age of fifty-two. His personality had alone dominated the discontent, lethargy and hopelessness created by ruthless financial economies. When he was gone, as always in the absence of a great leader, men adapted their lives to the line of least resistance. In thirty years the wreck was complete, and within the splendid squadrons which had been accustomed to manœuvre with perfect precision at the highest speed, there were (as F. A. von der Marwitz in his *Nachlass* clearly shows) not more than seven thoroughly trained men and horses to each, the remainder being trained for little longer and receiving less attention than is the case with modern 2nd line or auxiliary cavalry.

For the generation preceding the outbreak of the French Revolution, Frederick the Great's army, and especially his cavalry, had become the model for all Europe, but the mainspring of the excellence of his squadrons was everywhere overlooked. Seydlitz had manœuvred great masses of horsemen, therefore every one else must have great masses also; but no nation grasped the secret, viz. the unconditional obedience of the horse to its rider, on which his success had depended. Neither was it possible under the prevailing social conditions to secure the old stamp of horse, or the former attention to detail on the part of men and officers. In France, owing to the agricultural decay of the country, suitable remounts for charging cavalry were almost unobtainable, and as this particular branch of the arm was almost exclusively commanded by the aristocracy it suffered most in the early days of the Revolution. The hussars, being chiefly recruited and officered by Alsatians and Germans from the Rhine provinces, retained their individuality and traditions much longer than the dragoons and cuirassiers, and, to the very close of the great wars, we find them always ready to charge at a gallop; but the unsteadiness and poor horsemanship of the other branches was so great that up to 1812, the year of their destruction, they always charged at a trot only, considering that the advantage of superior cohesion thus gained more than balanced the loss of momentum due to the slower pace.

Cavalry in the revolutionary wars.

Generally, the growth of the French cavalry service followed the universal law. The best big horses went to the heavy charging cavalry, viz. the cuirassiers, the best light horses to the hussars, and the dragoons received the remainder, for in principle they were only infantry placed on horseback for convenience of locomotion, and were not primarily intended for combined mounted action. Fortunately for them, their principal adversaries, the Austrians, had altogether failed to grasp the lesson of the Seven Years' War. Writing in 1780 Colonel Mack, a very capable officer, said, "Even in 1769, the cavalry could not ride, could not manage to control their horses. Not a single squadron could keep its dressing at a gallop, and before they had gone fifty yards at least ten out of forty horses in the first rank would break out to the front," and though the veteran field marshal Lacy issued new regulations, their spirit seems always to have escaped the executive officers. The British cavalry was almost worse off, for economy had reduced its squadrons to mere skeletons, and the traditional British style of horsemanship, radically different from that in vogue in France, made their training for combined action even more difficult than elsewhere. Hence the history of cavalry during the earlier campaigns of the Revolution is marked by no decisive triumphs, the results are always inadequate when judged by the magnitude of the forces employed, and only the brilliant exploit of the 15th Light Dragoons (now Hussars) at Villers en Couché (April 24, 1794) deserves to be cited as an instance of the extraordinary influence which even a few horsemen can exercise over a demoralized or untrained mob of infantry.

Up to the campaign of Poland (see NAPOLEONIC CAMPAIGNS) French victories were won chiefly by the brilliant infantry fighting, cavalry only intervening (as at Jena) to charge a beaten enemy and complete his destruction by pursuit. But after the terrible waste of life in the winter of 1806–7, and the appalling losses in battle, Napoleon introduced a new form of attack. The case-shot preparation of his artillery (see ARTILLERY) sowed confusion and terror in the enemy's ranks, and the opportunity was used by masses of cavalry. Henceforward this method dominated the Napoleonic tactics and strategy. The essential difference between this system and the Frederician lies in this, that with the artillery available in the former period it was not possible to say in advance at what point the intervention of cavalry would be necessary, hence the need for speed and precision of manœuvre to ensure their arrival at the right time and place. Napoleon now selected beforehand the point he meant to overwhelm and could bring his cavalry masses within striking distance at leisure. Once placed, it was only necessary to induce them to run away in the required direction to overwhelm everything by sheer weight of men and horses. This method failed at Waterloo because the ground was too heavy, the slope of it against the charge, and the whole condition of the horses too low for the exertion demanded of them.

The British cavalry from 1793 to 1815 suffered from the same causes which at the beginning of the 20th century brought about its breakdown in the South African War. Over-sea transport brought the horses to land in poor condition, and it was rarely possible to afford them sufficient time to recover and become accustomed to the change in forage, the conditions of the particular theatre of operations, &c., before they had to be led against the enemy—hence a heavy casualty roll and the introduction into the ranks of raw unbroken horses which interfered with the precision of manœuvre of the remainder. Their losses (about 13% per annum) were small as compared with those of South Africa, but this is mainly accounted for by the fact that, operations being generally in the northern hemisphere, the change of climate was never so severe. Tactically, they suffered, like the Austrians and Prussians, from the absence of any conception of the Napoleonic strategy amongst their principal leaders. As it was not known where the great blow was to fall, they were distributed along the whole line, and thus became habituated to the idea of operating in relatively small bodies. This is the worst school for the cavalry soldier, because it is only when working in masses of forty to sixty squadrons that the cumulative consequences of small errors of detail become so apparent as to convince all ranks of the necessity of conforming accurately to established prescriptions. Nevertheless, they still retained the practice of charging at a gallop, and as a whole were by far the most efficient body of horsemen who survived at the close of the great wars.

In the reaction that then ensued all over Europe, cavalry

practically ceased to exist. The financial and agricultural exhaustion of all countries, and of Prussia in particular, was so complete that money was nowhere to be found for the great concentrations and manœuvre practices which are more essential to the efficiency of the cavalry than to that of the other arms. Hence a whole generation of officers grew up in ignorance of the fundamental principles which govern the employment of their arm. It was not till 1848 that the Prussians began again to unite whole cavalry divisions for drill and manœuvre, and the soldiers of the older generation had not yet passed away when the campaigns of 1866 and 1870 brought up again the realities of the battle-field. Meanwhile the introduction of long-range artillery and small arms had entirely destroyed the tactical relation of the three arms on which the Napoleonic tactics and strategy had been based, and the idea gained ground that the battle-field would no longer afford the same opportunities to cavalry as before. The experiences gained by the Americans in the Civil War helped to confirm this preconception. If in battles waged between infantries armed only with muzzle-loading rifles, cavalry could find no opportunity to repeat past exploits, it was argued that its chances could not fail to be still further reduced by the breech-loader. But this reasoning ignored the principal factors of former successes. The mounted men in America failed not as a consequence of the armament they encountered, but because the war brought out no Napoleon to create by his skill the opportunity for decisive cavalry action, and to mass his men beforehand in confident anticipation. The same reasoning applies to the European campaigns of 1866 and 1870, and the results obtained by the arm were so small, in proportion to the numbers of squadrons available and to their cost of maintenance as compared with the other arms, that a strong reaction set in everywhere against the existing institutions, and the re-creation of the dragoon, under the new name of mounted rifleman, was advocated in the hope of obtaining a cheap and efficient substitute for the cavalryman.

Later 19th century.

Later events in South Africa and in Manchuria again brought this question prominently to the front, but the essential difference between the old and new schools of thought has not been generally realized. The "mounted rifle" adherents base their arguments on the greatly increased efficiency of the rifle itself. The "cavalry" school, on the other hand, maintains that, the weapons themselves being everywhere substantially equal in efficiency, the advantage rests with the side which can create the most favourable conditions for their employment, and that, fundamentally, superior mobility will always confer upon its possessor the choice of the circumstances under which he will elect to engage. Where the two sides are nearly equally matched in mobility, neither side can afford the time to dismount, for the other will utilize that time to manœuvre into a position which gives him a relative superiority for whichever form of attack he may elect to adopt, and this relative superiority will always more than suffice to eliminate any advantage in accuracy of fire that his opponent may have obtained by devoting his principal attention to training his men on the range instead of on the mounted manœuvre ground.

Finally, the "cavalry" school reasons that in no single campaign since Napoleon's time have the conditions governing encounters been normal. Either the roadless and barren nature of the country has precluded of itself the rapid marching which forms the basis of all modern strategy, as in America, Turkey, South Africa and Manchuria, or the relative power of the infantry and artillery weapons, as in Bohemia (1866) and in France (1870), has rendered wholly impossible the creation of the great tactical opportunity characteristic of Napoleon's later method, for there then existed no means of overwhelming the enemy with a sufficient hail of projectiles to render the penetration of the cavalry feasible. The latest improvement in artillery, viz. the perfected shrapnel and the quick-firing guns, have, however, enormously facilitated the attainment of this primary fire superiority, and, moreover, it has simplified the procedure to such a degree that Napoleon is no longer needed to direct. The battles of the future will thus, in civilized countries, revert to the Napoleonic type, and the side which possesses the most highly trained and mobile force of cavalry will enjoy a greater relative superiority over its adversary than at any period since the days of Frederick.

The whole experience of the past thus goes to show that no nation in peace has ever yet succeeded in maintaining a highly trained cavalry sufficiently numerous to meet all the demands of a great war. Hence at the outbreak of hostilities there has always been a demand for some kind of supplementary force which can relieve the regular squadrons of those duties of observation and exploration which wear down the horses most rapidly and thus render the squadrons ineffective for their culminating duty on the battle-field. This demand has been met by the enrolment of men willing to fight and rendered mobile by mounts of an inferior description, and the greater the urgency the greater has been the tendency to give them arms which they can quickly learn to use. To make a man an expert swordsman or lancer has always taken years, but he can be taught to use a musket or rifle sufficiently for his immediate purpose in a very short time. Hence, to begin with, arms of this description have invariably been issued to him. But once these bodies have been formed, and they have come into collision with trained cavalry, the advantages of mobility, combined with the power of shock, have become so apparent to all, that insensibly the "dragoon" has developed into the cavalry soldier, the rate of this evolution being conditioned by the nature of the country in which the fighting took place.

This evolution is best seen in the American Civil War. The men of the mounted forces engaged had been trained to the use of the rifle from childhood, while the vast majority had never seen a sword, hence the formation of "mounted rifles"; and these "mounted rifles" developed precisely in accordance with the nature of their surroundings. In districts of virgin forests and marshland they remained "mounted rifles," in the open prairie country of the west they became cavalry pure and simple, though for want of time they never rivalled the precision of manœuvre and endurance of modern Prussian or Austrian horse. In South Africa the same sequence was followed, and had the Boer War lasted longer it is certain that such Boer leaders as de Wet and de la Rey would have reverted to cavalry tactics of shock and cold steel at the earliest possible opportunity.

Therefore when we find, extending over a cycle of ages, the same causes producing the same effects, the natural conclusion is that the evolution of the cavalry arm is subject to a universal law which persists in spite of all changes of armament.

Employment of Cavalry.—It is a fundamental axiom of all military action that the officer commanding the cavalry of any force comprising the three arms of the service is in the strictest sense an executive officer under the officer commanding that particular force as a whole. The latter again is himself responsible to the political power he represents. When intricate political problems are at stake, it may be, and generally is, quite impracticable that any subordinate can share the secret knowledge of the power to which he owes his allegiance.

The essence of the value of the cavalry soldier's services lies in this, that the demand is never made upon him in its supremest form until the instinct of the real commander realizes that the time has come. Whether it be to cover a retreat, and by the loss of hundreds to save the lives of tens of thousands, or to complete a victory with commensurate results in the opposite direction, the obligation remains the same—to stake the last man and horse in the attainment of the immediate object in view, the defeat of the enemy. This at once places the leader of cavalry in face of his principal problem. It is a matter of experience that the broader the front on which he can deliver a charge, the greater the chances of success. However strong the bonds of discipline may be, the line is ultimately, and at a certain nervous tension, only a number of men on horses, acting and reacting on one another in various ways. When therefore, of two lines, moving to meet one another at speed, one sees itself overlapped to either hand, the men in the line thus overlapped invariably and inevitably tend to open outwards, so as at least to meet their enemy on an equal frontage. Hence

every cavalry commander tries to strike at the flank of his enemy, and the latter manœuvres to meet him, and if both have equal mobility, local collision must ensue on an equal and parallel front. Therefore both strive to put every available man and horse in their first line, and if men and horses were invulnerable such a line would sweep over the ground like a scythe and nothing could withstand it. Since, however, bullets kill at a distance, and inequalities and unforeseen difficulties of the ground may throw hundreds of horses and riders, a working compromise has to be found to meet eventualities, and, other things being equal, victory inclines to the leader who best measures the risks and uncertainties of his undertaking, and keeps in hand a sufficient reserve to meet all chances.

Thus there has arisen a saying, which is sometimes regarded as axiomatic, that in cavalry encounters the last closed reserve always wins. The truth is really that he who has best judged the situation and the men on both sides finds himself in possession of the last reserve at the critical moment. The next point is, how to ensure the presence of this reserve, and what is the critical moment. The battle-field is the critical moment in each phase of every campaign—not the mere chance locality on which a combat takes place, but the decisive arena on which the strategic consequences of all pre-existing conditions of national cohesion, national organization and of civilization are focussed. It is indeed the judgment-seat of nature, on which the right of the race to survive in the struggle for existence is weighed and measured in the most impartial scales.

Before, however, the final decision of the battle-field can be attained, a whole series of subordinate decisions have to be fought out, success in each of which conditions the result of the next series of encounters. Every commanding officer of cavalry thus finds himself successively called on to win a victory locally at any cost, and the question of economy of force does not concern him at all. Hence the same fundamental rules apply to all cavalry combats, of whatever magnitude, and condition the whole of cavalry tactics. Broadly speaking, if two cavalries of approximately equal mobility manœuvre against each other in open country, neither side can afford the loss of time that dismounting to fight on foot entails. Hence, assuming that at the outset of a campaign each side aims at securing a decisive success, both seek out an open plain and a mounted charge, sword in hand, for the decision. When the speed and skill of the combatants are approximately equal, collision ensues simultaneously along parallel fronts, and the threat of the overlapping line is the principal factor in the decision. The better the individual training of man and horse the less will be the chances of unsteadiness or local failures in execution, and the less the need of reserves; hence the force which feels itself the most perfect in the individual efficiency of both man and horse (on which therefore the whole ultimately depends) can afford to keep fewer men in reserve and can thus increase the width of its first line for the direct collision. Careful preparation in peace is therefore the first guarantee of success in action. This means that cavalry, unlike infantry, cannot be expanded by the absorption of reserve men and horses on the outbreak of hostilities, but must be maintained at war strength in peace, ready to take the field at a moment's notice, and this is actually the standard of readiness attained on the continent of Europe at the present day.

Further, uniformity of speed is the essential condition for the execution of closed charges, and this obviously cannot be assured if big men on little horses and small men on big horses are indiscriminately mixed up in the same units. Horses and men have therefore been sorted out everywhere into three categories, *light*, *medium* and *heavy*, and in periods when war was practically chronic, suitable duties have been allotted to each. It is clear, on purely mechanical grounds, that the greater the velocity of motion at the moment of collision the greater will be the chances of success, and this greater speed will be on the side of the bigger horses as a consequence of their longer stride. On the other hand, these horses, by reason of their greater weight, are used up much more rapidly than small ones. Hence, to ensure the greater speed at the moment of contact, it is necessary to save them as much as possible to keep them fresh for the shock only, and this has been the practice of all great cavalry leaders all over the world, and has only been departed from under special circumstances, as by the Germans in France in 1870, when their cavalry practically rode everywhere unopposed.

Collisions, however, must be expected by every body of troops large or small; hence each regiment—ultimately each squadron—endeavours to save its horses as far as this is compatible with the attainment of the special object in view, and this has led everywhere and always to a demand for some intermediate arm, less expensive to raise and maintain than cavalry proper, and able to cover the ground with sufficient rapidity and collect the information necessary to ensure the proper direction of the cavalry commands. Originally this intermediate force received the designation of dragoons; but since under pressure of circumstances during long periods of war these invariably improved themselves into cavalry and became permanent units in the army organization, fresh names have had to be invented for them, of which Mounted Infantry and Mounted Rifles are the latest, and every improvement in firearms has led to an increased demand for their services.

It is now relatively easy to trace out the considerations which should govern the employment of his cavalry by the officer commanding a force of the three arms. Assuming for purposes of illustration an army numerically weak in cavalry, what course will best ensure the presence of the greatest number of sabres at the decisive point, *i.e.* on the battle-field? To push out cavalry screens far to the front will be to court destruction, nor is the information they obtain of much real service unless the means to act upon it at once is at hand. This can only be supplied economically by the use of strong advanced guards of infantry, and such supplementary security and information as these may require will be best supplied by mounted infantry, the sacrifice of whom will disturb least the fighting integrity of the whole army.

Imagine an army of 300,000 men advancing by five parallel roads on a front of 50 m., each column (60,000 men, 2 army corps) being covered by a strong advance guard, coming in contact with a similarly constituted army moving in an opposite direction. A series of engagements will ensue, in each of which the object of the local commander will be to paralyse his opponent's will-power by a most vigorous attack, so that his superior officer following him on the same road will be free to act as he chooses. The front of the two armies will now be defined by a line of combats localized each about a comparatively small area, and between them will be wide gaps which it will be the chief business of the directing minds on either side to close by other troops as soon as possible. Generally the call will be made upon the artillery for this purpose, since they can cover the required distances far more rapidly than infantry. Now, as artillery is powerless when limbered up and always very vulnerable on the flanks of the long lines, a strong cavalry escort will have to be assigned to them which, trotting forward to screen the march, will either come in contact with the enemy's cavalry advancing with a similar object, or themselves find an opportunity to catch the enemy's guns at a disadvantage. These are opportunities for the cavalry, and if necessary it must sacrifice itself to turn them to the best account. The whole course of the battle depends on success or failure in the early formation of great lines of guns, for ultimately the victor in the artillery duel finds himself in command of the necessary balance of guns which are needed to prepare the way for his final decisive infantry attack. If this latter succeeds, then any mounted men who can gallop and shoot will suffice for pursuit. If it fails, no cavalry, however gallant, has any hope of definitely restoring the combat, for against victorious infantry, cavalry, now as in the past, can but gain a little time. This time may indeed be worth the price at which it can be bought, but it will always be more economical to concentrate all efforts to prevent the emergency arising.

After the Franco-German War much was written about the possibility of vast cavalry encounters to be fought far in advance of the main armies, for the purpose of obtaining information, and ideas were freely mooted of wide-flung raids traversing

the enemy's communications, breaking up his depots, reserve formations, &c. But riper consideration has relegated these suggestions to the background, for it is now evident that such expeditions involve the dissemination of force, not its concentration. Austria and France for example would scarcely throw their numerically inferior cavalry against the Germans, and nothing would suit them better than that the latter should hurl their squadrons against the frontier guards, advanced posts, and, generally, against unbeaten infantry; nor indeed would the Germans stultify their whole strategic teaching by weakening themselves for the decisive struggle. It follows therefore that cavalry reconnaissance duties will be strictly local and tactical, and that arrangements will be made for procuring strategical information by wireless telegraphy, balloons, motor cars, bicycles, &c., and that on the whole that nation will be best served in war which has provided in peace a nucleus of mounted infantry capable of rapid expansion to fill the gap which history shows always to have existed between the infantry and the cavalry. Such troops need not be organized in large bodies, for their mission is to act by "slimness," not by violence. They must be the old "verlorene Haufe" (*anglice*, "forlorn hope") of former days, men whose individual bravery and decision is of the highest order. But they can never become a "decision-compelling arm," though by their devotion they may well hope to obtain the grand opportunity for their cavalry, and share with them in harvesting the fruits of victory.

The great cavalry encounters of forty to sixty squadrons on either side, which it has been shown must arise from the necessity of screening or preventing the formation of the all-important artillery lines, will take their form mainly from the topographical conditions of the district, and since on a front of 60 to 100 m. these may vary indefinitely, cavalry must be trained, as indeed it always has been, to fight either on foot or on horseback as occasion requires. In either case, thoroughness of preparation in horsemanship (which, be it observed, includes horsemastership) is the first essential, for in the end victory will rest with the side which can put in the right place with the greatest rapidity the greatest number of sabres or rifles. In the case of rifles there is a greater margin of time available and an initial failure is not irremediable, but the underlying principle is the same in either case; and since it is impossible to foretell exactly the conditions of the collision, all alike, according to the class to which they belong, must be brought up to the highest standard, for this alone guarantees the smooth and rhythmical motion required for covering long distances with the least expenditure of physical and nervous strength on the part both of horse and rider. As a consequence of successes gained in these preliminary encounters, opportunities will subsequently arise for the balance of fresh or rallied squadrons in hand to ride home upon masses of infantry disorganized and demoralized by the combined fire of infantry and artillery, and such opportunities are likely to be much more numerous at the outbreak of future wars than they have been in the past, because the enormous gain in range and rapidity of fire enables a far greater weight of metal to be concentrated on any chosen area within a given time. It cannot be too often reiterated that cavalry never has ridden over unshaken infantry of average quality by reason of its momentum alone, but that every successful cavalry charge has always owed its issue to a previously acquired moral superiority which has prevented the infantry from making adequate use of their means of defence. Nor will such charges entail greater losses than in the past, for, great though the increase of range of modern infantry weapons has been, the speed and endurance of cavalry has increased in a yet higher ratio; whereas in Napoleon's days, with an extreme range for musketry of 1000 yds., cavalry were expected only to trot 800 yds. and gallop for 200, nowadays with an extreme infantry range of under 4000 yds., the cavalry are trained to trot for 8000 yds. and gallop for 2000.

Neither the experiences in South Africa nor those in Manchuria seriously influenced the views of the leading cavalry experts as above outlined, for the conditions of both cases were entirely abnormal. No nation in western Europe can afford to mount the whole of its able-bodied manhood, nor, with the restricted area of its possessions, could repeat the Boer tactics with useful effect; in Manchuria, the theatre of operation was so far roadless, and the motives of both combatants so distinct from any conceivable as a basis for European strategy, that time was always available to construct entrenchments and obstacles physically insuperable to mounted arms. In western Europe, with its extreme development of communications, such tactics are impracticable, and under the system of compulsory service which is in force in all nations, an early decision must be sought at any cost. This motive imposes a rapid-marching campaign in the Napoleonic style, and in such warfare there is neither time nor energy available for the erection of extemporised fortresses. Victory must therefore fall to the side that can develop the greatest fire power in the shortest time. The greatest factor of fire power is the long artillery lines, and as cavalry is the one arm which by its mobility can hamper or prevent the formation of such lines, on its success in this task all else must depend. Hence both sides will concentrate every available horse and man for this special purpose, and on the issue of the collisions this mutual concentration must entail will hang the fate of the battle, and ultimately of the nation. But the cavalry which will succeed in this task will be the one in which the spirit of duty burns brightest, and the oath of allegiance, renewed daily on the cross of the sword, is held in the highest esteem.

Organization.—The existing organization of cavalry throughout the civilized world is an instance of the "survival of the fittest" in an extreme form. The execution of the many manœuvres with the speed and precision which condition success is only possible by a force in which, as Frederick the Great said, "every horse and trooper has been finished with the same care that a watchmaker bestows upon each wheel of the watch mechanism." Uniformity of excellence is in fact the keystone of success, and this is only attainable where the mass is subdivided into groups, each of which requires superintendence enough to absorb the whole energy of an average commander. Thus it has been found by ages of experiment that an average officer, with the assistance of certain subordinates to whom he delegates as much or as little responsibility as he pleases, finds his time fully occupied by the care of about one hundred and fifty men and horses, each individual of which he must understand intimately, in character, physical strength and temper, for horse and man must be matched with the utmost care and judgment if the best that each is capable of is to be attained. The fundamental secret of the exceptional efficiency attained by the Prussian cavalry lies in the fact that they were the first to realize what the above implies. After the close of the Napoleonic Wars they made their squadron commanders responsible, not only for the training of the combatants of their unit, but also for the breaking in of remounts and the elementary teaching of recruits as well, and in this manner they obtained an intimate knowledge of their material which is almost unattainable by British officers owing to the conditions entailed by foreign service and frequent changes of garrisons.

Further, to obtain the maximum celerity of manœuvre with the minimum exertion of the horses, the squadron requires to be subdivided into smaller units, generally known as *troops*, and experience has shown that with 128 sabres in the ranks (the average strength on parade, after deducting sick and young horses, and the N.C. officers required as troop guides, &c.) four troops best satisfy all conditions; as, with this number, the squadron will, under all circumstances of ground and surroundings, make any change of formation in less time and with greater accuracy than with any other number of subdivisions. The size of the unit next above the squadron, the *regiment*, is again fixed by the number of subordinates that an average commander can control, and the universal experience of all arms has settled this as not less than four and not more than eight. Experiments with eight and even ten squadrons have been tried both in Austria and Prussia, but only exceptional men have succeeded in controlling such large bodies effectively, and in the end the normal has been fixed at four or five squadrons in quarters, and three or four in the field. Of these, the larger number

is undoubtedly preferable, for, with the work of the quartermaster and the adjutant to supervise, in addition, the regimental commander is economically applied to the best advantage. The essential point, however, is that the officer commanding the regiment does not interfere in details, but commands his four squadron commanders, his quartermaster, and his adjutant, and holds them absolutely responsible for results.

There is no unity of practice in the constitution of larger units. Brigades vary according to circumstances from two regiments to four, and the composition of divisions fluctuates similarly. The custom in the German cavalry has been to form brigades of two regiments and divisions of three brigades, but this practice arose primarily from the system of recruiting and has no tactical advantage. The territory assigned to each army corps provides men and horses for two regiments of cuirassiers or lancers (classed as heavy in Germany), two of dragoons, and two of hussars, and since it is clearly essential to ensure uniformity of speed and endurance within those units most likely to have to work together, it was impossible to mix the different classes. But the views now current as to the tactical employment of cavalry contemplate the employment not only of divisions but of whole cavalry corps, forty to sixty squadrons strong, and these may be called on to fulfil the most various missions. The farthest and swiftest reconnaissances are the province of light cavalry, *i.e.* hussars, the most obstinate attack and defence of localities the task of dragoons, and the decisive charges on the battle-field essentially the duty of the heavy cavalry. It seems probable then that the brigade will become the highest unit the composition of which is fixed in peace, and that divisions and corps will be put together by brigades of uniform composition, and assigned to the several sections of the theatre of war in which each is likely to find the most suitable field for its special character. This was the case in the Frederician and Napoleonic epochs, when efficiency and experience in the field far outweighed considerations of administration and convenience in quarters.

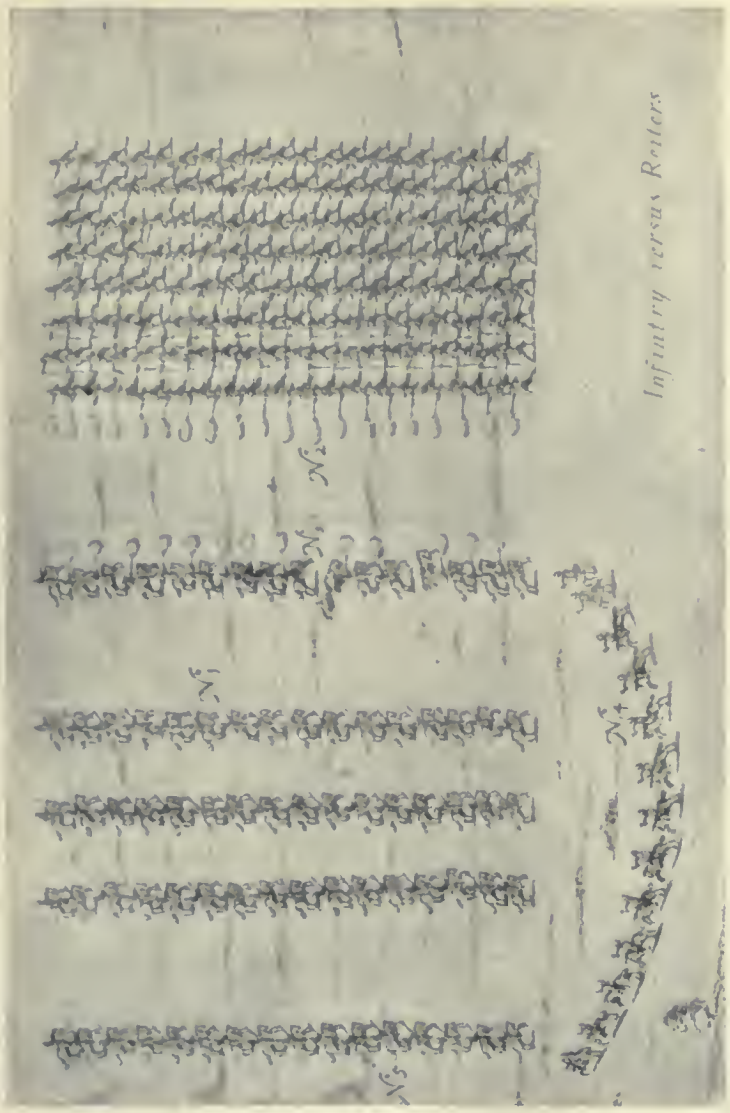
Hitherto, horse artillery in Europe has always formed an integral portion of the divisional organization, but the system has never worked well, and in view of the technical evolution of artillery material is no longer considered desirable. As it is always possible to assign one or more batteries to any particular brigade whose line of march will bring it across villages, defiles, &c. (where the support of its fire will be essential), and on the battle-field itself responsibility for the guns is likely to prove more of a hindrance than a help to the cavalry commander, it is probable that horse artillery will revert to the inspection of its own technical officers, and that the sole tie which will be retained between it and the cavalry will be in the batteries being informed as to the cavalry units they are likely to serve with in war, so that the officers may make themselves acquainted with the idiosyncrasies of their future commanders. The same course will be pursued with the engineers and technical troops required for the cavalry, but it seems probable that, in accordance with a suggestion made by Moltke after the 1866 campaign, the supply columns for one or more cavalry corps will be held ready in peace, and specially organized to attain the highest possible mobility which modern technical progress can ensure.

The general causes which have led to the differentiation of cavalry into the three types—hussars, dragoons and heavy—have already been dealt with. Obviously big men on little horses cannot manœuvre side by side with light men on big horses. Also, since uniformity of excellence within the unit is the prime condition of efficiency, and the greatest personal dexterity is required for the management of sword or lance on horseback, a further sorting out became necessary, and the best light weights were put on the best light horses and called hussars, the best heavy weights on the best heavy horses and called lancers, the average of either type becoming dragoons and cuirassiers. In England, the lance not being indigenous and the conditions of foreign service making adherence to a logical system impossible, lancers are medium cavalry, but the difference of weights carried and type of horses is too small to render these distinctions of practical moment. In Germany, where every suitable horse finds its place in the ranks and men have no right of individual selection, the distinctions are still maintained, and there is a very marked difference between the weights carried and the types of men and horses in each branch, though the dead weight which it is still considered necessary to carry in cavalries likely to manœuvre in large masses hardly varies with the weight of the man or size of the horse.

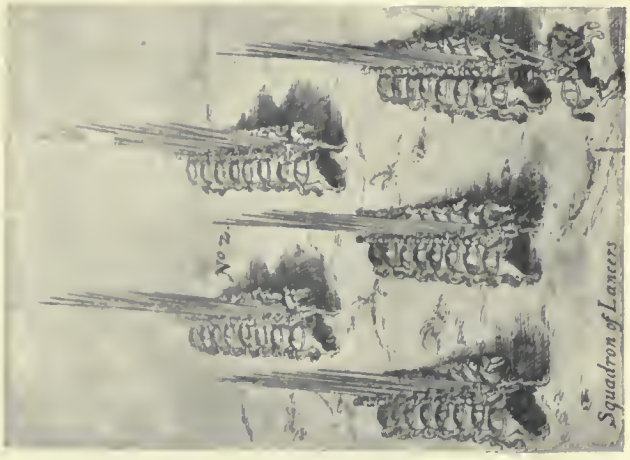
Where small units only are required to march and scout, the kit can be reduced to a minimum, everything superfluous for the moment being carried on hired transport, as in South Africa. But when 10,000 horsemen have to move by a single road all transport must be left miles to the rear, and greater mobility for the whole is attained by carrying upon the horse itself the essentials for a period of some weeks. Still, even allowing for this, it is impossible to account for the extraordinary load that is still considered necessary. In India, the British lancer, averaging 11 st. per man, could turn out in marching order at 17 st. 8 lb (less forage nets). In Germany, the hussar, averaging 10 st. 6 lb, rode at 18 st., also without forage, and the cuirassier at 21 st. to 22 st. Cavalry equipment is, in fact, far too heavy, for in the interests of the budgets of the departments which supply saddlery, harness, &c., everything is made so as to last for many years. Cavalry saddles fifty years old frequently remain in good condition, but the losses in horse-flesh this excessive solidity entails are ignored. The remount accounts are kept separately, and few realize that in war it is cheaper to replace a horse than a saddle. In any case, the armament alone of the cavalry soldier makes great demands on the horses. His sword and scabbard weigh about 4 lb, carbine or rifle 7 lb to 9 lb, 120 rounds of ammunition with pouches and belts about 12 lb, lance about 5 lb, and two days' forage and hay at the lowest 40 lb, or a gross total of 70 lb or 5 st., which with 11 st. for the man brings the total to 16 st.; add to this the lightest possible saddle, bridle, cloak and blanket, and 17 st. 8 lb is approximately the irreducible minimum. It may be imagined what care and management of the horses is required to enable them under such loads to manœuvre in masses at a trot, and gallop for distances of 5 m. and upwards without a moment for dismounting.

Reconnaissance and Scouting.—After 1870 public opinion, misled by the performances of the "ubiquitous Uhlan" and disappointed by the absence of great cavalry charges on the field of battle, came somewhat hastily to the conclusion that the day of "shock tactics" was past and the future of cavalry lay in acting as the eyes and ears of the following armies. But, as often happens, the fact was overlooked that the German cavalry screen was entirely unopposed in its reconnoitring expeditions, and it was not till long afterwards that it became apparent how very little these far-flung reconnaissances had contributed to the total success.

It has been calculated by German cavalry experts that not 1% of the reports sent in by the scouts during the advance from the Saar to the Meuse, August 1870, were of appreciable importance to the headquarters, and that before the orders based upon this evidence reached the front, events frequently anticipated them. Generally the conviction has asserted itself, that it is impossible to train the short-service soldiers of civilized nations sufficiently to render their reports worth the trouble of collating, and if a few cases of natural aptitude do exist nothing can ensure that these particular men should be sufficiently well mounted to transmit their information with sufficient celerity to be of importance. It is of little value to a commander to know that the enemy was at a given spot forty-eight hours previously, unless the sender of the report has a sufficient force at his disposal to compel the enemy to remain there; in other words, to attack and hold him. Cavalry and horse artillery alone, however, cannot economically exert this holding power, for, whatever their effect against worn-out men at the close of a great battle, against fresh infantry they are relatively powerless. Hence, it is probable that we shall see a revival of the strategic advanced guard of all arms, as in the Napoleonic days, which will not only reconnoitre, but fix the enemy until the army itself can execute the manœuvre designed to effect his destruction. The general situation of the



SIXTEENTH-CENTURY CAVALRY.
(Wallhausen's *Art militaire de la cavalerie, circa* 1600.)



CAVALRY

BATTLE OF STAFFARDA, 1690. (*From a contemporary engraving.*)

ACTION ON THE BULGANAK, 1854. (*From a lithograph by W. Simpson.*)

GERMAN GUARD DRAGOONS. (*Photo, Gebrüder Haeckel.*)

enemy's masses will, in western Europe, always be sufficiently fixed by the trend of his railway communications, checked by reports of spies, newspapers, &c., for, with neutral frontiers everywhere within a few hours' ride for a motor cyclist, anything approaching the secrecy of the Japanese in Manchuria is quite unattainable, and, once the great masses begin to move, the only "shadowing" which holds out any hope of usefulness is that undertaken by very small selected parties of officers, perfectly mounted, daring riders, and accustomed to cover distances of 100 m. and upwards. These will be supported by motor cars and advanced feelers from the field telegraphs, though probably the motor car would carry the eye-witness to his destination in less time than it would take to draft and signal a complete report.

Tactical scouting, now as always, is invaluable for securing the safety of the marching and sleeping troops, and brigade, divisional and corps commanders will remain dependent upon their own squadrons for the solution of the immediate tactical problem before them; but, since both sides will employ mounted men to screen their operations, intelligence will generally only be won by fighting, and the side which can locally develop a marked fire superiority will be the more likely to obtain the information it requires. In this direction the introduction of the motor car and of cyclists is likely to exercise a most important influence, but, whatever may be the conveyance, it must be looked upon as a means of advance only, never of retreat. The troops thus conveyed must be used to seize villages or defiles about which the cavalry and guns can manœuvre.

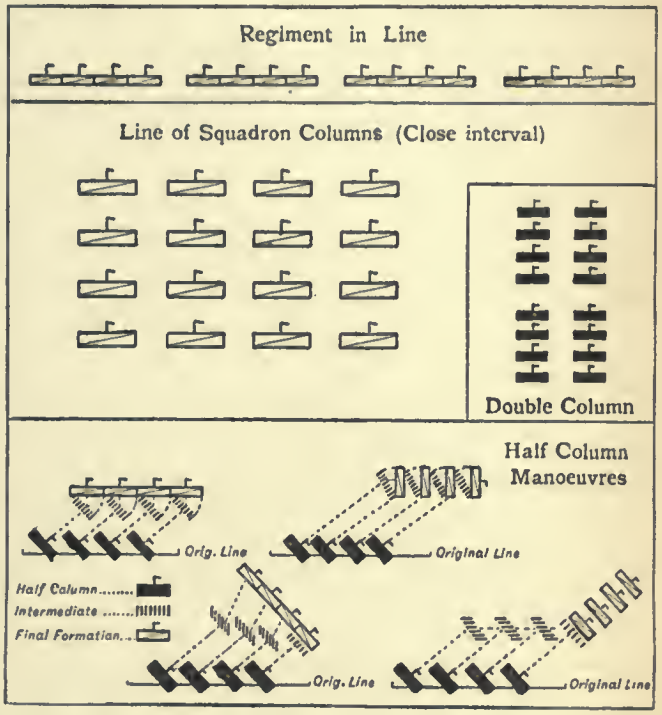
Formations and Drill.—Cavalry, when mounted, act exclusively by "shock" or more precisely by "the threat of their shock," for the immediate result of collision is actually decided some instants before this collision takes place. Experience has shown that the best guarantee for success in this shock is afforded by a two-deep line, the men riding knee to knee within each squadron at least. Perfect cavalry can charge in larger bodies without intervals between the squadrons, but, ordinarily, intervals of about 10 yds. between adjacent squadrons are kept to localize any partial unsteadiness due to difficulties of ground, casualties, &c. The obvious drawbacks of a two-deep line are that it halves the possible extent of front, and that if a front-rank horse falls the rear-rank horse generally tumbles over it also. To minimize the latter evil, the charge in two successive lines, 150 to 200 yds. apart, has often been advocated, but this has never stood the test of serious cavalry fighting; first, because when squadrons are galloping fast and always striving to keep the touch to the centre, if a horse falls the adjacent horses close in with such force that their sidelong collision may throw down more and always creates violent oscillation; and secondly, because owing to the dust raised by the first rank the following one can never maintain its true direction. It is primarily to avoid the danger and difficulty arising from the dust that the ranks in manœuvre are closed to within one horse's length, as, when moving at speed, the rear rank is past before the dust has time to rise.

Of all formations, the line is the most difficult to handle, and, particularly, to conceal—hence various formations in column are necessary for the preliminary manœuvres requisite to place the squadrons in position for the final deployment previous to the charge. Many forms of these columns have been tried, but, setting aside the columns intended exclusively for marching along roads, of which "sections" (four men abreast) is most usual in England, only these survive:—

Squadron column.
Double column of squadrons.
Half column.

In *squadron column*, the troops of the squadron formed are in line one behind the other at a distance equal to the front of the troop in line. The ideal squadron consists of 128 men formed in two ranks giving 64 files, and divided into four troops of 16 files—a larger number of troops makes the drill too complicated, a smaller number makes each troop slow and unhandy. When the squadron is weak, therefore, the troop should still be maintained as near 16 files as possible, the number of troops being if necessary reduced. Thus with only 32 files, two troops of 16 files would be better than four of only 8 files.

All other formations of the regiment or brigade are fundamentally derived from the squadron column, only varying with the order in which the squadrons are grouped, and the intervals which separate them. Thus the regiment may move in *line of squadron columns* at close interval, *i.e.* 11 paces apart or in *double column* as in the diagram. To form *line* for the charge, the squadrons open out, still in column, to full interval, *i.e.* the width they occupy when in line; and then on the command "Line to the front," each troop moves up to its place in line as shown in the diagram. When in line a large body of cavalry can no longer vary its direction without sacrificing its appearance of order, and as above pointed out, it is this appearance of order which really decides the result of the charge before the actual collision. Since, however, the enemy's movements may compel a change, an intermediate formation is provided, known as the



"half column." When this formation is ordered, the troops within each squadron wheel half right or left, and each squadron is then able to form into column or line to the front as circumstances demand, or the whole line can be formed into column of troops by continuing the wheel and in this formation gallop out into a fresh direction, re-forming line by a simple wheel in the shortest possible time.

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CAVAN, a county in the province of Ulster, Ireland, bounded N. by Fermanagh and Monaghan, E. by Monaghan and Meath, S. by Meath, Westmeath and Longford, and W. by Longford and Leitrim. The area is 477,399 acres, or about 746 sq. m. The surface of the county is uneven, consisting of hill and dale, without any great extent of level ground, but only in its northern extremity attaining a mountainous elevation. The barony of Tullyhaw, bordering on Fermanagh, a wild dreary mountain district, known as the kingdom of Glan or Glengavlin, contains the highest land in the county, reaching 2188 ft. in Cuilcagh, the place of inauguration for the Maguires, chieftains of Fermanagh, held in veneration by the peasantry, in connexion with legends and ancient superstitions. The remainder of the county is not deficient in wood, and contains numerous lakes, generally of small dimensions, but of much beauty, especially Lough Oughter, with its many inlets and islands formed by the Erne river, between the towns of Cavan and Killashandra. The county also shares with other counties the waters of Lough Gowna and Lough Sheelin, in which, as elsewhere in the county, the fishing is good. The chief river in the county is the Erne, which originates in Lough Scrabby, one of the minor sheets of water communicating with Lough Gowna on the borders of Longford. The river takes a northerly direction by Killashandra and Belturbet, being enlarged during its course by the Annalee and other smaller streams, and finally enters Lough Erne near the northern limit of the county. The other waters, consisting of numerous lakes and their connecting streams, are mostly tributary to the Erne. A copious spring called the Shannon Pot, at the foot of the Cuilcagh Mountain, in the barony of Tullyhaw, is regarded as the source of the river Shannon. The Blackwater, a tributary of the Boyne, also rises in this county, near Bailieborough. Several mineral springs exist in this county, the chief of which is near the once frequented village of Swanlinbar. In the neighbourhood of Belturbet, near the small lake of Annagh, is a carbonated chalybeate spring. There are several other springs of less importance; and the small Lough Leighs, or Lough-an-Leighaghs, which signifies the healing lake, on the summit of a mountain between Bailieborough and Kingscourt, is celebrated for its antiscorbutic properties. The level of this lake never varies. It has no visible supply nor vent for its discharge; nor is it ever frozen during the severest winters.

Geology.—This elongated county includes on the north-west some of the highland of Millstone Grit and Coal-Measures that rises above Lough Allen. The beds below these are referred to the English Yoredale series, and include some flaggy sandstones. It is on this series that the Shannon rises, under the high outlier of grit on Cuilcagh. The Carboniferous Limestone then stretches down to Cavan town, a bold outlier of the higher strata being left above Ballyconnell. The river Erne forms, in the limestone area, a characteristic series of expansions and loops, with islands between them, known as Lough Oughter. At this point we pass on to the axis of underlying Silurian strata that runs from Longford to Donaghadee in Co. Down, and the country becomes hilly and irregular, culminating about Cross Keys on the old Dublin coach-road. A patch of granite, indicating doubtless a core like that exposed at Newry, is seen in a hollow at Crossdoney. On the south side of this axis of older rocks, we reach Carboniferous shale and limestone at Lough Sheelin, and here enter on the great central plain. The extreme south-east of the county includes part of the Triassic outlier of Kingscourt. The coal-seams and concretions of clay-ironstone in the north-west area resemble those mentioned under the head of Co. Roscommon. Anthracite, probably of inorganic origin, has been mined without permanent success in the Silurian beds near Kilnaleck, and is traceable freely, associated with veins of quartz and haematite, at Ballyjamesduff a little farther east.

Climate and Industries.—The climate suffers from the dampness arising from the numerous lakes and the nature of the soil, and from the boisterous winds which frequently prevail, more especially in the higher districts. The soil is generally a stiff clay, cold and watery, but capable of much improvement by drainage, for which its undulating surface affords facilities. Only about one-sixteenth of the total area is quite barren. Agriculture makes little progress; the extent of the farms being generally small. Oats and potatoes are the principal crops. Flax, once of some importance, is almost neglected. In the mountainous parts, however, where the land is chiefly under grazing, the farms are larger, and in stock-raising the county is progressing.

Cavan is not a manufacturing county. The bleaching of linen and the distillation of whisky are both carried on to a small extent, but the people are chiefly employed in agricultural pursuits and in the sale of home produce. The soil in those districts not well adapted for tillage is peculiarly favourable for trees. The woods were formerly very considerable, and the timber found in the bogs is of large dimensions; but plantations are now chiefly found in demesnes, where they are extensive.

The county is not well served by railways. The Great Northern from Clones to Cavan, and the Midland Great Western from Mullingar in Westmeath to Cavan, form a through line from north to south. The Great Northern has branches to Belturbet from Ballyhaise, and to Cootehill from Ballyhay; the Midland Great Western has a branch to Killashandra, and from Navan in Meath to Kingscourt, just within Cavan. The Cavan & Leitrim railway starts from Belturbet and soon leaves the county to the west.

Population and Administration.—The population (111,917 in 1891; 97,541 in 1901), of which about 80% are Roman Catholics, shows a decrease among the most serious of the Irish counties, and emigration returns are among the heaviest. The population is almost wholly rural, the only towns being the small ones of Cavan (pop. 2822, the county town), Cootehill (1509), Belturbet (1587) and Bailieborough (1004). The county is divided into eight baronies, and contains thirty-two parishes and parts of parishes. It is almost entirely within the Protestant and Roman Catholic dioceses of Kilmore. The assizes are held at Cavan, and quarter sessions are held at Cavan, Bailieborough, Cootehill and Ballyconnell. Before the Union the county returned six members to the Irish parliament, two for the county at large, and two for each of the boroughs of Cavan and Belturbet; but since that period it has been represented in the imperial parliament by two members only, for the east and west divisions.

History and Antiquities.—At the period of the English settlement, and for some centuries afterwards, this district was known as the Brenny, being divided between the families of O'Rourke and O'Reilly; and its inhabitants, protected by the nature of the country, long maintained their independence. In 1579 Cavan was made shire ground as part of Connaught, and in 1584 it was formed into a county of Ulster by Sir John Perrott, and subdivided into seven baronies, two of which were assigned to Sir John O'Reilly and three to other members of the family; while the two remaining, possessed by the septs of Mackernon and Magauran, and situated in the mountains bordering on O'Rourke's country, were left subject to their ancient tenures and the exactions of their Irish lord. The county subsequently came within the scheme for the plantation of Ulster under James I. The population is less mixed in race than in most parts of Ulster, being generally of Celtic extraction. Some few remains of antiquity remain in the shape of cairns, raths and the ruins of small castles, such as Cloughoughter Castle on an island (an ancient crannog) of Lough Oughter. Three miles from the town of Cavan is Kilmore, with its cathedral, a plain erection containing a Romanesque doorway brought from the abbey of Trinity Island, Lough Oughter. The bishopric dates

from about 1450. A portion of a round tower is seen in the churchyard of the parish of Drumlane at Belturbet.

CAVAN, a market-town and the county town of Co. Cavan, Ireland, near the centre of the county, in the west parliamentary division, 85½ m. N.W. of Dublin by the Midland Great Western railway, and the terminus of a branch of the Great Northern railway from Clones. Pop. of urban district (1901), 2822. It is on one of the tributary streams of the Annalee river, in a broad valley surrounded on every side by elevated ground, with picturesque environs, notably the demesnes of Farnham and of Kilmore, which belongs to the bishops of that diocese. Cavan has no buildings of antiquarian interest, but the principal county institutions are here, and the most conspicuous building is the grammar school, founded by Charles I. It was rebuilt in 1819 on an eminence overlooking one of the main entrances into the town, and is capable of accommodating 100 resident pupils. The college of St Patrick is near the town. Cavan has some linen trade, and a considerable retail business is transacted in the town. A monastery of Dominican friars, founded by O'Reilly, chieftain of the Brenny, formerly existed here, and became the burial-place of the celebrated Irish general, Owen O'Neill, who died as is supposed by poison, in 1649, at Cloughoughter. There was also the castle of the O'Reillys, but this and all other antiquities of the town were swept away during the violent and continuous feuds to which the country was subjected. In 1690 the chief portion of the town was burned by the Enniskilleners under General Wolseley, when they routed a body of James II.'s troops under the duke of Berwick.

CAVANILLES, ANTONIO JOSÉ (1745–1804), Spanish botanist, was born at Valencia on the 16th of January 1745. He was educated at the university of that town, and in 1777 went to Paris, where he resided twelve years, engaged in the study of botany. In 1801 he became director of the botanic gardens at Madrid, where he died on the 4th of May 1804. In 1785–1786 he published *Monadelphiae Classis Dissertationes X.*, and in 1791 he began to issue *Icones et descriptiones plantarum Hispaniae*.

His nephew, ANTONIO CAVANILLES (1805–1864), was a distinguished advocate, and the author of a history of Spain, published at Madrid in 1860–1864.

CAVATINA (Ital. diminutive of *cavata*, the producing of tone from an instrument, plural *cavatine*), originally a short song of simple character, without a second strain or any repetition of the air. It is now frequently applied to a simple melodious air, as distinguished from a brilliant aria, recitative, &c., and often forms part of a large movement or *scena* in oratorio or opera.

CAVE, EDWARD (1691–1754), English printer, was born at Newton, Warwickshire, on the 27th of February 1691. His father, Joseph Cave, was of good family, but the entail of the family estate being cut off, he was reduced to becoming a cobbler at Rugby. Edward Cave entered the grammar school of that town, but was expelled for robbing the master's hen-roost. After many vicissitudes he became apprentice to a London printer, and after two years was sent to Norwich to conduct a printing house and publish a weekly paper. While still a printer he obtained a place in the post office, and was promoted to be clerk of the franks. He was at this time engaged in supplying London newsletters to various country papers; and his enemies, who had twice summoned him before the House of Commons for breach of privilege, now accused him of opening letters to obtain his news, and he was dismissed the service. With the capital which he had saved, he set up a small printing office at St John's Gate, Clerkenwell, which he carried on under the name of R. Newton. He had long formed a scheme of a magazine "to contain the essays and intelligence which appeared in the two hundred half-sheets which the London press then threw off monthly," and had tried in vain to persuade some publisher to take it up. In 1731 he himself put it into execution, and began the *Gentleman's Magazine* (see PERIODICALS), of which he was the editor, under the pseudonym "Sylvanus Urban, Gent." The magazine had a large circulation and brought a fortune to the projector. In 1732 he began to issue reports of the debates in both Houses of Parliament. He commissioned friends to note the speeches, which he published with the initial and final letters of personal names. In 1738 Cave was censured by parliament for printing the king's answer to an address before it had been announced by the speaker. From that time he called his reports the debates of a "parliament in the empire of Lilliput" (see REPORTING). To piece together and write out the speeches for this publication was Samuel Johnson's first literary employment. In 1747 Cave was reprimanded for publishing an account of the trial of Lord Lovat, and the reports were discontinued till 1752. He died on the 10th of January 1754. Cave published Dr Johnson's *Rambler*, and his *Irene*, *London* and *Life of Savage*, and was the subject of a short biography by him.

CAVE, WILLIAM (1637–1713), English divine, was born at Pickwell in Leicestershire. He was educated at St John's College, Cambridge, and successively held the livings of Islington (1662), of All-Hallows the Great, Thames Street, London (1679), and of Isleworth in Middlesex (1690). Dr Cave was chaplain to Charles II., and in 1684 became a canon of Windsor. The two works on which his reputation principally rests are the *Apostolici*, or History of Apostles and Fathers in the first three centuries of the Church (1677), and *Scriptorum Ecclesiasticorum Historia Literaria* (1688). The best edition of the latter is the Clarendon Press, 1740–1743, which contains additions by the author and others. In both works he was drawn into controversy with Jean le Clerc, who was then writing his *Bibliothèque universelle*, and who accused him of partiality. He wrote several other works of the same nature which exhibit scholarly research and lucid arrangement. He is said to have been a good talker and an eloquent preacher. His death occurred at Windsor on the 4th of July 1713.

CAVE (Lat. *cavea*, from *cavus*, hollow), a hollow extending beneath the surface of the earth. The word "cavern" (Lat. *caverna*) is practically a synonym, though a distinction is sometimes drawn between sea caves and inland caverns, but the term "cave" is used here as a general description. Caves have excited the awe and wonder of mankind in all ages, and have been the centres round which have clustered many legends and superstitions. They were the abode of the sibyls and the nymphs in Roman mythology, and in Greece they were the temples of Zeus, Pan, Dionysus, Pluto and the Moon, as well as the places where the oracles were delivered at Delphi, Corinth and Mount Cithaeron. In Persia they were connected with the obscure worship of Mithras. Their names frequently are survivals of the superstitious ideas of antiquity, as, for example, the Fairy, Dragon's, or Devil's Caves of France and Germany. Long after the Fairies and Little Men had forsaken the forests and glens of Germany, they dwelt in their palaces deep in the Harz Mountains, in the Dwarfholes, &c., whence they came from time to time into the upper air.

The Seven Sleepers of Ephesus slept their long sleep in a cave. The hills of Granada are still believed by the Moorish children to contain the great Boabdil and his sleeping host, who will awake, when an adventurous mortal invades their repose, to restore the glory of the Moors in Spain.

Caves have been used in all ages by mankind for habitation, refuge and burial. In the Old Testament we read that when Lot went up out of Zoar he dwelt in a cave with his two daughters. The five kings of the Canaanites took refuge from Joshua, and David from Saul, in the caves of Palestine, just as the Aquitani fled from Caesar to those of Auvergne, and the Arabs of Algeria to those of Dahra, where they were suffocated by Marshal Pelissier in 1845. In Central Africa David Livingstone discovered vast caves in which whole tribes found security with their cattle and household stuff.

The cave of Machpelah may be quoted as an example of their use as sepulchres, and the rock-hewn tombs of Palestine and of Egypt and the Catacombs of Rome probably owe their existence to the ancient practice of burial in natural hollows in the rock. We might therefore expect to find in them most important evidence as to the ancient history of mankind, which would reach long beyond written record; and since they have always

been used by wild beasts as lairs we might reasonably believe also that their exploration would throw light upon the animals which have in many cases disappeared from the countries which they formerly inhabited. The labours of Buckland, Pengelly, Falconer, Lartet and Christy, and Boyd Dawkins have added an entirely new chapter to the history of man in Europe, as well as established the changes that have taken place in the European fauna. The physical history of caves will be taken first, and we shall then pass on to the discoveries relating to man and the lower animals which have been made in them of late years.

Physical History.—The most obvious agent in hollowing out caves is the sea. The set of the currents, the force of the breakers, the grinding of the shingle inevitably discover the weak places in the cliff, and leave caves as one of the results of their work, modified in each case by the local conditions of the rock. Those formed in this manner are easily recognized from their floors being rarely much out of the horizontal; their entrances are all in the same plane, or in a succession of horizontal and parallel planes, if the land has been elevated at successive times. From their inaccessible position they have been rarely occupied by man. Among them Fingal's Cave, on the island of Staffa, off the south-west coast of Scotland, hollowed out of columnar basalt, is perhaps the most remarkable in Europe. In volcanic regions also there are caves formed by the passage of lava to the surface of the ground, or by the expansion of steam and gases in the lava while it was in a molten state. They have been observed in the regions round Vesuvius and Etna, in Iceland and Teneriffe. We may take as an example the Grotto del Cane (" cave of the dog "), near Pozzuoli, a few miles to the south-west of Naples, remarkable for the flow of carbonic acid from crevices in the floor, which fills the lower part of the cave and suffocates any small animal, such as a dog, immersed long enough in it.

The most important class of caves, however, and that which immediately demands our notice, is that composed of those which have been cut out of calcareous rocks by the action of carbonic acid in the rain-water, combined with the mechanical friction of the sand and stones set in motion by the streams which have, at one time or another, flowed through them. They occur at various levels, and are to be met with wherever the strata are sufficiently compact to support a roof. Those of Brixham and Torquay and of the Eifel are in the Devonian limestone; those of Wales, Somerset, the Pennine chain, Ireland, the central and northern counties of Belgium, Saxony, and Westphalia, of Maine and Anjou, of Virginia and Kentucky, are in that of the Carboniferous age. The cave of Kirkdale in Yorkshire, and most of those in Franconia and Bavaria, penetrate Jurassic limestones. The Neocomian and Cretaceous limestones contain most of the caverns of France, rendered famous by the discovery of the remains of the cave-men along with the animals which they hunted; as well as those of the Pyrenees, the Alps, Sicily, Greece, Dalmatia, Carniola and Palestine. The cave of Lunelviel near Montpellier is the most important of those which have been hollowed in limestones of the Tertiary age. They are also met with in rocks composed of gypsum; in Thuringia, for example, they occur in the saliferous and gypseous strata of the Zechstein, and in the gypseous Tertiary rocks of the neighbourhood of Paris, as, for example, at Montmorency.

Caves formed by the action of carbonic acid and the action of water are distinguished from others by the following characters. They open on the abrupt sides of valleys and ravines at various levels, and are arranged round the main axes of erosion, just as the branches are arranged round the trunk of a tree. In a great many cases the relation of the valley to the ravine, and of the ravine to the cave, is so intimate that it is impossible to deny that all three have been produced by the same causes. The caves themselves ramify in the same irregular fashion as the valleys, and are to be viewed merely as the capillaries in the general valley system through which the rain passes to join the main channels. Sometimes, as in the famous caves of Adelsberg, Kentucky, Wookey Hole in Somersetshire, the Peak in Derbyshire, and in many in the Jura, they are still the passages of subterranean streams; but very frequently the drainage has found an outlet at a lower level, and the ancient watercourses have been deserted. These in every case present unmistakable proof that they have been traversed by water in the sand, gravel and clay which they contain, as well as in the worn surfaces of the sides and bottom. In all districts where there are caves there are funnel-shaped depressions of various sizes called pot-holes or swallow-holes, or bêtoires, " chaldrons du diable," " marmites des géants," or " katavothra," in which the rain is collected before it disappears into the subterranean passages. They are to be seen in all stages, some being mere hollows which only contain water after excessive rain, while others are profound vertical shafts into which the water is continually falling. Gaping Ghyl, 330 ft., and Helln Pot in Yorkshire, 300 ft. deep, are examples of the latter class. The *cirques* described by M. Desnoyers belong to the same class as the swallow-holes.

The history of swallow-holes, caves, ravines and valleys in calcareous strata may be summed up as follows:—The calcareous rocks are invariably traversed by joints or lines of shrinkage, which are lines of weakness by which the direction of the drainage is determined; and they are composed to a large extent of carbonate of lime, which is readily exchanged into soluble bicarbonate by the addition of carbonic acid. The rain in its passage through the air takes up carbonic acid, and it is still further charged with it in percolating through the surface soil in which there is decomposing vegetable matter. As the raindrops converge towards some one point, determined by some local accident on the surface, and always in a line of joint, the carbonic acid attacks the carbonate of lime with which it comes into contact; and thus a funnel is gradually formed ending in the vertical joint below. Both funnel and vertical joint below are being continually enlarged by this process. This chemical action goes on until the free carbonic acid is used up. The subterranean passages are enlarged in this manner, and what was originally an insignificant network of fissures is developed into a series of halls, sometimes as much as from 80 to 100 ft. high. These results are considerably furthered by the mechanical friction of the pebbles and sand hurried along by the current, and by falls of rock from the roof produced by the removal of the underlying strata. In many cases the results of this action have produced a regular subterranean river system. The thick limestones of Kentucky, for example, are traversed by subterranean waters which collect in large rivers, and ultimately appear at the surface in full power. The river Axe, near Wells, the stream flowing out of the Peak Cavern at Castleton, Derbyshire, that at Adelsberg in Carniola, flow out of caverns in full volume. The river Styx and the waters of Acheron disappear in a series of caverns which were supposed to lead down to the infernal regions.

If the direction of the drainage in the rock has been altered, either by elevations such as those with which the geologist is familiar, or by the opening out of new passages at a lower level, these watercourses become dry, and present us with the caves which have afforded shelter to man and the wild animals from the remotest ages, sometimes high up on the side of a ravine, at other times close to the level of the stream at the bottom.

Caves, as a general rule, are as little effected by disturbances of the rock as the ravines and valleys, which have been formed, in the main, irrespective of the lines of fault or dislocation.

We must now examine what happens to the bicarbonate of lime which has been formed by the action of the acid on the limestone. If a current of air play upon the surface of the water, the carbonic acid, which floats up the lime, so to speak, is given off and the insoluble carbonate is deposited, and as a result of this action we have the elaborate and fantastic stony incrustations termed stalactites and stalagmites. The water percolating through the rock covers the sides of the cavern with a stalactitic drapery, and if a line of drops persistently falls from the same point to the floor, the calcareous deposit gradually descends from the roof, forming in some cases stony tassels, and in others long columns which are ultimately united to the calcareous boss formed by the plash of the water on the floor. The surface also of the pools is sometimes covered over with an ice-like sheet of stalagmite, which shoots from the sides, and sometimes forms a

solid and firm floor when the water on which it was supported has disappeared. Sometimes the drops form a little calcareous basin, beautifully polished inside, which contains small pearl-like particles of carbonate of lime, polished by friction one against the other. The most beautiful stalactitic caves in Great Britain are those of Cheddar in Somerset, Caldy Island and Poole's Cavern at Buxton. A portion only of the carbonate of lime is thus deposited in the hollows of the rock from which it was taken; the rest is carried into the open air by the streams, in part deposited on the sides and bottom, forming tufa and the so-called petrifications, and partly being conveyed down to the sea to be ultimately secreted in the tissues of the Mollusca, Echinodermata and Foraminifera. Through these it is again collected in a solid form, and in the long course of ages it is again lifted up above the level of the water as limestone rock, and again undergoes the same series of changes. Thus the cycle of carbonate of lime is a never-ending one from the land to the ocean, from the ocean to the land, and so it has been ever since the first stratum of limestone was formed out of the remains of the animals and plants of the sea. The rate of the accumulation of stalagmite in caverns is necessarily variable, since it is determined by the presence of varying currents of air. In the Ingleborough cavern a stalagmite, measured in 1839 and in 1873, is growing at the rate of ·2946 in. per annum. It is obvious, therefore, that the vast antiquity of deposits containing remains of man underneath layers of stalagmite cannot be inferred from a thickness of a few inches or even of a few feet.

The intimate relation which exists between caves and ravines renders it extremely probable that many of the latter have been originally subterranean watercourses, which have been unroofed by the degradation of the rock. In all limestone districts ravines are to be found continued in the same direction as the caves, and the process of atmospheric erosion may be seen in the fallen blocks of stone which generally are to be met with at the mouths of the caverns. In illustration of this the valley and caves of Weathercote, in Yorkshire, may be quoted, or the source of the Axe at Wookey; and the ravine formed in this way has very frequently been widened out into a valley by the action of subaerial waste, or by the grinding of glaciers through it during the glacial stage of the Pleistocene period.

For further details as to the physical history of caverns we must refer the reader to the works quoted at the end of this article, by E. A. Martel, the intrepid explorer of most of the large European caves, including those of Great Britain and Ireland. The history of the *Glacières* or Ice-caves will be found in Browne's *Ice Caves in France and Switzerland*.

Classification.—The caves which have offered shelter to the *mammalia* are classified according to their contents, and are of various ages, ranging from the Pliocene to the present day. (1) Those containing the Pliocene *mammalia* belong to that age. (2) Those with the remains of the mammoth, woolly rhinoceros and other extinct species, or with palaeolithic man (see ARCHAEOLOGY), are termed Pleistocene. These are sometimes called Quaternary, under the mistaken idea that they belong to an age succeeding the Tertiary period. (3) Those which contain the remains of the domestic animals in association with the remains of man either in the Neolithic, Bronze or Iron stages of civilization are termed Prehistoric. (4) The fourth group consists of those which can be brought into relation with the historic period, and are therefore termed Historic.

The Pliocene Caves.—It is a singular fact, only to be explained by the vast denudation of the earth's surface since the Pliocene Age, that only one cave referable to that age has as yet been discovered, that at Doveholes near Buxton, Derbyshire, described by Boyd Dawkins in 1903 (*Quart. Journ. Geol. Soc.*). The cave consists of a large horizontal chamber and a small passage, connected with a swallow-hole close by, and exposed in the working face of a quarry in 1901, at a depth of about 40 ft. from the surface. The locality is in the limestone plateau, 1158 ft. high, which forms the divide between the waters flowing into the Mersey on the west and the Humber on the east. Both swallow-hole and cave were completely blocked up with débris, and the latter was filled with red and yellow clay, horizontally stratified and containing pebbles of sandstone from the neighbouring ridge of Axe Edge, and bones and teeth of fossil mammals, some waterworn and others without traces of transport by water. All the mammals belong to well-known species found in the Pliocene strata of East Anglia, and in Auvergne and Italy. Among them were the sabre-toothed lion (*Machairodus crenatidens*), the hyena of Auvergne, the mastodon, and the southern elephant (*E. meridionalis*), and rhinoceros (*R. Etruscus*), and Steno's horse. Most of the bones had evidently been gnawed by hyenas and accumulated in one of their dens, and had afterwards been carried by water into the chambers deep down in the rock, where they were found. Since that time the general level of the district has been lowered by denudation to an extent of more than 230 ft., and all the hyena dens destroyed with the Pliocene surface not only in this district but generally over the world. In this case a covering of limestone some 270 ft. thick, including the depth from the present surface, protected the remains from the denuding forces.

The Pleistocene Caves.—The search after *ebur fossile* or unicorns' horn, or in other words the fossil bones which ranked high in the *materia medica* of the 16th and 17th centuries, led to the discovery of the ossiferous caverns of the Harz Mountains, and of Hungary and Franconia. The famous cave of Gailenreuth in the last of these districts was explored by Goldfuss in 1810. The bones of the hyena, lion, wolf, fox and stag, which it contained, were identified by Baron Cuvier, and some of the skulls have been proved by Busk to belong to the grizzly bear. They were associated with the bones of the reindeer, horse and bison, as well as with those of the great cave bear. These discoveries were of very great interest, because they established the fact that the above animals had lived in Germany in ancient times. The first bone cave systematically explored in England was one at Oreston near Plymouth in 1816, which proved that an extinct species of rhinoceros (*R. leptorhinus*) lived in that district. Four years later the famous hyena den at Kirkdale in Yorkshire was explored by Buckland. He brought forward proof that it had been inhabited by hyenas, and that the broken and gnawed bones of the mammoth, rhinoceros, stag, bison and horse belonged to animals which had been dragged in for food. He pointed out that all these animals had lived in Yorkshire in ancient times, and that it was impossible for the carcases of the rhinoceros, hyena and mammoth to have been floated from tropical regions into the places where he found their bones. He subsequently investigated bone caves in Derbyshire, South Wales and Somerset, as well as in Germany, and published his *Reliquiae Diluvianae* in 1822, a work which laid the foundations of the new science of cave-hunting in this country. The well-known cave of Kent's Hole near Torquay furnished McEnery, between the years 1825 and 1841, with the first flint implements discovered in intimate association with the bones of extinct animals. He recognized the fact that they proved the existence of man in Devonshire while those animals were alive, but the idea was too novel to be accepted by his contemporaries. His discoveries have since been verified by the subsequent investigations carried on by Godwin Austen, and ultimately by the committee of the British Association, which worked for several years under the guidance of Pengelly. There are four distinct strata in the cave. 1st, The surface is composed of dark earth, and contains medieval remains, Roman pottery and articles which prove that it was in use during the Iron, Bronze and Neolithic Ages. 2nd, Below this is a stalagmite floor, varying in thickness from 1 to 3 ft., and covering (3rd) the red earth, which contained bones of the hyena, lion, mammoth, rhinoceros and other animals, in association with flint implements and an engraved antler, which proved man to have been an inhabitant of the cavern during the time of its deposition. 4th, Filling the bottom of the cave is a hard breccia, with the remains of bears and flint implements, in the main ruder than those found above; in some places it was no less than 12 ft. thick. The most remarkable animal found in Kent's Hole is the sabre-toothed carnivore, *Machairodus latidens* of Owen. While the value of McEnery's discoveries was in dispute the

exploration of the cave of Brixham near Torquay in 1858 proved that man was coeval with the extinct mammalia, and in the following year additional proof was offered by the implements that were found in Wookey Hole. Similar remains have been met with in the caves explored since that time in Wales, and in England as far north as Derbyshire (Creswell), proving that palaeolithic man hunted the mammoth and rhinoceros and other extinct animals over the whole of southern and middle England.

The discoveries in Kent's Hole and in the Creswell caves prove further that palaeolithic man was in two stages of civilization—the ruder or riverdrift man, with implements of the type found in the river gravels (see ARCHAEOLOGY; and PALAEOLITHIC) being the older; and the more highly advanced, or the cave-man, mainly characterized by the better implements, and a singular facility in depicting animal life (as shown by the figure of a horse incised on the fragment of a bone found in the Creswell caves), being the newer. We may also conclude from the absence of palaeolithic implements from the glaciated regions in which most of these caves occur, that both riverdrift and cave-men dwelt in middle and northern Britain in the pre-glacial age, their remains being protected in the caverns from the denuding forces that removed all traces of their existence from the surface of the ground in glacial and post-glacial times. The riverdrift man is, however, proved to be post-glacial in southern and eastern England, by the occurrence of his implements in the river gravels of that age. Both these peoples inhabited southern England and the continent before and after the glacial period. The riverdrift man, whose implements occur in river deposits in middle and southern Europe, in Africa, Palestine and Hindustan, is everywhere in the same age of primitive barbarism, and has not as yet been identified with any living race. The cave-men are in a higher and more advanced stage, and led a life in Europe identical with that of the Eskimos in the Arctic regions.

The Pleistocene Caves of the European Continent.—The researches of Mortillet have proved that the same two groups of cave-dwellers occur in the caves of France, the older being represented by the Chelléen and Moustérien sections, and the newer by that of Solutré and La Madelaine. To the former belong the human remains found in the caverns of Spy and Neanderthal, which prove that the riverdrift man had "the most brutal of all known human skulls." To the latter we must assign all the caves and rock-shelters of Périgord, with the better implements, explored by Lartet and Christy in 1863–1864 in the valleys of the Vézère and Dordogne. These offer as vivid a picture of the life of the cave-men as that revealed of Italian manners in the 1st century by the buried cities of Herculaneum and Pompeii. The old floors of human occupation consist of broken bones of animals killed in the chase, mingled with rude implements and weapons of bone and unpolished stone, and with charcoal and burnt stones, which indicate the position of the hearths. Flakes without number, awls, lance-heads, hammers and saws made of flint rest *pêle-mêle* with bone needles, sculptured reindeer antlers, arrowheads and harpoons, and bones of the reindeer, bison, horse, ibex, Saiga antelope and musk sheep. These singular accumulations of débris mark the places where the ancient hunters lived, and are merely the refuse cast aside. The reindeer formed by far the greater portion of the food, and must have lived in enormous herds at that time in the centre of France. From this, as well as from the presence of the most arctic of the herbivores, the musk sheep, we may infer the severe climate of that portion of France at that time. Besides these animals the cave bear and lion have been met with in one, and the mammoth in five localities, and their remains bear marks of cutting or scraping which showed they fell a prey to the hunters. The most remarkable remains left behind in these refuse heaps are the sculptured reindeer antlers and figures engraved on fragments of schist and on ivory. A well-defined outline of an ox stands out boldly from one piece of antler; a second represents a reindeer kneeling down in an easy attitude with his head thrown up in the air so that the antlers rest on the shoulders, and the back forms an even surface for a handle, which is too small to be grasped by an ordinary European hand; in a third a man stands close to a horse's head, and on the other side of the same cylinder are two heads of bisons drawn with sufficient clearness to ensure recognition by any one who has seen that animal. On a fourth the natural curvature of one of the tines has been taken advantage of by the artist to engrave the head and the characteristic recurved horns of the ibex; and on a fifth horses are represented with large heads, upright dishevelled manes and shaggy ungroomed tails. The most striking figure is that of the mammoth engraved on a fragment of its own tusk; the peculiar spiral curvature of the tusk and the long mane, which are now not to be found in any living elephant, prove that the original was familiar to the eye of the artist. These drawings probably employed the idle hours of the hunter, and hand down to us the scenes which he witnessed in the chase. They are full of artistic feeling and are evidently drawn from life. The mammoth is engraved in its own ivory, and the reindeer and the stag on their respective antlers. Further researches have revealed the fact that in Auvergne and in the Pyrenees the cave-men ornamented some of their caves with incised figures and polychrome frescoes of the wild animals. Rivière has discovered on the walls of the grotto of La Mouthe (Dordogne) three large hunting scenes, one with bisons and horses, a second representing a primitive hut, a bison, reindeer, ibex and mammoth, and a third with a mammoth, hinds and horses. In the Pyrenees similar frescoes have been described by Cartailhac and Breuil. They are on the walls of the cavern and roof of Altamira, and on the walls of Marsoulas. The outlines have been engraved first, and afterwards filled in with colour in brown and red ochre and black oxide of manganese.

The cave-men ranged over middle Europe as far south as the Pyrenees and the Alps, and inhabited the caverns of Belgium and Germany, Hungary and Switzerland. Their remains have not as yet been met with in southern Europe. They lived by hunting and fishing, they were fire users, and lit up the darkness of their caves with stone lamps filled with fat (Altamira). They were clad in skins sewn together with sinews of reindeer or strips of intestines. They used huts as well as caves for habitation. They had a marvellous facility for drawing animal figures. They possessed no domestic animals, nor were they acquainted with spinning or with the potter's art. We have no evidence that they buried their dead—the interments, such as those of Aurignac, Les Eyzies and Mentone, most probably belonging to a later age.

If these remains be compared with those of existing races, it will be found that the cave-men were in the same hunter stage of civilization as the Eskimos, and that they are unlike any other races of hunters. If they were not allied to the Eskimos by blood, there can be no doubt that they handed down to the latter their art and their manner of life. The bone needles, and many of the harpoons, as well as the flint spearheads, arrowheads and scrapers, are of precisely the same form as those now in use amongst the Eskimos. The artistic designs from the caves of France, Belgium and Switzerland, are identical in plan and workmanship with those of the Eskimos, with this difference only, that the hunting scenes familiar to the Palaeolithic cave-dwellers were not the same as those familiar to the inhabitants of the shores of the Arctic Ocean. Each represented the animals which he knew, and the whale, walrus and seal were unknown to the inland dwellers of Aquitaine, just as the mammoth, bison and wild horse are unknown to the Eskimos. The reindeer, which they both knew, is represented in the same way by both. The practice of accumulating large quantities of the bones of animals round their dwelling-places, and the habit of splitting the bones for the sake of the marrow, are the same in both. The hides were prepared with the same sort of instruments, and the needles with which they were sewn together are of the same pattern. The stone lamps were used by both. In both there was the same disregard of sepulture. All these facts can hardly be mere coincidences caused by both peoples leading a savage life under similar conditions. The conclusion, therefore, seems inevitable that, so far as we have any evidence of the race to which the cave-dwellers belong, that evidence points only in the direction

of the Eskimos. It is to a considerable extent confirmed by a consideration of the animals found in the caves. The reindeer and musk sheep afford food to the Eskimos now in the Arctic Circle, just as they afforded it to the cave-men in Europe; and both these animals have been traced by their remains from the Pyrenees to the north-east through Europe and Asia as far as the very regions in which they now live. The mammoth and bison also have been tracked by their remains in the frozen river gravels and morasses through Siberia as far as the American side of Bering Strait. Palaeolithic man appeared in Europe with the arctic mammalia, lived in Europe with them, and in all human probability retreated to the north-east along with them.

There are refuse heaps in north-eastern Siberia containing the remains of the mammoth and woolly rhinoceros as well as the reindeer and musk sheep, which may be referred with equal justice to the cave-men or to the Eskimos.

Ancient Geography of Europe.—The remains of man and the animals described in the preceding paragraphs have been introduced into the caves either by man or the wild beasts, or by streams of water, which may or may not now occupy their ancient courses; and the fact that the same species are to be met with in the caves of France, Switzerland and Britain implies that our island formed part of the continent, and that there were no physical barriers to prevent their migration from the Alps as far to the north-west as Ireland.

The same conclusion may be gathered from the exploration of caves in the south of Europe, which has resulted in the discovery of African species, in Gibraltar, Sicily and Malta. In the first of these the spotted hyena, the serval and Kaffre cat lie side by side with the horse, grizzly bear and slender rhinoceros (*R. leptorhinus*)—see Falconer's *Palaeontographical Memoirs*. To these African animals inhabiting the Iberian peninsula in the Pleistocene age, Lartet has added the African elephant and striped hyena, found in a stratum of gravel near Madrid, along with flint implements. The hippopotamus, spotted hyena and African elephant occur in the caves of Sicily, and imply that in ancient times there was a continuity of land between that spot and Africa, just as the presence of the *Elephas antiquus* proves the non-existence of the Straits of Messina during a portion, to say the least, of the Pleistocene age. A small species of hippopotamus (*H. Pentlandi*) occurs in incredible abundance in the Sicilian caves. It has also been found in those of Malta along with an extinct pigmy elephant species (*E. Melitensis*). It has also been discovered in Candia and in the Peloponnese. For these animals to have found their way to these regions, a continuity of land is necessary. The view advanced by Dr Falconer and Admiral Spratt, that Europe was formerly connected with Africa by a bridge of land extending southwards from Sicily, is fully borne out by these considerations. The present physical geography of the Mediterranean has been produced by a depression of land to the amount of about 400 fathoms, by which the Sicilo-African and Ibero-African barriers have been submerged, and Crete and Malta separated from the South-European continent. It is extremely probable that this submergence took place at the same time that the adjoining sea-bottom was elevated to about the same amount so as to constitute that region now known as the Sahara.

Pleistocene Caves of the Americas and Australia.—The Pleistocene caverns of the Euro-Asiatic continent contain the progenitors of the animals now alive in some parts of the Old World, the extinct forms being closely allied to those now living in the same geographical provinces. Those of Brazil and of Pennsylvania present us with animals whose nearest analogues are to be found in North and South America, such as sloths, armadillos and agoutis. Those, again, of Australia present us with marsupials (*metatheria*) only, allied to, or identical with, those of that most ancient continent. The extinct forms in each case are mainly those of the larger animals, which, from their large size, and low fecundity, would be specially liable to be beaten in the battle for life by their smaller and more fertile contemporaries, and less likely to survive those changes in their environment which have undoubtedly taken place in the long lapse of ages. It is, therefore, certain that the mammalian life in the Old, New and Australian worlds, was as well marked out into geographical provinces in the Pleistocene age as at the present time, and that it has been continuous in these areas from that remote time to the present day.

Prehistoric Caves of Neolithic Age in Europe.—The prehistoric caves are distinguished from Pleistocene by their containing the remains of domestic animals, and by the wild animals to which they have afforded shelter belonging to living species. They are divisible into three groups according to the traces of man which occur in them—into the Neolithic, Bronze and Iron Ages.

The Neolithic caves are widely spread throughout Europe, and have been used as the habitations and tombs of the early races who invaded Europe from the East with their flocks and herds. The first of these systematically explored was at Perthi Chwareu, near the village of Llandegla, Denbighshire, in 1869. In the following years five others were discovered close by, as well as a second group in the neighbourhood of Cefn on the banks of the Elwy. They contained polished celts, flint flakes, rude pottery and human skeletons, along with the broken bones of the pig, dog, horse, Celtic shorthorn and goat. The remains of the wild animals belong to the wolf, fox, badger, bear, wild boar, stag, roe, hare and rabbit. Most of the bones were broken or cut, and the whole group was obviously an accumulation which resulted from these caves having been used as dwellings. They had subsequently been used for burial. The human skeletons in them were of all ages, from infancy to old age; and the interments had been successive until each became filled. The bodies were buried in the contracted posture which is so characteristic of Neolithic interments generally. The men to whom these skeletons belonged were a short race, the tallest being about 5 ft. 6 in., and the shortest 4 ft. 10 in.; their skulls are orthognathic, or not presenting jaws advancing beyond a vertical line dropped from the forehead, in shape long or oval, and of fair average capacity. The face was oval, and the cheek bones were not prominent. Some of the individuals were characterized by a peculiar flattening of the shinbone (platycnemism), which probably stood in relation to the free action of the foot that was not hampered by the use of a rigid sole or sandal. This, however, cannot be looked upon as a race character, or as a tendency towards a simian type of leg. These Neolithic cave-dwellers have been proved to be identical in physique with the builders of the cairns and tumuli which lie scattered over the face of Great Britain and Ireland. (See Thurnam, *Crania Britannica*.) They have also been met with abundantly in France. In the Caverne de l'Homme Mort, for example, in the department of Lozère, explored in 1871, the association of remains was of precisely the same nature as those mentioned above, and the human skeletons were of the same small type. The same class of remains has also been discovered in Gibraltar, in the caves of Windmill Hill, and some others. The human remains examined by Busk are of precisely the same type as those of Denbighshire. In the work of Don Manuel Gongora J. Martinez (*Antiguedades prehistoricas de Andalusia*, 1868), several interments are described in the cave of Murcielagos, which penetrates the limestone out of which the grand scenery of the southern Sierra Nevada has been to a great extent carved. In one place a group of three skeletons was met with, one of which was adorned with a plain coronet of gold, and clad in a tunic made of esparto grass finely plaited, so as to form a pattern like that on some of the gold ornaments in Etruscan tombs. In a second spot farther within, twelve skeletons formed a semicircle round one covered with a tunic of skin, and wearing a necklace of esparto grass, ear-rings of black stone, and ornaments of shell and wild boar tusk. There were other articles of plaited esparto grass, such as baskets and sandals. There were also flint flakes, polished-stone axes, implements of bone and wood, together with pottery of the same type as that from Gibraltar. The same class of remains have been discovered in the Woman's Cave, near Alhama de Granada. From the physical identity of the human remains in all these cases it may be inferred that in the Neolithic Age a long-headed,

small race inhabited the Iberian peninsula, extending through France, as far north as Britain, and to the north-west as far as Ireland—a race considered by Professor Busk "to be at the present day represented by at any rate a part of the population now inhabiting the Basque provinces." This identification of the ancient Neolithic cave-dwellers with the modern Basque-speaking inhabitant of the western Pyrenees is corroborated by the elaborate researches of Broca, Virchow and Thurnam on modern Basque skulls. It may, therefore, be concluded that in the Neolithic Age an Iberian population occupied the whole of the area mentioned above, inhabiting caves and burying their dead in caves and chambered tombs, and possessed of the same habits of life. The remains of the same small, oval-featured, long-headed race have been found in Belgium in the cave of Chauvaux, and they have been described by Sergi in southern Europe under the name of the Mediterranean race.

There is no evidence that any other race except the Iberic buried their dead in the caves of Britain in the Neolithic Age. In Belgium, however, the exploration of the cave of Sclaigneaux by Soreil proves that broad-headed men of the type defined by Huxley and Thurnam as brachycephalic, and characterized by high cheek-bones, projecting muscles and large stature, the average height being 5 ft. 8·4 in. (Thurnam), inhabited and buried their dead in the caves of that region. In France they occur in the sepulchral cave of Orrouy (Oise) in association with those of the Iberic type. They have also been met with in Gibraltar. This type is undistinguishable from the Celtic (Goidelic) or Gaulish, found so abundantly in the chambered tombs of the Neolithic Age in France. Both these ancient races are represented at the present day by the Basques and Aquitanians of France and Spain, and by the Celts or Gauls of France, Britain and the Mediterranean border of Spain, their relative antiquity being proved by an appeal to their history and geographical distribution. For just as the earliest records show that the Iberic power extended as far north as the Loire, and as far east as the Rhone, so we have proof of the gradual retrocession of the Iberic frontier southwards, under the attacks of the successive Celtic hordes, until ultimately we find the latter in possession of a considerable part of southern Spain, forming by their union with the conquered the powerful nation of Celt-Iberi. The Iberians were in possession of the continent before they were dispossessed by the Goidels, and at a later time by the Brythons. They are recognized by Tacitus in Britain in the Silures of Wales; and they are still to be seen in the small, dark, lithe inhabitants of North Wales. The discovery of the characteristic skulls of both these races in the same family vault in the cave of Gop near Prestatyn, Flintshire, proves that the two races were mingled together in Britain as far back as the Bronze Age.

From the present distribution of this non-Aryan race it is obvious that they were gradually pushed back westward by the advance of tribes coming from the East, and following those routes which were subsequently taken by the Low and High Germans.

The exploration of the Grotta dei Colombi, in the island of Palmaria, overlooking the Gulf of Spezzia, in 1873, proves that the stories scattered through the classical writers, that the caves on the Mediterranean shores were inhabited by cannibals, are not altogether without foundation. In it broken and cut bones of children and young adults were found along with those of the goat, hog, fox, wolf, wild-cat, flint flakes, bone implements and shells perforated for suspension.

Prehistoric Caves of Bronze and Iron Ages.—The extreme rarity of articles of bronze in the European caves implies that they were rarely used by the Bronze folk for habitation or burial. Bronze weapons mingled with gold ornaments have, however, been discovered in the Heatheryburn cave near Stanhope, Durham, as well as in those of Kirkhead in Cartmell, in Thor's cave in Staffordshire, and the Cat Hole in Gower in Glamorganshire. In the Iberian peninsula the cave of Cesareda, explored by Signor Delgado, in the valley of the Tagus, contained bronze articles, associated with broken and cut human bones, as well as those of domestic animals, rendering it probable that cannibalism was practised in early times in that region. Busk believes, however, that the facts are insufficient to support the charge of cannibalism against the ancient Portuguese.

Caves containing articles of iron, and therefore belonging to that division of the prehistoric age, are so unimportant that they do not deserve notice in this place. As man increased in civilization he preferred to live in houses of his own building, and he no longer buried his dead in the natural sepulchres provided for him in the rock.

Prehistoric caves have been rarely explored in extra-European areas. Among those which abound in Palestine, one in Mount Lebanon, examined by Canon Tristram, contained flint implements along with charcoal and broken bones and teeth, some of which may be referred to a small ox, undistinguishable from the small short-horn, *Bos longifrons*. In North America the remains found by F. W. Putnam in the caves of Kentucky, consisting of moccasins, rudely-plaited cloth, and other articles, may be referred to the same division.

Historic Caves in Britain.—The historic caves have only attracted notice in fairly recent years, and in Britain alone, principally through the labours of the Settle Cave Committee from the year 1869 to the present day. To them is due the exploration of the Victoria cave, which had been discovered and partially investigated as early as the year 1838. It consists of three large ill-defined chambers opening on the face of the cliff, 1450 ft. above the sea, and filled with débris very nearly up to the roof. It presented three distinct eras of occupation—one by hyenas, which dragged into it rhinoceroses, bisons, mammoths, horses, reindeer and bears. This was defined from the next occupation, which is probably of the Neolithic Age, by a layer of grey clay, on the surface of which rested a bone harpoon and a few flint flakes and bones. Then after an interval of débris at the entrance was a layer of charcoal, broken bones, fragments of old hearths, and numerous instruments of savage life associated with broken pottery, Roman coins, and the rude British imitations of them, various articles of iron, and elaborate personal ornaments, which implied a considerable development of the arts. The evidence of the coins stamps the date of the occupation of the cave to be between the first half of the 5th century and the English conquest. Some of the brooches present a peculiar flamboyant and spiral pattern in relief, of the same character as the art of some of the illuminated manuscripts, as for example one of the Anglo-Saxon gospels at Stockholm, and of the gospels of St Columban in Trinity College, Dublin. It is mostly allied to that work which is termed by Franks late Celtic. From its localization in Britain and Ireland, it seems to be probable that it is of Celtic derivation; and if this view be accepted, there is nothing at all extraordinary in its being recognized in the illuminated Irish gospels. Ireland, in the 6th and 7th centuries, was the great centre of art, civilization and literature; and it is only reasonable to suppose that there would be intercourse between the Irish Christians and those of the west of Britain, during the time that the Romano-Celts, or Brit-Welsh, were being slowly pushed westwards by the heathen English invader. Proof of such an intercourse we find in the brief notice of the *Annales Cambriae*, in which Gildas, the Brit-Welsh historian, is stated to have sailed over to Ireland in the year A.D. 565. It is by no means improbable that about this time there was a Brit-Welsh migration into Ireland, as well as into Brittany. Objects with these designs found in Germany are probably directly or indirectly due to the Irish missionaries, who spread Christianity through those regions. The early Christian art in Ireland grew out of the late Celtic, and is to a great extent free from the influence of Rome, which is stamped on the Brit-Welsh art of the same age in this country.

Several other ornaments with enamel deserve especial notice. The enamel, composed of red, blue and yellow, has been inserted into the hollows in the bronze, and then heated so as to form a close union with it. They are of the same design as those which have been met with in late Roman tumuli in this country, and in places which are mainly in the north. They all belong to a class named late Celtic by Franks, and are considered by him to be of British manufacture. This view is supported by the only

reference to the art of enamelling furnished by the classical writers. Philostratus, a Greek sophist in the court of Julia Domna, the wife of the emperor Severus, writes, "It is said that the barbarians living in the ocean pour these colours (those of horse-trappings) on heated bronze, and that these adhere, grow as hard as stone, and preserve the designs that are made in them." It is worthy of remark that, since the emperor Severus built the wall which bears his name, marched in person against the Caledonians, and died at York, the account of the enamels may have reached Philostratus from the very district in which the Victoria Cave is situated.

Associated with these were bronze ornaments inlaid with silver, and miscellaneous iron articles, among which was a Roman key. Remains of this kind have been met with in the Albert and Kelko caves in the neighbourhood, in that of Dowkerbottom near Arncliffe, in that of Kirkhead on the northern shore of Morecambe Bay, in Poole's Cavern near Buxton, and in Thor's Cave near Ashbourne, and over a wide area ranging from Yorkshire and the Lake district southwards into Somerset and Devon.

List of Principal Animals and Objects found in Brit-Welsh Strata in Caves.

Animals.	Victoria.	Kelko.	Dowker-bottom.	Kirk-head.	Poole's Cavern.	Thor's Cave.
DOMESTIC—						
Canis familiaris. Dog	×	×	×	×	×	?
Sus scrofa. Pig	×	×	×	×	×	?
Equus caballus. Horse	×	×	×	×	×	?
Bos longifrons. Celtic short-horn	×	×	×	×	×	?
Capra hircus. Goat	×	×	×	×	×	?
WILD—						
Canis vulpes. Fox	×	..	×	×	×	?
Meles taxus. Badger	×	..	×	..	..	×
Cervus elaphus. Stag	×	..	×	×	×	?
Cervus capreolus. Roe	×	..	×	×	..	?
Roman coins, or imitations	×	×	×	×	×	×
Enamelled ornaments, in bronze	×	×	×	×	..	..
Bronze ornaments, inlaid with silver	×	×	×	..	×	..
Iron articles	×	×	×	..	×	×
Samian ware	×	..	×	..	×	×
Black ware	×	×	×	..	×	×
Bone spoon fibulae	×	×	×	..	..	..
Bone combs	×	×	×	..	..	×

It is obvious in all these cases that men accustomed to luxury and refinement were compelled, by the pressure of some great calamity, to flee for refuge to caves with whatever they could transport thither of their property. The number of spindle-whorls and personal ornaments imply that they were accompanied by their families. We may also infer that they were cut off from the civilization to which they had been accustomed, because in some cases they extemporized spindle-whorls out of fragments of Samian ware, instead of using those which were expressly manufactured for the purpose. Why the caves were inhabited is satisfactorily explained by an appeal to contemporary history. In the pages of Gildas, in the *Anglo-Saxon Chronicle*, and in the *Annales Cambriae*, we have a graphic picture of that long war of invasion by which the inhabitants of the old Roman province of Britannia were driven back by the Jutes, Angles and Saxons, who crossed over with their families and household stuff. Slowly, and in the chances of a war which extended through three centuries, they were gradually pushed back into Cumberland, Wales and West Somerset, Devon and Cornwall. While this war was going on the coinage became debased and Roman coins afforded the patterns for the small bronze minimi, which are to be met with equally in these caves and in the ruins of Roman cities. As the tide of war rolled to the west, the English tongue and, until towards the close of the struggle, the worship of Thor and Odin supplanted the British tongue and the Christian faith, and a rude barbarism replaced what was left of the Roman civilization in the island. It is to this period that relics of this kind in the caves must be assigned. They are traces of the anarchy of those times, and complete the picture of the desolation of Britain, revealed by the ashes of the cities and villas that were burnt by the invader. They prove that the vivid account given by Gildas of the straits to which his countrymen were reduced was literally true.

The shrines of Zeus in the Idaean and Dictaean caves have been explored by Halbher and Orsi (*Antichità dell' antro de Zeus Ideo*) and by Arthur Evans and Hogarth (*Journal of Hellenic Studies*). These discoveries prove that the cult of Zeus began among the Mycenaean peoples some 2000 years B.C. according to Evans, and was practised far down into the later Greek times. They show that the Greeks are indebted to the Mycenaean peoples not only for their art, but for the chief of their divinities.

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CAVEA, the Latin name given to the subterranean cells in which the wild beasts were confined prior to the combats in the Roman arena. The term is sometimes applied to the amphitheatre (*q.v.*) itself.

CAVEAT (Latin for "let him beware," from *cavere*), in law, a notice given by the party interested (caveator) to the proper officer of a court of justice to prevent the taking of a certain step without warning. It is entered in connexion with dealings in land registered in the land registry, with the grant of marriage licences, to prevent the issuing of a lunacy commission, to stay the probate of a will, letters of administration, &c. Caveat is also a term used in United States patent law (see PATENTS).

Caveat emptor ("let the buyer beware") is a maxim which implies that the responsibility for making a bad bargain over a purchase rests on the purchaser. In an ordinary contract for the sale of goods, there is no implied warranty or condition as to the quality or fitness for any particular purpose of the goods supplied, with certain exceptions, and, therefore, the buyer takes at his own risk. The maxim does not apply (*a*) where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, so as to show that the buyer relies on the seller's skill or judgment, and that the goods are of a description which it is in the course of the seller's business to supply; (*b*) where goods are bought by description from a seller who deals in goods of that description, for there is an implied condition that the goods are of merchantable quality, though if the buyer has actually examined the goods, there is no implied condition as regards defects which the examination ought to have revealed; (*c*) where the usage of trade annexes an implied warranty or condition to the goods as to their quality or fitness for a particular purpose. The maxim of *caveat emptor* is said to owe its origin to the fact that in early times sales of goods took place principally in market overt. (See further SALE OF GOODS.)

CAVEDONE, JACOPO (1577–1660), Italian painter, born at Sassuolo in the Modenese, was educated in the school of the Caracci, and under them painted in the churches of Bologna. His principal works are the "Adoration of the Magi," the "Four Doctors," and the "Last Supper"; and more especially the "Virgin and Child in Glory," with San Petronio and other saints, painted in 1614, and now in the Bolognese Academy. Cavedone became an assistant to Guido Reni in Rome; his art was generally of a subdued undemonstrative character, with rich Titianesque colouring. In his declining years his energies broke down after his wife had been accused of witchcraft, and after the death of a cherished son. He died in extreme poverty, in a stable at Bologna.

CAVENDISH, GEORGE (1500–1562?), English writer, the biographer of Cardinal Wolsey, was the elder son of Thomas

Cavendish, clerk of the pipe in the exchequer, and his wife, Alice Smith of Padbrook Hall. He was probably born at his father's manor of Cavendish, in Suffolk. Later the family resided in London, in the parish of St Alban's, Wood Street, where Thomas Cavendish died in 1524. Shortly after this event George married Margery Kemp, of Spains Hall, an heiress, and the niece of Sir Thomas More. About 1527 he entered the service of Cardinal Wolsey as gentleman-usher, and for the next three years he was divided from his wife, children and estates, in the closest personal attendance on the great man. Cavendish was wholly devoted to Wolsey's interests, and also he saw in this appointment an opportunity to gratify his master-passion, a craving "to see and be acquainted with strangers, in especial with men in honour and authority." He was faithful to his master in disgrace, and showed the courage of the "loyal servitor." It is plain that he enjoyed Wolsey's closest confidence to the end, for after the cardinal's death George Cavendish was called before the privy council and closely examined as to Wolsey's latest acts and words. He gave his evidence so clearly and with so much natural dignity, that he won the applause of the hostile council, and the praise of being "a just and diligent servant." He was not allowed to suffer in pocket by his fidelity to his master, but retired, as it would seem, a wealthy man to his estate of Glemsford, in West Suffolk, in 1530. He was only thirty years of age, but his appetite for being acquainted with strange acts and persons was apparently sated, for we do not hear of his engaging in any more adventures. It is not to be doubted that Cavendish had taken down notes of Wolsey's conversation and movements, for many years passed before his biography was composed. At length, in 1557, he wrote it out in its final form. It was not, however, possible to publish it in the author's lifetime, but it was widely circulated in MS. Evidently one of these MSS. fell into Shakespeare's hands, for that poet made use of it in his *King Henry VIII.*, although it is excessive to say, as Singer has done, that Shakespeare "merely put Cavendish's language into verse." The book was first printed in 1641, in a garbled text, and under the title of *The Negotiations of Thomas Wolsey*. The genuine text, from contemporary MSS., was given to the world in 1810, and more fully in 1815. Until that time it was believed that the book was the composition of George Cavendish's younger brother William, the founder of Chatsworth, who also was attached to Wolsey. Joseph Hunter proved this to be impossible, and definitely asserted the claim of George. The latter is believed to have died at Glemsford in or about 1562. The intrinsic value of Cavendish's *Life of Cardinal Wolsey* has long been perceived, for it is the sole authentic record of a multitude of events highly important in a particularly interesting section of the history of England. Its importance as a product of biographical literature was first emphasized by Bishop Creighton, who insisted over and over again on the claim of Cavendish to be recognized as the earliest of the great English biographers and an individual writer of particular charm and originality. He writes with simplicity and with a certain vivid picturesqueness, rarely yielding to the rhetorical impulses which governed the ordinary prose of his age. (E. G.)

CAVENDISH, HENRY (1731–1810), English chemist and physicist, elder son of Lord Charles Cavendish, brother of the 3rd duke of Devonshire, and Lady Anne Grey, daughter of the duke of Kent, was born at Nice in October 1731. He was sent to school at Hackney in 1742, and in 1749 entered Peterhouse, Cambridge, which he left in 1753, without taking a degree. Until he was about forty he seems to have enjoyed a very moderate allowance from his father, but in the latter part of his life he was left a fortune which made him one of the richest men of his time. He lived principally at Clapham Common, but he had also a town-house in Bloomsbury, while his library was in a house in Dean Street, Soho; and there he used to attend on appointed days to lend the books to men who were properly vouched for. So methodical was he that he never took down a volume for his own use without entering it in the loan-book. He was a regular attendant at the meetings of the Royal Society, of which he became a fellow in 1760, and he dined every Thursday with the club composed of its members. Otherwise he had little intercourse with society; indeed, his chief object in life seems to have been to avoid the attention of his fellows. With his relatives he had little intercourse, and even Lord George Cavendish, whom he made his principal heir, he saw only for a few minutes once a year. His dinner was ordered daily by a note placed on the hall-table, and his women servants were instructed to keep out of his sight on pain of dismissal. In person he was tall and rather thin; his dress was old-fashioned and singularly uniform, and was inclined to be shabby about the times when the precisely arranged visits of his tailor were due. He had a slight hesitation in his speech, and his air of timidity and reserve was almost ludicrous. He was never married. He died at Clapham on the 24th of February 1810, leaving funded property worth £700,000, and a landed estate of £8000 a year, together with canal and other property, and £50,000 at his bankers.

Cavendish's scientific work is distinguished for the wideness of its range and for its extraordinary exactness and accuracy. The papers he himself published form an incomplete record of his researches, for many of the results he obtained only became generally known years after his death; yet in spite of the absence of anything approaching self-advertisement he acquired a very high reputation within his own country and abroad, recognized by the Institute of France in 1803 when it chose him as one of its eight foreign associates. Arsenic formed the subject of his first recorded investigation, on which he was engaged at least as early as 1764, and in 1766 he began those communications to the Royal Society on the chemistry of gases, which are among his chief titles to fame. The first (*Phil. Trans.*, 1766) consists of "Three papers containing experiments on Factitious Airs," dealing mostly with "inflammable air" (hydrogen), which he was the first to recognize as a distinct substance, and "fixed air" (carbon dioxide). He determined the specific gravity of these gases with reference to common air, investigated the extent to which they are absorbed by various liquids, and noted that common air containing one part in nine by volume of fixed air is no longer able to support combustion, and that the air produced by fermentation and putrefaction has properties identical with those of fixed air obtained from marble. In the following year he published a paper on the analysis of one of the London pump-waters (from Rathbone Place, Oxford Street), which is closely connected with the memoirs just mentioned, since it shows that the calcareous matter in that water is held in solution by the "fixed air" present and can be precipitated by lime. Electrical studies seem next to have engaged his attention, and in 1771 and 1772 he read to the Royal Society his "Attempt to explain some of the principal phenomena of electricity by an elastic fluid," which was followed in 1775 by an "Attempt to imitate the effects of the Torpedo (a fish allied to the ray)" (*Phil. Trans.*, 1776). But these two memoirs contain only a part of the electrical researches he carried out between 1771 and 1781, and many more were found after his death in a number of sealed packets of papers. The contents of these for a long time remained unknown, but ultimately by permission of the duke of Devonshire, to whom they belonged, they were edited by James Clerk Maxwell and published in 1879 by the Cambridge University Press as the *Electrical Researches of the Hon. Henry Cavendish*. About 1777 or 1778 he resumed his pneumatic inquiries, though he published nothing on the subject till 1783. In that year he described a new eudiometer to the Royal Society and detailed observations he had made to determine whether or not the atmosphere is constant in composition; after testing the air on nearly 60 different days in 1781 he could find in the proportion of oxygen no difference of which he could be sure, nor could he detect any sensible variation at different places. Two papers on "Experiments with Airs," printed in the *Phil. Trans.* for 1784 and 1785, contain his great discoveries of the compound nature of water and the composition of nitric acid. Starting from an experiment, narrated by Priestley, in which John Warltire fired a mixture of common air and hydrogen by electricity, with the result that there was a diminution of volume and a deposition of moisture,

Cavendish burnt about two parts of hydrogen with five of common air, and noticed that almost all the hydrogen and about one-fifth of the common air lost their elasticity and were condensed into a dew which lined the inside of the vessel employed. This dew he judged to be pure water. In another experiment he fired, by the electric spark, a mixture of hydrogen and oxygen (dephlogisticated air), and found that the resulting water contained nitric acid, which he argued must be due to the nitrogen present as an impurity in the oxygen (" phlogisticated air with which it [the dephlogisticated air] is debased "). In the 1785 paper he proved the correctness of this supposition by showing that when electric sparks are passed through common air there is a shrinkage of volume owing to the nitrogen uniting with the oxygen to form nitric acid. Further, remarking that little was known of the phlogisticated part of our atmosphere, and thinking it might fairly be doubted " whether there are not in reality many different substances confounded together by us under the name of phlogisticated air," he made an experiment to determine whether the whole of a given portion of nitrogen (phlogisticated air) of the atmosphere could be reduced to nitric acid. He found that a small fraction, not more than $\frac{1}{120}$th part, resisted the change, and in this residue he doubtless had a sample of the inert gas argon which was only recognized as a distinct entity more than a hundred years later. His last chemical paper, published in 1788, on the " Conversion of a mixture of dephlogisticated and phlogisticated air into nitrous acid by the electric spark," describes measures he took to authenticate the truth of the experiment described in the 1785 paper, which had " since been tried by persons of distinguished ability in such pursuits without success." It may be noted here that, while Cavendish adhered to the phlogistic doctrine, he did not hold it with anything like the tenacity that characterized Priestley; thus, in his 1784 paper on " Experiments on Air," he remarks that not only the experiments he is describing, but also " most other phenomena of nature seem explicable as well, or nearly as well," upon the Lavoisierian view as upon the commonly believed principle of phlogiston, and he goes on to give an explanation in terms of the antiphlogistic hypothesis.

Early in his career Cavendish took up the study of heat, and had he promptly published his results he might have anticipated Joseph Black as the discoverer of latent heat and of specific heat. But he made no reference to his work till 1783, when he presented to the Royal Society some " Observations on Mr Hutchins's experiments for determining the degree of cold at which quicksilver freezes." This paper, with others published in 1786 and 1788, is concerned with the phenomena attending the freezing of various substances, and is noteworthy because in it he expresses doubt of the supposition that " the heat of bodies is owing to their containing more or less of a substance called the matter of heat," and inclines to Newton's opinion that it " consists in the internal motion of the particles of bodies." His " Account of the Meteorological Apparatus used at the Royal Society's House " (*Phil. Trans.*, 1776) contains remarks on the precautions necessary in making and using thermometers, a subject which is continued in the following year in a report signed by him and six others.

Cavendish's last great achievement was his famous series of experiments to determine the density of the earth (*Phil. Trans.*, 1798). The apparatus he employed was devised by the Rev. John Michell, though he had the most important parts reconstructed to his own designs; it depended on measuring the attraction exercised on a horizontal bar, suspended by a vertical wire and bearing a small lead ball at each end, by two large masses of lead. (See GRAVITATION.) The figure he gives for the specific gravity of the earth is 5·48, water being 1, but in fact the mean of the 29 results he records works out at 5·448. Other publications of his later years dealt with the height of an aurora seen in 1784 (*Phil. Trans.*, 1790), the civil year of the Hindus (*Id.* 1792), and an improved method of graduating astronomical instruments (*Id.* 1809). Cavendish also had a taste for geology, and made several tours in England for the purpose of gratifying it.

A life by George Wilson (1818–1859), printed for the Cavendish Society in 1851, contains an account of his writings, both published and unpublished, together with a critical inquiry into the claims of all the alleged discoverers of the composition of water. Some of his instruments are preserved in the Royal Institution, London, and his name is commemorated in the Cavendish Physical Laboratory at Cambridge, which was built by his kinsman the 7th duke of Devonshire.

CAVENDISH [CANDISH], **THOMAS** (1555?–1592), the third circumnavigator of the globe, was born at Trimley St Martin, Suffolk. On quitting Corpus Christi College, Cambridge (without a degree), he almost ruined himself by his extravagance as a courtier. To repair his fortune he turned to maritime and colonial enterprise, and in 1585 accompanied Sir Richard Grenville to Virginia. Soon returning to England, he undertook an elaborate imitation of Drake's great voyage. On the 21st of July 1586, he sailed from Plymouth with 123 men in three vessels, only one of which (the " Desire," of 140 tons) came home. By way of Sierra Leone, the Cape Verde Islands and C. Frio in Brazil, he coasted down to Patagonia (where he discovered " Port Desire," his only important contribution to knowledge), and passing through Magellan's Straits, fell upon the Spanish settlements and shipping on the west coast of South and Central America and of Mexico. Among his prizes were nineteen vessels of worth, and especially the treasure-galleon, the " Great St Anne," which he captured off Cape St Lucas, the southern extremity of California (November 14, 1587). After this success he struck across the Pacific for home; touched at the Ladrones, Philippines, Moluccas and Java; rounded the Cape of Good Hope; and arrived again at Plymouth (September 9–10, 1588), having circumnavigated the globe in two years and fifty days. It is said that his sailors were clothed in silk, his sails were damask, and his top-mast covered with cloth of gold. Yet by 1591 he was again in difficulties, and planned a fresh American and Pacific venture. John Davis (*q.v.*) accompanied him, but the voyage (undertaken with five vessels) was an utter failure, much of the fault lying with Cavendish himself, who falsely accused Davis, with his last breath, of deserting him (May 20, 1592). He died and was buried at sea, on the way home, in the summer of 1592.

See Hakluyt's *Principal Navigations*, (*a*) edition of 1589, p. 809 (N. H.'s narrative of the voyage of 1586–1588); (*b*) edition of 1599–1600, vol. iii. pp. 803-825 (Francis Pretty's narrative of the same); (*c*) edition of 1599–1600, vol. iii. pp. 251-253 (on the venture of 1585); (*d*) edition of 1599–1600, vol. iii. pp. 845-852 (John Lane's narrative of the last voyage, of 1591–1592); also *Stationers' Registers* (Arber), vol. ii. pp. 505-509; the Molyneux Globe of 1592, in the library of the Middle Temple, London, and the Ballads in *Biog. Brit.*, vol. i. p. 1196.

CAVENDISH, SIR WILLIAM (*c.* 1505–1557), founder of the English noble house of Cavendish, was the younger brother of George Cavendish (*q.v.*). His father, Thomas, was a descendant of Sir John Cavendish, the judge, who in 1381 was murdered by Jack Straw's insurgent peasants at Bury St Edmunds. Of William's education nothing seems known, but in 1530 he was appointed one of the commissioners for visiting monasteries; he worked directly under Thomas Cromwell, whom he calls " master " and to whom many of his extant letters are addressed. In 1541 he was auditor of the court of augmentations, in 1546 treasurer of the king's chamber, and was knighted and sworn of the privy council. Under Edward VI. and Mary he continued in favour at court; during the latter's reign he partially conformed, but on the occasion of the war with France he with other Derbyshire gentlemen refused the loan of £100 demanded by the queen. He died in 1557. Cavendish acquired large properties from the spoils of the monasteries, but in accordance with the wish of his third wife Elizabeth he sold them to purchase land in Derbyshire. This wife was the celebrated " building Bess of Hardwick," daughter of John Hardwicke, of Hardwicke, Derbyshire; she completed the original building of Chatsworth House,—begun in 1553 by her husband,—of which nothing now remains. Her fourth husband was George Talbot, 6th earl of Shrewsbury. By her Cavendish had six children; an elder son who died without issue; William, who in 1618 was created earl of Devonshire; Charles, whose son William became 1st duke of Newcastle;

Frances, who married Sir Henry Pierpont, and was the ancestress of the dukes of Kingston; Elizabeth, who married Charles Stuart, earl of Lennox, and was the mother of Arabella Stuart; and Mary, who married Gilbert Talbot, 7th earl of Shrewsbury.

CAVETTO (Ital. diminutive of *cavo*, hollow), in architecture, the term given to a hollow concave moulding sometimes employed in the place of the cymatium of a cornice, as in that of the Doric order of the theatre of Marcellus. It forms the crowning feature of the Egyptian temples, and took the place of the cymatium in many of the Etruscan temples.

CAVIARE, or CAVIAR, the roe of various species of *Acipenser* or sturgeon (*q.v.*), prepared, in several qualities, as an article of food. The word is common to most European languages and supposed to be of Turk or Tatar origin, but the Turk word *khavyah* is probably derived from the Ital. *caviale*; the word does not appear in Russian. The best caviare, which can only be made in winter and is difficult to preserve, is the loosely granulated, almost liquid, kind, known in Russia as *ikra*. It is prepared by beating the ovaries and straining through a sieve to clear the eggs of the membranes, fibres and fatty matter; it is then salted with from 4-6% of salt. The difficulty of preparation and of transport has made it a table delicacy in western Europe, where it has been known since the 16th century, as is evidenced by Hamlet's "His play . . . pleased not the million, 'twas caviare to the general." It is eaten either as an *hors d'œuvre*, particularly in Russia and northern Europe with kümmel or other liqueurs, or as a savoury, or as a flavouring to other dishes. The coarser quality, in Russia known as *pájusnaya* (from *pajus*, the adherent skin of the ovaries), is more strongly salted in brine and is pressed into a more solid form than the *ikra*; it is then packed in small barrels or hermetically-sealed tins. This forms a staple article of food in Russia and eastern Europe. Though the best forms of caviare are still made in Russia, and the greater quantity of the coarser kinds are exported from Astrakhan, the centre of the trade, larger amounts are made each year for export in America and also in Germany, Norway and Sweden. The roe of tunny and mullet, pickled in brine and vinegar, is used, under the name of "Botargo," along the Mediterranean littoral and in the Levant.

CAVITE, a fortified seaport, the capital of the province of Cavite, Luzon, Philippine Islands, and the seat of the principal Asiatic naval station of the United States, on a forked tongue of land in Manila Bay, 8 m. S. of the city of Manila. Pop. (1903) 4494; with the barrios of San Roque and Caridad (on the main peninsula), which are under the municipal government of Cavite (15,630). Cavite is the terminus of a railway which follows the shore of the bay from Manila. The northern part of the town, Sangley Point (one of the two forks of the main peninsula), is the principal coaling station of the U.S. fleet in Asiatic waters. The naval station proper and the old town of Cavite are on the south fork of the peninsula. Cavite's buildings are mostly of stone, with upper storeys of wood; its streets are narrow and crooked. It has five churches (one of these is an independent Filipino church), and is the seat of a provincial high school. Cavite has long been the principal naval base of the Philippine Islands, and one of the four Spanish penitentiaries in the Islands was here. During the 19th century Cavite was the centre of political disturbances in the Philippines; in 1896 on the parade ground thirteen political prisoners were executed, and to their memory a monument was erected in 1906 at the head of the isthmus connecting with the main peninsula. The town was nearly destroyed by an earthquake in 1880. It was taken from the Spanish by an American squadron under Commodore George Dewey in May 1898.

CAVOUR, CAMILLO BENSO, COUNT (1810–1861), Italian statesman, was born at Turin on the 1st of August 1810. The Bensos, who belonged to the old Piedmontese feudal aristocracy, were a very ancient house, said to be descended from a Saxon warrior who settled at Santena in the 12th century and married a Piedmontese heiress; Camillo's father, the marquis Michele, married a noble Genevese lady, and both he and his wife held offices in the household of Prince Borghese, the governor of Piedmont under Napoleon, and husband of the latter's sister, Pauline Bonaparte. Being a younger son (his brother Gustavo was the eldest) Cavour was destined for the army, and when ten years old he entered the military academy at Turin. On leaving the college at the age of sixteen he was first of his class, and received a commission in the engineers. He spent the next five years in the army, residing at Ventimiglia, Genoa, and various Alpine fortresses to superintend defence works; but he spent his leisure hours in study, especially of the English language. He soon developed strongly marked Liberal tendencies and an uncompromising dislike for absolutism and clericalism, which, as he had not acquired the art of reticence, made him a suspect in the eyes of the police and of the reactionaries; at the same time he does not seem to have joined any secret society, for he was too loyal to conspire against the king whose uniform he wore, and he did not believe that the time was yet ripe for a revolution. But after the accession to the throne of Charles Albert, whom he always distrusted, he felt that his position in the army was intolerable, and resigned his commission (1831). From that moment we find him in the ranks of the opponents of the government, although his was always a loyal and straightforward opposition which held aloof from conspiracies. During the next few years he devoted himself to the study of political and social problems, to foreign travel, and to acquiring a thorough knowledge of practical agriculture. Cavour's political ideas were greatly influenced by the July revolution of 1830 in France, which proved that an historic monarchy was not incompatible with Liberal principles, and he became more than ever convinced of the benefits of a constitutional monarchy as opposed both to despotism and to republicanism. But he was not affected by the doctrinaire Liberalism of the time, and his views were strengthened by his studies of the British constitution, of which he was a great admirer; he was even nicknamed "Milord Camillo." He frequently visited Paris and London, where he plunged into the political and social questions of the day, and contributed among other essays two admirable and prophetic articles, one on the Irish question, in which he strongly defended the Union, and another on the Corn Laws. He applied his knowledge of agriculture to the management of his father's estate at Leri, which he greatly improved, he founded the Piedmontese Agricultural Society, and took the lead in promoting the introduction of steam navigation, railways and factories into the country.

Thus his mind gradually evolved, and he began to dream dreams of a united Italy free of foreign influence, but owing to the reactionary policy of the Piedmontese government he was unable to take any active part in politics. In 1847, however, the psychological moment seemed to have arrived, for the new pope, Pius IX., showed marked Liberal tendencies and seemed ready to lead all the forces of Italian patriotism against the Austrian domination. The hopes of the Italian Liberals rose high and the so-called neo-Guelph party, represented by such men as Vincenzo Gioberti and Cesare Balbo, believed that an Italian confederation might be formed under the presidency of the pope. Cavour, although he realized that a really Liberal pope was an impossibility, saw the importance of the movement and the necessity of profiting by it. Together with Balbo, P. di Santa Rosa, and M. Castelli, he founded a newspaper at Turin called *Il Risorgimento*, which advocated the ideas of constitutional reform in Piedmont, with a view to preparing that country for an important rôle in the upheaval which seemed imminent. In January 1848 the revolution first broke out in Sicily. Cavour, in a speech before a delegation of journalists, declared that the king must take a decided line and grant his people a constitution. Strong pressure was brought to bear on Charles Albert, and after much hesitation he was induced to grant a charter of liberties (February 8, 1848). Cesare Balbo was called upon to form the first constitutional ministry; but Cavour was not offered a seat in it, being suspected by Liberals and Conservatives alike. He continued his journalistic activity, and his articles in the *Risorgimento* came to exercise great influence both on the king and on public opinion. When the news of the revolt of the Milanese against the Austrians, known as the Five Days, reached Turin on the 19th of March, Cavour felt that the time for Piedmont to act with energy had come, and advocated war against Austria. "After deliberately weighing

each word," he wrote, "we are bound in conscience to declare that only one path is open to the nation, the government, and the king: war, immediate war!" Piedmont was the only part of Italy enjoying a government at once national and independent, and if it did not hasten to the assistance of the Milanese in their desperate struggle, if possible before the Austrians were expelled, the monarchy could not survive. The situation was most critical, and even the British government was not friendly to Piedmont; but Cavour was prepared to face any danger rather than see his country inactive. In an article in the *Risorgimento* he declared that, while he never believed that material help was to be expected from England, he was convinced that she would not actively help Austria to crush the revolution, but that if she did "she would have against her a coalition not of princes, but of peoples." Cavour's article made such an impression that it put an end to the king's vacillations, and a few days after its appearance war was declared (March 25).

For a few months patriotic and revolutionary enthusiasm carried all before it. In Hungary, in Germany, in Paris, in Vienna itself the revolution was triumphant; constitutions were granted, dynasties tottered and fell, and provisional governments were set up. In all parts of Italy, too, revolts broke out against the established order. But the Piedmontese army, although the troops behaved with gallantry, was no match for Austria's veteran legions, and except in a few minor engagements, in one of which Cavour's nephew Gastavo was killed, it was generally unsuccessful, and an armistice was concluded in the summer. In the meanwhile the elections were being held in Piedmont. Cavour himself was not returned until the supplementary elections in June, and he took his seat in parliament on the right as a Conservative. His parliamentary career was not at first very successful; he was not a ready speaker; his habit of talking French made Italian difficult for him, and, although French was at that time allowed in the chamber, he preferred to speak Italian. But he gradually developed a strong argumentative power, his speeches became models of concise reasoning, and he rose at times to the highest level of an eloquence which was never rhetorical. After the dissolution in January 1849, Cavour was not re-elected. The new parliament had to discuss, in the first instance, the all-important question of whether the campaign should be continued now that the armistice was about to expire. The king decided on a last desperate throw, and recommenced hostilities. On the 23rd of March the Piedmontese were totally defeated at Novara, a disaster which was followed immediately by the abdication of Charles Albert in favour of his son Victor Emmanuel II.

Although the new king was obliged to conclude peace with Austria and the Italian revolution was crushed, Cavour nevertheless did not despair; he believed that so long as the constitution was maintained in Piedmont, the Italian cause was safe. There were fresh elections in July, and this time Cavour was returned. He was still in the difficult position of a moderate Liberal at a time when there seemed to be room for none but reactionaries and conspirators, but by his consummate ability he convinced men that his attitude was the right one, and he made it triumph. His speech on the 7th of March 1850, in which he said that, "Piedmont, gathering to itself all the living forces of Italy, would be soon in a position to lead our mother-country to the high destinies to which she is called," made a deep impression, for it struck the first note of encouragement after the dark days of the preceding year. He supported the ministry of which Massimo d' Azeglio was president in its work of reform and restoration, and in October of the same year, on the death of Santa Rosa, he himself was appointed minister of agriculture, industry and commerce. In 1851 he also assumed the portfolio of finance, and devoted himself to the task of reorganizing the Piedmontese finances. By far the ablest man in the cabinet, he soon came to dominate it, and, in his anxiety to dominate the chamber as well, he negotiated the union of the Right Centre with the Left Centre (a manœuvre known as the *connubio*), and promoted the election of Urbano Rattazzi to the presidency of the chamber. This, which he accomplished without d' Azeglio's knowledge, led to a split between that statesman and Cavour, and to the latter's resignation. Cavour has been blamed for not informing his colleagues of the compact, but for public reasons it was not desirable that the *connubio* should be discussed before it was consummated. D' Azeglio indeed bore no malice, and remained Cavour's friend. Cavour made use of his freedom to visit England and France again, in order to sound public opinion on the Italian question. In London he found the leaders of both parties friendly, and Lord Palmerston told him that if the constitutional experiment in Piedmont succeeded the Italian despots were doomed. At this time Sir James Hudson was appointed British minister at Turin, where he became the intimate friend of Cavour and gave him valuable assistance. In Paris, Cavour had a long interview with Prince Louis Napoleon, then president of the republic, and he already foresaw the great part which that ruler was destined to play in Italian affairs. He also met several Italian exiles in France.

On Cavour's return he found the country in the throes of a new cabinet crisis, in consequence of which, on d' Azeglio's recommendation, he was invited to form a ministry. By the 4th of November he was prime minister, a position which he held with two short interruptions until his death. He devoted the first years of his premiership to developing the economic resources of the country; but in preparing it for greater destinies, he had to meet the heavy expenditure by increased taxation, and some of his measures made him the object of hostile demonstrations, although he soon outlived his unpopularity. Cavour's first international difficulty was with Austria; after the abortive rising at Milan in February 1853, the Austrian government, in addition to other measures of repression, confiscated the estates of those Lombards who had become naturalized Piedmontese, although they had nothing to do with the outbreak. Cavour took a strong line on this question, and on Austria's refusal to withdraw the obnoxious decree, he recalled the Piedmontese minister from Vienna, thus by his very audacity winning the sympathy of the Western powers.

Then followed the Crimean War, in which Cavour first showed his extraordinary political insight and diplomatic genius. The first suggestion of Piedmontese co-operation is usually believed to have come from England, who desired the Italian contingent, not only as material assistance, but also in order to reduce the overwhelming French preponderance. From the Piedmontese point of view there were several reasons why Cavour should desire his country to participate in the campaign. Firstly, it was advisable to use every opportunity of making the Italian question an international one; secondly, by joining the alliance Piedmont would place the Western powers under an obligation; thirdly, Cavour, like Balbo, believed that the Italian question was bound up with the Eastern problem, and as Austria was demanding the permission of the powers to occupy Alessandria, as a guarantee that Piedmont would not profit by the war in the East to create trouble in Italy, Piedmontese participation would in itself prove the best guarantee; and finally, as he always looked to Italy and not merely to Piedmont, he felt that, having proved to Europe that Italians could combine order with liberty, it remained to show that they were capable of fighting as well. But there were serious difficulties in the way. Had Austria joined the allies, as at one time seemed probable, Sardinia's, position fighting by her side would have been an impossible one. On the other hand, Piedmont could not demand definite promises of future aid from the Western powers as some politicians desired, because these would never have been given, lest Austria should be offended and driven into the arms of Russia. Then, both the extreme Conservatives and the extreme Radicals were opposed to expenditure on foreign adventures for which they could see no use. In all these difficulties, however, Cavour was loyally supported by the king, who saw the advantages of Piedmontese participation, even if unattended by definite promises. General Dabormida, the minister of foreign affairs, disapproved of this policy and resigned. The vacant portfolio was offered to d' Azeglio, who refused it; whereupon Cavour assumed it himself. On the same

day (January 10, 1855) the treaty with France and England was signed, and shortly afterwards 15,000 Piedmontese troops under General La Marmora were despatched to the Crimea.

Events at first seemed to justify the fears of Cavour's opponents. Cholera attacked the Piedmontese soldiers, who for a long time had no occasion to distinguish themselves in action; public opinion became despondent and began to blame Cavour, and even he himself lost heart. Then came the news of the battle of the Tchernaya, fought and won by the Italians, which turned sadness and doubt into jubilation. Joy was felt throughout Italy, especially at Milan, where the victory was the first sign of daylight amid the gloom caused by the return of the Austrians. Everyone realized that the Piedmontese contingent was fighting Italy's battles. But to Cavour the announcement that Russia had accepted Austrian mediation (January 16, 1856) was a great disappointment. He had always hoped that if the war continued Austria would be forced to side with Russia in return for the aid given by the emperor Nicholas in suppressing the Hungarian revolt in 1849, and the Western powers would then have an opportunity of helping the Italian cause. He sent a memorandum, at Napoleon's request, to Count Walewski, the French minister of foreign affairs, setting forth a kind of minimum programme of Piedmont's claims. On the summoning of the congress of Paris at the conclusion of the war, Cavour first proposed that d' Azeglio should represent Piedmont, and on the latter's refusal decided to go himself. After much discussion, and in spite of the opposition of Austria, who as mediator occupied a predominant position, behaving " as though she had taken Sevastopol," Cavour obtained that Piedmont should be treated as one of the great powers. Although he did not expect that the congress would liberate Italy, yet by his marvellous diplomatic skill, far superior to that of his colleagues, he first succeeded in isolating Austria, secondly in indirectly compromising Napoleon in the Italian question, and thirdly in getting the wretched conditions of Italy discussed by the representatives of the great powers, who declared that some remedy to that state of things was necessary, not in the interests of Italy alone, but of all Europe. A scheme of reform proposed by Count Walewski gave Cavour the opportunity to plead the Italian cause, and from that moment it was manifest to all that the liberation of Italy was personified in him, the statesman who came to hold all the strings of European politics in his hands.

Cavour's chief measure of internal reform during this period was a bill for suppressing all monastic orders unconnected with education, preaching or charity; this aroused strong opposition from the extremists of both parties and also from the king, and led to the minister's resignation. But he was soon recalled, for the country could not do without him, and the bill was passed (May 29, 1855).

Cavour now saw that war with Austria was merely a question of time, and he began to establish connexions with the revolutionists of all parts of Italy, largely by means of La Farina; but it was necessary that this policy should not be advertised to Europe, and he strongly discountenanced Mazzini's abortive revolutionary attempts. He continued to strengthen Piedmont's military resources, and the army soon grew too large for the country and was obviously destined for more than merely defensive purposes. But he well knew that although Piedmont must be made as efficient as possible from the military point of view, it could not defeat Austria single-handed. He would have preferred an alliance with Great Britain, who would never demand territorial compensation; but although British sympathies were wholly Italian, the government was desperately anxious to avoid war. From Napoleon more was to be hoped, for the emperor still preserved some of his revolutionary instincts, while the insecurity of his situation at home made him eager to gain popularity by winning military glory abroad; but he still hesitated, and Cavour devoted the whole of his ability to overcoming his doubts. In the midst of these negotiations came Orsini's attempt on Napoleon's life (January 14, 1858), which threatened to alienate his Italian sympathies and cause serious embarrassments to Piedmont. But after some remonstrances to Piedmont for not acting with sufficient energy against the revolutionists, the incident was settled; and Napoleon was, in fact, afraid that if he did not help the Italian cause more such attempts would be made. A month after the Orsini outrage he laid before Cavour a proposal for a Franco-Piedmontese alliance and the marriage of Prince Jerome Bonaparte with Princess Clothilde, the daughter of Victor Emmanuel.

An " accidental " meeting between Napoleon and Cavour was arranged and took place at Plombières in July, and although no one knew what passed, the news of it fell like a bombshell on the diplomatic world. No definite treaty was signed, but the basis of an agreement was laid, whereby France and Piedmont were to declare war against Austria with the object of expelling her from Italy, and a north Italian state was to be formed; in exchange for this help France was to receive Savoy and possibly Nice. But the emperor still hesitated, and refused to decide on war unless Austria attacked Piedmont; the British government, too, in its anxiety to preserve peace, was not very friendly to the Italian cause. Cavour saw that the only way to overcome all these obstacles was to force Austria's hand. Then there was the danger lest an Italy freed by French arms should be overwhelmed under French predominance; for this reason Cavour was determined to secure the co-operation of volunteers from other parts of Italy, and that the war should be accompanied by a series of risings against Austria and the local despots. It was also necessary that the risings should break out in the various provinces *before* the Piedmontese and French troops arrived, so that the latter should not appear as invaders and conquerors, but merely as liberators.

The moment war was seen to be imminent, parties of Italians of all classes, especially Lombards, poured into Piedmont to enlist in the army. Cavour also had a secret interview with Garibaldi, with whom he arranged to organize volunteer corps so that the army should be not merely that of Piedmont, but of all Italy. Every day the situation grew more critical, and on the 10th of January 1859 the king in his speech from the throne pronounced the memorable words " that he could not remain deaf to the cry of pain (*il grido di dolore*) that reached him from all parts of Italy "—words which, although actually suggested by Napoleon, rang like a trumpet-call throughout the land. In the meanwhile the marriage negotiations were concluded, and during the emperor's visit to Turin a military convention was signed between the two states, and Savoy and Nice were promised to France as a reward for the expulsion of the Austrians from Italy. But the British government was still unfavourable, and Napoleon, ever hesitating, again sought an excuse for backing out of his engagements; he jumped at the Russian proposal to settle the Italian question by means of his own favourite expedient, a congress. To this Austria agreed on condition that Piedmont should disarm and should be excluded from the congress; England supported the scheme, but desired that all the Italian states should be represented. Cavour was in despair at the turn events were taking, and appealed to Napoleon, actually threatening to emigrate to America and publish all his correspondence with the emperor if the latter did not keep his engagements. He decided at last most reluctantly to accept the English proposal, lest Piedmont should be abandoned by all, but clung to the hope that Austria would reject it. On the 19th of April the Austrian emperor, on the advice of the military party, did reject it; and on the 23rd, to Cavour's inexpressible joy, Austria sent an ultimatum demanding the disarmament of Piedmont. Cavour replied that his government had agreed to the congress proposed by the powers and that it had nothing more to say. On quitting the chamber that day he said to a friend: " I am leaving the last sitting of the last Piedmontese parliament "—the next would represent united Italy. France now allied herself definitely with Piedmont, and England, delighted at Cavour's acquiescence to her own proposal and enraged by Austria's ultimatum, became wholly friendly to the Italian cause. A few days later Austria declared war.

As La Marmora now took the chief command of the army, Cavour added the ministry of war to the others he already held. His activity at this time was astounding, for he was virtually dictator and controlled single-handed nearly all the chief offices of the state. The French troops entered Piedmont, where they were received with enthusiasm, and the allies marched into Lombardy; the victory of Magenta, which opened the gates of Milan to them, was shortly followed by that of Solferino. The people rose in arms at Parma, Modena, Florence and Bologna, which had been occupied by Austria for the pope since 1849; the local princes were expelled and provisional governments set up. Cavour sent special commissioners to take charge of the various provinces in Victor Emmanuel's name. But these events, together with Prussia's menacing attitude, began to alarm Napoleon, who, although he wished to destroy Austrian influence in Italy, was afraid of a large and powerful Italian state. Consequently, after Solferino, he concluded an armistice with Austria at Villafranca on the 8th of July, without previously informing Cavour. When Cavour heard of it he was thunderstruck; he immediately interviewed the king at Monzambano, and in violent, almost disrespectful language implored him not to make peace until Venice was free. But Victor Emmanuel saw that nothing was to be gained by a refusal, and much against his own inclination, signed the peace preliminaries at Villafranca, adding the phrase, "pour ce qui me concerne," which meant that he was not responsible for what the people of other parts of Italy might do (July 12). Lombardy was to be ceded to Piedmont, Venetia to remain Austrian, the deposed princes to be reinstated, and the pope made president of an Italian confederation.

The cabinet resigned the next day, but remained in office provisionally, and Cavour privately advised the revolutionists of central Italy to resist the return of the princes, by force if necessary: "for we must now become conspirators ourselves," he said. His policy was thus continued after he left office, and Palmerston, who had meanwhile succeeded Malmesbury as prime minister, informed France and Austria that Great Britain would never tolerate their armed intervention in favour of the central Italian despots. The new Piedmontese ministry, of which La Marmora was the president, but Rattazzi the leading spirit, hesitated between annexing central Italy and agreeing to the terms of peace, but on the 10th of November peace was signed at Zürich. Napoleon proposed a new congress, which never met, and on the fall of the Rattazzi-La Marmora cabinet the king, in spite of the quarrel at Monzambano, asked Cavour to take office again. By January he was once more premier, as well as minister for foreign affairs and of the interior. His first act was to invite the people of Italy to declare their own wishes with regard to annexation to Piedmont; but Napoleon still refused to consent to the union of Tuscany with Piedmont, for he contemplated placing one of his own relatives on the throne of the grand-duchy. Cavour now saw that Napoleon might be ready to deal, and, although the bargain of the preceding year had not been exactly fulfilled, as the Austrians were still in Venice, he again brought forward the question of Nice and Savoy. To Cavour no less than to the king the loss of these two provinces was a cruel wrench, but it was a choice between them and central Italy. The plebiscites in the latter region had unanimously declared in favour of union with Piedmont, and Napoleon became more pressing, going so far as to threaten that unless the cession were made, the French troops would leave Lombardy at the mercy of Austria and occupy Bologna and Florence. On the 24th of March the treaty was signed and the emperor's opposition to the annexation of central Italy withdrawn. On the 2nd of April the parliament representing Piedmont, the duchies of Parma and Modena, Tuscany and Romagna, met, and Cavour had the difficult and ungrateful task of explaining the cession of Nice and Savoy. In spite of some opposition, the agreement was ratified by a large majority.

The situation in the kingdom of Naples was now becoming critical, but there seemed as yet little chance of union with upper Italy, for the Bourbon government was a more or less regular one, and, although risings had broken out, there was no general revolution. Cavour therefore had to follow a somewhat double-faced policy, on the one hand negotiating with the Bourbon king (Francis II.), suggesting a division of Italy between him and Victor Emmanuel, and on the other secretly backing up the revolutionary agitation. Having now learnt that Garibaldi was planning an expedition to Sicily with his volunteers, he decided, after some hesitation, not to oppose its departure; on the 5th of May it sailed from Quarto near Genoa, and Cavour was only deterred from declaring war on Naples by the fear of foreign complications. Garibaldi with his immortal Thousand landed at Marsala, and the whole rotten fabric of the Bourbon government collapsed. At Palermo they were welcomed by the Piedmontese admiral Persano, and soon the whole island was occupied and Garibaldi proclaimed dictator. The general now proposed to cross over to the mainland, and this placed Cavour in a serious dilemma; Russia and Austria protested against the expedition, France and Prussia were unfriendly, Great Britain alone remained warmly pro-Italian. He still hoped for a revolution in Naples, so that King Victor's authority might be established before Garibaldi's arrival, but this proved impossible. When Garibaldi crossed the straits of Messina the Neapolitan government fell, and he entered Naples in triumph. But there was still danger that he might be subsequently defeated, for the Neapolitan army was still a force in being, and Cavour feared, moreover, that, although Garibaldi himself had always loyally acted in the king of Italy's name, the red republicans around him might lead him to commit some imprudence and plunge the country into anarchy. The cession of Nice, Garibaldi's birthplace, had made an impassable gulf between the two men, and neither quite trusted the other. Cavour also feared that Garibaldi might invade the papal states, which would have led to further international complications. In any case, Rome must not be touched for the present, since Napoleon was pledged to protect the pope; but as the latter had made large armaments, and his forces, consisting largely of brigands and foreigners under the French general Lamoricière, were in a menacing attitude on the frontier, Cavour decided on the momentous step of annexing the papal states with the exception of the Roman province. The Italian army crossed the frontier from Romagna on the 11th of September, whereupon every power, except Great Britain and Sweden, withdrew its minister from Turin. But the troops advanced and were everywhere received with open arms by the people; Ancona was taken, Lamoricière was defeated and captured at the battle of Castelfidardo, and on the 20th King Victor marched into the Neapolitan kingdom. On the 1st of October Garibaldi defeated the Neapolitan troops on the Volturno, and Gaeta alone, where King Francis of Naples had retired, still held out.

New difficulties with Garibaldi arose, for he would not resign his dictatorship of the southern provinces, and wished to march on Rome. Cavour had to use all his tact to restrain him and at the same time not to appear ungrateful. He refused to act despotically, but he summoned parliament to vote on the annexation, which it did on the 11th. Two days later Garibaldi magnanimously gave in to the nation's will and handed his conquests over to King Victor as a free gift. Gaeta was invested, and after a siege prolonged through the action of Napoleon, who for some reason unknown kept his fleet before the town, preventing any attack by sea until England induced him to withdraw it, the garrison surrendered on the 13th of February, and King Francis retired to Rome. Parliament was dissolved once more; the new chamber showed an overwhelming majority in favour of Cavour, and Victor Emmanuel was proclaimed king of Italy.

The last question with which Cavour had to deal was that of Rome. For some years past the pope had only been able to maintain his authority by the help of foreign troops, and Cavour saw that as long as this state of things lasted there could be no united Italy. In October he declared in parliament that Rome must be the capital of Italy, for no other city was recognized as such by the whole country, and in January 1861 a resolution to that effect was passed. But owing to Napoleon's attitude he had to proceed warily, and made no attempt for the present to

carry out the nation's wishes. At the same time he was anxious that the church should preserve the fullest liberty, and he believed in the principle of "a free church in a free state." His great dream, save for Rome and Venice, was now realized, and Italy was free and united. But the wear and tear of these last years had been almost unbearable, and at last began to tell; the negotiations with Garibaldi were particularly trying, for while the great statesman wished to treat the hero and his volunteers generously, far more so than seemed wise to the Conservatives and the strictly military party, he did not wish the Italian cause to be endangered by their imprudences, and could not permit all the Garibaldian officers to be received into the regular army with the same grades they held in the volunteer forces. This question, together with that of Nice, led to a painful scene in the chamber between the two men, although they were formally reconciled a few days later. For some time past Cavour had been unwell and irritable, and the scene with Garibaldi undoubtedly hastened his end. A fever set in, and after a short illness he passed away on the 6th of June 1861. He was buried at his ancestral castle of Santena.

The death of Cavour was a terrible loss to Italy; there remained many problems to be solved in which his genius and personality were urgently needed. But the great work had been carried to such a point that lesser men might now complete the structure. He is undoubtedly the greatest figure of the *Risorgimento*, and although other men and other forces co-operated in the movement, it was Cavour who organized it and skilfully conducted the negotiations which overcame all, apparently insuperable, obstacles. "That which in Alfieri and Gioberti was lacking," wrote T. Artom, his private secretary, "a deep and lively sense of reality, Cavour possessed to a supreme degree. He was not a *littéraleur*; he was never a political dreamer. His views broadened progressively; at each stage he discovered a new horizon, and he followed his path without ever seeking anything save what was real and possible." He was gifted with pronounced political genius and with an astounding power of foresight. In his ideas he was always a moderate Liberal, and although he disapproved of republicanism, he was an ardent constitutionalist, ever refusing to resort to arbitrary methods, for he felt that, the Italian character being what it is, Italian unity could not last if unsupported by popular feeling. In meeting opposition he could not, like Bismarck, rely on a great military power, for the Piedmontese army was a small one; Austria must first be isolated and then an alliance had to be obtained with some other power. Some of his acts, especially his policy towards the Neapolitan kingdom, have been criticized as politically immoral; but apart from the fact that few revolutions—and Cavour, after all, was a revolutionist—can be conducted without attacking vested rights, it is hard to see that any policy which led to the destruction of a government, rightly described as the "negation of God on earth," could be deemed immoral. He has been accused of changing his views, but what statesman has not? Moreover, in the extremely complicated and difficult diplomatic situations which he had to face, what was impossible or dangerous one day became possible and desirable the next. This was particularly the case with the Neapolitan question. Cavour's one absorbing passion was the liberation and regeneration of Italy, and to this he devoted his whole life and talent.

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(L. V.*)

CAVOUR (anc. *Caburrum* or *Forum Vibii*), a town of Piedmont, Italy, in the province of Turin, 32 m. S.W. by rail and steam tram (via Pinerolo from the town of Turin). Pop. (1901) town, 2091; commune, 6843. It lies on the north side of a huge isolated mass of granite (the Rocca di Cavour) which rises from the plain. On the summit was the Roman village, which belonged to the province of the Alpes Cottiae. There are some ruins of medieval fortifications. The town gave its name to the Benso family of Chieri, who were raised to the marquisate in 1771, and of which the statesman Cavour was a member.

For the ancient name see Th. Mommsen in *Corp. Inscrip. Lat.* v. (Berlin, 1877), p. 825.

CAVY, a name commonly applied to several South American rodent animals included in the family *Caviidae* (see RODENTIA), but perhaps properly applicable only to those belonging to the typical genus *Cavia*, of which the most familiar representative is the domesticated guinea-pig. Cavies in general, the more typical representatives of the *Caviidae*, are rodents with hoof-like nails, four front and three hind toes, imperfect collar-bones, and the cheek-teeth divided by folds of enamel into transverse plates. The tail is short or rudimentary, the incisors are short, and the outer surface of the lower jaw is marked by a distinct ridge.

True cavies, or couies (*Cavia*), are best known by the guinea-pig, a domesticated and parti-coloured race derived from one of the wild species, all of which are uniformly coloured. They are comparatively small and stoutly built animals, with short, rounded ears and no tail. In habits they are partly diurnal; and live either in burrows among the crevices of rocks, beneath the leaves of aquatic plants in marshy districts, or underneath the floors of outbuildings. Their cries are faint squeaks and grunts. They feed upon nearly all vegetable substances, but drink little. Generally they associate in small societies, and seldom wander far from home. Although the guinea-pig is a fertile breeder, the wild species only produce one or two young at a birth, and this but once in a year. The young come into the world in a highly developed condition, being able to feed themselves the day following their birth. Cavies are widely distributed in South America, and are represented by several species. Among them may be mentioned the aperea or restless cavy (*C. porcellus* or *C. aperea*) of Brazil; the Bolivian *C. boliviensis*, found at great elevations in the Andes; the Brazilian rock-cavy (*C. rupestris*), characterized by its short blunt claws; and the Peruvian *C. cutleri*. The latter was tamed by the Incas, and is the ancestor of the guinea-pig. As to the origin of that name, some writers consider it a corruption of Guiana-pig, but it is more probable that the word "Guinea" merely signifies foreign. The guinea-pig is a singularly inoffensive and defenceless creature, of a restless disposition, and wanting in that intelligence which usually characterizes domestic pets, although said to show some discrimination. It is of no particular service to man, neither its flesh nor its fur being generally put to use, while the statement that its presence is sufficient to drive off rats and mice appears to be without foundation. It is exceedingly prolific, beginning to breed at the age of two months; the number of young varying, according to the age of the parent, from four to twelve. It has been calculated that a single pair of guinea-pigs may prove the parent stock of a thousand individuals in a single year.

A very different animal is the Patagonian cavy, or mara (*Dolicholis patachonica*), the typical representative of a genus characterized by long limbs, comparatively large ears, and a short tail. The animal is about the size of a hare, to which it approximates in form and habits. It is most abundant in the open districts of Patagonia, but also ranges on to the Argentina Pampas, where it is now scarce. Although occasionally seen in large flocks, the mara is more commonly found in small parties or in pairs, the parties commonly moving in single file. It has a peculiar kind of hopping gait; and is mainly diurnal, in accordance with which habit its eyes are protected by lashes. It lives in a burrow, generally excavated by itself; but when pursued, seeks safety in flight, rather than by a retreat to its hole. From two to five young are produced twice a year. A

much smaller species, *D. salinicola*, without the characteristic black band above the tail, inhabits the salt-plains of Argentina. Maras have been introduced into several British parks. Fossil species of *Dolichotis* occur in the caverns of Brazil, and also in the superficial deposits of Argentina. (R. L.*)

CAWDOR, a village and parish of Nairnshire, Scotland. Pop. of parish (1901) 925. The village is situated 5 m. S.S.W. of Nairn and 3 m. from Gollanfield Junction on the Highland railway. The castle was the scene, according to the tradition which Shakespeare has perpetuated, of the murder of King Duncan by Macbeth, thane of Cawdor (or Calder), in 1040. Since the oldest part of the structure dates from 1454, however, and seemingly had no predecessor, the tradition has no foundation in fact. The building stands on the rocky bank of Cawdor Burn, a right-hand tributary of the Nairn. The massive keep with small turrets is the original portion of the castle, and to it were added, in the 17th century, the modern buildings forming two sides of a square.

Kilravock (pronounced *Kilrawk*) Castle, 1½ m. W. of Cawdor, occupies a commanding site on the left bank of the Nairn. Its keep dates from 1460, and the later buildings belong to the 17th century. It has been continuously tenanted by the Roses, one of the most remarkable families in Scotland. They came over with William the Conqueror and settled at Kilravock in 1293, since which date son has succeeded father without the interposition of a collateral heir, an instance of direct descent unique in Scottish history. Moreover, nearly every Rose has borne the Christian name of Hugh, and only one attained to a higher social rank than that of laird. Queen Mary was received at the castle in 1562, and Prince Charles Edward was entertained four days before the battle of Culloden. The gardens are remarkable for their beauty.

CAWNPORE, or KANPUR, a city and district of British India in the Allahabad division of the United Provinces. The city is situated on the south bank of the Ganges, 40 m. south-west of Lucknow, and formed from early times a frontier outpost of the people of Oudh and Bengal against their northern neighbours. Clive selected it, on account of its commanding position, as the cantonment for the brigade of troops lent him by the nawab of Oudh. In 1801, when the Ceded Provinces were acquired by the East India Company, it became the chief British frontier station. But by the time of the Mutiny the frontier had left it behind, and it was denuded of troops. Now it is chiefly known as the junction of four railways, the East Indian, Oudh & Rohilkand, Rajputana and Indian Midland, and as a great emporium for harness, shoes and other leather-work. In 1901 the population was 197,170, showing an increase of 4 % in the decade. In 1903 the city was devastated by an epidemic of plague.

The name of Cawnpore is indelibly connected with the blackest episode in the history of the Indian Mutiny—the massacre here in July 1857 of hundreds of women and children by the Nana Sahib. The full details of the siege and massacre will be found under INDIAN MUTINY, and here it will suffice to refer to the local memorials of that evil time. The entrenchment, where General Sir H. M. Wheeler with his small band of soldiers and the European and Eurasian residents were exposed for 21 days to the fire of the mutineers, is merely a bare field, containing the well where many women and children were shot while getting water. This well is now surrounded by an enclosure with an inscription upon its cross. About three-quarters of a mile away, on the banks of the river Ganges, is the Massacre Ghat. A grassy road between banks 10 to 12 ft. high leads down to the river, and it was among the trees on these banks that the murderers concealed themselves who shot down the little garrison as soon as they were embarked in the boats which were to take them to safety. On the river bank is a temple to Siva, of hexagonal shape, old and going to ruin. Steps lead from this temple to an enclosed flight of stairs, which in the cold season descend to the water, but in the rains are covered almost to the top. This is the ghat where some 600 helpless people were slain, in spite of a promise of safe-conduct from the Nana. The remaining 200 victims, who had escaped the bullets of the siege and survived the butchery of the river bank, were massacred afterwards and cast down the famous well of Cawnpore, which is now marked by a memorial and surrounded by gardens. The memorial is crowned by the figure of an angel in white marble, and on the wall of the well itself is the following inscription:—

> Sacred to the perpetual Memory of a great company of Christian people, chiefly Women and Children, who near this spot were cruelly murdered by the followers of the rebel Nana Dhundu Pant, of Bithur, and cast, the dying with the dead, into the well below, on the xvth day of July, MDCCCLVII.

The DISTRICT OF CAWNPORE is situated between the Ganges and Jumna rivers, and is a portion of the well-watered and fertile tract known as the Doab, the total area being 2384 sq. m. The general inclination of the country is from north to south. Besides the two great rivers, the principal streams are the Arand or Rhind, the Kavan or Singar, the Isan and the Pandu. The district is watered by four branches of the Ganges canal, and traversed by two lines of railway. It used to be a great centre of the indigo industry, which has now declined. The population in 1901 was 1,258,868, showing an increase of 4 % during the decade.

CAXTON, WILLIAM (*c.* 1422–1491), the first English printer, was born somewhere in the Weald of Kent, perhaps at Tenterden. The name, which was apparently pronounced Cauxton, is identical with Causton, the name of a manor in the parish of Hadlow, and was a fairly common surname in the 15th century. The date of Caxton's birth was arbitrarily fixed in 1748 by Oldys as 1412. Blades, however, inferred that in 1438, when he was apprenticed to Robert Large, he would not have been more than sixteen years of age. This would place his birth in 1422–1423. Robert Large was a rich silk mercer who became sheriff in 1430 and lord mayor of London in 1439, and the fact of Caxton's apprenticeship to him argues that Caxton's own parents were in a good position. Large died in 1441, leaving a small bequest to Caxton, and his executors would be bound to place the young man where he could finish his term. He was probably sent direct to Bruges, then the central foreign market of the Anglo-Flemish trade, for he presently entered business there on his own account. In 1450 his name appears in the Bruges records as standing joint surety for the sum of £100; and in 1463 he was acting governor of the company of Merchant Adventurers in the Low Countries. This association, sometimes known as the "English Nation," was dominated by the Mercers' Company, to the livery of which Caxton had been formally admitted in London in 1453. The first governor, appointed in terms of a charter granted by Edward IV. in 1462, was W. Obray, but Caxton's position is definitely asserted in 1464. In that year he was appointed, together with Sir Richard Whitehill, to negotiate with Philip, duke of Burgundy, the renewal of a treaty concerning the wool trade, which was about to expire. These attempts failed, but he was again employed, with two other members of the Mercers' Company, in a similar but successful mission in October 1468 to the new duke, Charles the Bold, who earlier in the year had married Princess Margaret of York, sister of Edward IV. The last mention of Caxton in the capacity of governor of the "English Nation" is on the 13th of August 1469, and it was probably about that time that he entered the household of the duchess Margaret, possibly in the position of commercial adviser. In his diplomatic mission in 1468 he had been associated with Lord Scales, afterwards Earl Rivers and one of his chief patrons, and at the Burgundian court he must have come in touch with Edward IV. during his brief exile in 1470.

He had begun his translation of the popular medieval romance of Troy, *The Recuyell of the Historyes of Troye*, from the French of Raoul le Fèvre, early in 1469; and, after laying it aside for some time, he resumed it at the wish of the duchess Margaret, to whom the MS. was presented in September 1471. During his thirty-three years' residence in Bruges Caxton would have access to the rich libraries of the duke of Burgundy and other nobles, and about this time he learned the art of printing. His disciple, Wynkyn de Worde, says that he was taught at Cologne, probably during a visit there in 1471, recorded in the preface to

the *Recuyell*; Blades suggests that he learnt from Colard Mansion, but there is no evidence that Mansion set up his press at Bruges before 1474. He ceased to be a member of the gild of St John (a gild of illuminators) in 1473, and the first dated book he is known to have printed is dated 1476. Mansion and Caxton were partners or associates at Bruges, where Caxton printed his *Recuyell* in 1474 or 1475. His second book, *The Game and Playe of Chesse*, from the *Liber de ludo scacchorum* of Jacobus de Cessolis through the French of Jehan de Vignay, was finished in 1474, and printed soon after; the last book printed by Mansion and Caxton at Bruges was the *Quatre derrenieres choses*, an anonymous treatise usually known as *De quattuor novissimis*. Other books in the same type were printed by Mansion at Bruges after Caxton's departure.

By September 1476 Caxton had established himself in the almonry at Westminster at the sign of the Red Pale. Robert Copland the printer, who was afterwards one of Caxton's assistants, states that Caxton began by printing small pamphlets. The first dated book printed in England was Lord Rivers's translation (revised by Caxton) of *The Dictes or sayengis of the philosophres* (1477). From this time until his death in 1491 Caxton was busy writing and printing. His services to English literature, apart from his work as a printer (see TYPOGRAPHY), are very considerable. His most important original work is an eighth book added to the *Polychronicon* (vol. viii. in the Rolls Series edition) of Ralph Higden. Caxton revised and printed John of Trevisa's work, and brought down the narrative himself from 1358 to 1460, using as his authorities *Fasciculus temporum*, a popular work in the 15th century, and an unknown *Aureus de universo*. In the year before his death he complained in the preface to his *Eneydos* of the changing state of the English language, a condition of things which he did as much as any man to remedy. He printed Chaucer's *Canterbury Tales* (1478? and 1483), *Troilus and Creseide* (1483?), the *House of Fame* (1483?), and the translation of Boethius (1478?); Gower's *Confessio Amantis* (1483), and many poems of Lydgate. His press was, however, not worked for purely literary ends, but was a commercial speculation. For the many service-books which he printed there was no doubt a sure sale, and he met the taste of the upper classes by the tales of chivalry which issued regularly from his press. He printed Malory's *Morte d'Arthur*, and himself translated from the French the *Boke of Histories of Jason* (1477?), *The Historye of Reynart the Foxe* (from the Dutch, 1481 and 1489?), *Godfrey of Boloyne* or *The Siege and Conqueste of Jherusalem* (1481), *The Lyf of Charles the Grete* (1485), *The Knyght Parys and the Fayr Vyenne* (1485), *Blanchardyn and Eglantine* (1489?), *The Foure Sonnes of Aymon* (1489?); also the *Morale Proverbs* (1478), and the *Fayttes of Armes and of Chyualrye* (1489) of Christine de Pisan. The most ambitious production of his press was perhaps his version of the *Golden Legend*, the translation of which he finished in November 1483. It is based on the lives of the saints as given in the 13th century *Legenda aurea* of Jacobus de Voragine, but Caxton chiefly used existing French and English versions for his compilation. The book is illustrated by seventy woodcuts, and Caxton says he was only encouraged to persevere in his laborious and expensive task by the liberality of William, earl of Arundel. The idleness which he so often deprecates in his prefaces was no vice of his, for in addition to his voluminous translations his output as a printer was over 18,000 pages, and he published ninety-six separate works or editions of works, with apparently little skilled assistance, though later printers, Wynkyn de Worde, Robert Copland and possibly Richard Pynson, were trained under him.

The different founts of type used by Caxton are illustrated by Blades and Duff, and there is an excellent selection of Caxtons in the British Museum, in the University library at Cambridge, besides those in private hands. A record price for a Caxton was reached in 1902 when Mr Bernard Quaritch paid £2225 for *The Royal Book* (1487?), a translation of the popular *Somme des vices et des vertus*. His books have no title-pages, and from 1487 onwards are usually adorned with a curious device, consisting of the letters W. C. separated by a trade mark, with an elaborate border above and below. The flourishes on the trade mark have been fancifully interpreted as S.C. for Sancta Colonia, implying that Caxton learnt his art at Cologne, and the whole mark has been read as 74, for 1474, the date of his first printed book. This device was first used in an edition of the Sarum missal, printed for Caxton by George Maynial in Paris, and was subsequently adopted with small alterations by his successor at the Westminster press, Wynkyn de Worde. The first of his books containing woodcut illustrations was his *Myrrour of the World* (1481), translated from Vincent de Beauvais, which has diagrams and pictures for the assistance of young students. He had used a woodcut initial letter in his broadside *Indulgence* printed in 1480.

No record of Caxton's marriage or of the birth of his children has been found, but Gerard Croppe was separated from his wife Elizabeth, daughter of William Caxton, before 1496, when Croppe made certain claims in connexion with his father-in-law's will.

AUTHORITIES.—Earlier biographies of Caxton were superseded by the work of William Blades, whose *Life and Typography of William Caxton* (2 vols., 1861–1863) remains the standard authority. It contains a bibliography of each of the works issued from Caxton's press. For later discoveries see George Bullen's *Catalogue* of the Caxton celebration loan collection exhibited at South Kensington in 1877; articles by E. J. L. Scott in the *Athenaeum* (Feb. 10, 1900; May 21 and June 8, 1892); articles in *Notes and Queries* (April 21, 1900; Feb. 24, 1906), and the publications of the Caxton Club, Chicago, notably *William Caxton*, by E. Gordon Duff (1905). See also *Census of Caxtons*, by Seymour de Ricci, No. xv. of the illustrated monographs of the Bibliographical Society, 1909. Many of Caxton's translations are available in modern reprints; the *Golden Legend*, the *Recuyell* and *Godeffroy of Boloyne*, were printed by William Morris at the Kelmscott Press in 1892–1893; the *Boke of Curtesye* (1868), the *Lyf of Charles the Grete* (1880), Alain Chartier's *Curial* (1888), *Foure Sonnes of Aymon* (1884), *Eneydos* (1890), *Blanchardyn and Eglantine* (1890), and others, by the Early English Text Society. For modern editions of *Reynart* see REYNARD THE FOX. No authentic portrait of Caxton is known, but a MS. at Magdalene College, Cambridge, of the last six books of the *Metamorphoses of Ovid*, translated by Caxton, is probably in his handwriting.

CAYENNE, a seaport and the capital of French Guiana, on the N.W. extremity of the island of Cayenne, and near the mouth of the river of that name, in 4° 56′ 28″ N., and 52° 20′ 36″ W. Pop. about 12,600. The town forms an almost perfect square, and has clean and well-macadamized streets. The houses, mostly of two storeys, are of wood, strengthened on the first and ground floors by brickwork. In the old town, which contains the government-house and Jesuits' College, the streets are not so regularly and well built as in the new. The Place d'Armes, a fine quadrangular space, lies between them. To the right of the governor's house is Mount Cépéron, on which stand Fort St Michel, the marine barracks, the signal station and the lighthouse. Here, too, are the capacious reservoirs for the water-supply of the town, the source of which is a lake to the south of the island. The harbour is shallow at its entrance, and craft drawing more than 14 ft. are obliged to anchor 6 m. from the town. There is no dock for the repair of vessels; but there are two quays at the town. The principal exports of Cayenne are gold, cocoa, phosphates, hides, woods and spices. The imports are French wines, spirits and liqueurs; silk and cotton stuffs, tobacco, hardware, glass, earthenware, clothing, preserved meat, fish, and vegetables, maize, flour, hay, bran, oils and cattle. There is a regular mail service between Cayenne and Martinique once a month. Cayenne is the seat of the government of French Guiana, and was formerly a penal settlement for political offenders. Food as well as clothing is exorbitantly dear, the only cheap articles of consumption being bread and French wines. The temperature of Cayenne is between 76° and 88° Fahr. throughout the year; but the heat is tempered by easterly winds. Between December and March a north wind blows, unfavourable to weak constitutions. Yellow and other fevers often attack the

inhabitants of the town, but the climate, though moist, is as a whole healthy. (See GUIANA.)

CAYENNE PEPPER (GUINEA PEPPER, SPANISH PEPPER, CHILLY), a preparation from the dried fruit of various species of *Capsicum*, a genus of the natural order Solanaceae. The true peppers are members of a totally distinct order, Piperaceae. The fruits of plants of the genus *Capsicum* have all a strong, pungent flavour. The capsicums bear a greenish-white flower, with a star-shaped corolla and five anthers standing up in the centre of the flower like a tube, through which projects the slender style. The pod-like fruit consists of an envelope at first fleshy and afterwards leathery, within which are the spongy pulp and several seeds. The plants are herbaceous or shrubby; the leaves are entire, and alternate, or in pairs near one another; the flowers are solitary and do not arise in the leaf-axils. There are about thirty species, natives of Central and South America. They are now grown in various parts of the world, both for the sake of the fruit and for ornament. In England the annual sorts are sown from March to the middle of April under a frame. They can be planted out when 2 or 3 in. high, and in June may be transferred to a light rich soil in the open garden. They flower in July or August, and produce pods from August till the end of September. The perennial and shrubby kinds may be wintered in a conservatory. Several species or varieties are used to make cayenne pepper. The annual or common capsicum (*C. annuum*), the Guinea pepper plant, was brought to Europe by the Spaniards, and was grown in England in 1548. It is indigenous to South America, but is now cultivated in India, Hungary, Italy, Spain and Turkey, with the other species of capsicum. It is a hardy herbaceous plant, which attains a height of 2 or 3 ft. There are numerous cultivated forms, differing in the shape and colour of the pod, which varies from more or less roundish to narrow-conical, with a smooth or wrinkled coat, and white, yellow, red or black in colour. The principal source of cayenne pepper is *C. frutescens*, the spur or goat pepper, a dwarf shrub, a native of South America, but commonly cultivated in the East Indies. It produces a small, narrow, bright red pod, having very pungent properties. *C. tetragonum*, or bonnet pepper, is a species much esteemed in Jamaica; it bears very fleshy fruits. Other well-known kinds of capsicum are the cherry pepper (*C. cerasiforme*), with small berries; bell pepper (*C. grossum*), which has thick and pulpy fruit, well adapted for pickling; and berry or bird pepper (*C. baccatum*). The last mentioned has been grown in England since 1731; its fruit is globular, and about the size of a cherry. The West Indian stomachic *man-dram* is prepared by mashing a few pods of bird pepper and mixing them with sliced cucumber and shallots, to which have been added a little lime-juice and Madeira wine. Chillies, the dried ripe or unripe fruit of capsicums, especially *C. annuum* and *C. frutescens*, are used to make chilly-vinegar, as well as for pickles. Cayenne pepper is manufactured from the ripe fruits, which are dried, ground, mixed with wheat flour, and made into cakes with yeast; the cakes are baked till hard like biscuit, and then ground and sifted. The pepper is sometimes prepared by simply drying the pods and pounding them fine in a mortar. Cayenne pepper is occasionally adulterated with red lead, vermilion, ochre, salt, ground-rice and turmeric. The taste of the pepper is impaired by exposure to damp and the heat of the sun. Chillies have been in use from time immemorial; they are eaten in great quantity by the people of Guiana and other warm countries, and in Europe are largely consumed both as a spice and as medicine.

The dried ripe fruit of *Capsicum frutescens* from Zanzibar, known as pod pepper and Guinea pepper, is official in the British Pharmacopoeia under the name *Capsici Fructus*. The fruit has a characteristic, pungent odour and an intensely bitter taste. The chief constituents are a crystallizable resin, capsaicin, a volatile alkaloid, capsicine and a volatile oil. The dose is ½-1 grain. The British Pharmacopoeia contains two preparations of capsicum, a tincture (dose 5-15 minims) and an ointment. Externally the drug has the usual action of a volatile oil, being a very powerful counter-irritant. It does not, however, cause pustulation. Its internal action is also that of its class, but its marked contact properties make it specially useful in gastriatony and flatulence, and sometimes in hysteria.

CAYEY, an inland district and mountain town of the department of Guayama, Porto Rico, celebrated for its cool, invigorating climate and the beauty of its scenery. Pop. (1899) of the town, 3763; of the district, 14,442. The town is surrounded by mountain summits, the highest of which, El Torito, rises to an elevation of 2362 ft. above sea-level. It was made a military post by the Spaniards and used as an acclimatizing station. The old Spanish barracks have been enlarged and improved by the American military authorities and, under the name of "Henry Barracks," are used for the same purpose. The town is a popular summer resort for residents of the coast cities. The surrounding country is wooded and very fertile, being especially noted for its coffee and tobacco. The town has large cigar factories. Cayey is connected with Guayama by an excellent military road.

CAYLEY, ARTHUR (1821–1895), English mathematician, was born at Richmond, in Surrey, on the 16th of August 1821, the second son of Henry Cayley, a Russian merchant, and Maria Antonia Doughty. His father, Henry Cayley, retired from business in 1829 and settled in Blackheath, where Arthur was sent to a private school kept by the Rev. G. B. F. Potticary; at the age of fourteen he was transferred to King's College school, London. He soon showed that he was a boy of great capacity, and in particular that he was possessed of remarkable mathematical ability. On the advice of the school authorities he was entered at Trinity College, Cambridge, as a pensioner. He was there coached by William Hopkins of Peterhouse, was admitted a scholar of the college in May 1840, and graduated as senior wrangler in 1842, and obtained the first Smith's Prize at the next examination. In 1842, also, he was elected a fellow of Trinity, and became a major fellow in 1845, the year in which he proceeded to the M.A. degree. He was assistant tutor of Trinity for three years. In 1846, having decided to adopt the law as a profession, he left Cambridge, entered at Lincoln's Inn, and became a pupil of the conveyancer Mr Christie. He was called to the bar in 1849, and remained at the bar fourteen years, till 1863, when he was elected to the new Sadlerian chair of pure mathematics in the university of Cambridge. He settled at Cambridge in the same year, and married Susan, daughter of Robert Moline of Greenwich. He continued to reside in Cambridge and to hold the professorship till his death, which occurred on the 26th of January 1895. From the time he went first to Cambridge till his death he was constantly engaged in mathematical investigation. The number of his papers and memoirs, some of them of considerable length, exceeds 800; they were published, at the time they were composed, in various scientific journals in Europe and America, and are now embodied, through the enterprise of the syndics of the Cambridge University Press, in thirteen large quarto volumes. These form an enduring monument to his fame. He wrote upon nearly every subject of pure mathematics, and also upon theoretical dynamics and spherical and physical astronomy. He was quite as much a geometrician as he was an analyst. Among his most remarkable works may be mentioned his ten memoirs on quantics, commenced in 1854 and completed in 1878; his creation of the theory of matrices; his researches on the theory of groups; his memoir on abstract geometry, a subject which he created; his introduction into geometry of the "absolute"; his researches on the higher singularities of curves and surfaces; the classification of cubic curves; additions to the theories of rational transformation and correspondence; the theory of the twenty-seven lines that lie on a cubic surface; the theory of elliptic functions; the attraction of ellipsoids; the British Association Reports, 1857 and 1862, on recent progress in general and special theoretical dynamics, and on the secular acceleration of the moon's mean motion. He is justly regarded as one of the greatest of mathematicians. Competent judges have compared him to Leonhard Euler for his range, analytical power and introduction of new and fertile theories. He was the recipient of nearly every academic distinction that can be conferred upon an eminent man

of science. Amongst others may be noted honorary degrees by the universities of Oxford, Dublin, Edinburgh, Göttingen, Heidelberg, Leiden and Bologna. He was fellow or foreign corresponding member of the French Institute, the academies of Berlin, Göttingen, St Petersburg, Milan, Rome, Leiden, Upsala and Hungary; and he was nominated an officer of the Legion of Honour by President Carnot. At various times he was president of the Cambridge Philosophical Society, of the London Mathematical Society and of the Royal Astronomical Society. He was elected a fellow of the Royal Society in 1852, and received from that body a Royal medal in 1859 and the Copley medal in 1882. He also received the De Morgan medal from the London Mathematical Society, and the Huygens medal from Leiden. His nature was noble and generous, and the universal appreciation of this fact gave him great influence in his university. His portrait, by Lowes Dickinson, was placed in the hall of Trinity College in 1874, and his bust, by Henry Wiles, in the library of the same college in 1888. (P. A. M.)

CAYLUS, ANNE CLAUDE PHILIPPE DE TUBIÈRES DE GRIMOARD DE PESTELS DE LÉVIS, Comte de, Marquis d'Esternay, baron de Bransac (1692–1765), French archaeologist and man of letters, was born at Paris on the 31st of October 1692. He was the eldest son of Lieutenant-General Count de Caylus. His mother, Marthe Marguerite le Valois de Vilette de Murçay, comtesse de Caylus (1673–1729), was a cousin of Mme de Maintenon, who brought her up like her own daughter. She wrote valuable memoirs of the court of Louis XIV. entitled *Souvenirs*; these were edited by Voltaire (1770), and by many later editors, notably Renouard (1806), Ch. Asselineau (1860), M. de Lescure (1874), M. E. Raunié (1881), J. Soury (1883). While a young man Caylus distinguished himself in the campaigns of the French army, from 1709 to 1714. After the peace of Rastadt he spent some time in travelling in Italy, Greece, the East, England and Germany, and devoted much attention to the study and collection of antiquities. He became an active member of the Academy of Painting and Sculpture and of the Academy of Inscriptions. Among his antiquarian works are *Recueil d'antiquités égyptiennes, étrusques, grecques, romaines, et gauloises* (6 vols., Paris, 1752–1755), *Numismata Aurea Imperatorum Romanorum*, and a *Mémoire* (1755) on the method of encaustic painting with wax mentioned by Pliny, which he claimed to have rediscovered. Diderot, who was no friend to Caylus, maintained that the proper method had been found by J. J. Bachelier. Caylus was an admirable engraver, and copied many of the paintings of the great masters. He caused engravings to be made, at his own expense, of Bartoli's copies from ancient pictures and published *Nouveaux sujets de peinture et de sculpture* (1755) and *Tableaux tirés de l'Iliade, de l'Odysse, et de l'Enéide* (1757). He encouraged artists whose reputations were still in the making,but his patronage was somewhat capricious. Diderot expressed this fact in an epigram in his *Salon* of 1765 : "La mort nous a délivrés du plus cruel des amateurs." Caylus had quite another side to his character. He had a thorough acquaintance with the gayest and most disreputable sides of Parisian life, and left a number of more or less witty stories dealing with it. These were collected (Amsterdam, 1787)as his *Œuvres badines complètes*. The best of them is the *Histoire de M. Guillaume, cocher* (*c.* 1730).

The *Souvenirs du comte de Caylus*, published in 1805, is of very doubtful authenticity. See also A. and J. de Goncourt, *Portraits intimes du XVIIIe siècle*; Ch. Nisard's edition of the *Correspondance du comte de Caylus avec le père Paciaudi* (1877); and a notice by O. Uzanne prefixed to a volume of his *Facéties* (1879).

CAYMAN ISLANDS, a group of three low-lying islands in the West Indies. They consist of Grand Cayman, Little Cayman and Cayman Brac, and are situated between 79° 44′ and 80° 26′ W. and 19° 44′ and 19° 46′ N., forming a dependency of Jamaica, which lies 178 m. E.S.E. Grand Cayman, a rock-bound island protected by coral reefs, is 17 m. long and varies from 4 m. to 7 m. in breadth. It has two towns, Georgetown and Boddentown. Little Cayman and Cayman Brac are both about 70 m. E.N.E. of Grand Cayman. Excepting near the rocky coast, the islands are fruitful, mahogany and other valuable timbers with some dyewood are grown, and large quantities of coco-nuts are produced by the two smaller islands. Phosphate deposits of considerable value are worked, but the principal occupation of the inhabitants is catching turtles for export to Jamaica. The people are excellent shipwrights and do a considerable trade in schooners built of native wood. The islands are governed by a commissioner, and the laws passed by the local legislative assembly are subject to the assent of the governor of Jamaica. The population of the group is about 5000. The islands were discovered by Columbus, who named them Tortugas from the turtles with which the surrounding sea abounds. They were never occupied by the Spaniards and were colonized from Jamaica by the British.

CAZALÈS, JACQUES ANTOINE MARIE DE (1758–1805), French orator and politician, was born at Grenade in Languedoc, of a family of the lower nobility. Before 1789 he was a cavalry officer, but in that year was returned as deputy to the states general. In the Constituent Assembly he belonged to the section of moderate royalists who sought to set up a constitution on the English model, and his speeches in favour of retaining the right of war and peace in the king's hands and on the organization of the judiciary gained the applause even of his opponents. Apart from his eloquence, which gave him a place among the finest orators of the Assembly, Cazalès is mainly remembered for a duel fought with Barnave. After the insurrection of the 10th of August 1792, which led to the downfall of royalty, Cazalès emigrated. He fought in the army of the *émigrés* against revolutionary France, lived in Switzerland and in England, and did not return to France until 1803. He died on the 24th of November 1805. His son, Edmond de Cazalès, wrote philosophical and religious studies.

See *Discours de Cazalès*, edited by Chare (Paris, 1821), with an introduction; F. A. Aulard, *Les Orateurs de la Constituante* (2nd ed., Paris, 1905.)

CAZALIS, HENRI (1840–1909), French poet and man of letters, was born at Cormeilles-en-Parisis (Seine-et-Oise) in 1840. He wrote under the pseudonyms of Jean Caselli and Jean Lahor. His works include: *Chants populaires de l'Italie* (1865); *Vita tristis, Rêveries fantastiques, Romances sans musique* (1865); *Le Livre du néant* (1872); *Henry Regnault, sa vie et son œuvre*(1872); *L'Illusion* (1875–1893); *Melancholia* (1878); *Cantique des cantiques* (1885); *Les Quatrains d'Al-Gazali* (1896); *William Morris* (1897). The author of the *Livre du néant* has a predilection for gloomy subjects and especially for pictures of death. His oriental habits of thought earned for him the title of the "Hindou du Parnasse contemporain." He died in July 1909.

See a notice by P. Bourget in *Anthologie des poètes fr. du XIXe siècle* (1887–1888); J. Lemaître, *Les Contemporains* (1889); E. Faguet in the *Revue bleue* (October 1893).

CAZEMBE, the hereditary name of an African chief, whose territory was situated south of Lake Mweru and north of Bangweulu, between 9° and 11° S. In the end of the 18th century the authority of the Cazembe was recognized over a very extensive district. The kingdom, known also as the Cazembe, continued to exist, though with gradually diminishing power and extent, until the last quarter of the 19th century, when the Cazembe sank to the rank of a petty chief. The country is now divided between Great Britain and Belgian Congo. The British half, lying east of the Luapula, forms part of Rhodesia, and the chief town in it is called Kazembe. The native state, ruled by a negro race who overcame the aboriginals, had attained a certain degree of civilization. Agriculture was diligently followed, and cotton cloth, earthenware and iron goods manufactured. The country contains rich deposits of copper, and copper ore was one of the principal articles of export. The Cazembe had despotic power and used it in barbarous fashion. He had hundreds of wives, and his chiefs imitated his example according to their means. On his accession every new Cazembe chose a new site for his residence. In 1796 the Cazembe was visited by Manoel Caetano Pereira, a Portuguese merchant; and in 1798 a more important journey to the same region was undertaken by Dr Francisco José Maria de Lacerda. He died in that country on

the 18th of October that year, but left behind him a valuable journal. In 1802 two native traders or *pombeiros*, Pedro João Baptista and Amaro José, were sent by the Portuguese on a visit to the Cazembe; and in 1831 a more extensive mission was despatched by the Portuguese governor of Sena. It consisted of Major José Monteiro and Antonio Gamitto, with an escort of 20 soldiers and 120 negro slaves as porters; but its reception by the Cazembe was not altogether satisfactory. In 1868 David Livingstone visited the Cazembe, whose capital at that time numbered no more than 1000 souls. Since 1894, when the country was divided between Britain and the Congo State, it has been thoroughly explored. An important copper mining industry is carried on in the Congo division of the territory.

See *The Lands of the Cazembe*, published by the Royal Geographical Society in 1873, containing translations of Lacerda and Baptista's journals, and a résumé of Gamitto's *O Muata Cazembe* (Lisbon, 1854); also Livingstone's *Last Journals* (London, 1874).

CAZIN, JEAN CHARLES (1840–1901), French landscape-painter, son of a well-known doctor, F. J. Cazin (1788–1864), was born at Samer, Pas-de-Calais. After studying in France, he went to England, where he was strongly influenced by the pre-Raphaelite movement. His chief earlier pictures have a religious interest, shown in such examples as "The Flight into Egypt" (1877), or "Hagar and Ishmael" (1880, Luxembourg); and afterwards his combination of luminous landscape with figure-subjects ("Souvenir de fête," 1881; "Journée faite," 1888) gave him a wide repute, and made him the leader of a new school of idealistic subject-painting in France. He was made an officer of the Legion of Honour in 1889. His charming and poetical treatment of landscape is the feature in his painting which in later years has given them an increasing value among connoisseurs. His wife, Marie Cazin, who was his pupil and exhibited her first picture at the Salon in 1876, the same year in which Cazin himself made his début there, was also a well-known artist and sculptor.

CAZOTTE, JACQUES (1719–1792), French author, was born at Dijon, on the 17th of October 1719. He was educated by the Jesuits, and at twenty-seven he obtained a public office at Martinique, but it was not till his return to Paris in 1760 with the rank of commissioner-general that he made a public appearance as an author. His first attempts, a mock romance, and a coarse song, gained so much popularity, both in the court and among the people, that he was encouraged to essay something more ambitious. He accordingly produced his romance, *Les Prouesses inimitables d'Ollivier, marquis d'Édesse.* He also wrote a number of fantastic oriental tales, such as his *Mille et une fadaises, Contes à dormir debout* (1742). His first success was with a "poem" in twelve cantos, and in prose intermixed with verse, entitled *Ollivier* (2 vols., 1762), followed in 1771 by another romance, the *Lord Impromptu.* But the most popular of his works was the *Diable amoureux* (1772), a fantastic tale in which the hero raises the devil. The value of the story lies in the picturesque setting, and the skill with which its details are carried out. Cazotte possessed extreme facility and is said to have turned off a seventh canto of Voltaire's *Guerre civile de Genève* in a single night. About 1775 Cazotte embraced the views of the Illuminati, declaring himself possessed of the power of prophecy. It was upon this fact that La Harpe based his famous *jeu d'esprit*, in which he represents Cazotte as prophesying the most minute events of the Revolution. On the discovery of some of his letters in August 1792, Cazotte was arrested; and though he escaped for a time through the love and courage of his daughter, he was executed on the 25th of the following month.

The only complete edition is the *Œuvres badines et morales, historiques et philosophiques de Jacques Cazotte* (4 vols., 1816–1817), though more than one collection appeared during his lifetime. An édition de luxe of the *Diable amoureux* was edited (1878) by A. J. Pons, and a selection of Cazotte's *Contes*, edited (1880) by Octave Uzanne, is included in the series of *Petits Conteurs du XVIIIe siècle.* The best notice of Cazotte is in the *Illuminés* (1852) of Gérard de Nerval.

CEANOTHUS, in botany, a genus of the natural order Rhamnaceae, containing about forty species of shrubs or small trees, natives of North America. They are very attractive from their dense panicles of white or blue flowers, and several species are known as garden plants. The leaves of one of these, *C. americanus*, New Jersey tea, or red-root, are used instead of the true tea; the root, which contains a red colouring matter, has long been employed by the Indians as a febrifuge.

CEARÁ, a northern maritime state of Brazil, bounded N. by the Atlantic, E. by the Atlantic and the states of Rio Grande do Norte and Parahyba, S. by Pernambuco, and W. by Piauhy; and having an area of 40,253 sq. m. It lies partly upon the north-east slope of the great Brazilian plateau, and partly upon the sandy coastal plain. Its surface is a succession of great terraces, facing north and north-east, formed by the denudation of the ancient sandstone plateau which once covered this part of the continent; the terraces are seamed by watercourses, and their valleys are broken by hills and ranges of highlands. The latter are usually described as mountain ranges, but they are, in fact, only the remains of the ancient plateau, capped with horizontal strata of sandstone, and having a remarkably uniform altitude of 2000 to 2400 ft. The flat top of such a range is called a *chapada* or *taboleira*, and its width in places is from 32 to 56 m. The boundary line with Piauhy follows one of these ranges, the Serra de Ibiapaba, which unites with another range on the southern boundary of the state, known as the Serra do Araripe. Another range, or escarpment, crosses the state from east to west, but is broken into two principal divisions, each having several local names. These ranges are not continuous, the breaking down of the ancient plateau having been irregular and uneven. The higher ranges intercept considerable moisture from the prevailing trade winds, and their flanks and valleys are covered with forest, but the plateaus are either thinly wooded or open campo. These upland forests are of a scrubby character and are called *catingas*.

The sandy, coastal plain, with a width of 12 to 18 m., is nearly bare of vegetation. The rivers of the state are small and, with one or two exceptions, become completely dry in the dry season. The largest is the Jaguaribe, which flows entirely across the state in a north-east direction with an estimated length of 210 to 465 m. The year is divided into a rainy and dry season, the rains beginning in January to March and lasting until June. The dry season, July to December, is sometimes broken by slight showers in September and October, but these are of very slight importance. The soil is thin and porous and does not retain moisture, consequently the long, dry season turns the country into a barren desert, relieved only by vegetation along the river courses and mountain ranges, and by the hardy, widely-distributed carnahuba palm (*Copernicia cerifera*), which in places forms groves of considerable extent. Sometimes the rains fail altogether, and then a drought (*sêcca*) ensues, causing famine and pestilence throughout the entire region. The most destructive droughts recorded are those of 1711, 1723, 1777–1778, 1790, 1825, 1844–1845, and 1877–1878, the last-mentioned destroying nearly all the live-stock in the state, and causing the death through starvation and pestilence of nearly half-a-million people, or over half the population. The climate, which is generally described as healthful, is hot and humid on the coast, tempered by the cool trade winds; but in the more elevated regions it is very hot and dry, although the nights are cool. The sandy zone along the coast is nearly barren, but behind this is a more elevated region with broken surfaces and sandy soil which is amenable to cultivation and produces fruit and most tropical products when conditions are favourable.

The higher plateau is devoted almost exclusively to cattle-raising, once the principal industry of the state, though recurring sêccas have been an insuperable obstacle to its profitable development. There is still a considerable export of cattle, hides and skins, but no effort is made to develop the production of jerked beef on a large scale. Horses are raised to a limited extent; also goats, sheep and swine. The principal agricultural products are cotton, coffee, sugar, mandioca and tropical fruits. The production of cotton has increased largely since the development of cotton manufactures in Brazil. The natural vegetable productions are important, and include *maniçoba* or Ceará rubber, carnahuba wax and fibre, cajú wine and ipecacuanha.

There are two lines of railway running inland from the coast: the Baturité line from Fortaleza to Senador Pompeu, 179 m., and the Sobral line from Camocim (a small port) to Ipú, 134 m. These railways were built by the national government after the drought of 1877–1878 to give work to the starving refugees, and are now operated under leases. Great dams were also begun for irrigation purposes.

The misfortunes and poverty of the people have hindered their material development to a large extent, but another obstacle is to be found in their racial and social composition. Only a very small percentage of the population which numbered 805,687 in 1890, and 849,127 in 1900, is of pure European origin, the great majority being of the coloured races and their mixtures with the whites. The number of landed proprietors, professional men, merchants, &c., is comparatively small (about one-sixth), and a part of these are of mixed blood; the remaining five-sixths own no property, pay no taxes, and derive no benefits from the social and political institutions about them beyond the protection of the proprietors upon whose estates they live, the nominal protection of the state, and an occasional day's wage. Education has made no impression upon such people, and is confined almost exclusively to the upper classes, from which some of the most prominent men in Brazilian politics and literature have come. The state of Ceará has formed a bishopric of the Roman Catholic Church since 1853, the bishop having his residence at Fortaleza. The state is represented in the national congress by three senators and ten deputies. Its local government is vested in a president and legislative assembly of one chamber elected for a period of four years. Three vice-presidents are elected at the same time who succeed to the presidency in case of a vacancy according to the number of votes received. The judicial organization consists of the tribunal da Relação at the state capital and subordinate courts in the *comarcas* and *termos*. The judges of the higher courts are appointed for life. The capital of the state is Fortaleza, sometimes called Ceará, which is also the principal commercial centre and shipping port. The principal towns are Aracaty, Baturité, Acarahú, Crato, Maranguape and Sobral.

The territory of Ceará includes three of the *capitanias* originally granted by the Portuguese crown in 1534. The first attempts to settle the territory failed, and the earliest Portuguese settlement was made near the mouth of the Rio Camocim in 1604. The French were already established on the coast, with their headquarters at Saint Louis, now Maranhão. Ceará was occupied by the Dutch from 1637 to 1654, and became a dependency of Pernambuco in 1680; this relationship lasted until 1799, when the *capitania* of Ceará was made independent. The *capitania* became a province in 1822 under Dom Pedro I. A revolution followed in 1824, the president of the province was deposed fifteen days after his arrival, and a republic was proclaimed. Internal dissensions immediately broke out, the new president was assassinated, and after a brief reign of terror the province resumed its allegiance to the empire. Ceará was one of the first provinces of Brazil to abolish slavery.

See Rodolpho Theophilo, *Historia da Secca do Ceará, 1877 a 1880* (Fortaleza, 1883); Professor and Mrs Louis Agassiz, *A Journey in Brazil* (Boston, 1869); George Gardiner, *Travels in the Interior of Brazil* (London, 1846); C. F. Hartt, *Geology and Physical Geography of Brazil* (Boston, 1870); and H. H. Smith, *Brazil: the Amazon and the Coast* (New York, 1879).

CEAWLIN (d. 593), king of the West Saxons, first mentioned in the *Anglo-Saxon Chronicle* under the date 556 as fighting with his father Cynric against the Britons at the battle of Beranbyrig or Barbury Hill. Becoming king in 560, he began a career of conquest. Silchester was taken, and moving eastwards Ceawlin and his brother Cutha defeated the forces of Æthelberht, king of Kent, at the battle of Wibbandun in 568. In 577 he led the West Saxons from Winchester towards the Severn valley; gained an important victory over some British kings at Deorham, and added the district round Gloucester, Bath and Cirencester to his kingdom. A further advance was begun in 583. Uriconium, a town near the Wrekin, and Pengwyrn, the modern Shrewsbury, were destroyed; but soon Ceawlin was defeated by the Britons at Fethanleag or Faddiley, near Nantwich, and his progress was effectually checked. Intestine strife among the West Saxons followed. In 591 Ceawlin lost the western part of his kingdom, and in 592 was defeated by his nephew, Ceolric, at Wanborough, and driven from Wessex. He was killed in 593, possibly in an attempt to regain his kingdom. Ceawlin is included in the *Chronicle* among the Bretwaldas.

See *Two of the Saxon Chronicles*, ed. by C. Plummer (Oxford, 1892); *Dictionary of National Biography*, vol. ix (London, 1887); E. Guest, *Origines Celticae*, vol. ii. (London, 1883).

CEBES, the name of two Greek philosophers. (1) Cebes of Cyzicus, mentioned in Athenaeus (iv. 156 D), seems to have been a Stoic, who lived during the reign of Marcus Aurelius. Some would attribute to him the *Tabula Cebetis* (see below), but as that work was well known in the time of Lucian, it is probably to be placed earlier. (2) Cebes of Thebes, a disciple of Socrates and Philolaus. He is one of the speakers in the *Phaedo* of Plato, in which he is represented as an earnest seeker after virtue and truth, keen in argument and cautious in decision. Three dialogues, the *Ἑβδόμη*, the *Φρύνιχος* and the *Πίναξ* or *Tabula*, are attributed to him by Suidas and Diogenes Laërtius. The two former are lost, and most scholars deny the authenticity of the *Tabula* on the ground of material and verbal anachronisms. They attribute it either to Cebes of Cyzicus (above) or to an anonymous author, of the 1st century A.D., who assumed the character of Cebes of Thebes. The work professes to be an interpretation of an allegorical picture in the temple of Cronus at Athens or Thebes. The author develops the Platonic theory of pre-existence, and shows that true education consists not in mere erudition, but rather in the formation of character.

The *Tabula* has been widely translated both into European languages and into Arabic (the latter version published with the Greek text and Latin translation by Salmasius in 1640). It is usually printed together with Epictetus. Separate editions by C. S. Jerram (with introduction and notes, 1878), C. Prächter (1893), and many others. See Zeller's *History of Greek Philosophy*; F. Klopfer, *De Cebetis Tabula* (1818–1822); C. Prächter, *Cebetis Tabula quanam aetate conscripta esse videatur* (1885).

CEBÚ, a city and municipality, port of entry, and the capital of the province of Cebú, island of Cebú, Philippine Islands, on the E. coast, a little N. of the centre. Pop. (1903) of the city proper, 18,330; of the municipality, 31,079; in the same year, after the census enumeration, the neighbouring municipalities of Mabolo (pop. 1903, 8454) and El Pardo (pop. 6461) were added to the municipality of Cebú. The surrounding country, which is level and fertile, is traversed by several good carriage roads. The port, formed by the north-west shore of the island of Mactán, is well protected from violent winds, and in front of it stands a picturesque Spanish fort. The streets are wide and regularly laid out. The government buildings are fairly good, and the church buildings very fine. Cebú is an episcopal see, and the palace of the bishop, although small, is widely known for its interior decorations. The Augustinian church is famous for its so-called miraculous image of Santo Niño. The Recoleto monastery and the seminary of San Carlos are worthy of mention. The cathedral was finished toward the end of the eighteenth century. The San José hospital here was founded by one of the religious orders. There was a leper hospital in the outskirts of the city until 1906, when a leper colony was established on the island of Culión. Commercially, Cebú is the second city of the Philippines. Hemp, tobacco, sugar and copra are the most important exports. In addition to the trade with foreign ports, an important domestic commerce is carried on with Manila, Bohol, Negros and northern Mindanao. Salt, pottery and fabrics of silk, sinamay, hemp and cotton are manufactured, and sugar sacks are woven in considerable quantity. The island of Cebú is known for its excellent mangoes and for the rare cornucopia-shaped sponges, called Venus's flower basket (*Euplectella aspergillum*), found here. Historically Cebú is famous as the scene of Magellan's landing in 1521. A cross, said to be the one first erected by him, is still preserved in the cathedral. The great explorer lost his life in the neighbouring island of Mactán; a monument marks the place where he was

killed. The first Spanish settlement in the Philippines was established at Cebú in 1565, and from that year to 1571 it was the capital of the colony. The city is unincorporated. The language is Cebú-Visayan.

CECCO D'ASCOLI (1257–1327), the popular name of FRANCESCO DEGLI STABILI, a famous Italian encyclopaedist and poet—Cecco being the diminutive of Francesco, and Ascoli, in the marshes of Ancona, the place of the philosopher's birth. He devoted himself to the study of mathematics and astrology, and in 1322 was made professor of the latter science at the university of Bologna. It is alleged that he entered the service of Pope John XXII. at Avignon, and that he cultivated the acquaintance of Dante only to quarrel with the great poet afterwards; but of this there is no evidence. It is certain, however, that, having published a commentary on the sphere of John de Sacrobosco, in which he propounded audacious theories concerning the employment and agency of demons, he got into difficulties with the clerical party, and was condemned in 1324 to certain fasts and prayers, and to the payment of a fine of seventy crowns. To elude this sentence he betook himself to Florence, where he was attached to the household of Carlo di Calabria. But his free-thinking and plain speaking had got him many enemies; he had attacked the *Commedia* of Dante, and the *Canzone d' Amore* of Guido Cavalcanti; and his fate was sealed. Dino di Garbo, the physician, was indefatigable in pursuit of him; and the old accusation of impiety being renewed, Cecco was again tried and sentenced, this time to the stake. He was burned at Florence the day after sentence, in the seventieth year of his age.

Cecco d' Ascoli left many works in manuscript, most of which have never been given to the world. The book by which he achieved his renown and which led to his death was the *Acerba* (from *acervus*), an encyclopaedic poem, of which in 1546, the date of the last reprint, more than twenty editions had been issued. It is unfinished, and consists of four books in *sesta rima*. The first book treats of astronomy and meteorology; the second of stellar influences, of physiognomy, and of the vices and virtues; the third of minerals and of the love of animals; while the fourth propounds and solves a number of moral and physical problems. Of a fifth book, on theology, the initial chapter alone was completed. A man of immense erudition and of great and varied abilities, Cecco, whose knowledge was based on experiment and observation (a fact that of itself is enough to distinguish him from the crowd of savants of that age), had outstripped his contemporaries in many things. He knew of metallic aerolites and shooting stars; the mystery of the dew was plain to him; fossil plants were accounted for by him through terrene revolutions which had resulted in the formation of mountains; he is even said to have divined the circulation of the blood. Altogether a remarkable man, he may be described as one of the many Cassandras of the middle ages—one of the many prophets who spoke of coming light, and were listened to but to have their words cast back at them in accusations of impiety and sentences of death.

The least faulty of the many editions of the *Acerba* is that of Venice, dated 1510. The earliest known, which has become excessively rare, is that of Brescia, which has no date, but is ascribed to 1473 or thereabouts.

CECIL, the name of a famous English family. This house, whose two branches hold each a marquessate, had a great statesman and administrator to establish and enrich it. The first Lord Burghley's many inquiries concerning the origin of his family created for it more than one splendid and improbable genealogy, although his grandfather is the first ascertained ancestor. In the latter half of the 15th century a family of yeomen or small gentry with the surname of Seyceld, whose descendants were accepted by Lord Burghley as his kinsmen, lived on their lands at Allt yr Ynys in Walterstone, a Herefordshire parish on the Welsh marches. Of the will of Richard ap Philip Seyceld of Allt yr Ynys, made in 1508, one David ap Richard Seyceld, apparently his younger son, was overseer. This David seems identical with David Cyssell, Scisseld or Cecill, a yeoman admitted in 1494 to the freedom of Stamford in Lincolnshire. He may well have been one of those men from the Welsh border who fought at Bosworth, for at the funeral of Henry VII. he appears as a yeoman of the guard and is given a livery of black cloth. At Stamford he prospered, being three times mayor and three times member of parliament for the borough, and he served as sheriff of Northamptonshire in 1532–1533. Remaining in the service of Henry VIII. he was advanced to be yeoman of the chamber and sergeant-at-arms, being rewarded with several profitable leases and offices. His first wife was the daughter of a Stamford alderman, and his second the already twice widowed heir of a Lincolnshire squire. By the first marriage David Cecil left at his death in 1536 a son and heir, Richard Cecil, who enjoyed a place at court as yeoman of the king's wardrobe under Henry VIII. and Edward VI. A gentleman of the privy chamber and sometime sheriff of Rutland, Richard Cecil had his share at the distribution of abbey lands, St Michael's priory in Stamford being among the grants made to him. William Cecil, only son of Richard, was born, by his own account, in 1520, at Bourne in Lincolnshire. He advanced himself first in the service of the protector Somerset, after whose fall, his great abilities being necessary to the council, he was made a secretary of state and sworn of the privy council. In 1571 he was created Lord Burghley, and from 1572, when he was given the Garter, he was lord high treasurer and principal minister to Queen Elizabeth. By his first wife, Mary Cheke, sister of the scholar Sir John Cheke, tutor to Edward VI., he was father to Thomas, first earl of Exeter. By a second wife, Mildred Cooke, the most learned lady of her time, he had an only surviving son, Robert Cecil, ancestor of the house of Salisbury.

Created earl of Exeter by James I., the second Lord Burghley was more soldier than statesman, and from his death to the present day the elder line of the Cecils has taken small part in public affairs. William Cecil, 2nd earl of Exeter, took as his first wife the Lady Roos, daughter and heir of the 3rd earl of Rutland of the Manners family. The son of this marriage inherited the barony of Roos as heir general, and died as a Roman Catholic at Naples in 1618 leaving no issue. A third son of the 1st earl was Edward Cecil, a somewhat incompetent military commander, created in 1625 Lord Cecil of Putney and Viscount Wimbledon, titles that died with him in 1638, although he was thrice married. In 1801 a marquessate was given to the 10th earl of Exeter, the story of whose marriage with Sarah Hoggins, daughter of a Shropshire husbandman, has been refined by Tennyson into the romance of "The Lord of Burleigh." This elder line is still seated at Burghley, the great mansion built by their ancestor, the first lord.

The younger or Hatfield line was founded by Robert Cecil, the only surviving son of the great Burghley's second marriage. As a secretary of state he followed in his father's steps, and on the death of Elizabeth he may be said to have secured the accession of King James, who created him Lord Cecil of Essendine (1603), Viscount Cranborne (1604), and earl of Salisbury (1605). Forced by the king to exchange his house of Theobalds for Hatfield, he died in 1612, worn out with incessant labour, before he could inhabit the house which he built upon his new Hertfordshire estate. Of Burghley and his son Salisbury, "great ministers of state in the eyes of Christendom," Clarendon writes that "their wisdom and virtues died with them." The 2nd earl of Salisbury, "a man of no words, except in hunting and hawking," was at first remarked for his obsequiousness to the court party, but taking no part in the Civil War came at last to sit in the Protector's parliament. After the Restoration, Pepys saw him, old and discredited, at Hatfield, and notes him as "my simple Lord Salisbury." The 7th earl was created marquess of Salisbury in 1789.

Hatfield House, a great Jacobean mansion which has suffered much from restoration and rebuilding, contains in its library the famous series of state papers which passed through the hands of Burghley and his son Salisbury, invaluable sources for the history of their period. (O. BA.)

CECILIA, SAINT, in the Catholic Church the patron saint of music and of the blind. Her festival falls on the 22nd of November. It was long supposed that she was a noble lady of Rome

who, with her husband and other friends whom she had converted, suffered martydom, *c.* 230, under the emperor Alexander Severus. The researches of de Rossi, however (*Rom. sott.* ii. 147), go to confirm the statement of Fortunatus, bishop of Poitiers (d. 600), that she perished in Sicily under Marcus Aurelius between 176 and 180. A church in her honour existed in Rome from about the 4th century, and was rebuilt with much splendour by Pope Paschal I. about the year 820, and again by Cardinal Sfondrati in 1599. It is situated in the Trastevere near the Ripa Grande quay, where in earlier days the Ghetto was located, and gives a "title" to a cardinal priest. Cecilia, whose musical fame rests on a passing notice in her legend that she praised God by instrumental as well as vocal music, has inspired many a masterpiece in art, including the Raphael at Bologna, the Rubens in Berlin, the Domenichino in Paris, and in literature, where she is commemorated especially by Chaucer's "Seconde Nonnes Tale," and by Dryden's famous ode, set to music by Handel in 1736, and later by Sir Hubert Parry (1889).

Another St Cecilia, who suffered in Africa in the persecution of Diocletian (303–304), is commemorated on the 11th of February.

See U. Chevalier, *Répertoire des sources historiques* (1905), i. 826 f.

CECROPIA, in botany, a genus of trees (natural order Moraceae), native of tropical America. They are of very rapid growth, affording a light wood used for making floats. *C. peltata* is the trumpet tree, so-called from the use made of its hollow stems by the Uaupé Indians as a musical instrument. It is a tree reaching about 50 ft. in height with a large spreading head, and deeply lobed leaves 12 in. or more in diameter. The hollows of the stem and branches are inhabited by ants, which in return for the shelter thus afforded, and food in the form of succulent growths on the base of the leaf-stalks, repel the attacks of leaf-cutting ants which would otherwise strip the tree of its leaves. This is an instance of "myrmecophily," *i.e.* a living together for mutual benefit of the ants and the plant.

CECROPS (Κέκροψ), traditionally the first king of Attica, and the founder of its political life (Pausanias ix. 33). He was said to have divided the inhabitants into twelve communities, to have instituted the laws of marriage and property, and a new form of worship. The introduction of bloodless sacrifice, the burial of the dead, and the invention of writing were also attributed to him. He is said to have acted as umpire during the dispute of Poseidon and Athena for the possession of Attica. He decided in favour of the goddess, who planted the first olive tree, which he adjudged to be more useful than the horse (or water) which Poseidon caused to spring forth from the Acropolis rock with a blow of his trident (Herodotus viii. 55; Apollodorus iii. 14). As one of the autochthones of Attica, Cecrops is represented as human in the upper part of his body, while the lower part is shaped like a dragon (hence he is sometimes called διφυής or *geminus*, Diod. Sic. i. 28; Ovid, *Metam.* ii. 555). Miss J. E. Harrison (in *Classical Review*, January 1895) endeavours to show that Cecrops is the husband of Athene, identical with the snake-like Zeus Soter or Sosipolis, and the father of Erechtheus-Erichthonius.

CEDAR (Lat. *cedrus*, Gr. κέδρος), a name applied to several members of the natural order Coniferae. The word has been derived from the Arabic *Kedr*, worth or value, or from *Kedrat*, strong, and has been supposed by some to have taken its origin from the brook Kedron, in Judaea.

Cedrus Libani, the far-famed Cedar of Lebanon, is a tree which, on account of its beauty, stateliness and strength, has always been a favourite with poets and painters, and which, in the figurative language of prophecy, is frequently employed in the Scriptures as a symbol of power, prosperity and longevity. It grows to a vertical height of from 50 to 80 ft.—"exalted above all trees of the field"—and at an elevation of about 6000 ft. above sea-level. In the young tree, the bole is straight and upright, and one or two leading branches rise above the rest. As the tree increases in size, however, the upper branches become mingled together, and the tree is then clump-headed. Numerous lateral ramifying branches spread out from the main trunk in a horizontal direction, tier upon tier, covering a compass of ground the diameter of which is often greater than the height of the tree. William Gilpin, in his *Forest Scenery*, describes a cedar which, at an age of about 118 years, had attained to a height of 53 ft. and had a horizontal expanse of 96 ft. The branchlets of the cedar take the same direction as the branches, and the foliage is very dense. The tree, as with the rest of the fir-tribe, except the larch, is evergreen; new leaves are developed every spring, but their fall is gradual. In shape the leaves are straight, tapering, cylindrical and pointed; they are about 1 in. long and of a dark green colour, and grow in alternate tufts of about thirty in number. The male and female flowers grow on the same tree, but are separate. The cones, which are on the upper side of the branches, are flattened at the ends and are 4 to 5 in. in length and 2 in. wide; they take two years to come to perfection and while growing exude much resin. The scales are close pressed to one another and are reddish in colour. The seeds are provided with a long membranous wing. The root of the tree is very strong and ramifying. The cedar flourishes best on sandy, loamy soils. It still grows on Lebanon, though for several centuries it was believed to be restricted to a small grove in the Kadisha valley at 6000 ft. elevation, about 15 m. from Beyrout. The number of trees in this grove has been gradually diminishing, and as no young trees or seedlings occur, the grove will probably become extinct in course of time. Cedars are now known to occur in great numbers on Mt. Lebanon, chiefly on the western slopes, not forming a continuous forest, but in groves, some of which contain several thousands of trees. There are also large forests on the higher slopes of the Taurus and Anti-Taurus mountains. Lamartine tells us that the Arabs regard the trees as endowed with the principles of continual existence, and with reasoning and prescient powers, which enable them to prepare for the changes of the seasons.

The wood of the cedar of Lebanon is fragrant, though not so strongly scented as that of the juniper or red-cedar of America. The wood is generally reddish-brown, light and of a coarse grain and spongy texture, easy to work, but liable to shrink and warp. Mountain-grown wood is harder, stronger, less liable to warp and more durable.

The cedar of Lebanon is cultivated in Europe for ornament only. It can be grown in parks and gardens, and thrives well; but the young plants are unable to bear great variations of temperature. The cedar is not mentioned in Evelyn's *Silva* (1664), but it must have been introduced shortly afterwards. The famous Enfield cedar was planted by Dr Robert Uvedale, (1642–1722), a noted schoolmaster and horticulturist, between 1662–1670, and an old cedar at Bretby Park in Derbyshire is known to have been planted in 1676. Some very old cedars exist also at Syon House, Woburn Abbey, Warwick Castle and elsewhere, which presumably date from the 17th century. The first cedars in Scotland were planted at Hopetoun House in 1740; and the first one said to have been introduced into France was brought from England by Bernard de Jussieu in 1734, and placed in the Jardin des Plantes. Cedar-wood is earliest noticed in Leviticus xiv. 4, 6, where it is prescribed among the materials to be used for the cleansing of leprosy; but the wood there spoken of was probably that of the juniper. The term *Eres* (cedar) of Scripture does not apply strictly to one kind of plant, but was used indefinitely in ancient times, as is the word cedar at present. The term *arz* is applied by the Arabs to the cedar of Lebanon, to the common pine-tree, and to the juniper; and certainly the "cedars" for masts, mentioned in Ezek. xxvii. 5, must have been pine-trees. It seems very probable that the fourscore thousand hewers employed by Solomon for cutting timber did not confine their operations simply to what would now be termed cedars and fir-trees. Dr John Lindley considered that some of the cedar-trees sent by Hiram, king of Tyre, to Jerusalem might have been procured from Mount Atlas, and have been identical with *Callitris quadrivalvis*, or arar-tree, the wood of which is hard and durable, and was much in request in former times for the building of temples. The timber-work of the roof of Cordova cathedral, built eleven centuries ago, is composed of it. In the time of

Vitruvius "cedars" were growing in Crete, Africa and Syria. Pliny says that their wood was everlasting, and therefore images of the gods were made of it; he makes mention also of the oil of cedar, or *cedrium*, distilled from the wood, and used by the ancients for preserving their books from moths and damp; papyri anointed or rubbed with cedrium were on this account called *cedati libri*. Drawers of cedar or chips of the wood are now employed to protect furs and woollen stuffs from injury by moths. Cedar-wood, however, is said to be injurious to natural history objects, and to instruments placed in cabinets made of it, as the resinous matter of the wood becomes deposited upon them. *Cedria*, or cedar resin, is a substance similar to mastic, that flows from incisions in the tree; and cedar manna is a sweet exudation from its branches.

The genus *Cedrus* contains two other species closely allied to *C. Libani*—*Cedrus Deodara*, the deodar, or "god tree" of the Himalayas, and *Cedrus atlantica*, of the Atlas range, North Africa. The deodar forms forests on the mountains of Afghanistan, North Beluchistan and the north-west Himalayas, flourishing in all the higher mountains from Nepal up to Kashmir, at an elevation of from 5500 to 12,000 ft.; on the peaks to the northern side of the Boorung Pass it grows to a height of 60 to 70 ft. before branching. The wood is close-grained, long-fibred, perfumed and highly resinous, and resists the action of water. The foliage is of a paler green, the leaves are slender and longer, and the twigs are thinner than those of *C. Libani*. The tree is employed for a variety of useful purposes, especially in building. It is now much cultivated in England as an ornamental plant. *C. atlantica*, the Atlas cedar, has shorter and denser leaves than *C. Libani*; the leaves are glaucous, sometimes of a silvery whiteness, and the cones smaller than in the other two forms; its wood also is hard, and more rapid in growth than is that of the ordinary cedar. It is found at an altitude above the sea of from 4000 to 6000 ft.

The name cedar is applied to a variety of trees, including species of several genera of Conifers, *Juniperus*, *Thuja*, *Libocedrus* and *Cupressus*. *Thuja gigantea* of western North America is known in the United States as White (or Yellow) cedar, and the same name is applied to *Cupressus Lawsoniana*, the Port Orford or Oregon cedar, a native of the north-west States, and one of the most valuable juniper trees of North America. The Bermuda cedar (*Juniperus bermudiana*) and the red or American cedar (*J. virginiana*) are both much used in joinery and in the manufacture of pencils; though other woods are now superseding them for pencil-making. The Japanese cedar (*Cryptomeria japonica*) is a kind of cypress, the wood of which is very durable. Another species of cypress (*Cupressus thyoides*, also known as *Chamaecyparis thyoides* or *sphaeroidea*), found in swamps in the south of Ohio and Massachusetts, is known as the American white cedar. It has small leaves and fibrous bark, the wood is light, soft and easily-worked, and very durable in contact with the soil, and is much used for boat-building and for making fences and coopers' staves. The Spanish cedar is a name applied to *Juniperus thurifera*, a native of the western Mediterranean region, and also to another species, *J. Oxycedrus*, a common plant in the Mediterranean region, forming a shrub or low tree with spreading branches and short, stiff, prickly leaves. The latter was much used by the Greeks for making images; and its empyreumatic oil, Huile de Cade, is used medicinally for skin-diseases. A species of cypress, *Cupressus lusitanica*, which has been naturalized in the neighbourhood of Cintra is known as the cedar of Goa. The genus *Widdringtonia* of tropical and South Africa is also known locally as cedar. *W. juniperoides* is the characteristic tree of the Cederberg range in Cape Colony, while *W. Whytei*, recently discovered in Nyasaland and Rhodesia (the Mlanje cedar) is a fine tree reaching 150 ft. in height, and yielding an ornamental light yellow-brown wood, suitable for building. The order Cedrelaceae (which is entirely distinct from the Conifers) includes, along with the mahoganies and other valuable timber-trees, the Jamaica and the Australian red cedars, *Cedrela odorata*, and *C. Toona* respectively. The cedar-wood of Guiana, used for making canoes, is a species of the natural order Burseraceae, *Icica altissima*. It is a large tree, reaching 100 ft. in height, the wood is easily worked, fragrant and durable.

See Gordon's *Pinetum*; Loiseleur-Deslongchamps, *Histoire du cèdre du Liban* (Paris, 1838); Loudon, *Arboretum Britannicum*, vol. iv. pp. 2404-2432 (London, 1839); Marquis de Chambray, *Traité pratique des arbres résineux conifères* (Paris, 1845); J. D. Hooker, *Nat. Hist. Review* (January, 1862), pp. 11-18; Brandis, *Forest Flora of North-west and Central India*, pp. 516-525 (London, 1874); Veitch, *Manual of Coniferae* (2nd ed., London, 1900).

CEDAR CREEK, a small branch of the North Fork of the Shenandoah river, Virginia, U.S.A. It is known in American history as the scene of a memorable battle, which took place on the 19th of October 1864, between the Union army under Major-General P. H. Sheridan and the Confederates under Lieut.-General J. A. Early. (See SHENANDOAH VALLEY CAMPAIGNS.)

CEDAR FALLS, a city of Black Hawk county, Iowa, U.S.A., on the Cedar river, about 100 m. W. of Dubuque. Pop. (1890) 3459; (1900) 5319; (1905, state census) 5329, of whom 872 were foreign-born. It is served by the Chicago, Rock Island & Pacific, the Illinois Central, the Chicago Great Western, and the Waterloo, Cedar Falls & Northern railways. Its manufactures include flour, ground feed, other cereal preparations, hardware specialties, canned vegetables (especially Indian corn), and planing-mill products. It is the seat of the state normal school (1876), and has a public library. The settlement of the place, the oldest in the county, was begun in 1847; it was laid out as a town in 1851, incorporated as a village in 1857, chartered as a city in 1865, and for a short time in 1853 was the county-seat.

CEDAR RAPIDS, a city of Linn county, Iowa, U.S.A., on the Cedar river, in the east central part of the state. Pop. (1890) 18,020; (1900) 25,656, of whom 4478 were foreign-born, an unusually large and influential part being Bohemians; (estimate, 1906) 29,380. It is served by the Chicago, Milwaukee & Saint Paul, the Chicago & North-Western, the Chicago, Rock Island & Pacific (which has repair shops here), and the Illinois Central railways, and by interurban electric lines. The city has an air of substantial prosperity; its principal streets are from 80 ft. to 120 ft. wide, paved with brick and asphalt, and well shaded. Prominent among its buildings are the federal building, the auditorium, the public library and the Masonic library, which contains one of the best collections of Masonic literature in the world. The city has two well-equipped hospitals, a home for aged women, a home for the friendless, and four parks. The grounds of the Cedar Rapids country club comprise 180 acres. Cedar Rapids is in a rich agricultural country. The name of the city was suggested from the rapids in the river, which afford abundant water power and have enabled the city to take first rank in Iowa (1905) as a manufacturing centre. From 1900 to 1905 there was an increase in the value of its manufactured products from $11,135,435 to $16,279,706, or 46·2%. More than one-fourth of the value of its manufactures is in Quaker Oats and other food preparations; among those of less importance are lumber and planing-mill products, foundry and machine-shop products, furniture, patent medicines, pumps, carriages and waggons, packed meats and agricultural implements. Cedar Rapids has also a large grain trade and a large jobbing business, especially in dry goods, millinery, groceries, paper and drugs. At Cedar Rapids are Coe College (co-educational; Presbyterian), which grew out of the Cedar Rapids Collegiate Institute (1851), was named in honour of Daniel Coe, a benefactor, and was chartered under its present name and opened in 1881; the Interstate Correspondence schools, and the Cedar Rapids business college. The first settlers came in 1838; but the city's early growth was slow, and it was not incorporated until 1856. It has been governed by commission since 1908.

CEFALU (anc. *Cephaloedium*), a seaport and episcopal see of the province of Palermo, Sicily, 42 m. E. of Palermo by rail. Pop. (1901) 13,273. The ancient town (of Sicel origin, probably, despite its Greek name) takes its name from the headland (κεφαλή, head) upon which it stood (1233 ft.); its fortifications extended to the shore, on the side where the modern town now is, in the form of two long walls protecting the port. There are remains of a wall of massive rectangular blocks of stone at the

modern Porta Garibaldi on the south. It does not appear in history before 396 B.C., and seems to have owed its importance mainly to its naturally strong position. The only ancient remains on the mountain are those of a small building in good polygonal work (a style of construction very rare in Sicily), consisting of a passage on each side of which a chamber opens. The doorways are of finely-cut stone, and of Greek type, and the date, though uncertain, cannot, from the careful jointing of the blocks, be very early. On the summit of the promontory are extensive remains of a Saracenic castle. The new town was founded at the foot of the mountain, by the shore, by Roger II. in 1131, and the cathedral was begun in the same year. The exterior is well preserved, and is largely decorated with interlacing pointed arches; the windows also are pointed. On each side of the façade is a massive tower of four storeys. The round-headed Norman portal is worthy of note. The interior was restored in 1559, though the pointed arches of the nave, borne by ancient granite columns, are still visible: and the only mosaics preserved are those of the apse and the last bay of the choir: they are remarkably fine specimens of the art of the period (1148) and, though restored in 1859–1862, have suffered much less than those at Palermo and Monreale from the process. The figure of the Saviour is especially fine. The groined vaulting of the roof is visible in the choir and the right transept, while the rest of the church has a wooden roof. Fine cloisters, coeval with the cathedral, adjoin it. (See G. Hubbard in *Journal of the R.I.B.A.* xv. 333 sqq., 1908.) The harbour is comparatively small. (T. As.)

CEHEGÍN, a town of south-eastern Spain, in the province of Murcia, on the right bank of the river Caravaca, a small tributary of the Segura. Pop. (1900) 11,601. Cehegín has a thriving trade in farm produce, especially wine, olive oil and hemp; and various kinds of marble are obtained from quarries near the town. Some of the older houses, however, as well as the parish church and the convent of San Francisco, which still has well-defined Roman inscriptions on its walls, are built of stone from the ruins of *Begastri*, a Roman colony which stood on a small adjacent hill known as the Cabecico de Roenas. The name *Cehegín* is sometimes connected by Spanish antiquaries with that of the *Zenaga*, *Senhaja* or *Senajeh*, a North African tribe, which invaded Spain in the 11th century.

CEILING (from a verb "to ceil," *i.e.* to line or cover; of disputed etymology, but apparently connected with Fr. *ciel*, Lat. *caelum*, sky), in architecture, the upper covering of a church, hall or room. Ceilings are now usually formed of plaster, but in former times they were commonly either boarded (of which St Albans cathedral is perhaps the earliest example), or showed the beams and joists, which in England were moulded and carved, and in France and Italy were richly painted and gilded. Sometimes the ceilings were horizontal, sometimes canted on two sides, and sometimes they take the form of a barrel-vault. Ribs are sometimes planted on the boarding to divide up the surface, and their intersections are enriched with bosses. About the middle of the 16th century the ceilings were formed in plaster with projecting ribs, interlaced ornament and pendants, and the characteristics of the Elizabethan style. At Bramall Hall, Broughton Castle, Hatfield, Knowle, Sizergh and Levens in Westmorland, and Dorfold in Cheshire, are numerous examples, some with pendants. In Italy, at the same period, the plaster ceilings were based on the forms taken by vaulting; they were of infinite variety and were richly decorated with sunk panels containing the Roman conventional foliage. Raphael, about 1520, reproduced in the Vatican some of the stucco-duro ornament which he had studied in the Golden House of Nero, excavated under his directions. Later, about the middle of the 16th century, great coves were formed round the room, which were decorated with cartouches and figures in relief, garlands and swags. The great halls of the Ducal Palace at Venice and the galleries of the Pitti Palace at Florence were ceiled in this way. These coved ceilings were introduced into England in the middle of the 17th century. In Holyrood Palace at Edinburgh there is a fine ceiling of 1671, with figures (probably executed by Italian craftsmen) and floral wreaths.

At Coleshill, Berkshire, a ceiling by Inigo Jones (1650) shows a type which became more or less universal for a century, viz. deeply sunk panels with modillions round, and bands enriched with foliage, fruit, &c., in bold relief. Wren, Nicholas Hawksmoor, James Gibbs, John Webb and other architects continued on the same lines, and in 1760 Robert Adam introduced his type of ceiling, sometimes horizontal, and sometimes segmental, in which panels are suggested only, with slight projecting lines and rings of leaves, swags and arabesque work, which, like Raphael's, was found on the ceilings of the Roman tombs and baths in Rome and Pompeii. George Richardson followed with similar work, and Sir W. Chambers, in the rooms originally occupied by the Royal Academy and the learned societies in Somerset House, designed many admirable ceilings. The moulds of all the ornamental devices of Robert Adam are preserved and are still utilized for many modern ceilings. (R. P. S.)

CEILLIER, REMY (1688–1761), Benedictine monk of the Lorraine congregation of St Vannes. He was the compiler of an immense Patrology, *Histoire générale des auteurs sacrés et ecclésiastiques* (23 vols., Paris, 1729–1763), being a history and analysis of the writings of all the ecclesiastical writers of the first thirteen centuries. He put infinite trouble and time into the work, and many portions of it are exceedingly well done. A later and improved edition was produced in Paris, 1858, in 14 vols. Ceillier's other work, *Apologie de la morale des pères de l'église* (Paris, 1718), also won some celebrity.

CELAENAE, an ancient city of Phrygia, situated on the great trade route to the East. Its acropolis long held out against Alexander in 333 and surrendered to him at last by arrangement. His successor, Eumenes, made it for some time his headquarters, as did Antigonus until 301. From Lysimachus it passed to Seleucus, whose son Antiochus, seeing its geographical importance, refounded it on a more open site as Apamea (*q.v.*). West of the acropolis were the palace of Xerxes and the Agora, in or near which is the cavern whence the Marsyas, one of the sources of the Maeander, issues. According to Xenophon, Cyrus had a palace and large park full of wild animals at Celaenae.

See G. Weber, *Dineir-Celènes* (1892).

CELANDINE, *Chelidonium majus*, a member of the poppy family, an erect branched herb from 1 to 2 ft. high with a yellow juice, much divided leaves, and yellow flowers nearly an inch across, succeeded by a narrow thin pod opening by a pair of thin valves, separating upwards. The plant grows in waste places and hedgerows, and is probably an escape from cultivation. The lesser celandine is a species of *Ranunculus* (*R. Ficaria*), a small low-growing herb with smooth heart-shaped leaves and bright yellow flowers about an inch across, borne each on a stout stalk springing from a leaf-axil. It flowers in early spring, in pastures and waste-places.

CELANO, a town of the Abruzzi, Italy, in the province of Aquila, 73 m. E. of Rome by rail. Pop. (1901) 9725. It is finely situated on a hill above the Lago Fucino, and is dominated by a square castle, with round towers at the angles, erected in its present form in 1450. It contains three churches with 13th century façades in the style of those of Aquila. The origin of the town goes back to Lombard times. A count of Celano is first mentioned in 1178. It was the birthplace of Thomas of Celano, the author of the *Dies Irae*.

CELEBES,[1] one of the four Great Sunda Islands in the Dutch East Indies. Its general outline is extremely irregular, and has been compared to that of a starfish with the rays torn off from one side, corresponding to the west side of the island. It consists of four great peninsulas, extending from a comparatively small nucleus towards the north-east, east, south-east and south, and separated by the three large gulfs of Tomini or Gorontalo, Tolo or Tomaiki, and Boni. Of these gulfs the first is by far the largest, the other two having much wider entrances and not extending so far inwards. Most important among the smaller inlets are the bays of Amurang, Kwandang and Tontoli on the

[1] The second syllable is accented.

north coast, Palos and Pare-Pare on the west, and Kendari or Vosmaer on the east. Of the numerous considerable islands which lie north-east, east and south of Celebes (those off the west coast are few and small), the chief are prolongations of the four great peninsulas—the Sangir and Talaut islands off the north-east, the Banggai and Sula off the east, Wuna and Buton off the south-east, and Saleyer off the south. Including the adjacent islands, the area of Celebes is estimated at 77,855 sq. m., and the population at 2,000,000; without them the area is 69,255 sq. m. and the population 1,250,000.

The scenery in Celebes is most varied and picturesque. "Nowhere in the archipelago," wrote A. R. Wallace, "have I seen such gorges, chasms and precipices as abound in the district of Maros" (in the southern peninsula); "in many parts there are vertical or even overhanging precipices five or six hundred feet high, yet completely clothed with a tapestry of vegetation." Much of the country, especially round the Gulf of Tolo, is covered with primeval forests and thickets, traversed by scarcely perceptible paths, or broken with a few clearings and villages. A considerable part of the island has been little explored, but the general character seems to be mountainous. Well-defined ranges prolong themselves through each of the peninsulas, rising in many places to a considerable elevation. Naturally there are no great river-basins or extensive plains, but one of the features of the island is the frequent occurrence, not only along the coasts, but at various heights inland, of beautiful stretches of level ground often covered with the richest pastures. Minahassa, the north-eastern extremity, consists of a plateau divided into sections by volcanoes (Klabat, 6620 ft., being the highest). Sulphur springs occur here. In the west of the northern peninsula the interior consists in part of plateaus of considerable extent enclosed by the coast ranges. Near Lake Posso, in the centre of the island, the mountains are higher; the Tampiko massif has a height of nearly 5000 ft., the chains south and west of the lake have a general altitude of about 5450 ft., with peaks still loftier. In the southern peninsula two chains stretch parallel with the west and east coasts; the former is the higher, with a general altitude of 3200 ft. In the south it joins the Peak of Bonthain, or Lompo-battang, a great volcanic mass 10,088 ft. high. In the east central part of the island the mountain Koruve exceeds 10,000 ft., and is supposed to be the highest in the island. An alluvial coast plain, 7 to 9 m. wide, stretches along the foot of the western chain, and between the two chains is the basin of the Walannaë river, draining northward into Lake Tempe. Little is known of the orography of the eastern peninsula. At the base of the south-eastern there is another large lake, Tovieti. In this peninsula there are parallel ranges on the east and west flanks. The trench between them is partly occupied by the vast swamp of Lake Opa.

The rivers of the narrow mountainous peninsulas form many rapids and cataracts; as the Tondano, draining the lake of the same name to the north-west coast of Minahassa at Menado; the Rano-i-Apo, flowing over the plateau of Mongondo to the Gulf of Amurang; the Poigar, issuing from a little-known lake of that plateau; the Lombagin, traversing narrow cañons; and the river of Boni, which has its outfall in the plain of Gorontalo, near the mouth of the Bolango or Tapa, the latter connected by a canal with the Lake of Limbotto. All these rivers are navigable by praus or rafts for only a few miles above the mouth. In central Celebes, the Kodina flows into Lake Posso, and the Kalaëna discharges to the Gulf of Boni; the Posso, navigable by *blottos* (canoes formed of hollowed tree-trunks), is the only river flowing from the lake to the Gulf of Tomini. The rivers of the southern peninsula, owing to the relief of the surface, are navigable to a somewhat greater extent. The Walannaë flows into Lake Tempe, and, continued by the Jenrana (Tienrana), which discharges into the Gulf of Boni, is navigable for small boats; the Sadang, with many affluents, flows to the west coast, and is navigable by *sanpans*. The Jenemaja is a broad river, navigable far from the mouth. The coasts of Celebes are often fertile and well populated; but, as shown by the marine charts, many sand, mud and stone banks lie near the shore, and consequently there are few accessible or natural ports or good roadsteads.

Geology.— The geological observations on Celebes are too scattered to reveal its structure. The greater part of the island seems to be formed of gneiss and other crystalline rocks. These are overlaid by conglomerates, limestones and clay slates of very doubtful age, the most interesting being a radiolarian clay which occurs on the south side of the Matinang Mountains, at the north end of Lake Posso, &c.; it may correspond with the radiolarian cherts of Borneo. Tertiary beds are found, especially near the coast. The Eocene includes a series of sandstones and marls with lignite, and these are overlaid by nummulite limestones. The Miocene contains an *Orbitoides* limestone. Intrusive and volcanic rocks of great variety and of various ages occur. Peridotite and gabbro form much of the eastern peninsula (Banggai). Leucite and nepheline rocks have been found in various parts of the island, especially in the south-west. In Minahassa, at the northern extremity, there is a large area of tuffs and agglomerates consisting chiefly of augite andesite, and in this area there are many recent volcanic cones. Eruptions still take place at intervals, but the volcanoes for the most part seem to have reached the solfataric stage.

Climate.—The climate of the island, everywhere accessible to the influence of the sea, is maritime-tropical, the temperature ranging generally between 77° and 80° F., the extremes being about 90° and 70° F., only on the higher mountains falling during the night to 54° or 55° F. The rainfall in the northern peninsula (north of the equator) differs from that of the southern; the former has rains (not caused by the monsoon), and of smaller amount, 102 in. annually; the latter has a greater rainfall, 157 in., brought by the north-western monsoon, and of which the west coast receives a much larger share than the east.

Fauna and Flora.—In spite of its situation in the centre of the archipelago, Celebes possesses a fauna of a very distinctive kind. The number of species is small, but in many cases they are peculiar to the island. Of land birds, for example, about 160 species are known, and of these not less than about 90 are peculiar, the majority of the remainder being Asiatic in distinction from Australian. Mammals are few in species, but remarkable, especially *Macacus niger*, an ape found nowhere else but in Bachian; *Anoa depressicornis*, a small ox-like quadruped which inhabits the mountainous districts; and the babirusa or pig-deer of the Malays. Some of the animals are probably descendants of specimens introduced by man; others are allied in species, but not identical, with mammals of Java and Borneo; others again, including the three just mentioned, are wholly or practically confined to Celebes. There are no large beasts of prey, and neither the elephant, the rhinoceros nor the tapir is represented. Wild-buffaloes, swine and goats are pretty common; and most of the usual domestic animals are kept. The horses are in high repute in the archipelago; formerly about 700 were yearly exported to Java, but the supply has considerably diminished.

The same peculiarity of species holds in regard to the insects of the Celebes (so far as they are known) as to the mammals and birds. Out of 118 species of butterflies, belonging to four important classes, no fewer than 86 are peculiar; while among the rose-chafers or *Cetoniinae* the same is the case in 19 out of 30. Equally remarkable with this presence of peculiar species is the absence of many kinds that are common in the rest of the archipelago; and these facts have been considered to indicate connexion with a larger land-mass at a very distant geological epoch, and the subsequent continuous isolation of Celebes. This view, however, has been controverted. It is held that in the Miocene and Pliocene periods there were land connexions with the Philippines, Java and the Moluccas, and through the last with Australasian lands to the east and south-east. Migration of species took place along these lines in both directions. Those immigrants which remained in what is now Celebes may have developed new species. Moreover, while Celebes has species which are peculiar to itself and one other of the islands just mentioned, it has none which it shares exclusively with Borneo, and thus the importance of the Macassar Strait as a biological division is indicated.

Vegetation is extremely rich; but there are fewer large trees than in the other islands of the archipelago. Of plants that

furnish food for man the most important are rice, maize and millet, coffee, the coco-nut tree, sago-palm, the obi or native potato, the bread-fruit and the tamarind; with lemons, oranges, mangosteens, wild-plums, Spanish pepper, beans, melons and sugar-cane. The shaddock is to be found only in the lower plains. Indigo, cotton and tobacco are grown; the bamboo and the ratan-palm are common in the woods; and among the larger trees are sandal-wood, ebony, sapan and teak. The palm, *Arenga saccharifera*, furnishes *gemuti* fibres for ropes; its juice is manufactured into sugar and a beverage called sagueir; and intoxicating drinks are prepared from several other palms.

Products.—As in natural vegetation and fauna, so in cultivated products, Celebes, apart from its peculiarities, presents the transitional link between the Asiatic and the Australian regions of the Malayan province. For example, rice is produced here in smaller quantity and of inferior quality to that in the western part of the archipelago, but superior to that in the eastern section, where sago and sorghum form the staple articles of food. The products of the forests supply about half the total exports. The fisheries include trepang, turtle and pearl oysters. Gold is worked under European direction in the district of Gorontalo, but with only partial success; the search for coal in the southern peninsula has yielded no satisfactory results; tin, iron and copper, found in the eastern peninsula and elsewhere, are utilized only for native industries.

Natives.—The native population of the island is all of Malayan stock. The three most important peoples are the Bugis (*q.v.*) the Macassars and the Mandars. The medley of other Malayan tribes, of a more or less savage type, living in the island, are known under the collective name of Alfuros (*q.v.*). The Macassars are well-built and muscular, and have in general a dark-brown complexion, a broad and expressive face, black and sparkling eyes, a high forehead, a flattish nose, a large mouth and long black soft hair. The women are sprightly, clever and amiable. The men are brave and not treacherous, but ambitious, jealous and extremely revengeful. Drunkenness is rare, but they are passionate, and running amuck is frequent among them. In all sorts of bodily exercises, as swinging, wrestling, dancing, riding and hunting, they take great pleasure. Though they call themselves Mahommedans, their religion is largely mingled with pagan superstitions; they worship animals, and a certain divinity called Karaeng Lové, who has power over their fortune and health. Except where Dutch influence has made itself felt, little attention has been paid by the native races to agriculture; and their manufacturing industries are few and limited. The weaving of cotton cloth is principally carried on by women; and the process, at least for the finer description, is tedious in the extreme. The houses are built of wood and bamboo; and as the use of diagonal struts is not practised, the walls soon lean over from the force of the winds. The Macassar language, which belongs to the Malayo-Javanese group, is spoken in many parts of the southern peninsula; but it has a much smaller area than the Buginese, which is the language of Boni. It is deficient in generalizations; thus, for example, it has words for the idea of carrying in the hand, carrying on the head, carrying on the shoulder, and so on, but has no word for carrying simply. It has adopted a certain number of vocables from Sanskrit, Malay, Javanese and Portuguese, but on the whole is remarkably pure, and has undergone comparatively few recent changes. It is written in a peculiar character, which has displaced, and probably been corrupted from, an old form employed as late as the 17th century. Neither bears any trace of derivation from the Sanskrit alphabet. The priests affect the use of the Arabic letters. The literature is poor, and consists largely of romantic stories from the Malay, and religious treatises from the Arabic. Of the few original pieces the most important are the early histories of Goa, Tello and some other states of Celebes, and the *Rapang*, or collection of the decrees and maxims of the old princes and sages. The more modern productions are letters, laws and poems, many of the last of considerable beauty.

Divisions, Towns, Population.—Celebes is divided by the Dutch, for administrative purposes, into the government of Celebes with dependencies (south-eastern and southern peninsulas and all west coast), and the residency of Menado (north-eastern peninsula and coast of Gulf of Tomini). The eastern peninsula and coast of the Gulf of Tolo belong politically to the residency of Ternate (*q.v.*). The following table shows approximately the distribution and composition of the population:—

	Europeans.	Chinese.	Arabs.	Other Oriental Foreigners.	Natives.	Total.
Government of Celebes and Dependencies .	1414	3738	554	54	409,739	415,499
Residency of Menado—						
Minahassa . .	836	3574	286	16	430,941	436,406
Gorontalo . .	115	505	133	..		

The *Government of Celebes and Dependencies* is subdivided into the government territory, the vassal states (Boni, *q.v.*, and Ternate), and the federal countries. The density of population for the whole government is estimated as 3·7 or 4 per sq. m., varying from 2·2 in the vassal and federated states to 14·7 to 18·4 for Macassar and the districts directly governed by the Dutch. The density of population in districts outside the influence of European government sinks to 1 and less per sq. m. As in the case of Minahassa, the difference must be explained by physical and moral conditions. Two-thirds of the natives live by agriculture, and one-third by trade, navigation, shipbuilding and other industries. In agreement with these principal occupations, the centres of population are found in southern Celebes, on the coast (not in the interior plains or on the lake, as in Menado). Palos (3000), with good port; Pare-Pare, connected by road with Lake Tempe; and Macassar (17,925), the seat of the governor and the centre of trade for the eastern part of the archipelago. On the south coast must also be named Bonthain (4000); on the east coast, Balong-Nipa; and Buton and Saleyer, seats of administration and ports of call on the island groups of the same names.

The *Residency of Menado* comprises three districts: Minahassa, the little states along the north coast west of Minahassa, and Gorontalo, including the other states of the northern peninsula lying along the Gulf of Tomini. The density of population being calculated at about 2·7 to 3 per sq. m. for Celebes, is 16·2 for Minahassa, but only 1·5 to 2 for the Residency of Menado. Centres of population in Menado are Amurang (3000), the seat of a Dutch controller, and a calling place for the steamers of the Indian Packet Company; Menado (10,000), the chief town of the residency, the principal station of the Dutch missionaries, with a fair amount of trade, but an unsafe roadstead; Tondano (12,000), near the lake and river of the same name, at an altitude of nearly 2000 ft., and one of the chief centres; Gorontalo, one of the most important towns of Celebes, carrying on direct trade with Singapore and Europe. All the other coast places have some importance as chief villages of the little states and as ports of call for the vessels of the steam packet company, but have only from 500 to 1000 inhabitants.

History.—Celebes was first discovered by the Portuguese in the early part of the 16th century, the exact date assigned by some authorities being 1512. The name is not used by the natives, and is apparently of foreign origin, but has been variously derived, *e.g.* from the mountain of Klabat or Kalabat, or from *Seli Besi*, an iron kris carried by the natives, of whom those who were first asked for the name of the island were conceived, according to this theory, to have misunderstood their questioners. At the time of the Portuguese discovery, the Macassars were the most powerful people in the island, having successfully defended themselves against the king of the Moluccas and the sultan of Ternate. In 1609 the British attempted to gain a footing. At what time the Dutch first arrived is not certainly known, but it was probably in the end of the 16th or beginning of the 17th century, since in 1607 they formed a connexion with Macassar. In 1611 the Dutch East Indian Company obtained the monopoly of trade on the island of Buton; and in 1618 an insurrection in Macassar gave them an opportunity of obtaining a definite establishment there. In 1660 the kingdom was subjugated, but in 1666 the war broke out anew. It was brought to an end in the following year, and the treaty of Bonga or Banga was signed, by which the Dutch were recognized as protectors.

In 1683 the north-eastern part of the island was conquered by Robert Paddenburg and placed under the command of the governor of the Moluccas. In 1703 a fort was erected at Menado. The kingdom of Boni was successfully attacked in 1824, and in August of that year the Bonga treaty was renewed in a greatly modified form. Since then the principal military event is the Boni insurrection which was quelled in 1859, but this was far from pacifying the country permanently. A series of revolts of various chiefs in 1905–6 was not arrested without considerable fighting, but after this the whole island was brought under Dutch authority, even where native rule survived.

BIBLIOGRAPHY.— In P. J. Veth's *Woordenboek van Nederlandsch Indie* there will be found an extensive bibliography of Celebes drawn up by H. C. Millies. For additional bibliography and data for the island and its population, see C. M. Kan, "Celebes," in the *Encyclopaedie van Nederlandsch Indie*, ed. by P. A. van der Lith and A. H. Spaan (The Hague, 1895), &c., vol. i. p. 314. See P. and F. Sarasin (who have carried out extensive explorations in the island), "Berichte aus Celebes," *Zeitschr. der Ges. f. Erdk.* xxix. 351; *Entwurf einer geographisch-geologischen Beschreibung der Insel Celebes* (Wiesbaden, 1901); *Reisen in Celebes, 1893–1896, 1902–1903* (Wiesbaden, 1905); *Versuch einer Anthropologie der Insel Celebes* (Wiesbaden, 1906); C. van der Hart, *Reize rondon het Eiland Celebes* (The Hague, 1853); Capt. R. Mundy, *Narrative of Events in Borneo and Celebes* (London, 1848); P. J. Veth, *Een Nederlandsch reiziger op Zuid Celebes* (Amsterdam, 1875); J. G. F. Riedel, *Het landschap Boeool, Noord Selebes* (1872); and "Die Landschaften Holontalo, Limoeto," &c., in *Zeitschr. für Ethnologie* (1871); H. Bücking, "Beiträge zur Geologie von Celebes," *Samml. geol. Reichsmus. Leiden*, vol. vii. pp. 29-205 (1902), pp. 221-224 (1904); and various articles in *Tijdschrift v. h. Aardrijkskundig Genootschap* and *Tijdsch. v. h. Batavian. Gen.*

CELERY (*Apium graveolens*), a biennial plant belonging to the natural order Umbelliferae, which, in its wild state, occurs in England by the sides of ditches and in marshy places, especially near the sea, producing a furrowed stalk and compound leaves with wedge-shaped leaflets, the whole plant having a coarse, rank taste and a peculiar smell. It is also widely distributed in the north temperate region of the Old World. By cultivation and blanching the stalks lose their acrid qualities and assume the mild sweetish aromatic taste peculiar to celery as a salad plant. The plants are raised from seed, sown either in a hot bed or in the open garden, according to the season of the year, and after one or two thinnings out and transplantings, they are, on attaining a height of 6 or 8 in., planted out in deep trenches for convenience of blanching, which is effected by earthing up and so excluding the stems from the influence of light. A large number of varieties are cultivated by gardeners, which are ranged under two classes, white and red,—the white varieties being generally the best flavoured and most crisp and tender. As a salad plant, celery, especially if at all "stringy," is difficult of digestion. Both blanched and green it is stewed and used in soups, the seeds also being used as a flavouring ingredient. In the south of Europe celery is seldom blanched, but is much used in its natural condition.

Celeriac, or turnip-rooted celery (*Apium graveolens* var. *rapaceum*), is a variety cultivated more on account of its roots than for the stalks, although both are edible and are used for salads and in soups. It is chiefly grown in the north of Europe. As the tops are not required, trenching is unnecessary, otherwise the cultivation is the same as for celery.

CÉLESTE, MADAME (1815–1882), French dancer and actress, was born in Paris on the 16th of August 1815. As a little girl she was a pupil in the ballet class at the Opéra. When fifteen, she had an offer from the United States, and made her début at the Bowery theatre, New York. Returning to England, she appeared at Liverpool as Fenella in *Masaniello*, and also in London (1831). In 1834 she aroused such enthusiasm in America that her admirers carried her on their shoulders and took the horses out of her carriage in order to pull it themselves. It is even said that President Jackson introduced her to his cabinet as an adopted citizen of the Union. Having made a large fortune, she returned to England in 1837. She now gave up dancing, and appeared as an actress, first at Drury Lane and then at the Haymarket. In 1844 she joined Benjamin Webster in the management of the Adelphi, and afterwards took the sole management of the Lyceum till 1861. She made a third visit to the United States from 1865 to 1868, and retired in 1870. Her favourite part was Miami in Buckstone's *Green Bushes*. She died in Paris on the 12th of February 1882.

CELESTINA, LA, the popular alternative title attached from 1519 (or earlier) to the anonymous *Comedia de Caliste y Melibea*, a Spanish novel in dialogue which was celebrated throughout Europe during the 16th century. In the two earliest known editions (Burgos, 1499, and Seville, 1501) the *Comedia* consists of sixteen acts; the reprints issued after 1501 are entitled *Tragicomedia de Calisto y Melibea*, and contain twenty-one acts. Three of these reprints include a twenty-second act which is admittedly spurious, and the authenticity of Acts XVII.-XXI. is disputed. The authorship of the *Celestina* and the date of its composition are doubtful. An anonymous prefatory letter in the editions subsequent to 1501 attributes the book to Juan de Mena or Rodrigo Cota, but this ascription is universally rejected. The prevailing opinion is that the author of the twenty-one acts was Fernando de Rojas, apparently a Spanish Jew resident at the Puebla de Montalban in the province of Toledo; R. Foulché-Delbose, however, maintains that the original sixteen acts are by an unknown writer who had no part in the five supplementary acts. Some scholars give 1483 as the date of composition; others hold that the book was written in 1497. These questions are still unsettled. Though profoundly original in treatment, the *Celestina* has points of analogy with the work of earlier writers, such as Juan Ruiz (*q.v.*), the archpriest of Hita; his rapid sketches of Trota-conventas, Melón and Endrina no doubt suggested the finished portraits of Celestina, Calisto and Melibea, and the closing scene in the *Celestina* recalls the suicide in Diego Fernandez de San Pedro's *Cárcel de Amor*. Allowing for these and other debts of the same kind, it cannot be denied that the *Celestina* excels all earlier Spanish works in tragic force, in impressive conception, and in the realistic rendering of characters drawn from all classes of society. It passed through innumerable editions in Spain, and was the first Spanish book to find acceptance throughout western Europe. At least twenty works by well-known Spanish authors are derived from it; it was adapted for the English stage as early as 1525–1530, and was translated into Italian (1505), French (1527) and other European languages. A Latin version by Caspar Barth was issued under the title of *Pornoboscodidascalus latinus* (1624) with all the critical apparatus of a recognized classic. James Mabbe's English rendering (1631) is one of the best translations ever published. The original edition of 1499 has been reprinted by R. Foulché-Delbose in the *Bibliotheca Hispanica* (1902), vol. xii.

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CELESTINE (CAELESTINUS), the name of five popes.

CELESTINE I., pope from 422 to 432. At his accession the dissensions caused by the faction of Eulalius (see BONIFACE I.) had not yet abated. He, however, triumphed over them, and his episcopate was peaceful. When the doctrines of Nestorius were denounced to him, he instructed Cyril, bishop of Alexandria, to follow up the matter. The emperor Theodosius II. convoked an ecumenical council at Ephesus, to which Celestine sent his legates. He had some difficulties with the bishops in Africa on the question of appeals to Rome, and with the bishops of Provence with regard to the doctrines of St Augustine. To expedite the extirpation of Pelagianism, he sent to Britain a deacon called Palladius, at whose instigation St Germanus of Auxerre crossed the English Channel, as delegate of the pope and bishops of Gaul, to inculcate orthodox principles upon the clergy of Britain. He also commissioned Palladius to preach the gospel in Ireland which was beginning to rally to Christianity. Celestine was the first pope who is known to have taken a direct interest in the churches of Britain and Ireland. (L. D.*)

CELESTINE II., pope in 1143–1144. Guido of Città di Castello (Tiferno), born of noble Tuscan family, able and learned, studied

under Abelard and became a cardinal priest. Elected the successor of Innocent II. on the 26th of September 1143, he died on the 8th of March following. He removed the interdict which Innocent had employed against Louis VII. of France. At the time of his death he was on the verge of a controversy with Roger of Sicily.

See A. Certini, *Vita* (Foligno, 1716); M. Bouquet, *Recueil des historiens des Gaules* (Paris, 1738 ff.), tome 15, 408-411; Migne, *Patrologiae cursus completus*, 179, 765-820; P. Jaffé, *Regesta Pontificum Romanorum*, 2nd ed. vol. ii. (Lipsiae, 1888), 1 ff.; Wetzer und Welte, *Kirchenlexikon*, 2nd ed. vol. iii. (Freiburg, 1884), 578 ff.; Herzog-Hauck, *Realencyklopädie*, 3rd ed. vol. iv. (Leipzig, 1898), 201.

CELESTINE III. (Giacinto Bobo), pope from 1191 to 1198, was cardinal deacon of Santa Maria in Cosmedin as early as 1144, and had reached the age of eighty-five when chosen on the 30th of March 1191 to succeed Clement III. The first pope of the house of the Orsini, his policy was marked by mildness and indecision. Henry VI. of Germany at once forced the pontiff to crown him emperor, and three or four years later took possession of the Norman kingdom of Sicily; he refused tribute and the oath of allegiance, and even appointed bishops subject to his own jurisdiction; moreover, he gave his brother in fief the estates which had belonged to the countess Matilda of Tuscany. Celestine did not dare so much as to threaten him with excommunication. It was Celestine's purpose to lay England under the interdict; but Prince John and the barons still refused to recognize the papal legate, the bishop of Ely. Richard I. had been set free before the dilatory pope put Leopold of Austria under the ban. In his last sickness Celestine wished to resign his office, but the cardinals protested. Death released him from his perplexities on the 8th of January 1198.

See "Epistolae Coelestini III. Papae," in M. Bouquet, *Receuil des historiens des Gaules et de la France*, tome 19 (Paris, 1738 ff.); J. P. Migne, *Patrologiae cursus completus*, tome 206 (Paris, 1855), 867 ff.; further sources in *Neues Archiv für die ältere deutsche Geschichtskunde*, 2. 218; 11. 398 f.; 12. 411-414; P. Jaffé, *Regesta Pontificum Romanorum*, vol. ii. (2nd ed., Leipzig, 1888), 577 ff. (W. W. R.*)

CELESTINE IV. (Godfrey Castiglione), pope in 1241, son of a sister of Urban III. (1185–1187), was archpriest and chancellor at Milan. After Urban's death he entered the Cistercian monastery at Hautecombe in Savoy. In 1227 Gregory IX. created him cardinal priest of St Mark's, and in 1233 made him cardinal bishop of Sabina. Elected to succeed Gregory on the 25th of October 1241, he died on the 10th of November, before consecration, and was buried in St Peter's.

See A. Potthast, *Regesta Pontificum Romanorum*, vol. i. (Berlin, 1874), 940 f.

CELESTINE V. (St Peter Celestine), pope in 1294, was born of poor parents at Isernia about 1215, and early entered the Benedictine order. Living as a hermit on Monte Morrone near Sulmone in the Abruzzi, he attracted other ascetics about him and organized them into a congregation of the Benedictines which was later called the Celestines (*q.v.*). The assistance of a vicar enabled him to escape from the growing administrative cares and devote himself solely to asceticism, apparently the only field of human activity in which he excelled. His *Opuscula*, published by Telera at Naples in 1640, are probably not genuine; he was *indoctus libris*. A fight between the Colonna and the Orsini, as well as hopeless dissensions among the cardinals, prevented a papal election for two years and three months after the death of Nicholas IV. Charles II. of Naples, needing a pope in order that he might regain Sicily, brought about a conclave. As the election of any cardinal seemed impossible, on the 5th of July 1294 the Sacred College united on Pietro di Morrone; the cardinals expected to rule in the name of the celebrated but incapable ascetic. Apocalyptic notions then current doubtless aided his election, for Joachim of Floris and his school looked to monasticism to furnish deliverance to the church and to the world. Multitudes came to Celestine's coronation at Aquila, and he began his reign the idol of visionaries, of extremists and of the populace. But the pope was in the power of Charles II. of Naples, and became his tool against Aragon. The king's son Louis, a layman of twenty-one, was made archbishop of Lyons. The cardinals, scarcely consulted at all, were discontented. The pope, who wanted more time for his devotions, offered to leave three cardinals in charge of affairs; but his proposition was rejected. He then wished to abdicate, and at length Benedetto Gaetano, destined to succeed him as Boniface VIII., removed all scruples against this unheard-of procedure by finding a precedent in the case of Clement I. Celestine abdicated on the 13th of December 1294. There is no sufficient ground for finding an allusion to this act in the noted line of Dante, "Che fece per viltate il gran rifiuto" ("who made from cowardice the great refusal," *Inferno*, 3, 60). Boniface at length put him in prison for safe keeping; he died in a monastic cell in the castle of Fumone near Anagni on the 19th of May 1296. He was canonized by Clement V. in 1313.

See Wetzer und Welte and Herzog-Hauck (with excellent bibliography) as above; Jean Aurélien, Supérieur de la Congrégation des Célestins, *La Vie admirable de . . . Saint Pierre Célestin* (Bar-le-Duc, 1873); H. Finke, *Aus den Tagen Bonifaz VIII.* (Münster, 1902), pp. 24-43. (W. W. R.*)

CELESTINE, or CELESTITE, a name applied to native strontium sulphate ($SrSO_4$), having been suggested by the celestial blue colour which it occasionally presents. This colour has been referred to a trace of iron phosphate, but in some cases such an explanation appears doubtful. The mineral is usually colourless, or has only a delicate shade of blue. Celestine crystallizes in the orthorhombic system, being isomorphous with barytes (*q.v.*). The angle between the prism faces is 76° 17′. The cleavage is perfect parallel to the basal pinacoid, and less marked parallel to the prism. Although celestine much resembles barytes in its physical properties, having for example the same degree of hardness (3), it is less dense, its specific gravity being 3·9. Celestine is a less abundant mineral than barytes. It is, however, much more soluble, and occurs frequently in mineral waters. W. W. Stoddart showed that many plants growing on Keuper marls containing celestine near Bristol appropriated the strontium salt, and the metal could be detected spectroscopically in their ashes.

Celestine occurs in the Triassic rocks of Britain, especially in veins and geodes in the Keuper marl in the neighbourhood of Bristol. At Wickwar and Yate in Gloucestershire it is worked for industrial purposes. Colourless crystals, of great beauty, occur in association with calcite and native sulphur in the sulphur deposits of Sicily, as at Girgenti. Fine blue crystals are yielded by the copper mines of Herrengrund, in Hungary; a dark blue fibrous form is known from Jena; and small crystals occur in flint at Meudon near Paris. Very large tabular crystals are found in limestone on Strontian Island in Lake Erie; and a blue fibrous variety from near Frankstown, Blair Co., Penn., is notable as having been the original celestine on which the species was founded by A. G. Werner in 1798.

Celestine is much used for the preparation of strontium hydrate, which is employed in refining beetroot sugar in Germany. The mineral is used also as a source of various salts of strontium such as the nitrate, which finds application in pyrotechny for the production of red fire. (F. W. R.*)

CELESTINES, a religious order founded about 1260 by Peter of Morrone, afterwards Pope Celestine V. (1294). It was an attempt to unite the eremitical and cenobitical modes of life. Peter's first disciples lived as hermits on Mount Majella in the Abruzzi. The Benedictine rule was taken as the basis of the life, but was supplemented by regulations notably increasing the austerities practised. The form of government was borrowed largely from those prevailing in the mendicant orders. Indeed, though the Celestines are reckoned as a branch of the Benedictines, there is little in common between them. For all that, St Celestine, during his brief tenure of the papacy, tried to spread his ideas among the Benedictines, and induced the monks of Monte Cassino to adopt his idea of the monastic life instead of St Benedict's; for this purpose fifty Celestine monks were introduced into Monte Cassino, but on Celestine's abdication of the papacy the project fortunately was at once abandoned. During the founder's lifetime the order spread rapidly, and eventually

there were about 150 monasteries in Italy, and others in France, Bohemia and the Netherlands. The French houses, twenty-one in number, formed a separate congregation, the head-house being in Paris. The French Revolution and those of the 19th century destroyed their houses, and the Celestine order seems no longer to exist.

Peter of Morrone was in close contact with the Franciscan Spirituals of the extreme type (see FRANCISCANS), and he endeavoured to form an amalgamation between them and his hermits, under the title "Poor Hermits of Celestine." On his abdication the amalgamation was dissolved, and the Franciscan element fled to the East and was finally suppressed by Boniface VIII. and compelled to re-enter the Franciscan order. The habit of the Celestines was black.

See Helyot, *Histoire des ordres religieux* (1792), vi. c. 23; Max Heimbucher, *Orden und Kongregationen* (1896), i. § 22, p. 134; the art. "Cölestiner" in Wetzer und Welte, *Kirchenlexicon* (ed. 2), and Herzog-Hauck, *Realencyklopädie* (ed. 3). (E. C. B.)

CELIBACY (Lat. *caelibatus*, from *caelebs*, unmarried), the state of being unmarried, a term now commonly used in the sense of complete abstinence from marriage; it originally included the state of widowhood also, and any one was strictly a *caelebs* who had no existing spouse. Physicians and physiologists have frequently discussed celibacy from their professional point of view; but it will be sufficient to note here the results of statistical inquiries. It has been established by the calculations of actuaries that married persons—women in a considerable, but men in a much greater degree—have at all periods of life a greater probability of living than the single. From the point of view of public utility, the state has sometimes attempted to discourage celibacy. The best-known enactment of this kind is that of the emperor Augustus, best known as *Lex Julia et Papia Poppaea*. This disabled *caelibes* from receiving an inheritance unless the testator were related to them within the sixth degree; it limited the amount which a wife could take by a husband's will, or the husband by the wife's, unless they had children; and preference was given to candidates for office in proportion to the number of their children.[1] Ecclesiastical legislators, on the other hand, have frequently favoured the unmarried state; and celibacy, partial or complete, has been more or less stringently enforced upon the ministers of different religions; many instances are quoted by H. C. Lea. The best known, of course, are the Roman Vestals; though here even the great honours and privileges accorded to these maidens were often insufficient to keep the ranks filled. In the East, however, this and other forms of asceticism have always flourished more freely; and the Buddhist monastic system is not only far older than that of Christendom, but also proportionately more extensive.[2] In early Judaism, chastity was indeed enjoined upon the priests at certain solemn seasons; but there was no attempt to enforce celibacy upon the sacerdotal caste. On the contrary, all priests were the sons of priests, and the case of Elizabeth shows that here, as throughout the Jewish people, barrenness was considered a disgrace. But Alexander's conquests brought the Jews into contact with Hindu and Greek mysticism; and this probably explains the growth of the ascetic Essenes some two centuries before the Christian era. The adherents of this sect, unlike the Pharisees and Sadducees, were never denounced by Christ, who seems on the contrary to have had real sympathy with the voluntary celibacy of an exceptional few (Matt. x. 12). St Paul's utterances on this subject, though they go somewhat further, amount only to the assertion that a struggling missionary body will find more freedom in its work in the absence of wives and children. At the same time, St Paul claimed emphatically for himself and the other apostles the right of leading about a wife; and he names among the qualifications for a bishop, an elder and a deacon, that he should be "the husband of one wife." Indeed it was freely admitted by the most learned men of the middle ages and Renaissance that celibacy had been no rule of the apostolic church; and, though writers of ability have attempted to maintain the contrary even in modern times, their contentions are unhesitatingly rejected by the latest Roman Catholic authority.[3]

The gradual growth of clerical celibacy, first as a custom and then as a rule of discipline, can be traced clearly enough even through the scanty records of the first few centuries. The most ascetic Christians began to question the legality of second marriages on the part of either sex, as even paganism had often reprobated second marriages of women. Though these extremists were presently branded as heretics for their eccentric ultra-ascetic tenets (Montanists, Cathari), yet as early as Tertullian's time (*c.* A.D. 220) the right of second marriages was theoretically denied to the priesthood. This was logically followed by a revival of the old Levitical rule which required that priests should marry none but virgins (Lev. xxi. 7, 13). Both these rules, however, proved difficult of enforcement and seem to have rested only on a vague basis of public opinion; twice-married men (*digami*) were admitted to the priesthood by Pope Calixtus I. (219–222), and even as late as the beginning of the 5th century we find husbands of widows consecrated to the episcopate. The so-called Apostolical Constitutions and Canons, the latter of which were compiled in the 4th century, give us the first clear and fairly general rules on the subject. Here we find "bishops and priests allowed to retain the wives whom they may have had before ordination, but not to marry in orders; the lower grades, deacons, subdeacons, &c., allowed to marry after entering the church; but all were to be husbands of but one wife, who must be neither a widow, a divorced woman nor a concubine" (Lea i. 28). Many causes, however, were already at work to carry public feeling beyond this stage. Quite apart from the few enthusiasts who would have given a literal interpretation to the text in Matt. xix. 12, vows of virginity became more and more frequent as the virtue itself was lauded by ecclesiastical writers in language of increasing fervour. These vows were at first purely voluntary and temporary; but public opinion naturally grew less and less tolerant of those who, having once formed and published so solemn a resolution, broke it afterwards. Again not only was the church doctrine itself more or less consciously influenced by the Manichaean tenet of the diabolical origin of all matter, including the human body, but churchmen were also naturally tempted to compete in asceticism with the many heretics who held this tenet, and whose abstinence brought them so much popular consideration. Moreover, in proportion as the clergy, no longer mere ringleaders of a despised and persecuted sect, became beneficiaries and administrators of rich endowments—and this at a time when the external safeguards against embezzlement were comparatively weak—a strong feeling grew up among the laity that church revenues should not go to support the priest's family.[4] Lastly, such partial attempts as we have already described to enforce upon the clergy a special rule of continence, by their very failure, suggested more heroic measures. Therefore, side by side with the evidence for difficult enforcement of the old rules, we find an equally constant series of new and more stringent enactments.

The first church council which definitely forbade marriage to the higher clergy was the local Spanish synod of Elvira (A.D. 305). A similar interpretation has sometimes been claimed for the third canon of that general council of Nicaea to which we

[1] W. Smith, *Dict. of Greek and Roman Antiquities* (3rd ed.), vol. ii. p. 44.

[2] "In the 14th century, the city of Ilchi, in Chinese Tartary, possessed 14 monasteries, averaging 3000 devotees in each; while in Tibet, at the present time, there are in the vicinity of Lhassa 12 great monasteries, containing a population of 18,500 lamas. In Ladak the proportion of lamas to the laity is as 1 to 13, in Spiti 1 to 7, and in Burmah 1 to 30" (Lea i. 103).

[3] 1 Cor. vii. 25 sq., ix. 5; 1 Tim. iii. 2, 11, 12; Titus i. 6; E. Vacandard in *Dict. de Théol. Cath.*, *s.v.* "Célibat."

[4] This was a natural argument for the defenders of clerical celibacy even in far later times. St Bonaventura (d. 1274) puts this very strongly: "For if archbishops and bishops now had children, they would rob and plunder all the goods of the Church so that little or nothing would be left for the poor. For since they now heap up wealth and enrich nephews removed from them by almost incalculable degrees of affinity, what would they do if they had legitimate children? . . . Therefore the Holy Ghost in His providence hath removed this stumbling-block," &c. &c. (*In Sent.* lib. iv. dist. xxxvii art. i. quaest. 3).

qwe the Nicene creed (325), but this is now abandoned by the best authorities on all sides. There can be no doubt, however, that the 4th century opened a wide breach in this respect between the Eastern and Western churches. The modern Greek custom is "(*a*) that most candidates for Holy Orders are dismissed from the episcopal seminaries shortly before being ordained deacons, in order that they may marry (their partners being in fact mostly daughters of clergymen), and after their marriage, return to the seminaries in order to take the higher orders; (*b*) that, as priests, they still continue the marriages thus contracted, but may not remarry on the death of their wife; and (*c*) that the Greek bishops, who may not continue their married life, are commonly not chosen out of the ranks of the married secular clergy, but from among the monks."[1] The Eastern Church, therefore, still adheres fairly closely to the rules laid down by the Apostolical Canons in the 4th century. In the West, however, a decisive forward step was taken by Popes Damasus and Siricius during the last quarter of that century. The famous decretal of Siricius (385) not only enjoined strict celibacy on bishops, priests and deacons, but insisted on the instant separation of those who had already married, and prescribed the punishment of expulsion for disobedience (Siric. *Ep.* i. c. 7; Migne, *P.L.* xiii. col. 1138). Although we find Siricius a year later writing to the African Church on this same subject in tones rather of persuasion than of command, yet the beginning of compulsory sacerdotal celibacy in the Western Church may be conveniently dated from his decretal of A.D. 385. Leo the Great (d. 461) and Gregory the Great (d. 604) further extended the rule of celibacy to subdeacons.

For the next three or four centuries there is little to note but the continual evidence of open or secret resistance to these decrees, and the parallel frequency and stringency of ecclesiastical legislation, which by its very monotony bears witness to its own want of success. At least seven episcopal constitutions of the 8th and 9th centuries forbade the priest to have even his mother or his sister in the house.[2] Nor did the only difficulty lie in such secret breaches of the law; in many districts the priesthood tended to become a mere hereditary caste, to the disadvantage of church and state alike. In northern and southern Italy public clerical marriages were extremely frequent, whether with or without regular forms.[3] The see of Rouen was held for more than a century (942–1054) by three successive bishops who were family men and two of whom were openly married.[4] In England St Swithun (d. 862) was married, though very likely by special papal dispensation; and the married clergy were apparently predominant in Alfred's time. In spite of Dunstan's reforms at the end of the 10th century, the Norman Lanfranc found so many wedded priests that he dared not decree their separation; and when his successor St Anselm attempted to go further, this seemed a perilous novelty even to so distinguished an ecclesiastic as Henry of Huntingdon, who wrote: "About Michaelmas of this same year (1102) Archbishop Anselm held a council in London, wherein he forbade wives to the English priesthood, heretofore not forbidden; which seemed to some a matter of great purity, but to others a perilous thing, lest the clergy, in striving after a purity too great for human strength, should fall into horrible impurity, to the extreme dishonour of the Christian name" (lib. vii.; Migne, *P.L.* cxcv. col. 944). Yet this was at a time when the decisive and continued action of two great popes ought to have left no possible doubt as to the law of the church.

The growing tendency of the clergy to look upon their endowments as hereditary fiefs, their consequent worldliness and (it must be added) their vices, aroused the indignation of two very remarkable men in the latter half of the 11th century. St Pietro Damiani (988–1072) was a scholar, hermit and reformer, who did more perhaps than any one else to combat the open marriages of the clergy. He complained that exhortation was wasted even on the bishops, "because they despair of attaining to the pinnacle of chastity, and have no fear of condemnation in open synod for the vice of lechery. . . . If this evil were secret [he adds], it might perhaps be borne."[5] His *Liber Gomorrhianus*, addressed to and approved by St Leo IX., is sufficient in itself to explain the vehemence of his crusade, though it emphasizes even more strongly the impolicy of proceeding more severely against the open marriages of the clergy than against concubinage and other less public vices.[6] Damiani found a powerful ally in the equally ascetic but far more imperious and statesmanlike Hildebrand, afterwards Pope Gregory VII. Under the influence of these two men, five successive popes between 1045 and 1073 attempted a radical reform; and when, in this latter year, Hildebrand himself became pope, he took measures so stringent that he has sometimes been erroneously represented not merely as the most uncompromising champion, but actually as the author of the strict rule of celibacy for all clerics in sacred orders. His mind, strongly imbued with the theocratic ideal, saw more clearly than any other the enormous increase of influence which would accrue to a strictly celibate body of clergy, separated by their very ordination from the strongest earthly ties; and no statesman has ever pursued with greater energy and resolution a plan once formulated. In order to break down the desperate, and in many places organized, resistance of the clergy, he did not shrink from the perilous course, so contrary to his general policy, of subjecting them to the judgment of the laity. Not only were concubinary priests—a term which was now made to include also those who had openly married—forbidden to serve at the altar and threatened with actual deposition in cases of contumacy, but the laity were warned against attending mass said by "any priest certainly known to keep a concubine or *subintroducta*."[7]

But these heroic measures soon caused serious embarrassment. If the laity were to stand aloof from all incontinent priests, while (as the most orthodox churchmen constantly complained) many priests were still incontinent, then this could only result in estranging large bodies of the laity from the sacraments of the church. It became necessary, therefore, to soften a policy which to the lay mind might imply that the virtue of a sacrament was weakened by the vices of its ministers; and, whereas Peter Lombard (d. 1160) concludes that no excommunicated priest can effect transubstantiation, St Thomas Aquinas (d. 1274) agrees with all the later Schoolmen in granting him that power, though to the peril of his own soul.[8] For, by the last quarter of the 13th century, the struggle had entered upon a new phase. The severest measures had been tried, especially against the priests' unhappy partners. As early as the council of Augsburg (952) these were condemned to be scourged, while Leo II. and Urban II., at the councils of Rome and Amalfi (1051, 1089),

[1] Hefele, *Beiträge zur Kirchengesch. u.s.w.* i. 139.

[2] See the quotations in Lea i. 156. These prohibitions were renewed in the 13th and 14th centuries (*ibid.* i. 410).

[3] Ratherius, *Itinerarium*, c. 5 (Migne, *P.L.* cxxxvi. col. 585). Gulielmus Apulus writes of southern Italy in 1059: "In these parts priests, deacons and the whole clergy were publicly married" (*De Normann.* lib. ii.).

[4] Dom Pommeraye, *S. Rotomag. Eccl. Concilia*, pp. 56, 65; cf. similar instances on p. 315 of Dr A. Dresdner's *Kultur-und Sittengeschichte d. italienischen Geistlichkeit im 10. und 11. Jhdt.* (Breslau, 1890).

[5] *Opusc.* xvii. praef. The saint's evidence is carefully weighed by Dresdner (*l.c.*), especially on pp. 309 ff. and 321 ff.

[6] Even Pope Innocent III. was compelled to decide that priests who had kept two or more concubines, successively or simultaneously, did not thereby incur the disabilities which attended digamists; or, in other words, that a layman who had contracted two lawful marriages and then proceeded to ordination on the death of his second wife, could be absolved only by the pope; whereas the concubinary priest, "as a man branded with simple fornication," might receive a valid dispensation from his own bishop (Letter to archbishop of Lund in 1212. *Regest.* lib. xvi. ep. 118; Migne, *P.L.* ccxvi. col. 914). As the great canonist Gratian remarked on a similar decretal of Pope Pelagius, "Here is a case where lechery has more rights at law than has chastity" (*Decret.* p. i. dist. xxxiv. c. vii. note a).

[7] The actual originator of this policy was Nicholas II., probably at Hildebrand's suggestion; but the decree remained practically a dead letter until Gregory's accession.

[8] Peter Lombard, *Sentent.* lib. iv. dist. 13; Aquinas, *Summa Theol.* pars iii. Q. lxxxiii. art. 7, 9.

adjudged them to actual slavery.[1] Such enactments naturally defeated their own purpose. More was done by the gentler missionary zeal of the Franciscans and Dominicans in the early 13th century; but St Thomas Aquinas had seen half a century of that reform and had recognized its limitations; he therefore attenuated as much as possible the decree of Nicholas II. His contemporary St Bonaventura complained publicly that he himself and his fellow-friars were often compelled to hold their tongues about the evil clergy; partly because, even if one were expelled, another equally worthless would probably take his place, but "perhaps principally lest, if the people altogether lost faith in the clergy, heretics should arise and draw the people to themselves as sheep that have no shepherd, and make heretics of them, boasting that, as it were by our own testimony, the clergy were so vile that none need obey them or care for their teaching."[2] In other passages of his works St Bonaventura tells us plainly how little had as yet been gained by suppressing clerical marriages; and the evidence of orthodox and distinguished churchmen for the next three centuries is equally decisive. Alvarez Pelayo, a Spanish bishop and papal penitentiary, wrote in 1332, "The clergy sin commonly in these following ways . . . fourthly, in that they live very incontinently, and would that they had never promised continence! especially in Spain and southern Italy, in which provinces the sons of the laity are scarcely more numerous than those of the clergy." Cardinal Pierre d'Ailly pleaded before the council of Constance in 1415 for the reform of "that most scandalous custom, or rather abuse, whereby many [clergy] fear not to keep concubines in public."[3]

Meanwhile, as has been said above, the custom of open marriage among clergy in holy orders (priests, deacons and subdeacons) was gradually stamped out. A series of synods, from the early 12th century onwards, declared such marriages to be not only unlawful, but null and void in themselves. Yet the custom lingered sporadically in Germany and England until the last few years of the 13th century, though it seems to have died out earlier in France and Italy. There was also a short-lived attempt to declare that even a clerk in lower orders should lose his clerical privileges on his marriage; but Boniface VIII. in 1300 definitely permitted such marriages under the already-quoted conditions of the Apostolic Canons; in these cases, however, a bishop's licence was required to enable the cleric to officiate in church, and the episcopal registers show that the diocesans frequently insisted on the celibacy of parish-clerks. As the middle ages drew to a close, earnest churchmen were compelled to ask themselves whether it would not be better to let the priests marry than to continue a system under which concubinage was even licensed in some districts.[4] Serious proposals were made to reintroduce clerical marriage at the great reforming councils of Constance (1415) and Basel (1432); but the overwhelming majority of orthodox churchmen were unwilling to abandon a rule for which the saints had fought during so many centuries, and to which many of them probably attributed an apostolic origin.[5] This conservative attitude was inevitably strengthened by the attacks first of Lollard and then of Lutheran heretics; and Sir Thomas More was driven to declare, in answer to Tyndale, that the marriage of priests, being essentially null and void, "defileth the priest more than double or treble whoredom." It is well known that this became one of the most violently disputed questions at the Reformation, and that for eight years it was felony in England to defend sacerdotal marriage as permissible by the law of God (Statute of the Six Articles, 31 Hen. VIII. c. 14). The diversity of practice on this point drew one of the sharpest lines between reformers and orthodox, until the disorders introduced by these religious wars tempted the latter to imitate in considerable numbers the licence of their rivals.[6] This moved the emperor Charles V. to obtain from Paul III. dispensations for married priests in his dominions; and his successor Ferdinand, with the equally Catholic sovereigns of France, Bavaria and Poland, pleaded strongly at the council of Trent (1545) for permissive marriage. The council, after some hesitation, took the contrary course, and in the 9th canon of its 24th session it erected sacerdotal celibacy practically, if not formally, into an article of faith. In spite of this, the emperor Joseph II. reopened the question in 1783. In France the revolutionary constitution of 1791 abolished all restrictions on marriage, and during the Terror celibacy often exposed a priest to suspicion as an enemy to the Republic; but the better part of the clergy steadily resisted this innovation, and it is estimated that only about 2% were married. The Old Catholics adopted the principle of sacerdotal marriage in 1875.

The working of the system in modern times is perhaps too controversial a question to be discussed here; but one or two points may be noted on which all fairly well informed writers would probably agree. It can scarcely be denied that the Roman Catholic clergy have always owed much of their influence to their celibacy, and that in many cases this influence has been most justly earned by the celibate's devotion to an unworldly ideal. Again, the most adverse critics would admit that much was done by the counter-Reformation, and that modern ecclesiastical discipline on this point is considerably superior to that of the middle ages; while, on the other hand, many authorities of undoubted orthodoxy are ready to confess that it is not free from serious risks even in these days of easy publicity and stringent civil discipline.[7] Lastly, statistical research has shown that the children of the married British clergy have been distinguished far beyond their mere numerical proportion.[8]

[1] Labbe-Mansi, *Concilia*, vol. xix. col. 796 and xx. col. 724. Dr Lea is probably right in suggesting that it was a confused recollection of these decrees which prompted one of Cranmer's judges to assure him that "his children were bondmen to the see of Canterbury." Strype, *Memorials of Cranmer*, bk. iii. c. 28 (ed. 1812, vol. i. p. 601).

[2] Bonaventura, *Libell. Apologet.* quaest. i.; cf. his parallel treatise *Quare Fratres Minores praedicent.* The first visitation of his friend Odo Rigaldi, archbishop of Rouen, shows that about 15 % of the parish clergy in that diocese were notoriously incontinent (*Regestrum Visitationum*, ed. Bonnin, Rouen, 1852, pp. 17 ff.). Vacandard (*loc. cit.* p. 2087) appeals rather misleadingly to this record as proving the progress made during the half-century before Odo's time. It is probable that there were many more offenders than these 15 % known to the archbishop.

[3] Alvarus Pelagius, *De Planctu Ecclesiae*, ed. 1517, f. 131a, col. 2; cf. f. 102b, col. 2; Hermann von der Hardt, *Constantiensis Concilii*, &c. vol. i. pars. viii. col. 428.

[4] This more or less regular sale of licences by bishops and archdeacons flourished from the days of Gregory VII. to the 16th century; see index to Lea, *s.v.* "Licences." Dr Lea has, however, omitted the most striking authority of all. Gascoigne, the most distinguished Oxford chancellor of his day, writing about 1450 of John de la Bere, then bishop of St David's, says that he had refused to separate the clergy of his diocese from their concubines, giving publicly as his reason, "for then I your bishop should lose the 400 marks which I receive yearly in my diocese for the priests' lemans" (Gascoigne, *Lib. Ver.* ed. Rogers, p. 36). Even Sir Thomas More, in his polemic against the Reformers, admitted that this concubinage was too often tolerated in Wales (*English Works*, ed. 1557, p. 231, cf. 619).

[5] One of Dr Lea's few serious mistakes is his acceptance of the spurious pamphlet in favour of priestly marriage which was attributed in the 11th century to St Ulrich of Augsburg (i. 171).

[6] Janssen, *Gesch. d. deutschen Volkes*, 13th ed., vol. viii. pp. 423, 4, 9; 434; Lea ii. 195, 204 ff.

[7] Lea (ii. 339 ff.) gives a long series of quotations to this effect from church synods and orthodox disciplinary writers of modern times.

[8] Havelock Ellis, *A Study of British Genius* (London, 1904, p. 80), "Even if we compare the church with the other professions with which it is most usually classed, we find that the eminent children of the clergy considerably outnumber those of lawyers, doctors and army officers put together." Mr Ellis points out, however, that "the clerical profession . . . also produces more idiots than any other class."

AUTHORITIES.—Henry Charles Lea, *History of Sacerdotal Celibacy* (3rd ed., 1907, 2 vols), is by far the fullest and best work on this subject, though a good deal of important matter omitted by Dr Lea may be found in *Die Einführung der erzwungenen Ehelosigkeit* by the brothers Johann Anton and Augustin Theiner, which was put on the Roman *Index*, though Augustin afterwards became archivist at the Vatican (Altenburg, 1828, 2 vols.). The history of monastic celibacy has not yet been fully treated anywhere; the most important evidence of the episcopal registers is either still in MS. or has been published only in comparatively recent years. The most learned work on clerical celibacy from the strictly conservative point of view is that of Francesco Antonio Zaccaria, *Storia Polemica del celibato sacro* (Rome, 1774); but many of his most important

conclusions are set aside by the abbé E. Vacandard in his contribution to the *Dictionnaire de théologie catholique* (vol. ii. art. "Célibat ecclésiastique"). (G. G. Co.)

CELL (from Lat. *cella*, probably from an Indo-European *kal* —seen in Lat. *celare*, to hide; another suggestion connects the word with Lat. *cera*, wax, taking the original meaning to refer to the honeycomb), in its earliest application a small detached room in a building, particularly a small monastic house (see ABBEY), generally in the country, belonging to large conventual buildings, and intended for change of air for the monks, as well as places to reside in to look after the lands, vassals, &c. Thus Tynemouth was a cell to St Albans; Ashwell, Herts, to Westminster Abbey. The term was also used of the small sleeping apartments of the monks, or a small apartment used by the anchorite or hermit. This use still survives in the application to the small separate chambers in a prison (*q.v.*) in which prisoners are confined. The word is applied to various small compartments which build up a compound structure such as a honeycomb, to the minute compartments in a tissue, &c. More particularly the word is used, in electrical science, of the single constituent compartments of a voltaic battery (*q.v.*), and in biology of the living units of protoplasm of which plants and animals are composed (see CYTOLOGY).

CELLA, in architecture, the Latin name for the sanctuary of a Roman temple, corresponding with the naos of the Greek temple. In the Etruscan temples, according to Vitruvius, there were three cellas, side by side; and in the temple of Venus built by Hadrian at Rome there were two cellas, both enclosed, however, in a single peristyle.

CELLARET (*i.e.* little cellar), strictly that portion of a sideboard which is used for holding bottles and decanters, so called from a cellar (which in general may be any underground unlighted apartment) being commonly used for keeping wine. Sometimes it is a drawer, divided into compartments lined with zinc, and sometimes a cupboard, but still an integral part of the sideboard. In the latter part of the 18th century, when the sideboard was in process of evolution from a side-table with drawers into the large and important piece of furniture which it eventually became, the cellaret was a detached receptacle. It was most commonly of mahogany or rosewood, many-sided or even octagonal, and occasionally oval, bound with broad bands of brass and lined with zinc partitions to hold the ice for cooling wine. Sometimes a tap was fixed in the lower part for drawing off the water from the melted ice. Cellarets were usually placed under the sideboard, and were, as a rule, handsome and well-proportioned; but as the artistic impulse which created the great 18th-century English school of furniture died away, their form grew debased, and under the influence of the English Empire fashion, which drew its inspiration from a bastard classicism, they assumed the shape of sarcophagi incongruously mounted with lions' heads and claw-feet. Hepplewhite called them "gardes du vin"; they are now nearly always known as "wine-coolers."

CELLE, a town of Germany, in the Prussian province of Hanover, on the left bank of the navigable Aller, near its junction with the Fuse and the Lachte, 23 m. N.E. of Hanover, on the main Lehrte-Hamburg railway. Pop. (1905) 21,400. The town has a Roman Catholic and five Protestant churches, among the latter the town-church with the burial vault of the dukes of Lüneburg-Celle. Here rest the remains of Sophia Dorothea, wife of the elector George of Hanover, afterwards George I. of England, and those of Caroline Matilda, the divorced wife of Christian VII. of Denmark and sister of George III. of England, who resided here from 1772 until her death in 1775. The most interesting building in Celle is the former ducal palace, begun in 1485 in Late Gothic style, but with extensive Renaissance additions of the close of the 17th century. The building of the court of appeal (*Oberlandesgericht*), with a valuable library of 60,000 volumes and many MSS., including a priceless copy of the *Sachsenspiegel*, the museum and the hall of the estates (*Landschaftshaus*) are also worthy of notice. There are manufactures of woollen yarn, tobacco, biscuits, umbrellas and printers' ink, and a lively trade is carried on in wax, honey, wool and timber. Celle is the seat of the court of appeal from the superior courts of Aurich, Detmold, Göttingen, Hanover, Hildesheim, Lüneburg, Osnabrück, Stade and Verden. Founded in 1292, the town was the residence of the dukes of Lüneburg-Celle, a cadet branch of the ducal house of Brunswick, from the 14th century until 1705.

See Dehning, *Geschichte der Stadt Celle* (Celle, 1891).

CELLIER, ALFRED (1844–1891), English musical composer, was born at Hackney on the 1st of December 1844. From 1855 to 1860 he was a chorister at the Chapel Royal, St James's, under the Rev. Thomas Helmore, where Arthur Sullivan was one of his youthful colleagues. His first appointment was that of organist at All Saints' church, Blackheath (1862). In 1866 he succeeded Dr Chipp as director of the Ulster Hall concerts, Belfast, at the same time acting as conductor of the Belfast Philharmonic Society. In 1868 he returned to London as organist of St Alban's, Holborn. From 1871 to 1875 he was conductor at the Prince's theatre, Manchester; and from 1877 to 1879 at various London theatres. During this period he composed many comic operas and operettas, of which the most successful was *The Sultan of Mocha*, which was produced at Manchester in 1874, in London at the St James's theatre in 1876, and revived at the Strand theatre in 1887. In 1880 Cellier visited America, producing a musical version of Longfellow's *Masque of Pandora* at Boston (1881). In 1883 his setting of Gray's *Elegy* in the form of a cantata was produced at the Leeds Festival. In 1886 he won the great success of his life in *Dorothy*, a comic opera written to a libretto by B. C. Stephenson, which was produced at the Gaiety theatre on the 25th of September 1886, and, transferred first to the Prince of Wales theatre and subsequently to the Lyric theatre, ran until April 1889. *Doris* (1889), and *The Mountebanks*, which was produced in January 1892, a few days after the composer's death, were less successful. Cellier owed much to the influence of Sir Arthur Sullivan. He had little of the latter's humour and vivacity, but he was a fertile melodist, and his writing is invariably distinguished by elegance and refinement. He died in London on the 28th of December 1891.

CELLINI, BENVENUTO (1500–1571), Italian artist, metal worker and sculptor, was born in Florence, where his family, originally landowners in the Val d'Ambra, had for three generations been settled. His father, Giovanni Cellini, was a musician and artificer of musical instruments; he married Maria Lisabetta Granacci, and eighteen years elapsed before they had any progeny. Benvenuto (meaning "Welcome") was the third child. The father destined him for the same profession as himself, and endeavoured to thwart his inclination for design and metal work. When he had reached the age of fifteen his youthful predilection had become too strong to be resisted, and his father reluctantly gave consent to his being apprenticed to a goldsmith, Antonio di Sandro, named Marcone. He had already attracted some notice in his native place, when, being implicated in a fray with some of his companions, he was banished for six months to Siena, where he worked for Francesco Castoro, a goldsmith; from thence he removed to Bologna, where he became a more accomplished flute-player and made progress in the goldsmith's art. After visiting Pisa, and after twice resettling for a while in Florence (where he was visited by the sculptor Torrigiano, who unsuccessfully suggested his accompanying him to England), he decamped to Rome, aged nineteen. His first attempt at his craft here was a silver casket, followed by some silver candlesticks, and later by a vase for the bishop of Salamanca, which introduced him to the favourable notice of Pope Clement VII.; likewise at a later date one of his celebrated works, the gold medallion of "Leda and the Swan,"—the head and torso of Leda cut in hard stone—executed for Gonfaloniere Gabbriello Cesarino, which is now in the Vienna museum; he also reverted to music, practised flute-playing, and was appointed one of the pope's court-musicians. In the attack upon Rome by the constable de Bourbon, which occurred immediately after, in 1527, the bravery and address of Cellini proved of signal service

to the pontiff; if we may believe his own accounts, his was the very hand which shot the Bourbon dead, and he afterwards killed Philibert, prince of Orange. His exploits paved the way for a reconciliation with the Florentine magistrates, and his return shortly after to his native place. Here he assiduously devoted himself to the execution of medals, the most famous of which (executed a short while later) are "Hercules and the Nemean Lion," in gold repoussé work, and "Atlas supporting the Sphere," in chased gold, the latter eventually falling into the possession of Francis I. From Florence he went to the court of the duke of Mantua, and thence again to Florence and to Rome, where he was employed not only in the working of jewelry, but also in the execution of dies for private medals and for the papal mint. Here in 1529 he avenged a brother's death by slaying the slayer; and shortly afterwards had to flee to Naples to shelter himself from the consequences of an affray with a notary, Ser Benedetto, whom he wounded. Through the influence of several of the cardinals he obtained a pardon; and on the elevation of Paul III. to the pontifical throne he was reinstated in his former position of favour, notwithstanding a fresh homicide of a goldsmith which he had committed more by accident than of malice prepense in the interregnum. Once more the plots of Pierluigi Farnese, a natural son of Paul III., led to his retreat from Rome to Florence and Venice, and once more he was restored with greater honour than before. On returning from a visit to the court of Francis I., being now aged thirty-seven, he was imprisoned on a charge (apparently false) of having embezzled during the war the gems of the pontifical tiara; he remained some while confined in the castle of Sant' Angelo, escaped, was recaptured, and treated with great severity, and was in daily expectation of death on the scaffold. At last, however, he was released at the intercession of Pierluigi's wife, and more especially of the Cardinal d' Este of Ferrara, to whom he presented a splendid cup. For a while after this he worked at the court of Francis I. at Fontainebleau and in Paris; but he considered the duchesse d'Étampes to be set against him, and the intrigues of the king's favourites, whom he would not stoop to conciliate and could not venture to silence by the sword, as he had silenced his enemies in Rome, led him, after about five years of laborious and sumptuous work, and of continually-recurring jealousies and violences, to retire in 1545 in disgust to Florence, where he employed his time in works of art, and exasperated his temper in rivalries with the uneasy-natured sculptor Baccio Bandinelli. The first collision between the two had occurred several years before when Pope Clement VII. commissioned Cellini to mint his coinage. Now, in an altercation before Duke Cosimo, Bandinelli insultingly stigmatized Benvenuto as guilty of gross immorality; in his autobiography Cellini rather repels than denies the charge, but he certainly repels it with demonstrative and grotesque vivacity. Two somewhat similar charges had been made ere this: one in Paris, which he braved out in court —the other, in Florence, was a mere private quarrel, and perhaps undeserving of attention. During the war with Siena Cellini was appointed to strengthen the defences of his native city, and, though rather shabbily treated by his ducal patrons, he continued to gain the admiration of his fellow-citizens by the magnificent works which he produced. He died in Florence in 1571, unmarried, and leaving no posterity, and was buried with great pomp in the church of the Annunziata. He had supported in Florence a widowed sister and her six daughters.

Besides the works in gold and silver which have been adverted to, Cellini executed several pieces of sculpture on a grander scale. The most distinguished of these is the bronze group of "Perseus holding the head of Medusa," a work (first suggested by Duke Cosimo de' Medici) now in the Loggia dei Lanzi at Florence, full of the fire of genius and the grandeur of a terrible beauty, one of the most typical and unforgettable monuments of the Italian Renaissance. The casting of this great work gave Cellini the utmost trouble and anxiety; and its completion was hailed with rapturous homage from all parts of Italy. The original relief from the foot of the pedestal—Perseus and Andromeda—is in the Bargello, and replaced by a cast.

Not less characteristic of its splendidly gifted and barbarically untameable author are the autobiographical memoirs which he composed, beginning them in Florence in 1558,—a production of the utmost energy, directness and racy animation, setting forth one of the most singular careers in all the annals of fine art. His amours and hatreds, his passions and delights, his love of the sumptuous and the exquisite in art, his self-applause and self-assertion, running now and again into extravagances which it is impossible to credit, and difficult to set down as strictly conscious falsehoods, make this one of the most singular and fascinating books in existence. Here we read, not only of the strange and varied adventures of which we have presented a hasty sketch, but of the devout complacency with which Cellini could contemplate a satisfactorily achieved homicide; of the legion of devils which he and a conjuror evoked in the Colosseum, after one of his not innumerous mistresses had been spirited away from him by her mother; of the marvellous halo of light which he found surrounding his head at dawn and twilight after his Roman imprisonment, and his supernatural visions and angelic protection during that adversity; and of his being poisoned on two several occasions. If he is unmeasured in abusing some people, he is also unlimited in praising others. The autobiography has been translated into English by Thomas Roscoe, by J. A. Symonds, and by A. Macdonald. Cellini also wrote treatises on the goldsmith's art, on sculpture, and on design (translated by C. R. Ashbee, 1899).

Among his works of art not already mentioned, many of which have perished, were a colossal Mars for a fountain at Fontainebleau and the bronzes of the doorway, coins for the Papal and Florentine states, a Jupiter in silver of life size, and a bronze bust of Bindo Altoviti. The works of decorative art are, speaking broadly, rather florid than chastened in style.

In addition to the bronze statue of Perseus and the medallions already referred to, the works of art in existence to-day executed by him are the celebrated silver salt-cellar of Francis I. at Vienna; a medallion of Clement VII. in commemoration of the peace between the Christian princes, 1530, with a bust of the pope on the reverse and a figure of Peace setting fire to a heap of arms in front of the temple of Janus, signed with the artist's name; a medal of Francis I. with his portrait, also signed; and a medal of Cardinal Pietro Bembo. Cellini, while employed at the papal mint at Rome during the papacy of Clement VII. and later of Paul III., executed the dies of several coins and medals, some of which still survive at this now defunct mint. He was also in the service of Alessandro de' Medici, first duke of Florence, for whom he executed in 1535 a forty-soldi piece with a bust of the duke on one side and standing figures of the saints Cosmo and Damian on the other. Some connoisseurs attribute to his hand several plaques, "Jupiter crushing the Giants," "Fight between Perseus and Phinaeus," a Dog, &c.

The important works which have perished include the uncompleted chalice intended for Clement VII.; a gold cover for a prayer-book as a gift from Pope Paul III. to Charles V.,—both described at length in his autobiography; large silver statues of Jupiter, Vulcan and Mars, wrought for Francis I. during his sojourn in Paris; a bust of Julius Caesar; and a silver cup for the cardinal of Ferrara. The magnificent gold "button," or morse, made by Cellini for the cope of Clement VII., the competition for which is so graphically described in his autobiography, appears to have been sacrificed by Pius VI., with many other priceless specimens of the goldsmith's art, in furnishing the indemnity of 30,000,000 francs demanded by Napoleon at the conclusion of the campaign against the States of the Church in 1797. According to the terms of the treaty, the pope was permitted to pay a third of that sum in plate and jewels. Fortunately there are in the print room of the British Museum three water-colour drawings of this splendid morse by F. Bertoli, done at the instance of an Englishman named Talman in the first half of the 18th century. The obverse and reverse, as well as the rim, are drawn full size, and moreover the morse with the precious stones set therein, including a diamond then considered the second largest in the world, is fully described.

BIBLIOGRAPHY.—The autobiography already named is the foundation of most of the works written concerning Cellini's life. See also *Cellini, His Times and Contemporaries*, by "the Author of the Life of Sir Kenelm Digby" (1899); L. Dimier, *Cellini à la cour de France* (1898); Eugène Plon, *Cellini, orfèvre, médailleur, &c.* (1883); Bolzenthal, *Skizzen zur Kunstgeschichte der modernen Medaillen-Arbeit 1429–1840* (Berlin, 1840); A. Armand, *Les Médailleurs italiens des XVe et XVIe siècles* (3 vols., Paris, 1883–1887); Dr Francesco Tassi, *Vita di Benvenuto Cellini* (Firenze, 1829), *Vita di Benvenuto Cellini scritta da lui medisimo* (1832); E. Babelon, *La Gravure en pierres fines* (Paris, 1894); A. Heiss, *Les Médailleurs florentins* (Paris, 1887); J. Friedländer, *Die italienischen Schaumünzen des fünfzehnten Jahrhunderts* (Berlin, 1880–1882); N. Rondot, *Les Médailleurs lyonnais* (Mâcon, 1897); Dr Julius Cahn, *Medaillen und Plaketten der Sammlung W. P. Metzler* (Frankfort-on-Main, 1898); Molinier, *Les Plaquettes*; I. B. Supino, *Il Medagliere Mediceo nel R. Museo Nazionale di Firenze* (Florence, 1899); *L'Arte di Benvenuto Cellini* (Florence, 1901); C. von Fabriczy, *Medaillen der italienischen Renaissance* (Leipzig); L. Forrer, *Biographical Dictionary of Medallists, &c.* (London, 1904), &c. (W. M. R.; E. A. J.)

CELLULOSE, the name given to both an individual—cellulose proper, in the restricted sense of a chemical individual—and to a group of substances, the celluloses or cellulose group, which constitute in infinitely varied forms the containing envelope of the plant cell. They are complex carbohydrates, or "saccharocolloids" (Tollens), and are resolved by ultimate hydrolysis into monoses. The typical cellulose is represented by the empirical formula $C_6H_{10}O_5$, identical with that of starch, with which it has many chemical analogies as well as physiological correlations. The representative "cellulose" is the main constituent of the cotton fibre substance, and is obtainable by treating the raw fibre with boiling dilute alkalis, followed by chlorine gas or bromine water, or simply by alkaline oxidants. The cellulose thus purified is further treated with dilute acids, and then exhaustively with alcohol and ether. Chemical filter-paper (Swedish) is practically pure cellulose, the final purification consisting in exhaustive treatment with hydrofluoric acid to remove silicious inorganic residues. The "cellulose" group, however, comprises a series of substances which, while presenting the characters generally similar to those of cotton cellulose, also exhibit marked divergences. The resemblances are maintained in their synthetical reactions; but reactions involving the decomposition of the complex show many variations. For example, cotton cellulose is difficultly hydrolysed; other celluloses are more or less readily split up by dilute acids, the extreme members readily yielding sugars: the hexoses—dextrose, mannose and galactose; and the pentoses—xylose and arabinose; these less resistant cell-wall constituents are termed hemi-celluloses.

The celluloses proper are essentially non-nitrogenous, though originating in the cell protoplasm. The cell-walls of the lower cryptogams, similarly purified, retain a notable proportion —2·0-4·0%—of constitutional nitrogen. When hydrolysed these fungoid celluloses yield, in addition to monoses, glucosamine and acetic acid. The celluloses of the phanerogams are generally associated, in a degree ranging from physical mixture to chemical union, with other complicated substances, constituting the "compound celluloses." The nature of the associated groups affords a convenient classification into pecto-celluloses, ligno-celluloses and cuto-celluloses. *Pecto-celluloses* are so named because the associated substances—carbohydrates, together with their oxidation products, *i.e.* containing either two carbonyls (CO) in the unit group or carboxyl (CO·OH) groups in a complex—are readily hydrolysed by weak acids to the gelatinous "pectic acids" or their salts. *Ligno-celluloses* are the substances of lignified tissue, the non-cellulose constituents of which are characterized by the presence of benzenoid and furfuroid groups; and although essentially complex, they may be regarded as homogeneous, and are conveniently grouped under the name *lignone*. The lignone complex reacts, by its unsaturated groups, with the halogens. It is a complex containing but little hydroxyl; and is of relatively high carbon percentage (55·0-57·0%). *Cuto-celluloses* predominate in the protective coatings of plant organs, and are characterized by constituent groups, the decomposition products of which are compounds of the fatty series, and also wax alcohols, acids, cholesterols, &c.

The typical pecto-cellulose is the flax fibre, *i.e.* the bast fibre of the flax plant (*Linum usitatissimum*), as it occurs in the plant, or as the commercial textile fibre in its raw state. Rhea, or ramie, is another leading textile fibre in which the cellulose occurs associated with alkali-soluble colloidal carbohydrates. Pecto-celluloses are found in the stems of the Gramineae (cereal straws, esparto), and in the fibro-vascular bundles of monocotyledons used as textile and rope-making fibres. They are the chief constituents of the fleshy parenchyma of fruits, tubers, rhizomes. Ligno-celluloses find their chemical representative in the jute fibre. They constitute the woods, and are therefore of the widest distribution and the highest industrial utility. It is important to note that a complex having all the chemical characteristics of a ligno-cellulose occurs in a soluble colloidal form in the juice of the white currant. The formation of ligno-cellulose is the chemical equivalent of the morphological change of the plant cell known as "lignification." The typical cuto-celluloses are the epidermal tissues of all growing plants or organs, which are easily detached from the underlying tissues which it is their function to protect. To subserve this function, they are extremely resistant to the attack of reagents. The associated groups are mostly of the normal saturated series, and of very high molecular weight.

Cellulose and Botanical Science.—The elaboration of cellulose, *i.e.* of the cell walls, and its morphological and physiological aspects are discussed in the articles PLANTS: *Physiology*, *Anatomy*: and CYTOLOGY; while in the article COAL the part played by cellulose in the formation of these deposits receives treatment: here we may deal with its general relation to agriculture. In the analysis of fodder plants and other vegetable produce, the residue obtained after successive acid and alkaline hydrolysis is the "crude fibre" of the agricultural chemist, and is generally taken as a measure of the actual cellulose contents of the raw material. We give in tabular form the average percentage of crude fibre in typical food-stuffs and agricultural produce:—

SEEDS

Seeds of Cereals.	Per cent of Fibre.	Leguminous and Oil Seeds.	Per cent of Fibre.
Wheat	2·8	Rape	6·4
Barley	6·3	Cotton	7·5
Oats	9·0	Beans	10·0
Maize	5·2	Peas	10·0
Rye	8·0	Lentils	10·0
Rice	2·5	Vetches	7·2

FODDER CROPS

Stems and Foliage of Root Crops.	Per cent of Fibre.	Fodder Crops.	Per cent of Fibre.[1]	Cereal Straws.	Per cent of Fibre.
White Turnip	3·9	Grasses	32·0	Oats	60·68
		Meadow Hay	25·8	Wheat	75·77
Swedish "	4·2			Barley	71·74
Carrot	3·1	Clover and Trefoil	23·5		
Mangel	2·6	Vetches	25·9		
Parsnip	2·6	Lucerne	26·7		
		Sainfoin	28·7		

	Leguminous.	Oil Seeds.	Stems and Foliage of Root Crops	Fodder Crops.	Cereal Straws.
Average % of water	14	7	87	70-80	15

[1] This percentage is calculated on airdry-produce containing 15% of water.

The above figures have a purely empirical value, since they represent a complicated mixture of various residues derived from the celluloses and compound celluloses. This mixture may be further resolved, and by special quantitative methods the proportions of actual cellulose, ligno-cellulose and cuto-celluloses estimated (J. König, *Ber.*, 1906, 39, p. 3564). The figures are taken as an inverse measure of digestibility; at the same time it has been established that this group of relatively indigestible food constituents are more or less digestible and assimilable as flesh and fat producers. The percentage or coefficient of digestibility of the celluloses of the more important food-stuffs—green fodder, hay, straw and grains—varies from 20 to 75%. It has also been established that their physiological efficiency is, under certain conditions, quite equal to that of starch.

It must also be borne in mind that the indigestible food residues, as finally voided by the animal, have played an important mechanical part as an aid to digestion of those constituents more readily attacked in the digestive tract of animals. They are further an important factor of the agricultural cycle. Returned to the soil as "farm-yard manure," mixed with other cellulosic matter which has served as litter, they add "fibre" to the soil and, as a mechanical diluent of the mineral soil components, maintain this in a more open condition, penetrable by the atmospheric gases, and promoting distribution of moisture. Further by breaking down, with production of "humus," a complex of colloidal "unsaturated" bodies of acid function, they fulfil important chemical functions by interaction with the mineral soil constituents.

Chemistry of Cellulose.—Purified cotton cellulose, which is the definitive prototype of the cellulose group or series, is a complex of monoses or their "residues." It is resolved by solution in sulphuric acid and subsequent hydrolysis of the esters thus produced into dextrose. This fundamental fact with its elementary composition, most simply expressed by the formula $C_6H_{10}O_5$, has caused it to be regarded as a polyanhydride of dextrose. Forming, as it does, simple esters in the ratio of the reacting hydroxyls 3OH: $C_6H_{10}O_5$, and taking into account its direct conversion into ω-brom-methyl furfural (Fenton) a constitutional formula has been proposed by A. G. Green (*Zeit. Farb. Textil Chem.* 3, pp. 97 and 309 (1904)), which is a useful generalization of its reactions, and its ultimate relations to the simpler carbohydrates, viz., $\begin{matrix}CH(OH)\cdot CH\cdot CH(OH)\\ |\quad\quad >O\ >O\\ CH(OH)\cdot CH\cdot CH_2\end{matrix}$. Green considers, moreover, that a group thus formulated may consistently represent the actual dimensions of the reacting unit, but that unit of larger dimensions, if postulated, is easily derived from the above by oxygen linkings.

From another point of view the unit group has been formulated as $CO\begin{matrix}\nearrow CH(OH)\cdot CH(OH)\\ \\ \searrow CH(OH)\cdot CH(OH)\end{matrix}>CH_2$, the main linking of such units in the complex taking place as between their respective CO and CH_2 groups in the alternative enolic form CH—C(OH). This view gives expression to the genetic relations of the celluloses to the ligno-celluloses, to the tendency to carbon condensation as in the formation of coals, and pseudo-carbons, to the relative resistance of cellulose to hydrolysis, and its other points of differentiation from starch, and more particularly to the ketonic character of its carbonyl (CO) groups, which is also more in harmony with the experimental facts established by Fenton as to the production of methyl furfural.

The probability, however, is that no simple molecular formula adequately represents the constitution of cellulose as it actually exists or indeed reacts. On the other hand, it has been suggested that cellulose is to be regarded as representing a condition of matter analogous to that of a saline electrolyte in solution, *i.e.* as a complex of molecular aggregates, and of residues (of monose groups) having distinct and opposite polarities; such a complex is essentially labile and its configuration will change progressively under reaction. The exposition of this view is the subject of a publication by Cross and Bevan (*Researches on Cellulose*, ii. 1906). The main purpose is to give full effect to the colloidal characteristics of cellulose and its derivatives, with reference to the modern theory of the colloidal state as involving a particular internal equilibrium of amphoteric electrolytes.

The typical cellulose is a white fibrous substance familiar to us in the various forms of bleached cotton. Other fibrous celluloses are equally characteristic as to form and appearance, *e.g.* bleached flax, hemp, ramie. It is hygroscopic, absorbing 6 to 7% its weight of moisture from the air. When dry, it is an electrical insulator, and has a specific inductive capacity of about 7: when wetted it is a conductor, and manifests electrolytic phenomena.[1] It is insoluble in water and in the ordinary solvents; it dissolves, however, in a 40-50% solution of zinc chloride, and in ammoniacal solutions of copper oxide (3% CuO, 15% NH_3): from these solutions it is obtained as a highly hydrated, gelatinous precipitate, from the former by dilution or addition of alcohol, from the latter by acidification; these solutions have important industrial application. Projected or drawn into a precipitating solution they may be solidified continuously to threads of various, but controlled dimensions: the regenerated cellulose, now amorphous, in its finer dimensions is known as artificial silk or lustra-cellulose. These forms of cellulose retain the general characters of the original fibrous and "natural" celluloses. In composition they differ somewhat by combination with water (of hydration), which they retain in the air-dry condition. They also further combine with an increased proportion of atmospheric moisture, viz. up to 10-11% of their weight.

Derivatives.—Important derivatives are the esters or ethereal salts of both inorganic and organic acids, cellulose behaving as an alcohol, the highest esters indicating that it reacts as a trihydric alcohol of the formula $n[C_6H_7O_2(OH)_3]$. The nitrates result by the action of concentrated nitric acid, either alone or in the presence of sulphuric acid: the normal dinitrate represents a definite stage in the series of nitrates, and the ester at this point manifests the important property of solubility in various alcoholic solvents, notably ether-alcohol. Such nitrates are the basis of collodion, of artificial silk by the processes of Chardonnet and Lehner, and of celluloid or xylonite. Higher nitrates are also obtainable up to the limit of the trinitrate, which is insoluble in ether or alcohol, but is soluble in nitroglycerin, nitrobenzene and other solvents. These higher nitrates are the basis of the most important modern explosives.

Cellulose reacts directly with acetic anhydride to form low esters; in the presence of sulphuric acid the reaction proceeds to higher limits; the triacetate is soluble in chloroform. The acid sulphuric ester, $C_6H_8O_2(SO_4H)_2$, is obtained by the action of sulphuric acid, but its relation to the original cellulose is doubtful. The monobenzoate and dibenzoate are formed by benzoyl chloride reacting on alkali-cellulose (see below). Cellulose xanthates are obtained from carbon bisulphide and alkali-cellulose; these are water soluble derivatives and the basis of "viscose," and of important industries. Mixed esters—aceto-sulphate, aceto-benzoate, nitrobenzoyl nitrates, aceto-nitro-sulphates—have also been investigated.

Cellulose (cotton), when treated with a 15-20% caustic soda solution, gives the compound $C_6H_{10}O_5\cdot H_2O\cdot 2NaOH$, alkali-cellulose, the original riband-like form with reticulated walls of the cellulose being transformed into a smooth-walled cylinder. The structural changes in the ultimate fibre determine very considerable changes in the dimensions of fabrics so treated. The reactions and structural changes were investigated by J. Mercer, and are known generally as "mercerization." In recent years a very large industry in "mercerized" fabrics (cotton) has resulted from the observation that if the shrinkages of the yarns and fabrics be antagonized by mechanical means, a very high lustre is developed.

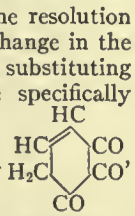
Similar, but less definite compounds, are formed with the oxides of lead, manganese, barium, iron, aluminium and chromium. These derivatives, which also find industrial applications in the dyeing and printing of fabrics, differ but little in

[1] C. F. Cross and E. J. Bevan, *Jour. Chem. Soc.*, 1895, 67, p. 449; C. R. Darling, *Jour. Faraday Soc.* 1904; A. Campbell, *Trans. Roy. Soc.* 1906.

appearance from the original cellulose, and are without influence on its essential characteristics.

Decompositions.—Hydrolysis:—By solution in sulphuric acid followed by dilution and boiling the diluted solution cellulose hydrolyses to fermentable sugars; this reaction is utilized industrially in the manufacture of glucose from rags. Hydrochloric acid produces a friable mass of "hydrocellulose," probably $C_{12}H_{22}O_{11}$, insoluble in water, but readily attacked by alkalis, with the production of soluble derivatives; some dextrose is formed in the original reaction. Hydrobromic acid in ethereal solution gives furfurane derivatives. Cold dilute acids have no perceptible action on cellulose. The actions of such acids are an important auxiliary to bleaching, dyeing and printing processes, but they require careful limitation in respect of concentration and temperature. Cellulose is extremely resistant to the action of dilute alkalis: a 1-2% solution of sodium hydrate having little action at temperatures up to 150°; hence the use of caustic soda, soda ash and sodium silicate in bleaching processes, *i.e.* for the elimination of the non-cellulose components of the raw fibres. Oxidation in acid solutions gives compounds classed as "oxycelluloses," insoluble in water, but more or less soluble in alkalis; continued oxidation gives formic, acetic and carbonic acids. Oxidation in alkaline solution is more easily controlled and limited; solutions of bleaching powder, or more generally of alkaline hydrochlorites, receive industrial application in oxidizing the coloured impurities of the fibre, or residues left after more or less severe alkali treatments, leaving the cellulose practically unaffected. This, however, is obviously a question of conditions: this group of oxidants also oxidize to oxycellulose, and under more severe conditions to acid products, *e.g.* oxalic and carbonic acids. Certain bacteria also induce decompositions which are resolutions into ultimate products of the lowest molecular dimensions, as hydrogen, carbon dioxide, methane, acetic acid and butyric acid (Omeliansky) (*Handb. Techn. Mykologie* [F. Lafar] pp. 245-268), but generally the cellulose complex is extremely resistant to the organic ferments. Cellulose burns with a luminous flame to carbon dioxide and water; dry distillation gives a complicated mixture of gaseous and liquid products and a residue of charcoal or pseudo-carbon. Chromic acid in sulphuric acid solutions effects a complete oxidation, *i.e.* combustion to water and carbonic acid.

Ligno-celluloses.—These compounds have many of the characteristics of the cellulose esters; they are in effect ethereal compounds of cellulose and the quinonoid lignone complex, and the combination resists hydrolysis by weak alkalis or acids. The cellulose varies in amount from 80 to 50%, and the lignone varies inversely as the degree of lignification, that is, from the lignified bast fibre of annuals, of which jute is a type, to the dense tissues of the perennial dicotyledonous woods, typified by the beech. The empirical formula of the lignone complex varies from $C_{19}H_{22}O_9$ (jute) to $C_{26}H_{30}O_{10}$ (pine wood). In certain reactions the non-cellulose or lignone constituents are selectively converted into soluble derivatives, and may be separated as such from the cellulose which is left; for example, chlorination gives products soluble in sodium sulphite solution, by the combination of unsaturated groups of the lignone with the halogen, while digestion with bisulphite solutions at elevated temperatures (140°-160°) gives soluble sulphonated derivatives. This last reaction is employed industrially in the preparation of cellulose for paper-making from coniferous woods. These reactions are "quantitative" since they depend upon well-defined constitutional features of the lignone complex, and the resolution of the ligno-cellulose takes place with no further change in the lignone than the synthetical combination with the substituting groups. The constituent groups of the lignone specifically reacting are of benzenoid type of the probable form



deduced from the similarity of the chlorinated derivatives to mairogallol, the product of the action of chlorine on pyrogallol in acetic acid solution (A. Hantzsch, *Ber.* 20, p. 2033). The complex contains methoxy (OCH_3) groups. There is also present a residue which is readily broken down by oxidizing agents, and indeed by simple hydrolysis, to acetic acid. Another important group of actual constituents are pentosanes —partially isolated as "wood gum" by solution in alkalis —and furfural derivatives (hydroxy furfurals) derived from these. The actual constitutional relationships of these main groups. as well as the localization of the methoxy groups, are still problematical.

Certain colour reactions are characteristic, though they are in some cases reactions of certain constituents invariably present in the natural forms of the ligno-cellulose; which may be removed without affecting the essential character of the lignone complex. Aniline salts generally give a yellow coloration, dimethyl-para-phenylenediamine gives a deep red coloration, phloroglucin in hydrochloric acid gives a crimson coloration. Reactions more definitely characteristic of the lignone are:—ferric ferrocyanide, which is taken up and transformed into Prussian blue throughout the fibre, without affecting its structure, although there may be as much as a 50% gain in weight; iodine in potassium iodide solution gives a deep brown colour due to absorption of the halogen, a reaction which admits of quantitative application, *i.e.* as a measure of the proportion of ligno-cellulose in a fibrous mixture; nitric acid gives a deep orange yellow coloration; digested with the dilute acid (5-10% HNO_3) at 50° the ligno-celluloses are entirely resolved, the lignone complex being attacked and dissolved in the form of nitroso-ketonic acids, which, on continued heating, are finally resolved to oxalic, acetic, formic and carbonic acids.

Derivatives of Ligno-cellulose.—By reaction with chlorine jute yields the derivative $C_{19}H_{18}Cl_4O_9$, soluble in alcohol, and in acetic acid; this derivative has the reactions of a quinone chloride. By reaction with sodium sulphite it is converted into a hydroquinone sulphonate of deep purple colour. The reaction of the ligno-celluloses (pine wood) with the bisulphites yields the soluble derivatives of the general formula $C_{26}H_{29}O_9 \cdot SO_3H$ (containing two $O \cdot CH_3$ groups). Jute reacts with nitric acid in presence of sulphuric acid to form nitrates; and with acetic anhydride to form low acetates. It reacts with alkaline hydrates with structural changes similar to those obtained with cotton; and by the further action of benzoyl chloride and of carbon bisulphide upon the resulting compounds there result the corresponding benzoates and xanthates respectively. But these synthetical derivatives are mixtures of cellulose and lignone derivatives, and so far of merely theoretical interest.

Decompositions of Ligno-cellulose.—In addition to the specific resolutions above described which depend upon the distinctive chemical characters of the cellulose and lignone respectively, the following may be noted: to simple hydrolytic agents the two groups are equally resistant, therefore by boiling with dilute acids or alkalis the groups are attacked *pari passu*. Weak oxidants may also be used as bleaching agents to remove coloured by-products without seriously attacking the ligno-cellulose, which is obtained in its bleached form. Nitric acid of all strengths effects complete resolution. Chromic acid in dilute solutions combines with the lignone complex, but in presence of hydrolysing acids total oxidation of the lignone is determined. The principal products are oxalic, carbonic, formic and acetic acids. This reaction is an index of constitution. Generally, the lignone is attacked under many conditions and by many reagents which are without action upon cellulose, by virtue of its unsaturated constitution, and its acid and aldehydic residues.

Cuto-cellulose.—A typical cuto-cellulose is the cuticle (peel) of the apple which, when purified by repeated hydrolytic treatment and finally by alcohol and ether, gives a product of the composition C=75·66%, H=11·37%, O=14·97%. Hydrolysis by strong alkalis gives stearo-cutic acid, $C_{28}H_{48}O_4$, and oleo-cutic acid, $C_{14}H_{20}O_4$ (Frémy). Cork is a complex mixture containing various compound celluloses: extraction with alcohol removes certain fatty alcohols and acids, and aromatic derivatives related to tannic acid; the residue is probably a mixture of cellulose, ligno-cellulose, cerin, $C_{20}H_{32}O$ and suberin; the latter yields

stearic acid, $C_{18}H_{36}O_2$, and the acid $C_{22}H_{42}O_2$. The cutocelluloses have been only superficially investigated, and, with the exception of cork, are of but little direct industrial importance.

Industrial Uses of Cellulose.—The applications of cellulose to the necessities of human life, infinitely varied in kind as they are colossal in magnitude, depend upon two groups of qualities or properties, (1) structural, (2) chemical. The manufactures of vegetable textiles and of paper are based upon the fibrous forms of the naturally occurring celluloses, together with such structural qualities as are expressed in the terms strength, elasticity, specific gravity. As regards chemical properties, those which come into play are chiefly the negative quality of resistance to chemical change; this is obviously a primary factor of value in enabling fabrics to withstand wear and tear, contact with atmospheric oxygen and water, and such chemical treatments as laundrying; positive chemical properties are brought into play in the auxiliary processes of dyeing, printing, and the treatment and preparation in connexion with these. Staple textiles of this group are cotton, flax, hemp and jute; other fibres are used in rope-making and brush-making industries. These subjects are treated in special articles under their own headings and in the article FIBRES. The course of industrial development in the 19th century has been one of enormous expansion in use and considerable refinement in methods of preparation and manufacture. Efforts to introduce new forms of cellulose have had little result. Rhea or ramie has been a favourite subject of investigation; the industry has been introduced into England, and doubtless its development is only a question of time, as on the continent of Europe the production of rhea yarns is well established, though it is still only a relatively small trade—probably two or three tons a day total production. The paper trade has required to seek new sources of cellulose, in consequence of the enormous expansion of the uses of paper. Important phases of development were: (1) in the period of 1860 to 1870, the introduction of esparto, which has risen to a consumption of 250,000 tons a year in the United Kingdom, at which figure it remains fairly steady; (2) the decade 1870 to 1880, which saw the development of the manufacture of cellulose from coniferous woods, and this industry now furnishes a staple of world-wide consumption, though the industry is necessarily localized in countries where the coniferous woods are available in large quantities. As a development of the paper industry we must mention the manufacture of paper textiles, based upon the production of pulp yarns. Paper pulps are worked into flat strips, which are then rolled into cylindrical form, and by a final twisting process a yarn is produced sufficiently strong to be employed in weaving.

What we may call the special cellulose industries depend upon specific chemical properties of cellulose, partly intrinsic, partly belonging to the derivatives such as the esters. Thus the cellulose nitrates are the bases of our modern high explosives, as well as those now used for military purposes. Their use has been steadily developed and perfected since the middle of the 19th century. The industries in celluloid, xylonite, &c., also depend upon the nitric esters of cellulose, and the plastic state which they assume when treated with solvent liquids, such as alcohol, amyl acetate, camphor and other auxiliaries, in which state they can be readily moulded and fashioned at will. They have taken an important place as structural materials both in useful and artistic applications. The acetates of cellulose have recently been perfected, and are used in coating fine wires for electrical purposes, especially in instrument-making; this use depends upon their electrical properties of high insulation and low inductive capacity. Hydrated forms of cellulose, which result from treatment with various reagents, are the bases of the following industries: vegetable parchment results from the action of sulphuric acid upon cellulose (cotton) in the form of paper, followed by that of water, which precipitates the partially colloidalized cellulose. This industry is carried out on "continuous" machinery, the cellulose, in the form of paper, being treated in rolls. Vulcanized fibre is produced by similar processes, as for instance by treating paper with zinc chloride solvents and cementing together a number of sheets when in the colloidal hydrated state; the goods are exhaustively washed to remove last traces of soluble electrolytes; this is necessary, as the product is used for electrical insulation. The solvent action of cupro-ammonium is used in treating cellulose goods, cotton and paper, the action being allowed to proceed sufficiently to attack the constituent fibres and convert them into colloidal cupro-ammonium compounds, which are then dried, producing a characteristic green-coloured finish of colloidal cellulose and rendering the goods impervious to water. The important industry of mercerization has been mentioned above; this is carried out on both yarns and cloth of cotton goods chiefly composed of Egyptian cottons. A high lustrous finish is produced, giving the goods very much the appearance of silk.

Of special importance are the more recent developments in the production of artificial fibres of all dimensions, by spinning or drawing the solutions of cellulose or derivatives. Three such processes are in course of evolution. (1) The first is based on the nitrates of cellulose which are dissolved in ether-alcohol, and spun through fine glass jets into air or water, the unit threads being afterwards twisted together to constitute the thread used for weaving (process of Chardonnet and Lehner). These processes were developed in the period 1883 to 1897, at which later date they had assumed serious industrial proportions. (2) The cupro-ammonium solution of cellulose is similarly employed, the solution being spun or drawn into a strong acid bath which instantly regenerates cellulose hydrate in continuous length. (3) Still more recently the "viscose" solution of cellulose, *i.e.* of the cellulose xanthogenic acid, has been perfected for the production of artificial silk or lustra-cellulose; the alkaline solution of the cellulose derivative being drawn either into concentrated ammonium salt solutions or into acid baths. This product, known as artificial silk, prepared by the three competing processes, was in 1908 an established textile with a total production in Europe of about 5000 tons a year, a quantity which bids fair to be very largely increased by the advent of the viscose process, which will effect a very considerable lowering in the cost of production. The viscose solution of cellulose is also used for a number of industrial effects in connexion with paper-sizing, paper-coating, textile finishes, and the production of book cloth and leather cloth, and, solidified in solid masses, is used in preparing structural solids which can be moulded, turned and fashioned.

For the special literature of cellulose treated from the general point of view of this article, the reader may consult the following works by C. F. Cross and E. J. Bevan: *Cellulose* (1895, 2nd ed. 1903), *Researches on Cellulose*, i. (1901), *Researches on Cellulose*, ii. (1906). (C. F. C.)

CELSIUS, ANDERS (1701–1744), Swedish astronomer, was born at Upsala on the 27th of November 1701. He occupied the chair of astronomy in the university of his native town from 1730 to 1744, but travelled during 1732 and some subsequent years in Germany, Italy and France. At Nuremberg he published in 1733 a collection of 316 observations of the aurora borealis made by himself and others 1716–1732. In Paris he advocated the measurement of an arc of the meridian in Lapland, and took part, in 1736, in the expedition organized for the purpose by the French Academy. Six years later he described the centigrade thermometer in a paper read before the Swedish Academy of Sciences (see THERMOMETRY). His death occurred at Upsala on the 25th of April 1744. He wrote: *Nova Methodus distantiam solis a terra determinandi* (1730); *De observationibus pro figura telluris determinanda* (1738); besides many less important works.

See W. Ostwald's *Klassiker der exacten Wissenschaften*, No. 57 (Leipzig, 1904), where Celsius's memoir on the thermometric scale is given in German with critical and biographical notes (p. 132); Marie, *Histoire des sciences*, viii. 30; Poggendorff's *Biog.-literarisches Handwörterbuch.*

CELSUS (*c.* A.D. 178), a 2nd century opponent of Christianity, known to us mainly through the reputation of his literary work, *The True Word* (or *Account*; ἀληθὴς λόγος), published by Origen in 248, seventy years after its composition. In that year, though the Church was under no direct threat of attack, owing

to the inertia of the emperor Philip the Arabian, the atmosphere was full of conflict. The empire was celebrating the 1000th anniversary of its birth, and imperial aspirations and ideas were naturally prominent. Over against the state and the worship of the Caesar stood as usual the Christian ideal of a rule and a citizenship not of this world, to which a thousand years were but as a day. A supernatural pride was blended with a natural anxiety, and it was at this juncture that Origen brought to light again a book written in the days of Marcus Aurelius, which but for the great Alexandrian might have been lost for ever. Sometimes quoting, sometimes paraphrasing, sometimes merely referring, he reproduces and replies to all Celsus's arguments. His work shows many signs of haste, but he more than compensates for this by the way in which he thus preserves a singularly interesting memorial of the 2nd century. When we remember that only about one-tenth of the *True Word* is really lost and that about three-quarters of what we have is verbatim text, it would be ungracious to carp at the method.

The argument.

Celsus opens the way for his own attack by rehearsing the taunts levelled at the Christians by the Jews. Jesus was born in adultery and nurtured on the wisdom of Egypt. His assertion of divine dignity is disproved by his poverty and his miserable end. Christians have no standing in the Old Testament prophecies, and their talk of a resurrection that was only revealed to some of their own adherents is foolishness. Celsus indeed says that the Jews are almost as ridiculous as the foes they attack; the latter said the saviour from Heaven had come, the former still looked for his coming. However, the Jews have the advantage of being an ancient nation with an ancient faith. The idea of an Incarnation of God is absurd; why should the human race think itself so superior to bees, ants and elephants as to be put in this unique relation to its maker? And why should God choose to come to men as a Jew? The Christian idea of a special providence is nonsense, an insult to the deity. Christians are like a council of frogs in a marsh or a synod of worms on a dunghill, croaking and squeaking, "For our sakes was the world created." It is much more reasonable to believe that each part of the world has its own special deity; prophets and supernatural messengers had forsooth appeared in more places than one. Besides being bad philosophy based on fictitious history, Christianity is not respectable. Celsus does not indeed repeat the Thyestean charges so frequently brought against Christians by their calumniators, but he says the Christian teachers who are mainly weavers and cobblers have no power over men of education. The qualifications for conversion are ignorance and childish timidity. Like all quacks they gather a crowd of slaves, children, women and idlers. "I speak bitterly about this," says Celsus, "because I feel bitterly. When we are invited to the Mysteries the masters use another tone. They say, 'Come to us ye who are of clean hands and pure speech, ye who are unstained by crime, who have a good conscience towards God, who have done justly and lived uprightly.' The Jews say, 'Come to us ye who are sinners, ye who are fools or children, ye who are miserable, and ye shall enter into the kingdom of Heaven.' The rogue, the thief, the burglar, the poisoner, the spoiler of temples and tombs, these are their proselytes. Jesus, they say, was sent to save sinners; was he not sent to help those who have kept themselves free from sin? They pretend that God will save the unjust man if he repents and humbles himself. The just man who has held steady from the cradle in the ways of virtue He will not look upon." He pours scorn upon the exorcists—who were clearly in league with the demons themselves—and upon the excesses of the itinerant and undisciplined "prophets" who roam through cities and camps and commit to everlasting fire cities and lands and their inhabitants. Above all Christians are disloyal, and every church is an illicit collegium, an insinuation deadly at any time, but especially so under Marcus Aurelius. Why cannot Christians attach themselves to the great philosophic and political authorities of the world? A properly understood worship of gods and demons is quite compatible with a purified monotheism, and they might as well give up the mad idea of winning the authorities over to their faith, or of hoping to attain anything like universal agreement on divine things.

The philosophy of Celsus.

Celsus and Porphyry (*q.v.*) are the two early literary opponents of Christianity who have most claim to consideration, and it is worth noticing that, while they agree alike in high aims, in skilful address and in devoted toil, their religious standpoints are widely dissimilar. Porphyry is above all a pure philosopher, but also a man of deep religious feeling, whose quest and goal are the knowledge of God; Celsus, the friend of Lucian, though sometimes called Epicurean and sometimes Platonist, is not a professed philosopher at all, but a man of the world, really at heart an agnostic, like Caecilius in Minucius Felix (*q.v.*), whose religion is nothing more or less than the Empire. He is keen, positive, logical, combining with curious dashes of scepticism many genuine moral convictions and a good knowledge of the various national religions and mythologies whose relative value he is able to appreciate. "His manner of thought is under the overpowering influence of the eclectic Platonism of the time, and not of the doctrine of the Epicurean school. He is a man of the world, of philosophic culture, who accepts much of the influential Platonism of the time but has absorbed little of its positive religious sentiment. In his antipathy to Christianity, which appears to him barbaric and superstitious, he gives himself up to the scepticism and satire of a man of the world through which he comes in contact with Epicurean tendencies." He quotes approvingly from the *Timaeus* of Plato: "It is a hard thing to find out the Maker and Father of this universe, and after having found him it is impossible to make him known to all." Philosophy can at best impart to the fit some notion of him which the elect soul must itself develop. The Christian on the contrary maintained that God is known to us as far as need be in Christ, and He is accessible to all. Another sharp antithesis was the problem of evil. Celsus made evil constant in amount as being the correlative of matter. Hence his scorn of the doctrine of the resurrection of the body held then in a very crude form, and his ridicule of any attempt to raise the vulgar masses from their degradation. The real root of the difficulty to Platonist as to Gnostic was his sharp antithesis of form as good and matter as evil.

Place and date.

Opinion at one time inclined to the view that the *True Word* was written in Rome, but the evidence (wholly internal) points much more decisively to an Egyptian, and in particular an Alexandrian origin. Not only do the many intimate references to Egyptian history and customs support this position, but it is clear that the Jews of Celsus are not Western or Roman Jews, but belong to the Orient, and especially to that circle of Judaism which had received and assimilated the idea of the Logos.

The date also is clearly defined. Besides the general indication that the Empire was passing through a military crisis, which points to the long struggle waged by Marcus Aurelius against the Marcomanni and other Germanic tribes, there is a reference (*Contra Celsum*, viii. 69) to the rescript of that emperor impressing on governors and magistrates the duty of keeping a strict watch on extravagances in religion. This edict dates from 176–177, and inaugurated the persecution which lasted from that time till the death of Marcus Aurelius in 180. During these years Commodus was associated with Marcus in the imperium, and Celsus has a reference to this joint rule (viii. 71).

Value in the history of Christianity.

Celsus shows himself familiar with the story of Jewish origins. Any pagan who wished to understand and criticize Christianity intimately had to begin by learning from the Jews, and this accounts for the opening chapters of his argument. He has a good knowledge of Genesis and Exodus, refers to the stories of Jonah, Daniel (vii. 53) and Enoch (v. 52), but does not make much use of the Prophets or the Psalter. As regards the New Testament his position is closely in agreement with that reflected in the contemporary *Acts of the Martyrs of Scili*. He speaks of a Christian collection of writings, and knew and used the gospels, but was influenced less by the fourth than by the Synoptics. There is more evidence of Pauline ideas than of Pauline letters.

The gnostic sects and their writings were well known to him (viii. 15 and vi. 25), and so was the work of Marcion. There are indications, too, of an acquaintance with Justin Martyr and the Sibylline literature (vii. 53, cp. v. 61). "He is perfectly aware of the internal differences between Christians, and he is familiar with the various stages of development in the history of their religion. These are cleverly employed in order to heighten the impression of its instability. He plays off the sects against the Catholic Church, the primitive age against the present, Christ against the apostles, the various revisions of the Bible against the trustworthiness of the text and so forth, though he admits that everything was not really so bad at first as it is at present."

The *True Word* had very little influence either on the mutual

relations of Church and State, or on classical literature. Echoes of it are found in Tertullian and in Minucius Felix, and then it lay forgotten until Origen gave it new life. A good deal of the neo-Platonic polemic naturally went back to Celsus, and both the ideas and phrases of the *True Word* are found in Porphyry and Julian, though the closing of the New Testament canon in the meantime somewhat changed the method of attack for these writers.

Of more importance than these matters is the light which the book sheds on the strength of the Church about the year 180. It is of course easy to see that Celsus had no apprehension of the spiritual needs even of his own day which it was the Christian purpose to satisfy, that he could not grasp anything of the new life enjoyed by the poor in spirit, and that he underrated the significance of the Church, regarding it simply as one of a number of warring sections (mostly Gnostic), and so seeing only a mark of weakness. And yet, there is all through an undercurrent which runs hard against his surface verdicts, and here and there comes to expression. He is bound to admit that Christianity has been stated reasonably; against the moral teaching of Jesus he can only bring the lame charge of plagiarism, and with the Christian assertion that the Logos is the Son of God he completely accords. Most suggestive, however, is his closing appeal to the Christians. "Come," he says, "don't hold aloof from the common régime. Take your place by the emperor's side. Don't claim for yourselves another empire, or any special position." It is an overture for peace. "If all were to follow your example and abstain from politics, the affairs of the world would fall into the hands of wild and lawless barbarians" (viii. 68). Forced to admit that Christians are not *infructuosi in negotiis*, he wants them to be good citizens, to retain their own belief but conform to the state religion. It is an earnest and striking appeal on behalf of the Empire, which was clearly in great danger, and it shows the terms offered to the Church, as well as the strength of the Church at the time. Numerically, Christians may have formed perhaps a tenth of the population, *i.e.* in Alexandria there would be fifty or sixty thousand, but their power in a community was out of all proportion to their mere numbers.

LITERATURE.—Th. Keim, *Celsus' Wahres Wort* (1873); Pélagaud, *Étude sur Celse* (1878); K. J. Neumann's edition in *Scriptores Graeci qui Christianam impugnaverunt religionem*, and article in Hauck-Herzog's *Realencyk. für prot. Theol.*, where a very full bibliography is given. See also W. Moeller, *Hist. of the Chr. Church*, i. 169 ff.; A. Harnack, *Expansion of Christianity*, ii. 129 ff.; J. A. Froude, *Short Studies*, iv.

CELT, or KELT, the generic name of an ancient people, the bulk of whom inhabited the central and western parts of Europe. (For the sense of a primitive stone tool, see the separate article, later.) Much confusion has arisen from the inaccurate use of the terms "Celt" and "Celtic." It is the practice to speak of the dark-complexioned people of France, Great Britain and Ireland as "black Celts," although the ancient writers never applied the term "Celt" to any dark-complexioned person. To them great stature, fair hair, and blue or grey eyes were the characteristics of the Celt. The philologists have added to the confusion by classing as "Celtic" the speeches of the dark-complexioned races of the west of Scotland and the west of Ireland. But, though usage has made it convenient in this work to employ the term, "Celtic" cannot be properly applied to what is really "Gaelic."

The ancient writers regarded as homogeneous all the fair-haired peoples dwelling north of the Alps, the Greeks terming them all *Keltoi*. Physically they fall into two loosely-divided groups, which shade off into each other. The first of these is restricted to north-western Europe, having its chief seat in Scandinavia. It is distinguished by a long head, a long face, a narrow aquiline nose, blue eyes, very light hair and great stature. Those are the peoples usually termed Teutonic by modern writers. The other group is marked by a round head, a broad face, a nose often rather broad and heavy, hazel-grey eyes, light chestnut hair; they are thick-set and of medium height. This race is often termed "Celtic" or "Alpine" from the fact of its occurrence all along the great mountain chain from south-west France, in Savoy, in Switzerland, the Po valley and Tirol, as well as in Auvergne, Brittany, Normandy, Burgundy, the Ardennes and the Vosges. It thus stands midway not only geographically but also in physical features between the "Teutonic" type of Scandinavian and the so-called "Mediterranean race" with its long head, long face, its rather broad nose, dark brown or black hair, dark eyes, and slender form of medium height. The "Alpine race" is commonly supposed to be Mongoloid in origin and to have come from Asia, the home of round-skulled races. But it is far more probable that they are the same in origin as the dark race south of them and the tall fair race north of them, and that the broadness of their skulls is simply due to their having been long domiciled in mountainous regions. Thus the "Celtic" ox (*Bos longifrons*), from remote ages the common type in the Alpine regions, is characterized by the height of its forehead above the orbits, by its highly-developed occipital region, and its small horns. Not only do animals change their physical characteristics in new environment, but modern peoples when settled in new surroundings for even one or two centuries, *e.g.* the American of New England and the Boer of South Africa, prove that man is no less readily affected by his surroundings.

The northern race has ever kept pressing down on the broad-skulled, brown-complexioned men of the Alps, and intermixing with them, and at times has swept right over the great mountain chain into the tempting regions of the south, producing such races as the Celto-Ligyes, Celtiberians, Celtillyrians, Celto-Thracians and Celto-Scythians. In its turn the Alpine race has pressed down upon their darker and less warlike kindred of the south, either driven down before the tall sons of the north or swelling the hosts of the latter as they swept down south.

As the natives of the southern peninsula came into contact with these mixed people, who though differing in the shape of the skull nevertheless varied little from each other in speech and colour of their hair and eyes, the ancient writers termed them all "Keltoi." But as the most dreaded of these Celtic tribes came down from the shores of the Baltic and Northern Ocean, the ancients applied the name Celt to those peoples who are spoken of as Teutonic in modern parlance. The Teutons, whose name is generic for Germans, appear in history along with the Cimbri, universally held to be Celts, but coming from the same region as the Guttones (Goths) by the shores of the Baltic and North Sea. Again, the Germani themselves first appear in the Celtic host destroyed by Marcellus at Clastidium in 225 B.C. All the true Celtae or Galatae in France had come across the Rhine; the Belgic tribes in northern France were Cimbri, who also had crossed the Rhine: in Caesar's day the Germans were still constantly crossing that river, and so-called Gauls who lived near the Germans, *e.g.* the Treveri, closely resembled the latter in their habits, while in later times were to come Goths and Franks from beyond the great river. It is then not strange that the Gallic name for a henchman (*ambactus*) is the same as the Gothic (*ambahts*).

The earliest invaders, under the name of Celtae, had occupied all central Gaul, doubtless mixing with the aboriginal Ligurians and Iberians, who, however, maintained themselves respectively in the later Provence and in Aquitania. The Celts had firmly established themselves by the 7th century B.C. and we know not how long before, the Bituriges (whose name survives in Berri) being the dominant tribe. In the Alps and the Danube valley some of the Celts had dwelt from the Stone Age; there they had developed the working of copper, discovered bronze (an alloy of copper and tin), and the art of smelting iron (see HALLSTATT). The Umbrians, who were part of the Alpine Celts, had been pressing down into Italy from the Bronze Age, though checked completely by the rise of the Etruscan power in the 10th century B.C. The invention of iron weapons made the Celts henceforth irresistible. One of the earliest movements after this discovery was probably that of the Achaeans of Homer, who about 1450 B.C. invaded Greece (see ACHAEANS), bringing with them the use of iron and brooches, the practice of cremating the dead, and the style of ornament known as Geometric. Later the Cimmerians (see SCYTHIA and CIMMERII) passed down from the

Cimbric Chersonese, doubtless following the amber routes, and then turned east along the Danube, some of their tribes, *e.g.* the Treres, settling in Thrace, and crossing into Asia; others settled in southern Russia, leaving their name in the Crimea; then when hard pressed by the Scythians most of them passed round the east end of the Euxine into Asia Minor, probably being the people known as Gimirri on Assyrian monuments, and ravaged that region, the relics of the race finally settling at Sinope.

At the beginning of the 6th century B.C. the Celts of France had grown very powerful under the Biturigian king Ambigatus. They appear to have spread southwards into Spain, occupying most of that country as far south as Gades (Cadiz), some tribes, *e.g.* Turdentani and Turduli, forming permanent settlements and being still powerful there in Roman times; and in northern central Spain, from the mixture of Celts with the native Iberians, the population henceforward was called Celtiberian. About this time also took place a great invasion of Italy; Segovisus and Bellovisus, the nephews of Ambigatus, led armies through Switzerland, and over the Brenner, and by the Maritime Alps, respectively (Livy v. 34). The tribes who sent some of their numbers to invade Italy and settle there were the Bituriges, Arverni, Senones, Aedui, Ambarri, Carnuti and Aulerci.

Certain material remains found in north Italy, *e.g.* at Sesto Calende, may belong to this invasion. The next great wave of Celts recorded was that which swept down on north Italy shortly before 400 B.C. These invaders broke up in a few years the Etruscan power, and even occupied Rome herself after the disaster on the Allia (390 B.C.). Bought off by gold they withdrew from Rome, but they continued to hold a great part of northern Italy, extending as far south as Sena Gallica (*Sinigaglia*), and henceforward they were a standing source of danger to Rome, especially in the Samnite Wars, until at last they were either subdued or expelled, *e.g.* the Boii from the plains of the Po. At the same time as the invasion of Italy they had made fresh descents into the Danube valley and the upper Balkan, and perhaps may have pushed into southern Russia, but at this time they never made their way into Greece, though the Athenian ladies copied the style of hair and dress of the Cimbrian women. About 280 B.C. the Celts gathered a great host at the head of the Adriatic, and accompanied by the Illyrian tribe of Autariatae, they overthrew the Macedonians, overran Thessaly, and invaded Phocis in order to sack Delphi, but they were finally repulsed, chiefly by the efforts of the Aetolians (279 B.C.). The remnant of those who returned from Greece joined that part of their army which had remained in Thrace, and marched for the Hellespont. Here some of their number settled near Byzantium, having conquered the native Thracians, and made Tyle their capital. The Byzantines had to pay them a yearly tribute of 80 talents, until on the death of the Gallic king Cavarus (some time after 220 B.C.) they were annihilated by the Thracians. The main body of the Gauls who had marched to the Hellespont crossed it under the leadership of Leonnorius and Lutarius. Straightway they overran the greater part of Asia Minor, and laid under tribute all west of Taurus, even the Seleucid kings. At last Attila, king of Pergamum, defeated them in a series of battles commemorated on the Pergamene sculptures, and henceforth they were confined to a strip of land in the interior of Asia Minor, the Galatia of history. Their three tribes—Trocmi, Tolistobogians and Tectosages—submitted to Rome (189 B.C.), but they remained autonomous till the death of their king Amyntas, when Augustus erected Galatia into a province. Their descendants were probably the "foolish Galatians" to whom St Paul wrote (see GALATIA).

Ancient writers spoke of all these Gauls as Cimbri, and identified them with the Cimmerians of earlier date, who in Homeric times dwelt on the ocean next to the Laestrygones, in a region of wintry gloom, but where the sun set not in summer. Nor was it only towards the south and the Hellespont that the Celtic tide ever set. They passed eastward to the Danube mouth and into southern Russia, as far as the Sea of Azov, mingling with the Scythians, as is proved by the name Celto-scyths. Mithradates VI. of Pontus seems to have negotiated with them to gain their aid against Rome, and Bituitus, a Gallic mercenary, was with him at his death.

The Celts had continually moved westwards also. The Belgae, who were Cimbric in origin, has spread across the Rhine and given their name to all northern France and Belgium (*Gallia Belgica*). Many of these tribes sent colonies over into south-eastern Britain, where they had been masters for some two centuries when Caesar invaded the island (see BRITAIN). But there is evidence that from the Bronze Age there had been settlers in northern Britain who were broad-skulled and cremated their dead, a practice which had arisen in south Germany in the early Bronze Age or still earlier. It is not unlikely that, as tradition states, there were incursions of Celts from central Gaul into Ireland during the general Celtic unrest in the 6th century B.C. It is certain that at a later period invaders from the continent, bringing with them the later Iron Age culture, commonly called La Tène, which had succeeded that of Hallstatt, had settled in Ireland. Not only are relics of La Tène culture found in Ireland, but the oldest Irish epics celebrate tall, fair-haired, grey-eyed heroes, armed and clad in Gallic fashion, who had come from the continent. The Celts in Italy, in the Balkan, in France and in Britain, overspread the Indo-European peoples, who differed from themselves but slightly in speech. The Celts represented Indo-European *q* by *p*, whilst the Greeks, Illyrians, Thracians, Ligurians, and aborigines of France, Britain and Ireland represented it by *k*, *c* or *qu*. The Umbrian-Sabellian tribes had the same phonetic peculiarity as the Celts. Thus Gallic *petor* (*petor-ritum*, "four-wheeler"), Umbrian *petur*, Homeric πίσυρες, Boeotian (Achaean) πέτταρες, Welsh *pedwar*; but Gaelic *cethir*, Lat. *quatuor*. The Celts are thus clearly distinguished from the Gaelic-speaking dark race of Britain and Ireland, and in spite of usage it must be understood that it is strictly misleading to apply the term Celtic to the latter language.

See also Ridgeway, *Early Age of Greece*, vol. i., and *Oldest Irish Epic*; Ripley, *The Races of Europe*; Sergi, *The Mediterranean Race*.

(W. R.)

CELTIC LANGUAGES

Introduction.—The Celtic languages form one group of the Indo-European family of languages. As might be expected from their geographical distribution, they hold a position between the Italic and Teutonic groups. They are distinguished from these and other branches of the family by certain well-marked characteristics, the most notable of which are the loss of initial and inter-vocalic *p*, cf. Ir. *athair* with Lat. *pater*; Ir. *lān*, "full," Welsh *llawn*, Breton *leun*, with Lat. *plenus*; Gaulish *are-*, "beside," Ir. *ar*. Welsh, Breton *ar*, with Gr. περί, παρά; and the change of I. E. *ē* to *ī*, cf. Ir. *fīr*, "true," Welsh *gwir*, Breton *gwir*, Lat. *verus*. We may further mention that the I. E. labialized velar *gv* is represented by *b*, *e.g.* Ir. *bō*, "cow," Welsh *buwch*, Gr. βοῦς, Sanskr. *gāus*; Ir. *ben*, "woman," Gr. γυνή, whilst the medial aspirates *bh*, *dh*, *gh* result in simple voiced stops. I. E. sonant *r* and *l* become *ri*, *li*. Other distinctive features of the modern dialects are not found in Gaulish, partly owing to the character of the monuments. Such are the -ss- preterite and the fusion of simple prepositions with pronominal elements, *e.g.* Ir. *fri-umm*, "against me," Welsh *wrth-yf*, Breton *ouz-inn*. The initial mutations which are so characteristic of the living languages did not arise until after the Romans had left Britain. The Celtic languages betray a surprising affinity with the Italic dialects. Indeed, these two groups seem to stand in a much closer relationship to one another than any other pair. As features common to both Celtic and Italic we may mention: (1) the gen. sing. ending *-ī* of masc. and neut. stems in *o*; (2) verbal nouns in *-tion*; (3) the *b*-future; (4) the passive formation in *-r*.

The various Celtic dialects may be divided as follows:—(1) Gaulish; (2) Goidelic, including Irish, Scottish Gaelic, and Manx; (3) Brythonic, including Welsh, Breton and Cornish. Gaulish and Brythonic, like Oscan and Umbrian among the Italic dialects, change the I. E. labialized velar guttural *qv* to *p*, whilst the Goidelic dialects retain the *qv* which later gives up the labial

element and becomes *k*, *e.g.* Gaulish *petor-*, "four," Ir. *cethir*, Welsh *petguar*, Breton *pevar*, Lat. *quattuor*; Ir. *cia*, "who," Welsh *pwy*, Lat. *quis*; Gaulish *epo-*, "horse," Welsh *eb-ol*, Breton *eb-eul*, Ir. *ech*, Lat. *equus*. Several attempts have been made to prove the existence of Celtic dialects with *qv* on the continent. Forms containing *p* occur in the Coligny calendar, discovered in 1897, by the side of others with *qv*, a state of affairs not yet satisfactorily accounted for. The Rom tablets, discovered in 1898, have not been interpreted as yet, but *p* forms are found on them exclusively. In an excursus we shall deal with the language of the Picts.

No comprehensive handbook of the Celtic languages on the lines of Gröber's *Grundriss der romanischen Philologie* or Paul's *Grundriss der germanischen Philologie* was available in 1909. The reader may refer to Windisch's article "Keltische Sprachen" in Ersch und Gruber's *Allgemeine Encyklopädie der Wissenschaften und Künste*, and V. Tourneur, *Esquisse d'une histoire des études celtiques* (Liége, 1905; vol. ii. with full bibliography). Also H. Zimmer, "Die kelt. Litteraturen" in *Die Kultur d. Gegenwart*, T. i. Abh. xi. 1, Berlin and Leipzig, 1909. The materials for the study of the older forms of the languages are to be found in Zeuss's *Grammatica Celtica* as revised by Ebel. A comparative grammar of the Celtic dialects has been prepared by H. Pedersen (Göttingen, 1908). See also Whitley Stokes and A. Bezzenberger, *Wortschatz der keltischen Spracheinheit* (Göttingen, 1894).

I. Gaulish.—Celtic place-names are found as far east as the Dniester and Dobrudja, and as far north as Westphalia. The language of the Galatians in Asia Minor must have stood in a very close relation to Gaulish. Indeed few traces of dialectical differences are to be observed in continental Celtic. Unfortunately no literary monuments written in the ancient speech of Gaul have come down to us, though Caesar makes mention of religious poems orally transmitted by the Druids, and we also hear of *bardi* and *vates*. But a large number of personal and place-names have been preserved. The classical writers have, moreover, recorded a certain number of Gaulish words which can generally be identified without difficulty by comparing them with words still living in the modern dialects, *e.g.* *pempedula*, "cinquefoil," cf. Welsh *pump*, "five," and *deilen*, "leaf"; *ambactus*, Welsh *amaeth*; *petorritum*, "four-wheeled chariot," cf. Welsh *pedwar*, "four," and Ir. *roth*, "wheel," or *rith*, "course." We have further between thirty and forty inscriptions (three in north Italy) which we may without hesitation ascribe to the Gauls. These inscriptions are written in either N. Etruscan or Greek or Latin characters. We are thus in a position to reconstruct much of the old system of declension, which resembles Latin very closely on the one hand, and on the other represents the forms which are postulated by the O. Ir. paradigms. Hence Gaulish is particularly valuable as preserving the final vowels which have disappeared in early Irish and Welsh. The few verb-forms which occur in the remains of Gaulish are quite obscure and have not hitherto admitted of a satisfactory explanation. The statements of ancient authors with regard to the Belgae are conflicting, but there cannot be much doubt that the language of the latter was substantially the same as Gaulish. Caesar observes that there was little difference between the speech of the Gauls and the Britons in his day, and we may regard Gaulish as closely akin to the ancestor of the Brythonic dialects. It is difficult to say when Gaulish finally became extinct. It disappeared very rapidly in the south of France, but lingered on, possibly till the 6th century, in the northern districts, and it seems unnecessary to discredit Jerome's statement that the speech of the Galatians in Asia Minor bore a strong resemblance to the language he had heard spoken in the neighbourhood of Trier. There is no evidence that Breton has been influenced by continental Celtic. The number of Gaulish words which have come down in the Romance languages is remarkably small, and though at first sight the sound-changes of French and Welsh seem to bear a strong likeness to one another, any influence of Gaulish pronunciation on French is largely discounted when we find the same changes occurring in other dialects where there is little or no question of Celtic influence.

The proper names occurring in classical writers, on inscriptions and coins, have been collected by A. Holder in his monumental *altceltischer Sprachschatz* (Leipzig, 1896–1908). The inscriptions all have been most recently treated by J. Rhys in the *Proceedings of the British Academy*, vol. ii. See also a paper in this volume entitled "Celtae and Galli" by the same author for the text of the Coligny and Rom inscriptions. The value of Gaulish for grammatical purposes is set forth by Whitley Stokes in a paper on "Celtic Declension" in the *Proceedings of the London Philological Society* (1885–1886). For the extent over which Gaulish was spoken, its relation to Latin and its influence on Romance, see E. Windisch's article on "Keltische Sprache" in the section "Die vorromanischen Volkssprachen" in Gröber's *Grundriss der romanischen Philologie*[2], vol. i. pp. 373 ff. Cf. further the introduction to J. Loth's *Chrestomathie bretonne* (Paris, 1890); G. Dottin, *Manuel pour servir à l'étude des antiquités celtiques* (Paris, 1906); R. Thurneysen, *Keltoromanisches* (Halle, 1884).

II. Goidelic and Brythonic.—When the monuments of the Celtic dialects of the British Islands begin to appear, we find a wide divergence between the two groups. We can only mention some of the more important cases here. The Brythonic dialects have gone very much farther in giving up inflectional endings than Goidelic. In Irish all final syllables in general disappear except long vowels followed by *s* or *r* and *u* < *ō* preceded by *i*. But these reservations do not hold good for Brythonic. Thus, whilst O. Irish possesses five cases the Brythonic dialects have only one, and they have further lost the neuter gender and the dual number in substantives. In phonology there are also very striking differences, apart from the treatment of the labialized velar *qv* already mentioned. The sonant *n* appears in Brythonic as *an*, whereas in Goidelic the nasal disappears before *k*, *t* with compensatory lengthening of the vowel, *e.g.* I. E. **kmtom*, Ir. *cét*, "hundred," W. *cant*, Bret. *kant*; Prim. Celt. **jovṇko-*, O. Ir. *óac*, Mod. Ir. *óg*, "young," W. *ieuanc*, Bret. *iaouank*. *t*, *k* standing after a vowel and preceding *l*, *n* (and also *r* if *k* precede) disappear in Goidelic with compensatory lengthening of the vowel, *e.g.* Prim. Celt. **stātlā-*, Ir. *sál*, "heel," W. *sawdl*; Prim. Celt. **petno-*, Ir. *én*, "bird," O. W. *etn*, Mod. W. *edn*. Similarly *b*, *d*, *g* disappear in Goidelic when standing after a vowel and preceding *l*, *r*, *n* with compensatory lengthening of the vowel, but in Welsh they produce a vowel forming a diphthong with the preceding vowel, *e.g.* Prim. Celt. **neblo-*, Ir. *nél*, "cloud," W. *niwl*; Prim. Celt. **ogno-*, cf. Lat. *agnus*, Ir. *uan*, "lamb," from **ōn*, W. *oen*; Prim. Celt. **vegno-*, cf. Ger. *Wagen*, Ir. *fén*, "wagon," O. W. *guein*, Mod. W. *gwain*. The Goidelic dialects have preserved the vowels of accented syllables on the whole better than Brythonic. Thus Brythonic has changed Prim. Celt. *ā* (= I. E. *ā*, *ō*) to *ō* (W. *aw*, Bret. *eu*); and Prim. Celt. *ū* to *ī*, *e.g.* Ir. *brāthir*, "brother," W. *brawd*, Bret. *breur*; Gaulish *dūnum*, Ir. *dún*, "fort," W. *din*. Already in Gaulish the I. E. diphthongs show a tendency to become simple long vowels and the latter are treated differently by Goidelic and Brythonic. In early times I. E. *eu*, *ou* both became *ō* and I. E. *ei* gave *ē*. In Goidelic *ō*, *ē*, in accented syllables were diphthongized in the early part of the 8th century to *ua*, *ia* if the next syllable did not contain the vowels *e* or *i*, whereas in Brythonic *ō* gave *ȣ̄* (written *u*) and *ē* became in W. *ui* (*wy*), and in Bret. *oe* (*oue*), *e.g.* Gaulish *Teuto-*, *Toutius*, Ir. *tuath*, "people," W., Bret. *tud*; Brythonic *Lēto-cētum*, Ir. *liath*, "grey," W. *llwyd*, Bret. *loued*. Similarly in loan-words, Ir. *céir*, *fial*, W. *cwyr*, O. Corn. *guil*, from Lat. *cēra*, *vēlum*. Further I. E. *ai*, *oi* are preserved in Irish as *ai* (*ae*), *oi* (*oe*), Mod. Ir. *ao*, but in Welsh I. E. *ai* gave either *ai* or *oe*, whilst *oi* changed to *ȣ̄* (written *u*), Ir. *toeb*, "side," W., Bret. *tu*; I. E. **oinos*, Ir. *óen*, "one," W., Bret. *un*; Prim. Celt. **saillo-*, cf. Lat. *saeculum*, W. *hoedl*, "age," Bret. *hoal*. In Goidelic accented *e* changes to *i* before *i*, *u* in the following syllable, cf. Ir. *fid*, "wood," gen. sing. *fedo*, O. H. G. *witu*, and *i* changes to *e* before *a* or *o* under similar conditions. In like manner *u* becomes *o* before *a* or *o*, whilst *o* changes to *u* before *i*, *u*, cf. Ir. *muir*, "sea," Prim. Celt. **mori*, gen. sing. *mora*. Of Brythonic finals which disappear, *ā*, *ī*, (*ō*), *j* alone influence preceding vowels, whilst an *i* (*y*) which received the stress in O. W. was also able to modify vowels which went before it. In Goidelic the combinations *sqv*, *sv* appear respectively as *sc*, *s* (medially *f*), but in Brythonic they both give *chw*; Prim. Celt. **sqvetlon*, Ir. *scél*, "story," W. *chwedl*; Prim. Celt. **svesor*, Ir. *siur*, "sister," but *mo fiur*, "my sister" (whence Scottish *piuthar* by false de-aspiration), W. *chwaer*, Bret. *c'hoar*. In

Brythonic initial *s* becomes *h* in the 7th century, but this is unknown in Goidelic, *e.g.* Ir. *salann*, "salt," W. *halen*, Cornish *haloin*, Bret. *holenn*; Lat. *sē-men*, Ir. *sil*, "seed," W. *hil*. Initial *v* gives *f* in Goidelic in the course of the 7th century, whereas in Brythonic it appears as *gu*, *gw*, cf. Lat. *vērus*, Ir. *fir*, W., Bret. *gwir*. We may also mention that in Goidelic initial *j* and medial *v* disappear, *e.g.* Gaulish *Jovincillus*, W. *ieuanc*, "young," Bret. *iouank*, Ir. *óac*, *óc*; W. *bywyd*, "food," Ir. *biad*. Post-consonantic *j* in Brythonic sometimes gives *-id* (Mod. W. *-ydd*, Mod. Bret. *-ez*), *e.g.* Gaulish *nevio-*, *novio-*, O. Bret. *nowid*, W. *newydd*, Bret. *nevez*, Ir. *núe*. I. E. *-kt* and *-pt* both appear in Goidelic as *-cht* but in Brythonic as *-ith*, cf. Lat. *septem*, O. Ir. *secht*, W. *seith*, Bret. *seiz*.

We unfortunately know very little about the position of the stress in ancient Gaulish. According to Meyer-Lübke in place-names the penult was accented if the vowel was long, otherwise the stress lay on the preceding syllable, *e.g.* *Augustodūnum*, O. Fr. *Ostedun*, now *Autun*; *Catalāunos* (Châlons), *Tricasses* (Fr. Troyes), *Bitûriges* (Fr. Bourges). In Goidelic the stress, which is strongly expiratory, is always placed on the first syllable except in certain cases in verbs compounded with prepositional prefixes. In Old Welsh and Old Breton, on the other hand, the final syllable, *i.e.* the primitive penult, received the stress, but in both languages the stress was shifted in the middle period to the penultimate. The Goidelic dialects, like the Slavonic, distinguish between palatalized and nonpalatalized consonants, according as the consonant was originally followed by a front (*e*, *i*) or back vowel (*a*, *o*, *u*), a phenomenon which is entirely unknown to Brythonic.

Finally, the two groups differ radically in the matter of initial mutation or, as it is often called, aspiration. These mutations are by no means confined to initial consonants, as precisely the same changes have taken place under similar conditions in the interior of words. The Goidelic changes included under this head probably took place for the most part between the 5th and 7th centuries, whilst in Brythonic the process seems to have begun and continued later. It is easier to fix the date of the changes in Brythonic than in Goidelic, as a number of British names are preserved in lives of saints, and it is possible to draw conclusions from the shape that British place-names assumed in the mouths of the Anglo-Saxons. In Goidelic, we find two mutations, the vocalic and the nasal. Initial mutation only takes place between words which belong together syntactically, and which form one single stress-group, thus between article, numeral, possessive pronoun or preposition, and a following substantive; between a verbal prefix and the verb itself.

1. When the word causing mutation ended in a vowel we get the vocalic mutation, called by Irish grammarians aspiration. The sounds affected are the tenues *k* (*c*), *t*, *p*; the mediae *g*, *d*, *b*; the liquids and nasals *m*, *n*, *r*, *l*; *s*, and Prim. Celt. *v* (Ir. *f*, W. *gw*). At the present day the results of this mutation in Irish and Welsh may be tabulated as follows. Where the sound is at variance with the traditional orthography, the latter is given in brackets. In the case

Original sound	k	t	p	g	d	b	m
Irish	χ(ch)	h(th)	f(ph)	ȝ(gh)	ȝ(dh)	v,w(bh)	v,w(mh)
Welsh	g	d	b	nil	ð(dd)	v(f)	v(f)

of *n*, *r*, *l* in Goidelic we get a different variety of *n*, *r*, *l* sound. In Welsh in the case of *r*, *l*, the absolute initial is a voiceless *r*, *l* written *rh*, *ll*, which on mutation become voiced and are written *r*, *l*. In Irish *s* becomes *h* written *sh* and the mutation of *f* is written *fh*, which, however, is now silent. Examples:—Irish, *cú*, "hound," *do chú*, "thy hound"; Welsh *ci*, *dy gi* (*do*, *dy* represent a Prim. Celt. **tovo*); Irish *máthair*, "mother," *an mháthair*, "the mother," Welsh *mam*, *y fam* (the feminine of the article was originally **sentā*, *sendā*).

2. When the word causing mutation originally ended in a nasal, we get the nasal mutation called by Irish grammarians eclipse. The sounds affected are *k* (*c*), *t*, *p*; *g*, *d*, *b*; Prim. Celt. *v* (Ir. *f*, W. *gw*). In mod. Irish and mod. Welsh the results are tabulated below. Irish *f* becomes *w* written *bh*, whilst W. *gw* gives *ngw*. Examples:—Irish *bliadhna*, "year," *seacht m-bliadhna*, "seven years," cf. Latin *septem*, Welsh *blynedd*, *saith mlynedd*; Irish *tir*, "country," *i d-tir*, "in a country," Welsh *tref*, "town," *yn nhref*, "in a town," cf. Latin *in*.

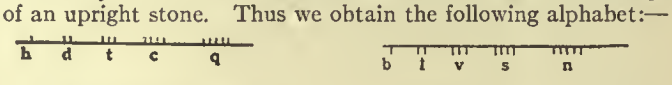
3. In Welsh *k* (*c*), *t*, *p* undergo a further change when the word

Original Sound	k	t	p	g	d	b
Irish	g	d	b	ng	n	m
Welsh	ngh	nh	mh	ng	n	m

causing mutation originally ended in *s*. There is nothing corresponding to this consonantal mutation in Goidelic. In this case *k* (*c*), *t*, *p* become the spirants χ (*ch*), *th*, *f* (*ph*), *e.g.* *tad*, "father," *ei thad*, "her father," *ei* represents a primitive **esiās*. In the interior of words in Brythonic, *cc*, *pp*, *tt* give the same result as initial *k*, *t*, *p* by this mutation.

The relation in which the other Celtic dialects stand to this system will be mentioned below in dealing with the various languages. It will be noted from what has been said above that, with the exception of the different treatment of the labialized velar *qv*, and the nasal sonant *n̥*, the features which differentiate the Brythonic from the Goidelic dialects first appear for the most part after the Romans had left Britain. At the beginning of the Christian era the difference between the two groups can only have been very slight. And Strachan has shown recently that Old Irish and Old Welsh agree in a very striking manner in the use of the verbal particle *ro* and in other syntactical peculiarities connected with the verb.

(i.) *Goidelic.*—The term Goidelic is used to embrace the Celtic dialects of Ireland, Scotland and the Isle of Man. In each case the national name for the speech is *Gaelic* (Ir. *Gaedhlig*, Scottish *Gàidhlig*, Manx *Gailck*), from Ir. Scottish *Gaodhal*, *Gaedheal*, Mid. Ir. *Gôedel*, W. *Gwyddel*, "a Gael, inhabitant of Ireland or Scotland." Old Irish may be regarded as the ancestor of Scottish and Manx Gaelic, as the forms of these dialects can be traced back to Old Irish, and there are practically no monuments of Scottish and Manx in the oldest period. Scottish and Irish may be regarded as standing to one another in much the same relation as broad Scottish and southern English. The divergences of Scottish and Manx from Irish will be mentioned below. The language of the Ogam inscriptions is the oldest form of Goidelic with which we are acquainted. Some 300 inscriptions have up to the present been discovered in this alphabet, the majority of them hailing from the south-west of Ireland (Kerry and Cork). In Scotland 22 are known, whilst in England and Wales about 30 have turned up. Most of the latter are in South Wales, but odd ones have been found in North Wales, Devon and Cornwall, and one has occurred as far east as Hampshire. The Isle of Man also possesses two. The letters in the oldest inscriptions are formed by strokes or notches scored on either side of the edge of an upright stone. Thus we obtain the following alphabet:—



This system, which was eked out with other signs, would seem to have been framed in the south-west of Ireland by a person or persons who were familiar with the Latin alphabet. Some of the inscriptions probably go back to the 5th century and may even be earlier. As illustrations of the simplest forms of Ogam inscriptions we may mention the following: *Dovcti maqqi Cattini*, *i.e.* "(the stone) of Dovetos son of Cattinos"; *Trenagusu Maqi Maqi-Treni* is rendered in Latin *Trenegussi Fili Macutreni hic jacit; Sagramni Maqi Cunatami*, "(the stone) of Sagramnos son of Cunotamos"; *Ovanos avi Ivacaltos*, "(the stone) of Ovanus descendant of Ivacattus." It will be seen that in the oldest of these inscriptions *q* is still kept apart from *k* (*c*), and that the final syllables have not disappeared (cf. *maqqi*, O. Ir. *maicc*), but it appears certain that in Ogamic writing stereotyped forms were used long after they had disappeared in ordinary speech. Several stones contain bilingual inscriptions, but the key to the Ogam alphabet is supplied by a treatise on Ogamic writing contained in the Book of Ballymote, a manuscript of the late 14th century. It should be mentioned that the Welsh

stones are early whilst the Scottish ones are almost without exception late, and several of the latter have so far defied interpretation. In addition to the Irish Ogams there are a number of Christian inscriptions in Latin character, but, with one exception, they are not older than the 8th century.

See R. R. Brash, *The Ogam Inscribed Monuments of the Gaedhil* (London, 1879); R. A. Stewart Macalister, *Studies in Irish Epigraphy* (London), vol. i. (1897), vol. ii. 1902, vol. iii. 1907. The Welsh inscriptions are contained in J. Rhys, *Lectures on Welsh Philology*[2] (London, 1879). The Scottish stones have also been treated by Rhys in the *Proceedings of the Scottish Society of Antiquaries* (Edinburgh, 1892). See also G. M. Atkinson for the tract in the Book of Ballymote, *Kilkenny Journal of Archaeology* (1874). The Irish Christian inscriptions were published by Margaret Stokes as the annual volumes of the Roy. Hist. and Archaeol. Association of Ireland (1870–1877), and have been republished by R. A. Stewart Macalister.

(*a*) *Irish.*—We are able to trace the history of the Irish language continuously for a period of 1200 years, and from the time that the literary documents begin we are better supplied with linguistic material for the study of the language than is the case with any other Celtic dialect. At the same time that form of Irish which is to be found in the oldest documents has preserved a number of features which have entirely, or almost entirely, disappeared from the Brythonic languages. For this reason scholars have largely occupied themselves with Irish, which for purposes of comparative philology may be regarded as the classic Celtic language.

The history of Irish is divided into three periods:—Old Irish (700–1100), the documents mainly representing the language of the 8th and 9th centuries; Middle Irish, extending roughly from 1100 to 1550; Modern Irish from 1550 to the present day. These periods merge into one another to such an extent that no firm division can be made. The language of some manuscripts of the 14th century contains forms which are really Old Irish, and Middle Irish orthography was partly employed by historians and antiquarians in the middle of the 17th century. Old Irish, as compared with Brythonic, preserves a wealth of inflectional forms in declension and conjugation, but many of these tend to disappear very early. In the modern dialects of Ireland and Scotland there is a rigid rule of orthography that a palatalized, or, as it is termed, slender consonant in medial or final position, must be preceded by a palatal vowel (*i*), and a non-palatalized consonant by a non-palatal or broad vowel (*a, o, u*). This is the famous rule of the grammarians known as *caol le caol agus leathan le leathan* ("slender to slender and broad to broad"), but it is not so strictly adhered to in the spoken language as is commonly stated. In the older language the quality of medial and final consonants is only denoted very imperfectly, thus non-palatalized final consonants are regularly not denoted as such, *e.g.* O. and Mid. Ir. *fir*, Mod. Ir. *fior*. In Old and Mid. Irish the initial mutations are only regularly denoted in the case of the vocalic mutation of *c, p, t, s, f*, and the nasal mutation of *b, d, g*. The vocalic mutation of *c, p, t, s, f* was denoted by writing *ch, ph, th, sh, fh*, the first three symbols of which were derived from the Latin alphabet. Another method of denoting the mutation was to write a dot over the letter, originally the punctum delens, which was justified in the case of mutated *f* as the latter early became silent. But no such devices were ready at hand in the case of the medial *b, d, g*, and the mutated forms of these consonants were consequently not represented at all in the orthography. The same remark holds good in the case of the nasal mutation (eclipse) of the tenues. But it is easy to demonstrate that the same condition of affairs as we find in the modern language must have obtained in Old Irish. This insufficiency of symbols renders the orthography of the early stages of the language very complicated. We find that *b, d, g* were used initially to denote the voiced stops, but medially and finally they represent spirants, the voiced stops in this case being denoted by *c, p, t*. It is not until much later times that the *h* in the mutated forms of the tenues, or the use of the dot, was extended to the mediae. Thus in Mid. Irish we find *do bochtaib in choimded* (Mod. Ir. *dobhochtaibh*), Mid. Ir. *ro-gab* = Mod. Ir. *do ghabh*. The nasal mutation of *c, p, t* was first denoted by writing these sounds double and finally in the 18th century by writing *gc, bp, dt*. The spirants arising out of Prim. Celt. *g, d, b* came in Old Irish to be confused with those which developed out of Prim. Celt. *p, t, k*, in other than initial positions. In final positions in polysyllables we commonly find *d* and *b* written but medially *th* and *ph*, *e.g. didnad*, "consolation," gen. sing. *dithnatha*. For the ending *-ad* cp. Lat. *-ātu-*. On the other hand we find *g* written medially and *ch* finally. These rules, however, are not yet applied in the oldest documents.

When we turn to the inflections we find that most of the old terminations have disappeared, but that their influence on preceding consonants is still felt and serves to distinguish one form from another; thus in the declension of *fer*, "man," nom. sing. *fer*, gen. sing. *fir*, dat. sing. *fiur*, acc. sing. *fer n-*, nom. pl. *fir*, gen. pl. *fer n-*, corresponding to Prim. Celt. (Gaulish) *viros, virī, virō, viron, virī, viron*, the influence of the following sound still differentiates the cases from one another. In the later language the initial mutations come more and more to be used for this purpose. In Middle Irish the declensions and conjugations are much simplified and the neuter gender is given up in substantives. In the verb the athematic conjugation has disappeared and the distinction of primary and secondary endings is not observed. On the other hand Irish has developed a peculiar system of absolute and conjoint inflection with different sets of endings. The conjoint endings are always used in the case of compound verbs, and in simple verbs they are employed after certain proclitics, *e.g.* the negative particles. Thus *berid*, "he bears," is an absolute form; *do-beir*, "he gives," *ni beir*, "he does not bear," are conjoint forms. Further, the verb system is partly dominated by the various devices employed to express relatival function. There are three main types of conjugation in Old Irish corresponding to the Latin first, third and fourth conjugations, the Latin types *moneo* and *audio* being difficult to distinguish in Irish. In the modern language there is in reality but one conjugation. The old Irish verb system comprises present and imperfect indicative, imperative, pres. subjunctive in *-ā-* or *-s-* with corresponding past subjunctive, future in *-f-* or *-s-* or *-ē-* or with reduplication along with corresponding secondary future, *-s-* preterite, *-t-* preterite, reduplicated preterite, a preterite containing a long stem-vowel, together with deponential and passive forms in *-r*. This system is eked out with the verbal prefix *ro*, which among other functions changes a preterite into a perfect or a present into a perfect. Such a cumbrous system was bound to fall to pieces. A number of isolated forms have come down, but the only tenses which have survived into the modern period are the present and imperfect indicative, the imperative, the present subjunctive, the *-s-* preterite, the *-b-* and *-ē-* future with corresponding secondary forms, and some of the passive forms in *-r*. At the same time in the modern language there is an increasing tendency to use analytical forms. Two noteworthy features of the Irish verb remain to be mentioned. The one is the use of pronouns as objects infixed between particle and verb, or in a verb compounded with a preposition between preposition and verb. There are two sets of forms according as to whether the verb occurs in a relative clause or not. Thus *-m-* is the ordinary infixed pronoun of the 1st pers. sing., whilst *-dom-* is the corresponding relative form. In the 3rd pers. sing. aspiration may be employed, *e.g. ní ceil*, "he does not hide," *ní cheil*, "he does not hide it." This has been given up in the modern language. Secondly in verbs compounded with prepositions the accent of the verb varies according as to whether the verb is used enclitically or not—thus after the negative *ní* or in the infinitive and imperative. Hence we have *do-béir*, "he gives," by the side of *ní tábair*, "he does not give," infin. *tabairt*; *do-gnīu*, "I do," *ní dēnim*, "I do not do," infin. *dēnum*. The changes caused by this alternation in addition to others due to the working of the Irish accent and to the initial and internal mutations have played havoc with the verb system and render it exceedingly difficult to reconstruct the paradigms. In the later periods of the language analogy naturally plays a great part, and many of the complicated forms are done away with, but even in the modern dialects the alternation between enclitic and orthotonic forms still survives in the commonest verbs, *e.g.* Irish *bheir sé* "he gives," *ní thabhair sé*, "he does not give," infin. *tabhairt*; Scottish *bheir e, cha toir, toirt*; Manx *ver eh, cha der, coyrt*; Irish *ní sé*, "he does," *ní dheanann sé*, "he does not do," infin, *deanamh*; Scottish *nì e*, "he does," *cha dean e*, "he will not do," infin. *deanamh*; Manx *nee eh, cha jean eh, jannoo*.

In the early period Irish borrowed a number of words from Latin. These are mainly connected with the church or with articles of civilization which would be imported from Roman Britain. Some of these show traces of British pronunciation, *e.g.* O. Ir. *trindóit*, from Latin *trinitātem* with *ō* for *ā*. In others again Lat. *p* is represented in Ir. by *c*, which may be due to the substitution of *q* as being the nearest Irish sound to the foreign *p*. Thus we find Ir. *corcur*, "purple," *casc*, "Easter"; *cenciges*, "Whitsuntide"; *cruimther*, "presbyter." In addition to these several loans were received from Norse. In the Mid. Irish period many French words came in, and during the middle and modern periods the number of English words introduced is legion. Pedersen has tried to show in his *Vergl. Gramm.* that a considerable number of words were borrowed from Brythonic (Welsh) at an early date.

[For the Latin loan-words, see J. Vendryès, *De hibernicis vocabulis quae a latina lingua originem duxerunt* (Paris, 1902); Kuno Meyer has collected a number of loan-words from Norse, Anglo-Saxon, Early English, Latin and Early French in *Revue celtique*, xii. 460 and xiii. 505. See also Whitley Stokes, *Bezzenberger's Beiträge*, xviii. 56 ff. For Celtic names in Norse see W. Stokes, *Revue celtique*, iii. 186 ff., and W. A. Craigie, *Zeitschr. f. celt. Phil.* i. 439 ff.]

With regard to the dialects of Irish, there is a well-known rhyme which states the peculiarities of the speech of the four provinces, and dialectical differences must have existed at an early period, though they do not make their appearance in the literary language until the 18th century. At the present day the Irish of Leinster has vanished entirely, and we have unfortunately no records of it. But in the other three provinces the vernacular still lives, and we find the Irish of Munster, Connaught and Ulster marked off from one another by well-defined peculiarities. In general it may be stated that the south of Ireland is more conservative than the north. In Munster there is a tendency to shift the word-stress from the initial syllable to a heavy derivative syllable, *e.g. -ān*. This does

not take place in Connaught, whilst in Ulster the tendency is to shorten the vowel. Again in monosyllables ending in *ll*, *nn*, *m*, and under certain other conditions a short vowel becomes a diphthong in the south, in Connaught it is merely lengthened, but in Ulster the original length is retained, *e.g.* Ulster *ball*, " member, limb," Connaught *bāll*, Munster *baull*. Final *dh*, *gh* in Munster are sounded as *g*. In certain cases the north prefers the vocalic mutation where the west and south have the nasal, thus notably in the dative singular after preposition and article, *e.g.* Munster-Connaught *do'n bhfear*, " to the man," Ulster *do'n fhear*. In the south synthetic verb-forms are employed to a much larger extent than in the north.

In the early part of the 19th century Irish was still the speech of more than half the inhabitants of Ireland. A German traveller reckoned that out of a total population of seven millions in 1835 four millions spoke Irish as their mother-tongue. The famine of 1846–1847 was felt most in those districts that were purely Irish, and these were the parts that were and still are chiefly affected by the tide of emigration. Add to this the fact that the influence of O'Connell and his satellites, and above all that of the Roman Catholic clergy, was against the language. In spite of the efforts of the Gaelic League (founded 1893), which have met with considerable success, the language is rapidly dying of internal decay. The speakers of Irish are chiefly confined to the following counties, where over 20% of the population speak Gaelic:—Waterford, Cork, Kerry, Clare, Galway, Mayo, Sligo, Donegal. The following figures will illustrate the decay of the language since the famine:—

Year.	Monoglots.	Bilinguists.
1851	319,602	1,204,684
1861	163,275	942,261
1871	103,562	714,313
1881	64,167	885,765
1891	38,192	642,053
1901	20,953	620,189

According to the 1901 census report the speakers of Irish were distributed as follows:—Leinster, 26,436; Munster, 276,268; Connaught, 245,580; Ulster, 92,858. The Gaelic movement, which has thriven largely on account of its anti-English character, would have a much better chance of galvanizing the ancient language of Ireland if it were not for the supreme difficulties of Irish spelling and phonetics. Of the hundreds of thousands of persons who attend the classes of the League not more than one or two per cent. at the outside arrive at any state of proficiency. Presbyterian Gaels in Scotland are taught to read the Bible but Irish Catholics are not encouraged to do so. The result of this is seen in the fact that, whilst many, if not all, of the local Nationalist newspapers under the pressure of the League publish badly-printed and little-read columns in Irish, there are only two regularly appearing periodicals which contain any large amount of Irish. Half the contents—and those the most important—of the weekly organ of the league, *An Claidheamh Soluis* (" the flaming sword "), are in English. The latter was started in 1898 under the title of *Fáinne an Lae* (" the ring of day," *i.e.* the dawn). The other periodical is the monthly *Gaelic Journal* (*Irisleabhar na Gaedhilge*), a would-be literary magazine of very inferior quality which has led a precarious existence since 1882. In 1898 it was decided to hold a festival called the *Oireachtas* (" hosting, gathering ") on the lines of the Welsh *Eisteddfod*. The venture was a great success and similar meetings have been held every year since, whilst each province and many of the counties have their annual local Gaelic *feis* (festival). The literary output of the movement has been prodigious, consisting in the main of a number of short stories and dramas (mostly propagandist), but nothing of any particular merit has as yet been forthcoming. The best-known writers are Dr Douglas Hyde (collector of folk-stories—*Beside the Fire*, 1890, *An Sgeulaidhe Gaedhealach*, 1895 (reprinted from vol. x. of the *Annales de Bretagne*), *Love Songs of Connaught*, 1893, *Religious Songs of Connaught*, 1905); P. O'Leary (author of two lengthy stories, *Seadna*, 1904, *Niamh*, 1907); P. Dinneen (author of an historical tale, *Cormac Ua Connaill*, 1901); P. O'Shea, better known as "Conan Maol," author of a collection of short stories entitled *An Buaiceas*, 1903.

Authorities on Irish Language.—For the study of Old Irish —Zeuss, *Grammatica Celtica*[2] (Berlin, 1871); B. Güterbock and R. Thurneysen, Indices to the Irish words treated in Zeuss (Leipzig, 1881); E. Windisch published the first grammar of Old Irish in 1879 (trans. by N. Moore, Pitt Press, 1882), but Windisch's treatment of the verb was rendered obsolete by the discovery of the laws of the Irish accent by H. Zimmer, *Keltische Studien* (Berlin, 1884), and R. Thurneysen, *Revue celtique*, vi. 309; J. Vendryès, *Grammaire du Vieil-Irlandais* (Paris, 1908); R. Thurneysen, *Handbuch des Alt-Irischen* (Heidelberg, 1909). Mention should also be made of J. Strachan, *Selections from the Old Irish Glosses* (Dublin, 1904); and the same writer's *Old Irish Paradigms* (Dublin, 1905), *Stories from the Táin* (Dublin, 1908). See also various papers on the Irish verb in the *Transactions of the London Philological Society* by Strachan (1895–1902); H. Pedersen, *Aspirationen i Irsk* (Copenhagen, 1898); C. Sarauw, *Irske Studier* (Copenhagen, 1901); G. J. Ascoli, *Archivio glottologico italiano*, vols. v. and vi. For the study of Middle Irish—E. Windisch, *Irische Texte mit Wörterbuch* (Leipzig, 1880). (Other volumes in conjunction with W. Stokes.)

Editions of texts by W. Stokes, Kuno Meyer and others in the *Revue celtique*, *Zeitschrift für celtische Philologie*, *Ériu*. K. Meyer has issued an exhaustive Mid. Irish glossary (A-D) as a supplement to the *Archiv für celtische Lexikographie*. The remainder is being published under the auspices of the Royal Irish Academy. The first grammar of Modern Irish was published by Francis Molloy in 1677 at Rome under the title of *Grammatica Latino-Hibernica*. Molloy was followed by Jeremiah Curtin in 1728 with a book called *Elements of the Irish Language*. Numerous other grammars were published towards the end of the 18th and at the beginning of the 19th century, but few of them have any value. The more important of them are enumerated in the introduction to O'Donovan's *Grammar* and to Windisch's *Kurzgefasste irische Grammatik*, and in Pedersen's *Aspirationen i Irsk*, pp. 29-47. We may mention W. Neilson's *Grammar* (1808) as it is important for the Irish of E. Ulster. But the greatest native grammarian was John O'Donovan, who traversed Ireland in connexion with the Ordnance Survey, and published in 1854 a comprehensive grammar noting the differences between the various dialects. A little grammar published by Molloy in 1867 is instructive on account of the author's peculiar point of view. The most useful books for the study of the living language are the series of booklets (five) published by Father O'Growney, one of the chief promoters of the present movement. Mention should also be made of J. P. Henry's *Handbook of Modern Irish*, pts. i.-iv., and of the grammars by P. W. Joyce (Dublin, 1896) and the Christian Brothers (Dublin, 1901). For the northern form of Irish J. P. Craig's *Grammar of Modern Irish* is useful ([2] Dublin, 1904). The phonetics of a Munster dialect have been investigated by R. Henebry, *A Contribution to the Phonology of Desi Irish* (Greifswald, 1901). The dialect of the Aran Islands off the coast of Galway has been described by F. N. Finck, *Die Araner Mundart*, i. *Lautlehre und Grammatik*, ii. *Wörterbuch* (Marburg, 1899). G. Dottin has given an account of a dialect of North Connaught (Mayo) in the *Revue celtique*, xiv. pp. 97-137. A study of the speech of the north was published by E. C. Quiggin under the title of *A Dialect of Donegal, Phonology and Texts* (Cambridge, 1906). For an account of the decay of Irish see H. Zimmer, " Die keltische Bewegung in Irland," *Preussische Jahrbücher* for 1898, vol. 93, p. 59 ff., and the last chapter of Douglas Hyde's *Literary History of Ireland* (London, 1901).

The work of the earlier compilers of glosses will be mentioned in the literature section below. The first dictionary of the modern language of any importance was that published by J. O'Brien in 1768. Next came E. O'Reilly with his *Irish-English Dictionary* (Dublin, 1817). This book contains a vast store of words gathered on no principle whatever from all manner of sources, and has therefore to be used with caution, but even at the present day it renders considerable service. A second edition with a supplement by O'Donovan was published after the latter's death in 1864. The first trustworthy dictionary of the modern language was published under the auspices of the Irish Texts Society by P. J. Dinneen (London, 1904). English-Irish dictionaries have been compiled by D. Foley (Dublin, 1855); E. E. Fournier (Dublin, 1903); T. O'Neill Lane (Dublin, 1904).

(*b*) *Scottish Gaelic.*—Scottish Gaelic is the form of Goidelic speech which was introduced into Scotland by the Dalriadic Scots who came over from Ireland in the early centuries of our era. We possess practically no early monuments of the language. We have one or two inscriptions in Latin characters, such as that at St Vigeans and the Ogams mentioned above, which have not yet been solved. In the *Book of Deir* there is a colophon of a few lines probably written by an Irish scribe in the 9th century, and as the language of these lines differs in no wise from the Irish of the period, we do not know if they accurately represent the Gaelic of Scotland or if they may not be pure Irish. In the same MS. there are further Gaelic scraps belonging to the 11th and 12th centuries. The word-forms in these entries are identical with those current at the time in Ireland, but the historical orthography seems to show more signs of decay than is the case in Irish. The medieval Scottish MSS. in the Advocates' Library at Edinburgh are only just being published, but they seem either to hail from Ireland or to be written in pure Irish. The end of the 15th century brought a change. The Lordship of the Isles, the great bond between Ireland and Scotland, was broken up. The Gaels of Scotland, thrown on their own resources, advanced their own dialect to the position of a literary language and tried to discard the Irish orthography. The *Book of the Dean of Lismore*, compiled about 1500, is written in a kind of phonetic orthography which has not as yet been sufficiently investigated. The language of those poems which are not directly ascribed to Irish poets, and which may therefore be regarded as representing the literary language of the Highlands at the time, seems to occupy a position midway between Irish and Scottish Gaelic. But until the beginning of the 18th century the Highlands were

under the literary dominion of Ireland, so much so that Bedell's Irish version of the Scriptures was circulated in Scotland with a glossary from 1690 to 1767, and Bishop Carsewell's version of Knox's Prayer-book (1567) is pure Irish. The language of the people is poorly represented in the 16th and 17th centuries, and the orthography is not fixed until we reach the 18th century.

Irish and Scottish Gaelic differ considerably in point of vocabulary, but there are also important divergences in phonetics and inflections. In the first place, Scottish Gaelic as written has entirely given up the nasal mutation (eclipse), *e.g.* Scottish *ar bò*, "our cow," Irish *ar m-bó*; Scottish *nan tìr*, "of the countries," Irish *na d-tír*. It should, however, be observed that in Skye and the Outer Isles the nasal mutation has been partly restored and in some places there are even parallels to the Welsh nasal mutation of *c*, *p*, *t* to *ngh*, *mh*, *nh*. Secondly, post-vocalic *c*, *p*, *t* are commonly preceded by a breathed sound not represented in writing, thus *mac* "son," is pronounced *mahk*; *slat*, "rod," as *slaht*. Again there is a tendency to insert a sibilant in the group *rt*, thus *ceart*, "right," is sounded *kearšt*, and the distinction between palatalized and non-palatalized sounds is not so rigidly observed as in Irish. The group *cht* is in Scotland pronounced as if *chk*. We may also mention that Scottish Gaelic preserves an old *ĕ* in a number of words where Irish now has *ă*, thus, Old Ir. *fer*, Scottish G. *fĕr*, Irish *făr*, but in both cases the spelling is *fear* (in this respect Scottish Gaelic goes hand in hand with Manx and the almost extinct Irish of Down). Similarly, we find that in Scottish Gaelic and Manx stressed vowels preceding a palatalized consonant have not undergone palatalization to the same extent as in Irish, *e.g.* in Ireland *duine*, "man," <**dunjo-*, is pronounced *din'ə*, but in Scotland *dun'ə* (in Manx written *dooinney*). A further peculiarity of Scottish Gaelic is that it substitutes lenes or voiceless mediae for the voiced stops, and even *l*, *r*, *n* sounds show a great tendency to give up the voice. Scottish Gaelic goes farther even than Irish in the confusion of vowel-sounds, *e.g.* Lat. *coxa*, Ir. *cos*, "foot," Sc. *cas*; Ir. *codal*, Sc. *cadal*. When we turn to the inflections we find that analogy has here played a much greater part than in Irish. There is a tendency to make the plural of all substantives except masculine monosyllables end in *-an*. In the conjugation the synthetic forms have with one or two exceptions entirely disappeared and the present forms have become momentary in force. Hence in ordinary grammars it is stated that the present has become a future, thus *ni mi* means "I shall do." The past participle chiefly ends in *-le* as against Irish *-the*, *-le*, or *-tha*, *-ta*, according to the quality of the preceding sound. The present (future) and past subjunctive (conditional, representing both the imperfect indic. and secondary future of Irish) supply the place of the Irish consuetudinal forms. In idiom also Scottish has diverged very considerably from Irish, *e.g.* in the use of *tha* (Ir. *tá*) for *is*.

It seems now to be agreed that the various dialects of Scottish Gaelic fall into two main divisions—northern and southern. Mackinnon states that the boundary between the two passes roughly up the Firth of Lorne to Loch Leven, then across country from Ballachulish to the Grampians. The country covered by the northern dialect was of old the country of the Northern Picts, whilst the portion of Argyllshire south of the boundary line, together with Bute and Arran, made up the kingdom of Dalriada. The Gaelic district south of the Grampians belonged to the Southern Picts. The southern dialect is commonly regarded as the literary language. It approaches more nearly to Irish and preserves the inflections much better than the speech of the north.

The following characteristics of the northern dialects may be mentioned:—(1) The diphthongization of open *ē* to *ia* is carried much farther in the north than in the south. (2) The vowel *ao* in the north is more regularly the high-back-narrow-unrounded vowel-sound, whereas the south in many cases has a low-front-wide-round sound. (3) The north has *str* in initial position where the south prefers *sr*. Further, the northern dialects go very far in dropping unaccented final vowels. It may be remarked that in the reduction of derivative endings containing long vowels Scotland goes hand-in-hand with Ulster Irish, thus Connaught *arán*, "bread," is in Ulster and Scotland *arăn*. Again, Scottish agrees with North Irish in the loss of synthetic verb-forms and in using as negative *cha*, Mid. Ir. *nico*, *nocha*. But, on the other hand, Scotland, with the exception of South Argyll and some of the Isles, diphthongizes accented *a*, *o*, *e*, in monosyllables, before *ll*, *nn*, *m*, thus resembling the speech of Munster. In South Argyll the original short vowel is half lengthened.

As to the southern limits of Gaelic speech in Scotland, the boundary between Gaelic and English in medieval times was the so-called Highland line, and at the War of Independence it is probable that it extended to Stirling, Perth and the Ochil and Sidlaw Hills, the Inglis being limited to a very narrow strip along the coast. Dr J. A. H. Murray traced the linguistic frontier in 1869–1870 with the following results. The line started about 3 m. west of the town of Nairn on the Moray Firth and ran in a south-east direction to the Dee, 4 m. above Ballater. On the other side of the Dee it began 4 m. above Balmoral and followed the boundary of Perth and Forfar as far as Glen Shee, where it went off to the south-west as far as Dunkeld. After passing Birnam Hill it turned due west until the upper part of Glen Almond was reached, where it bent to the southward, passing through Comrie and along the braes of Doune to the Teith, 3 or 4 m. below Callander. Thence it ran along the north shore of Lake Monteith to Gartmore, and from there to Rowardennan on the east side of Loch Lomond. On the west side it passed through Glen Douglas down Loch Long and the Firth of Clyde, leaving Bute and Arran to the west. At the present day this boundary has probably receded to the extent of several miles, and even in 1870 there were districts such as Bute and the region round Dunoon where Gaelic was only spoken by the oldest natives and the immigrant population. The language is not found in the north-east of Caithness, the boundary running, according to Murray, roughly from a little north-east of Lybster to the mouth of the Forss. Celtic was driven out of Shetland and Orkney by Scandinavian some time during the middle ages. (See further J. A. H. Murray, *The Dialect of the Southern Counties of Scotland*, London, 1875; *Revue celtique*, vol. ii. pp. 180-187.)

Until the 18th century Gaelic was spoken in Galloway and on the uplands of Ayr and Lanark. The following figures from the census returns illustrate the decrease in the number of persons who speak Gaelic:—

	Monolinguists.	Bilinguists.
1881 . . .	No return	231,594 (this includes Gaelic monolinguists)
1891 . . .	43,738	210,677
1901 . . .	28,106	202,700

In the last-mentioned year it appears that nearly one-half of the speakers of Gaelic are reported from the counties of Inverness and Ross (23,893 monolinguists and 82,573 bilinguists). From about 1300 we find Scottish emigrants filtering into the glens of Antrim, where the Gaelic that is spoken is still unmistakably Scottish. There have long been local societies of Highlanders for the cultivation of their native tongue, the most important one being *An Comunn Gàidhealach* (founded 1891). This society holds an annual gathering called the *Mòd* (=Eng. "moot") on the lines of the Welsh Eisteddfod, and recently the Scottish Education Department has countenanced the teaching of Gaelic in Highland schools. But the political element plays little or no part in the language movement in Scotland, and the latter is not likely to assume the proportions of the Gaelic League in Ireland. As a rule, however, Highlanders are better able to read their own language than Irish Gaels, for, the majority being Protestants, they are encouraged to read their Bibles. There are only two periodicals which devote half their space to Gaelic. The one is *An Deo-Greine* ("the sunbeam"), founded October 1905; and the other is the Catholic propagandist quarterly *Guth na Bliadhna* ("the voice of the year"), started in 1904. Up to 1905 a fortnightly newspaper printed wholly in Gaelic appeared in Prince Edward Island, under the title of *An Mac-talla* ("the echo"), and efforts have been made to revive it. A weekly newspaper wholly in Gaelic was started in 1908 by R. Stuart Erskine under the title of *Alba*.

AUTHORITIES ON SCOTTISH GAELIC.—The first grammar of Scottish Gaelic was compiled by W. Shaw (*An Analysis of the Galic Language*, 1778). The most useful one was that published by Alexander Stewart, *Elements of Gaelic Grammar* (Edinburgh, 1801). A revised edition of this work with many additions and corrections was published by H. C. Gillies, London, 1902. This book is rather spoilt by the author's attitude, and requires to be supplemented and corrected. G. Henderson and C. W. Robertson have published important papers on the modern dialects in the *Zeitschrift für celtische Philologie*, the *Celtic Review* and the *Transactions of the Gaelic Society of Inverness*. The most useful work on Gaelic philology is Alexander Macbain's *Etymological Gaelic Dictionary* (Inverness, 1896) (a later edition by W. J. Watson). The chief dictionaries are *Dictionarium Scoto-Celticum*, published by the Highland Society of Scotland (Edinburgh, 1828); R. A. Armstrong, *Gaelic Dictionary* in two parts (London, 1825); N. McAlpine, *Pronouncing Gaelic Dictionary* (Edinburgh, 1847) (this book gives the pronunciation of Islay); Macleod and Dewar, *Gaelic and English Dictionary* (latest edition, Edinburgh, 1901); *Faclair Gàidhlig*, published by E. Macdonald, Herne Bay, appearing in parts since 1902.

(*c*) *Manx.*—Our sources of information with regard to the language of the Isle of Man are even more scanty in the early period than they are in the case of Scotland. There are a number of references to the island in Irish literature, but the earliest monument of the vernacular we possess is the version of the Book of Common Prayer made by Bishop Phillips in 1610. In this translation the traditional Irish orthography is not followed. The spelling resembles the orthography which was employed in Scotland by the compiler of the *Book of the Dean of Lismore*. How far this system was used is a question which it is difficult to decide. In Scotland the Irish orthography has prevailed in a slightly modified form, but Manx writers adhered to a mode of spelling which was as phonetic as any system based on English, or, probably more correctly Anglo-Scottish, orthography could be. This fact, combined with the rapid phonetic decay of the

language, makes it extremely difficult to discover what sound-values are to be attached to the various symbols. At the beginning of the 18th century English was not understood by two-thirds of the natives, and in 1764 the S.P.C.K. issued a paper containing this statement: "The population of the Isle is 20,000, of whom the far greater number are ignorant of English." But from this time English gradually crept in. The last edition of the Manx Bible was issued in 1819, and of the New Testament in 1840. The present writer's great-grandmother refused to speak English, his grandfather (b. 1815) preached in Manx and English, and his father (b. 1844) only spoke English. The following figures illustrate the rapid decline of the language:—

	Monolinguists.	Bilinguists.
1875	190	12,340 (out of a population of 41,084 exclusive of Douglas)
1901	None	4,419

Manx stands in a much closer relation to Scottish Gaelic than Irish, and fishermen state that they could understand a good deal of what is said in South Argyll, though they are quite at a loss at Kinsale. Manx exhibits the same tendency as Scottish to use analytical and periphrastic forms in the verb, thus *jannoo*, "to do," is used like Scottish *deanamh* with an infinitive to express the past and future. The present has acquired a momentary (future) signification, and the past participle ends in *-it* (Scottish *-te*). The negative is *cha* as in Scotland and Ulster. Manx goes as far as northern Scottish in dropping unstressed final vowels, *e.g. chiarn*, "lord," Irish, *tighearna*; *-yn* is the favourite plural ending in substantives. The nasal mutation has been partly given up. Old Irish stressed *ĕ* is frequently retained, *e.g. fĕr*, "man," Irish *fĕr* (spelt *fear*), and the vowels *ŏ* and *ă* are confused as in Scottish, *e.g.* Manx *cass*, "foot," Scottish *cas*, Irish *cos*. Manx is divided in itself about the treatment of short accented vowels before *ll*, *nn*, *m*. According to Rhys the south side lengthens, whilst the north side diphthongizes; *e.g.* Irish *crann*, "tree," *clann*, "offspring," S. Manx *krōn*, *klōn*, N. Manx. *kroun*, *kloun* (written *croan*, *cloan*). In the matter of stress Manx is quite original, going farther even than the dialects of the south of Ireland. Not only does it shift the stress in the case of heavy derivative suffixes like *-ān* and reduce the preceding vowel, *e.g.* Ir. *fuarān*, Sc. *fuaran*, Manx *frān*, "spring," but even in cases like *caghláa*, "variety," Sc. Ir. *caochladh*, O. Ir. *coimmchloud*; *coráa*, "voice," Ir. *comhradh*. The Mid. English stress on the final is further retained in words from the French such as *ashóon*, "nation," *livrēy*, "deliver."

As other features peculiar to Manx we may mention the following. An intervocalic *s* or *sh* shows a tendency to become lisped and voiced to *d*. In monosyllables post-vocalic final *m*, *n*, are often preceded by an intrusive *b*, *d* respectively, thus *ben* "woman," may be heard as *bedn*. Ir. *ā* becomes more palatal and is often *ē*. Ir. *sc* becomes *st*, *sht*, *e.g.* Ir. *fescor*, "evening," Manx *fastyr*; Ir. *uisce*, "water," Manx *ushtey*.

AUTHORITIES ON MANX.—The place and personal names of the Isle of Man have been collected by A. W. Moore in *Manx Names*[2] (London, 1903) (33% of the proper names are Scandinavian). The chief source of information about the spoken language is J. Rhys, *The Outlines of the Phonology of Manx Gaelic* (London, 1895) (the book has unfortunately no index and no texts). The only serious attempt to represent spoken Manx graphically is the transcription of a song by J. Strachan in the *Zeitschr. für celtische Philologie*, vol. i. p. 54. The native grammarian is J. Kelly, who in 1803 published *A Practical Grammar of the Ancient Gaelic or Language of the Isle of Man, usually called Manks*. This book was republished by W. Gill for the Manx Society in 1859, and a facsimile reprint of this latter was made for Quaritch, London, 1870. A useful little book entitled, *First Lessons in Manx* was published by Edwin Goodwin (Dublin, 1901). There are two dictionaries, one by A. Cregeen, Douglas 1835, which is now being reprinted for *An Cheshaght Gailckagh*, a Douglas society which is endeavouring to encourage the use of Manx and to get it introduced into the schools. The other dictionary is by J. Kelly in two parts—(1) Manx and English, (2) English and Manx, published by the Manx Society in 1866. Kelly also prepared a Triglot of Manx, Irish and Gaelic, based upon English, which has never been published. A useful paper on the language appeared in the *Transactions of the London Philological Society* for 1875 by H. Jenner, "The Manx Language: Its Grammar, Literature and Present State." (E. C. Q.)

(ii). *Brythonic.* The term Brythonic is used to denote the Celtic dialects of Wales, Brittany and Cornwall. Unlike the Goidels the Brythonic peoples have no common name for their language. Forms of Brythonic speech were doubtless current throughout England and Wales and the Lowlands of Scotland at the time of the Saxon invasion. The S.E. of Britain may have been extensively Romanized, and it is not impossible that remnants of Goidelic speech may have lingered on in out-of-the-way corners. No literary documents dating from this period have been preserved, but some idea of the character of Brythonic may be gathered from the numerous inscriptions which have come to light. In the middle of the 6th century Brythonic was confined to the western half of Britain south of the Clyde and Forth. The colonization of Britannia minor or Armorican Brittany during the 5th and 6th centuries will be described later. In the latter part of the 6th century the W. Saxons pushed their conquests as far as the estuary of the Severn, and from that time the Brythons of S.W. Britain were cut off from their kinsmen in Wales. Early in the 7th century the Brythons of Strathclyde were similarly isolated by the battle of Chester (613). The kingdom of Strathclyde maintained a separate existence until the 10th century, and it is generally stated that Brythonic speech did not die out there until the 12th century. The question as to how far Brythonic names and words have survived in these districts has never been properly investigated. Certain it is that Brythonic numerals survived amongst shepherds in Cumberland, Westmorland and N.W. Yorkshire down to the second half of the 19th century, just as herrings are still counted in Manx by Manx fishermen otherwise quite innocent of the language. Accordingly, from the 7th century onwards Brythonic became gradually limited in Great Britain to three districts—Strathclyde, Wales, and Cornwall and Devon. During the 7th century the Brythons of Wales and Strathclyde often fought side by side against the Angles, and it is from this period that the name by which the Welsh call themselves is supposed to date, *Cymro*<**Combrox*, pl. *Cymry*<**Combroges*, *i.e.* "fellow-countrymen" as opposed to W. *allfro*, Gaul. *Allobroges*, "foreigners." We have no means of determining when Celtic speech became extinct in the petty states of the north which retained their independence longest.

The chief features which distinguish the Brythonic from the Goidelic dialects have already been enumerated. In the course of the 6th and 7th centuries final short vowels disappeared. In compound names the final vowel remains in the first component until the 7th century. Short vowels in other than initial syllables when immediately preceding the stress (on the historical penultimate) disappear, whilst long ones are shortened, *e.g.* Welsh *cardawt* from Lat. *caritātem*. Other vowels in unstressed position are apt to be reduced, thus *ŏ*, *ŭ*, give *i* in O. W. (Mid. W. *y*). A marked characteristic of Welsh as distinguished from Cornish and Breton is the treatment of *ă* under the influence of a following *ī*. In Welsh the result is *ei*, in Corn. and Bret. *e*, *e.g.* Welsh *seint*, "saints," Bret. *sent*, sing. *sant*. The mutations seem to have started in the second half of the 6th century in the case of the tenues.

See J. Loth, *Les Mots latins dans les langues Brittoniques* (Paris, 1892); J. Loth, *Chrestomathie bretonne* (Paris, 1890).

(a) *Welsh* (*Cymraeg*).—It is usual to divide the history of the Welsh language into three periods—Old, Middle and Modern. To the oldest period belong the collections of glosses, the earliest of which go back to about 800. The middle period extends from 1100 to 1500.

As a rule the medial mutation of the tenues and mediae is not denoted in O. Welsh. Intervocalic *g* is sometimes retained but generally it has disappeared, whilst after *r* and *l* it is still written. In the course of the 9th century initial *w* (*v*) becomes *gu* (later *gw*). As the O. Welsh documents consist almost entirely of isolated words, we know scarcely anything about the morphology of the language during this period. To the middle period belong the ancient poems from the Black Book of Carmarthen, but the language of these compositions is evidently much older than the date of the manuscript (12th century), as it preserves a number of very archaic features. Other important sources of information for this period are the O. Welsh Laws contained in a MS. of the 12th century. To a somewhat later date belong the Mabinogion (14th century MS.), and the prose versions of French romances published by R. Williams (15th century). In Middle Welsh the consonant mutations are in general denoted in writing, though not consistently, and from this period dates the introduction of *w* and *y* (O. W. *u*, *i*) to denote vowel sounds. The symbol *ll* to denote a voiceless *l* was already employed in Mid. W. but *rh* (=voiceless *r*), *dd* (=Eng. *th* in "thou") and *f* (=*v*) either do not appear or only become regular during the modern period. In Mod. W. the orthography is regularized and does not differ

materially from that of the late medieval documents. In O.W. the old stress on the final syllable (the historical penult) appears to have been preserved, but during the middle period the accent was shifted to the penult. In consequence of this change *aw* (<*ā*) in final syllables is reduced to *o* in Mod. W., *e.g.* Mid. W. *pechawt* <Lat. *peccātum*, Mod. W. *pechod*.

The comparative wealth of inflection preserved by O. Ir. has almost entirely disappeared in Welsh. There are only the faintest traces of the case forms, the dual and the neuter gender. Compared with the Irish nominal declension according to *-o-* (*-jo-*), *-ā-*, *-i-*, *-u-*, *-s-*, guttural, dental and nasal stems, Welsh only distinguishes the nom. sing. and plur., the latter sometimes retaining an old formation. Thus masc. *-o-* stems show palatal modification, *e.g. corn*, "horn," plur. *cyrn* <**kornī*; the plural ending of *-u-* stems, O. Gaulish *-oves*, gives O.W. *-ou*, Mid. W. *-eu*, Mod. W. *-au*, e.g. *penneu*, "heads." The termination *-ones* of the *-n-* stems appears as *-on*. The infixation of pronominal objects between a verbal particle and the verb itself continues in use down to the present day as in Breton. In the third person sing. of the pres. ind. there are instances in the oldest Welsh of the peculiar alternation between orthotonic and absolute forms which characterize the Irish paradigms, *e.g. pereid*, "it endures," but *ny phara*. The several types of conjugation represented in Irish have become obscured, traces remaining only in the endings of the third sing. of the pres. ind., the pret. ind. (Mid. W. *-as*, *-es*, *-is*) and the pret. passive (Mid. W. *-at*, *-et*, *-it*). The verb system of Welsh comprises the following tenses: indic. present (also used as future), imperative, imperfect, preterite (in Mid. W. forms with *s* have become prevalent as in Irish, but forms corresponding to the Irish preterites in *t* or with reduplication or unreduplicated with long vowel are not infrequent in the early poetry), pluperfect (a new formation), pres. and pret. passive. In the subj. early W. distinguishes pres. and past, but the latter comes to be replaced by the pluperfect indicative. The sign of the subj. is *-h-* <*s*, which reminds one of the Irish *s*-subj., though the formation is somewhat different. There are also traces of a future formation containing *h* <*s*. (See also under WALES.)

History and extent. We have seen already that Wales began to exist as a separate entity roughly at the end of the 6th and beginning of the 7th centuries. In the second half of the 8th century the Welsh were confined in pretty much their present limits by Offa, king of Mercia, who constructed the Dyke going by his name, which has approximately remained the political boundary between England and Wales ever since. From this time onwards the bitter feeling against England which we find expressed in the fervid compositions of Iolo Goch and other political bards served to prevent any serious inroads of English on Welsh-speaking territory. With the advent of the Tudors, however, there came a great change. Henry VII. owed his throne in large measure to the support he had received from Wales and he prided himself on his Welsh ancestry. A consequence of this was that throughout the 16th century Wales received exceptionally favourable treatment at the hands of the English sovereign and parliament. In 1562 a decree was issued ordering a translation of the Bible to be made into Welsh. All this could naturally not be without effect on the attitude of the leaders of the people towards England. The change is already apparent in the poems of Lewis Glyn Cothi and others. And the striking difference in the manner in which the Reformation was regarded in Ireland and Wales is worthy of remark. During the Stuart wars the Welsh nobles fought invariably on the Royalist side, and there is plenty of other evidence that the aristocracy of Wales was becoming thoroughly anglicized both in sentiment and language. At the same time the practice of the Tudors was reversed in many particulars. Thus it became the custom to appoint Englishmen ignorant of the national language to the Welsh bishoprics. In this manner it is not a matter for surprise that a feeling of estrangement should grow up between the bulk of the population, who only knew Welsh, and the clergy and nobles, their intellectual leaders. The neglect of the national language is evident from the large number of English words which have even crept into such classical works as Prichard's *Canwyll y Cymry* and Ellis Wynn's *Gweledigaethau y Bardd Cwsg*. It is stated that, of the 269 works published by Welshmen between 1546 and 1644, 44 were in Latin, 184 in English and only 41 in Welsh, and of these 37 consist of works of piety. Thus at the beginning of the 18th century there seemed a fair chance that Welsh would soon become extinct like Cornish.

An extraordinary change was brought about by the Methodist movement in Wales. The preachers, in order to get hold of the masses, addressed them in the vernacular, and their efforts were crowned with enormous success. At the same time a minister of the Established Church, Griffith Jones, went about Wales establishing lay schools to which young and old might come to learn to read the Welsh Bible. Between 1737 and 1761 3395 such schools sprang up, at which no fewer than 158,238 persons of all ages learned to read their native language. After Griffith Jones's death this work was carried on by others, notably by Charles of Bala (1755–1814), who passed over to Calvinistic Methodism and whose schools were transformed after the model of the Sunday schools instituted in 1782 by Robert Raikes. Charles of Bala was largely instrumental in the founding of the British and Foreign Bible Society, and Wales was provided with 100,000 copies of the Bible and Testament at very moderate prices. Bishop's Morgan's version of the Scriptures made in 1588 (final revision 1620) represents the speech of North Wales which had remained more or less free from English influence, so that the language of the Welsh Bible is rightly regarded as the literary model. Three-fourths of the inhabitants of Wales belong to the various Nonconformist sects, and therefore pass almost without exception through the Sunday school, where they are drilled in its sole object of study, the Welsh Bible.

With the increasing employment of Welsh owing to the Nonconformist movement there was also awakened a new interest in the past history of the principality. A society calling itself the *Cymdeithas y Cymmrodorion* was founded in London in 1751, and during the succeeding half-century two periodicals exclusively in Welsh were started, the one, *Trysorfa y Gwybodaeth*, in 1770, the other, *Cylchgrawn Cymraeg*, in 1793. The year 1792 witnessed the creation of an important society, the *Cymdeithas y Cymreigyddion*, in London, in which the moving spirits were William Owen (Pughe), Owen Jones and Edward Williams. The results of their indefatigable search for ancient Welsh manuscripts were published in three volumes under the title *Myvyrian Archaiology* (London, 1801–1807). Owen further published an edition of the greatest medieval Welsh poet Dafydd ap Gwilym, and also the first copious dictionary. But this was not all. In Goronwy Owen (1722–1769) a poet had arisen whose works could stand comparison with the compositions of the medieval writers, and it was owing to the efforts of the three men above mentioned that the national Eisteddfod (=session, from *eistedd*, "to sit") was revived. The origin of these literary festivals is shrouded in obscurity. It is recorded that a S. Welsh prince, Gruffydd ap Rhys, held a festival lasting forty days in 1135 to commemorate a victorious campaign at which poets and minstrels competed for gifts and other rewards. Gruffydd's son Rhys ap Gruffydd is reported to have instituted a similar contest in 1176, at which the successful competitors received a chair whilst the others were given presents. It would seem that after the loss of Welsh independence a carefully graded order and a system of jealously guarded rules came into existence. Similar national festivals were held under royal patronage under Henry VIII. in 1523 and again under Elizabeth in 1568. From 1568 until 1819 no general eisteddfod for all Wales was held. Since 1819 the national festival has been held annually and every little town has its own local celebration. Hence the Nonconformist Sunday school, the pulpit and the eisteddfod may be regarded as the most potent factors in resisting the inroads of English. The whole question of the vitality of Welsh and what may be called the political and social history of the language is treated in great detail by H. Zimmer, "Der Pan-Keltismus in Grossbritannien und Irland," i., in *Preussische Jahrbücher*, vol. xcii. (1898). In elementary schools in Wales the use of Welsh has been permitted since 1893.

With regard to the extent over which Welsh is spoken a detailed map is given in J. E. Southall's *Welsh Language Census of 1891* (Newport, 1895). A line drawn from the southern end of the estuary of the Dee about 2 m.W. of Connah's Quay to Aberthaw in Glamorgan would practically include all those districts where Welsh is spoken by 60% of the population, and considerable deductions would have to be made for parts of Flint, Montgomery, most of Radnor and the N. part of Brecon. Little is spoken in the southern half of the Gower peninsula or in S. Pembrokeshire. Over much of Anglesey 97½% of the population spoke Welsh and in parts of Cardiganshire 98·3%. Of a total population in 1901 of 2,012,876, 929,824 were returned as speakers of Welsh, of whom 280,905 were monoglots. That Welsh is a very living language may be gathered from the following statistics. Between 1801 and 1898 no fewer than 8425 volumes were published in the vernacular, whilst in 1895 there were appearing regularly 2 quarterlies, 2 bi-monthlies, 28 religious and literary monthlies and 25 weekly papers. In 1909 the number was probably greater. The danger for Welsh lies rather in the direction of internal decay. The speech of the people is saturated with English words and idiom, and modern writers like Daniel Owen submit to the same influence instead of returning to the classical models of the 17th century.

Much remains to be done as regards the classification of the modern Welsh dialects. It is usual to divide them into four groups—(1) Powys (N.E.); (2) Gwynedd (N.W.); (3) Dyfed (S.W.); (4) Gwent (S.E.). One of the chief points on which N. and S. diverge is the pronunciation of the vowels *i*, *u*, *y*, which in the S. all tend to become *i*. The difference between N. and S. was noticeable as early as the time of Giraldus Cambrensis. See M. Nettlau, *Beiträge zur cymrischen Grammatik* (Leipzig, 1887), also *Rev. celt.* ix. pp. 64 ff., 113 ff.; T. Darlington, "Some Dialectal Boundaries in Mid-Wales," *Trans. of the Hon. Soc. of Cymmrodorion*, 1900–1901. The only scientific description of a living dialect is "Spoken N. Welsh," by H. Sweet, *Trans. of the London Phil. Soc.*, 1882–1884.

AUTHORITIES ON WELSH LANGUAGE.—For the study of older Welsh:—J. C. Zeuss, *Grammatica Celtica* (Berlin², 1871)—an index to the O. Welsh glosses cited in this work was compiled by V. Tourneur, *Archiv f. celt. Lexikographie*, iii. 109-137; J. Strachan, *An Introduction to Early Welsh*, with a Reader (Manchester, 1909); J. Rhys, *Lectures on Welsh Philology* (London², 1879). Editions of texts—*The Black Book of Carmarthen*, facsimile edition by J. Gwenogvryn Evans (Pwllheli, 1906); J. Rhys and J. Gwenogvryn Evans, *The Text of the Mabinogion* (Oxford, 1887); *The Myvyrian*

Archaiology of Wales (1801–1807; reprinted Denbigh, 1870); W. F. Skene, *The Four Ancient Books of Wales* (2 vols., Edinburgh, 1868); Aneurin Owen, *Ancient Laws and Institutes of Wales* (London, 1841); facsimile edition by A. W. Wade-Evans, *Welsh Medieval Law* (Oxford, 1909); K. Meyer, *Peredur ap Efrawc* with glossary (Leipzig, 1887); R. Williams, *Selections from the Hengwrt Manuscripts* (London, 1876–1892); J. E. Southall, *Wales and Her Language* (Newport, 1892). The earliest Welsh grammar was published as long ago as 1567 in Milan by Griffiths Roberts, reprinted in facsimile as supplement to the *Revue celtique* (Paris, 1883). An account of the language was prefixed to Owen Pughe's Dictionary (1803). During the 19th century many manuals of indifferent value saw the light of day. The most authoritative works are:—T. Rowland, *A Grammar of the Welsh Language* (Wrexham, 1853[1], 1876[4]), (still the most complete work), the same author also published a companion volume of *Welsh Exercises* (Wrexham, n.d.); W. Spurrell, *A Grammar of the Welsh Language* (Carmarthen[3], 1870); E. Anwyl, *A Welsh Grammar for Schools*, (*i.*) *Accidence*, (*ii.*) *Syntax* (London[2], 1898). Other useful manuals for the beginner:—T. Jones, *A Guide to Welsh*, pts. i. ii. new ed. (Wrexham, n.d.); S. J. Evans, *The Elements of Welsh Grammar* (Newport[3], 1903). Dictionaries:—The first Welsh dictionary was compiled by William Salesbury (London, 1547; facsimile reprint, London, 1877); W. Owen Pughe, *A Dictionary of the Welsh Language* (2 vols., London, 1803; reprinted Denbigh, 1870); W. Spurrell, *Welsh-English and English-Welsh Dictionary* (Carmarthen[5], 1904); a smaller one by W. Richards in 2 vols. (Wrexham, n.d.), and many others. A dictionary on a large scale was planned by D. Silvan Evans and subsidized by the government. Only A-Dd has, however, appeared (Carmarthen, 1893–1906), cp. J. Loth in *Archiv f. celt. Lex.* vol. i. for additions and corrections. A survey of Welsh periodical literature is contained in T. M. Jones's *Llenyddiaeth fy Ngwlad* (Treffynnon, 1893). For Welsh folklore see J. Rhys, *Celtic Folklore, Welsh and Manx* (Oxford, 1901). H. H. Vaughan, *Welsh Proverbs* (London, 1889), also *Rev. celt.* iii. 419 ff. See also G. Dottin, *Revue de synthèse historique*, vi. 317 ff.; H. Zimmer and L. C. Stern in *Kultur der Gegenwart*, Teil 1, Abt. xi. 1. (E. C. Q.)

(*b*) *Breton.*—Breton (*Brezonek*) is the name given to the language spoken by those Britons who fled from the south-west of England to Armorica (see BRITTANY) in the 5th and 6th centuries of our era to avoid being harassed by the Saxons. The first migration probably took place about 450. The Dumnonii and Cornovii founded small states in Brittany, or Britannia Minor, as it was termed, and were followed in the second half of the 6th and into the 7th century by a long stream of refugees (cf. J. Loth, *L'Émigration bretonne*, Paris, 1883; A. de la Borderie, *Histoire de la Bretagne*[2], vol. i.,1905).

In the earliest stages it is difficult to distinguish Breton from Welsh. The history of the language may be divided into Old Breton from the 7th to the 11th centuries, Middle Breton from the 11th to the 17th centuries, and Modern Breton. In Old Breton the only material we possess consists of glosses and names occurring in lives of saints, Frankish authors, and charters. However, we find a few characteristics which serve to show that the old glosses are really Breton and not Welsh. Thus, an original *ā* never becomes a diphthong (*au, aw*) in Old Breton, but remains *ō*. In Bret. *gn* becomes *gr*. Further, in O. W. pretonic *ŭ* is weakened to an indeterminate sound written *i* and later *y*, a phenomenon which does not occur in Breton, *e.g.* Lat. *culcita* appears in O. W. as *cilcet*, but in O. Br. as *colcet*. A marked characteristic of Breton is the confusion of *ĭ* and *ĕ*, *e.g.* Ir. *lis*, "court," W. *llys*, Br. *les*. In Old Breton as in Old Welsh neither the initial nor the medial mutations are expressed in writing, whilst in Middle Breton only the latter are regularly denoted. In this period the language diverges very rapidly from Welsh. As prominent features we may mention the following. Stressed *ō* (=Prim. Celt. and Ir. *ā*) becomes *eu*, in unstressed syllables *e*; thus the suffix *-āco* becomes *-euc* and later *-ec*, but in Welsh *-auc* and later *-oc, -og*. Postvocalic *-lr, -ll* become *-dr, -dl* as in Welsh, but in Middle Breton they pass into *-zr, -zl*, which in the modern language appear as *-er, -el*; *e.g.* Mid. Br. *lazr*, Mod. Br. *laer*, "robber," W. *lleidr*, Lat. *latro*. Further, *-lt* becomes *-ot, -ut, e.g.* Br. *aot, aout*, "cliff," W. *allt*; Br. *autrou*, "lord," Ir. *altram*, W. *alltraw, athraw*, Corn. *altrou*; and, more important still, *th, d̄* (W. *dd*) become *s, z, e.g.* Mid. Br. *clezeff*, "sword," Mod. Br. *kleze*, W. *cleddyf*. The orthography only followed the pronunciation very slowly, and it is not until 1659 that we find any attempt made to reform the spelling. In this year a Jesuit priest, Julien Maunoir (Br. Maner), published a manual in which a new spelling is employed, and it is usual to date Modern Breton from the appearance of this book, although in reality it marks no new epoch in the history of the language. It is only now that the initial mutations are consistently denoted in writing (medially they are already written in the 11th century), and the differences between the dialects first come into view at this time. As in Welsh the accent is withdrawn during the middle period from the final to the penultimate (except in the Vannes dialect), which causes the modern unstressed vowel to be reduced in many cases. Again, in Old Welsh and Old Breton a short stressed vowel in words of one syllable was lengthened, *e.g.* W. *tād*, "father," pl. *tădau*, but in Modern Breton the accent tends to lengthen all stressed vowels. Breton has gone its own way in the matter of initial mutation. The nasal mutation has been entirely given up in the initial position, whilst a new mutation, called medial provection, has arisen in the case of *b, d, g*, which become *p, k, t* after a few words which originally ended for the most part in *z* or *ch*. The vocalic mutation of initial *g* in Breton is *c'h*. We may also make mention of one or two other points on which Breton differs widely from Welsh. Breton has given up the combination *ng*, *e.g.* Mid. Br. *moe*, Mod. Br. *moue*, "mane," W. *mwng*, Ir. *mong*. The language betrays a fondness for nasalized vowels, and in this connexion it may be noted that *v* representing an original *m* (W. *f*, Ir. *mh*), though generally written *ff* in Middle Breton, now frequently appears as *nv*; Mid. Br. *claff*, Mod. Br. *klanv*, "sick, ill," W. *claf*, M. Ir. *clam*. Final *g* after *r* and *l* and sometimes in monosyllables after a vowel is represented in Breton by *c'h*, whilst in Welsh in the one case we find a vowel and in the other nil, *c.g.* Br. *erc'h*, "snow," W. *eiry, eira*; Br. *lec'h*, "place," W. *lle*. In Welsh *mb, nd* immediately preceding the stress appear in the modern language as *mm, nn*, but in Breton we find *mp, nt, e.g.* Br. *kantol*, "candle," W. *cannwyll*, Lat. *candela*; Br. *kemper*, "confluence" (in place names), W. *cymmer*, Ir. *combor*.

With regard to the extent of country over which Breton is spoken we shall do well to note the seats of the old Breton bishoprics. These were Quimper, St Pol de Léon, Tréguier, St Brieuc, St Malo, Dol and Vannes. Under Count Nominoe the Bretons succeeded in throwing off the Frankish yoke (841–845) and founded an independent state. At this time of greatest political expansion the language boundary was formed by a line which started roughly a little to the west of Mont St Michel at the mouth of the Couesnon, and stretched to the mouth of the Loire. During the next three centuries, however, in consequence of political events which cannot be enumerated here, we find French encroaching rapidly on Breton, and the old dioceses of Dol, St Malo, St Brieuc, and in part Vannes became Romance-speaking (cp. J. Loth, *Revue celtique*, xxviii. 374-403). So that since the 13th and 14th centuries the boundary between French and Breton begins in the north about Plouha (west of St Brieuc Bay), and stretches to the mouth of the Vilaine in the south. That is to say, the Breton speakers are confined to the department of Finistère and the west of the departments Côtes-du-Nord and Morbihan. Lower Brittany contains a population of 1,360,000, of whom roughly 1,250,000 speak Breton. The number of monoglot Bretons is stated to have been 768,000 in 1878, 679,000 in 1885, and over 500,000 in 1898. There is an infinity of dialects and subdialects in Brittany, but it is usual to divide them into four groups. These are the dialects of (1) Léon in Finistère; (2) Cornouailles in Finistère, the Côtes-du-Nord and a part of Morbihan; (3) Tréguier in the Côtes-du-Nord and Finistère; (4) Vannes in Morbihan and a portion of the Côtes-du-Nord. The first three resemble one another fairly closely, but the speech of Vannes has gone its own way entirely. The dialect of Léon is regarded as the literary dialect, thanks to Legonidec.

The modern language is unfortunately saturated with words borrowed from French which form at least a quarter of the whole vocabulary. The living speech is further characterized by innumerable cases of consonantal metathesis and by parasitic nasalization. Loth gives specimens of the most important varieties of Breton in his *Chrestomathie bretonne*, pp. 363-380, but here we must confine ourselves to pointing out the two most salient differences between the speech of Vannes and the rest of Brittany. In Vannes the stress has not been shifted from the final syllable. In Haute-Cornouailles and Goelo there is a tendency to withdraw the stress on to the antepenultimate, whilst in Tréguier certain enclitics attract the accent to the final. *s, z* of the other dialects representing Welsh *th* become *h* in Vannes, *e.g.* W. *caeth*, Br. *keaz, kez*, "poor, miserable," Vannes *keah, keh*. This phenomenon occurs sporadically in other dialects. It may also be mentioned that Prim. Celt. non-initial *d*, W. *dd*, is retained as *z* in Léon but disappears when final or standing between vowels in the other dialects, *e.g.* O. Br. *fid*, W. *ffydd*, "faith," Léon *feiz*, in Cornouailles, Tréguier and Vannes *fé*. It is doubtful if the most serious differences between the dialects are older than the 16th century.

In the middle ages the language of the Breton aristocracy was French. Upper Brittany was politically more important than the western portion. The consequence was that no patronage was extended to the vernacular, and Breton sank to the level of a patois with no unity for literary purposes. But a new era dawned with the beginning of the 19th century. The national consciousness was awakened at the time of the Revolution, when the Bretons became aware of the difference between themselves and their French neighbours. It may be mentioned by the way that the Breton language was regarded with suspicion by the leaders of the First Republic and attempts were made to suppress it. A Breton named Legonidec had to flee to England for fighting against the Republic. He came under the influence of the movement in Wales, and on his return sought to create a Breton literary language. He published an excellent grammar (*Grammaire celto-bretonne*, Paris, 1807) and a dictionary (*Dictionnaire breton-français*, Paris, 1821), from which he omitted the numerous French words which had crept into the language and for which native terms already existed. Legonidec's

example fired a number of writers with zeal for their native tongue and the clergy became interested. Under their auspices manuals of Breton were published and the language was utilized in a number of schools. A society called the *Association Bretonne* was founded in the year 1844. But under the Second Empire, for reasons which are not easy to discover, this Breton awakening was declared to be contrary to the interests of the state, and all the means at the disposal of a highly centralized government like that of France were employed to throttle the movement. Down to the present day the use of Breton is strictly forbidden in all the state schools, and the influence of the Roman Catholic clergy has for the most part been hostile to the language. However, the attitude of the government aroused considerable dissatisfaction in the early 'nineties, and in 1896 the *Association Bretonne* (disbanded in 1859 and reconstructed in 1873) appointed a permanent committee with the object of preserving and propagating the national language. At the same time some of the clergy headed by Abbé Buléon began to move, and Breton was introduced into many of the schools not under state control. In 1898 was founded the *Union Régionaliste Bretonne*, the most important section of which endeavours to foster the native speech in conjunction with the *Comité de préservation du breton* (founded 1896). In 1899 the annual meeting of the U.R.B. was modelled on the lines of the Irish Oireachtas, the Welsh Eisteddfod and the Scottish Mòd, and festivals of this kind have been held ever since. Many Breton newspapers publish columns in Breton, thus *Ar Bobl* (a weekly newspaper founded in 1904 and published at Carhaix) frequently devotes half its columns to the language. But there is also a weekly four-page newspaper which is wholly in Breton. This is *Kroaz ar Vretoned*, edited by F. Vallée and published at St Brieuc. In addition to this there are three monthly magazines wholly in Breton. The first is *Ar Vro*, edited by the poet Jaffrennou, and in 1908 in its fifth year. The second is *Dihunamb*, written in the dialect of Vannes and started in 1905. The third is *Feiz ha Breiz*, started 1899.

AUTHORITIES FOR BRETON.—For the external history of Breton see H. Zimmer, "Die keltische Bewegung in der Bretagne," *Preussische Jahrbücher* for 1899, xcix. 454-497. For Old and Middle Breton, J. Loth, *Chrestomathie bretonne* (Paris, 1890), and the same writer's *Vocabulaire vieux-breton* (Paris, 1884). Loth and E. Ernault have been indefatigable in investigating the history of the language. Their numerous contributions are mainly to be found scattered through the *Revue celtique*, *Zeitschrift für celtische Philologie* and the *Annales de Bretagne*. Ernault has also published *Glossaire moyen-breton* in 2 vols. (Paris, 1895–1896); *Dictionnaire étymologique du moyen-breton* (Paris, 1888). Another etymological dictionary was published by V. Henry (Paris, 1900). Grammars, &c.:—Dialect of Léon: Legonidec, *Grammaire celto-bretonne* (Paris, 1807, 1838[2], also contained in H. de la Villemarqué's edition of Legonidec's Dictionary); F. Vallée, *Leçons élémentaires de grammaire bretonne* (St Brieuc, 1902); E. Ernault, *Petite Grammaire bretonne* (St Brieuc, 1897, the latter also takes account of the dialects of Tréguier and Cornouailles). Dialect of Tréguier: L. le Clerc, *Grammaire bretonne* (St Brieuc, 1908); J. Hingant, *Éléments de la grammaire bretonne* (Tréguier, 1868); P. le Roux, "Mutations et assimilations de consonnes dans le dialecte armoricain de Pleubian," *Annales de Bretagne*, xii. 3-31. Dialect of Vannes: A. Guillevic and P. le Goff, *Grammaire bretonne du dialecte de Vannes* (Vannes, 1902); *Exercises sur la grammaire bretonne* (Vannes, 1903); H. d'Arbois de Jubainville, "Étude phonétique sur le dialecte breton de Vannes," *Revue celtique*, i. 85 ff. 211 ff.; E. Ernault, "Le Dialecte vannetais de Sarzeau," *Rev. celt.* iii. 47 ff., 232 ff.; J. Guillome, *Grammaire française-bretonne* (Vannes, 1836). As a curiosity we mention P. Treasure, *An Introduction to Breton Grammar* (Carmarthen, 1903). Dictionaries: Legonidec, *Dictionnaire français-breton* (St Brieuc, 1847), *Breton-Français* (St Brieuc, 1850), both republished by de la Villemarqué and representing the Léon dialect; A. Troude, *Nouveau Dictionnaire pratique français et breton du dialecte de Léon avec les acceptations diverses dans les dialectes de Vannes, de Tréguier, et de Cornouailles* (Brest, 1869), and *Nouveau Dictionnaire pratique breton-français* (Brest, 1876); E. Ernault, "Supplément aux dictionnaires bretons-français," *Revue celtique*, iv. 145-170. The Breton words in Gallo, the French patois of Upper Brittany, were collected by E. Ernault, *Revue celtique*, v. 218 ff.

(*c*) *Cornish.*—The ancient language of Cornwall (*Kernûak*, *Carnoack*) stood in a much closer relation to Breton than to Welsh,[1] though in some respects it sides with the latter against the former.

It agrees with Breton on the following points:—It has given up the nasal mutation of initials but provects the mediae. Prim. Celt. *ā* is not diphthongized, but becomes *ē*, *e.g.* Corn. *ler*, "floor," Br. *leur*, W. *llawr*, Ir. *lār*. *Ng* is lost as in Breton, *e.g. toy*, "to swear," Br. *toui*, W. *tyngu*, Ir. *tongu*; *nd* becomes *nt* before the stress and not *nn* as in Welsh, *e.g.* Corn. Br. *hanter*, "half," W. *hanner*. Cornish like Breton does not prefix a vowel to words beginning with *s*+consonant, *e.g.* Corn. *spiril*, later *spyrys*, Br. *spered*, W. *ysprvd*. On the other hand, O. Cornish does not confuse *ŷ* and *ĕ* to the same extent as Bret., *e.g.* W. *helyg*, "willow," O. Cornish *heligen*, Br. *halek*. Further, Cornish does not change *th*, *ŧ* to *s*, *z* as in Breton, *e.g. beth*, "grave," Br. *bez*, W. *bedd*, and initial *g* disappears in the vocalic mutation as in Welsh. Peculiar to Cornish is the change of non-initial *t*, *d* to *s*, *z*. This occurs in the oldest Cornish after *n*, *l*, *e.g.* O. Corn. *nans*, "valley," W. *nant*; Corn. *tâs*, "father," W. *tad*. A feature of later Cornish is the introduction of a *d* before post-vocalic *m*, *n*, e.g. *pedn*, "head," W. *pen*. In later Cornish the accent seems to have fallen on the penultimate as in Modern Welsh and Breton.

In 936 the "Welsh" were driven out of Exeter by Æthelstan, and from that time the Tamar appears to have formed a general boundary between English and Cornish, though there seems to be evidence that even as late as the reign of Elizabeth Cornish was spoken in a few places to the east of that river. The decay of Cornish has been largely attributed to the Reformation. Neither the Prayer-book nor the Scriptures were translated into the vernacular, and we find the same apathy on the part of the Church of England in Cornwall as in Wales and Ireland. Unfortunately the Methodist movement came at a time when it was too late to save the language. By 1600 Cornish had been driven into the western parts of the duchy and in 1662 we are informed by John Ray that few of the children could speak it. Lhuyd gives a list of the parishes in which Cornish was spoken, but goes on to state that every one speaks English. In 1735 there were only a few people along the coast between Penzance and Land's End who understood Cornish, and Dolly Pentreath of Mousehole, who died in 1777, is commonly stated to have been the last person who spoke it, though Jenner seems to show that there were others who lived until well into the 19th century who were able to converse in the dialect. However, the modern English speech of West Cornwall is full of Celtic words, and nine-tenths of the places and people from the Tamar to Land's End bear Cornish names. Celtic words still in use are to be found in Jago's *Dialect of Cornwall* (Truro, 1882); thus the name for the dog-fish is *morgy*, "sea-dog."

AUTHORITIES FOR CORNISH.—A mass of details about Cornish is collected in H. Jenner's *Handbook of the Cornish Language* (London, 1904). (Cf. J. Loth's review in the *Revue celtique*, xxvii. 93.) Lhuyd's *Archaeologica Britannica* (1707) contains a grammar of the language as spoken in his day, and a *Sketch of Cornish Grammar* is to be found as an appendix to Norris's *Ancient Cornish Drama*. A dictionary was published by R. Williams entitled *Lexicon Cornu-Britannicum* (Landovery, 1865), to which W. Stokes published a supplement of about 2000 words in the *Transactions of the London Philological Society* for 1868–1869. We may also mention the *English-Cornish Dictionary*, by F. W. P. Jago (Plymouth, 1887), and a *Glossary of Cornish Names*, by J. Bannister (Truro, 1871). W. Stokes published a Glossary to *Beunans Meriasek* in the *Archiv für celtische Lexikographie*, i. 101, and important articles by J. Loth have appeared in the *Revue celtique*, vols. xviii. to xxiv. W. S. Lach-Szyrma, "Les Derniers Échos de la langue cornique," *Revue celtique*, iii. 239 ff. H. Jenner, "Some Rough Notes on the Present Pronunciation of Cornish Names," *Rev. celt.* xxiv. 300-305.

III. THE LANGUAGE OF THE ANCIENT PICTS.—The evidence from which we can draw any conclusions as to the affinities of the language of the Picts is so extremely scanty that the question has been the subject of great controversy. The Picts are first mentioned by Eumenius (A.D. 297), who regarded them as having inhabited Britain in the time of Caesar. In the year 368 they are described by Ammianus Marcellinus as invading the Roman province of Britain in conjunction with the Irish Scots. In Columba's time we find the whole of Scotland east of Drumalban and north of the Forth divided into two kingdoms—north and south Pictland—and it is reasonable to identify the Picts, at any rate in part, with the Caledonians of the classical authors. Galloway and Co. Down were also inhabited by Picts. Bede in enumerating the languages of Britain mentions those of the Britons, Picts, Scots and the English. The names by which the Picts are known in history have aroused considerable discussion. It seems natural to connect Lat. *Picti* with the *Pictones* and *Pictavi* of Gaul, but in Irish they are known as *Cruithne*, which appears in Welsh as *Prydyn*, "Pict"; cp. *Prydein*, "Britain," forms corresponding to the earliest Greek name for these islands, *νῆσοι Πρεταννικαί*.

Three conflicting theories have been held as to the character of the Pictish language. Rhys, relying on the strange character of the Scottish Ogam inscriptions, pronounces it to be non-Celtic and non-Indo-European. In this he has been followed by Zimmer, who bases his argument on the Pictish rule of succession. Skene maintained that the Picts spoke a language nearly allied to Goidelic, whilst Stokes, Loth, Macbain, D'Arbois and Meyer are of opinion that Pictish was more closely related

[1] J. Loth gives it as his opinion that as late as 1400–1600 a Cornishman and a Breton might have been able to understand one another.

to Brythonic. Of personal names mentioned by classical writers we have Calgacus and Argentocoxus, both of which are certainly Celtic. The names occurring in Ptolemy's description of Scotland have a decidedly Celtic character, and they seem, moreover, to bear a greater resemblance to Brythonic than to Goidelic, witness such tribal designations as Epidii, Cornavii, Damnonii, Decantae, Novantae. In the case of all these names, however, it should be borne in mind that they probably reached the writers of antiquity through Brythonic channels. Bede mentions that the east end of the Antonine Wall terminated at a place called in Pictish *Pean-fahel*, and in Saxon *Penneltun*. *Pean* resembles Old Welsh *penn*, "head," Old Irish *cenn*, and the second element may possibly be connected with Gaelic *fàl*, Welsh *gwawl*, "rampart." The names of the kings in the Pictish chronicles are not an absolutely trustworthy guide, as owing to the Pictish rule of succession the bearers of the names may in many cases have been Brythons. The names of some of them occur in one source in a Goidelic, in another in a Brythonic form. It is of course possible that the southern part of Pictish territory was divided between Goidels and Brythons, the population being very much mixed. On the other hand there are a number of elements in place-names on Pictish ground which do not occur in Wales or Ireland. Such are *pet*, *pit*, "farm" (?), *for*, *fother*, *fetter*, *foder*, "lower" (?). *Aber*, "confluence," on the contrary, is pure Brythonic (Gaelic *inver*). Though the majority of scholars are of opinion that Pictish was nearly akin to the Brythonic dialects, we are entirely in the dark as to the manner in which that language was ousted by the Goidelic speech of the Dalriadic Scots. In view of the comparatively unimportant part played for a considerable period in Scottish affairs by the colony from Ireland, it is well-nigh incredible that Pictish should have been supplanted by Gaelic.

Authorities.—J. Rhys, *Celtic Britain* (London², 1905), *The Welsh People* (London³, 1902), "The Language and Inscriptions of the Northern Picts," in *Proceedings of the Society of Antiquaries of Scotland* (1892); H. Zimmer, "Das Mutterrecht der Pikten," in *Savignys Zeitschrift* (1895); also trans. by G. Henderson in *Leabhar nan Gleann* (Inverness, 1898); W. F. Skene, *Celtic Scotland* (Edinburgh, 1876); A. Macbain in appendix to reprint of Skene's *Highlanders of Scotland* (Stirling, 1902); A. Macbain, "Ptolemy's Geography of Scotland," in *Transactions of the Gaelic Society of Inverness*, xviii. 267-288; W. Stokes, *Bezzenbergers Beiträge*, xviii. 267 ff.; H. d'Arbois de Jubainville, *Les Druides et les dieux celtiques à forme d'animaux* (Paris, 1906). The various theories have been recently reviewed and criticized by T. Rice Holmes in an appendix to his *Caesar's Invasion of Britain* (London, 1907).

IV. History of Celtic Philology.—For many centuries the affinities of the Celtic languages were the subject of great dispute. The languages were in turn regarded as descended from Hebrew, Teutonic and Scythian. The first attempt to treat the dialects comparatively was made by Edward Lhuyd in his *Archaeologia Britannica* (Oxford, 1707), but the work of this scholar seems to have remained unnoticed. A century later Adelung in Germany divided the dialects into true Celtic (= Goidelic) and Celtic influenced by Teutonic (= Brythonic). But it took scholars a long time to recognize that these languages belonged to the Indo-European family. Thus they were excluded by Bopp in his comparative grammar, though he did not fail to notice certain resemblances between Celtic and Sanskrit. James Pritchard was the first to demonstrate the true relationship of the group in his *Eastern Origin of the Celtic Nations* (London, 1831), but his conclusions were not accepted. As late as 1836 Pott denied the Indo-European connexion. A year later Pictet resumed Pritchard's arguments, and Bopp himself in 1838 admitted the languages into the charmed circle, showing in an able paper entitled *Über die keltischen Sprachen* that the initial mutations were due to the influence of terminations now lost. But it was reserved to a Bavarian historian, J. C. Zeuss (1806–1856), to demonstrate conclusively the Indo-European origin of the Celtic dialects. Zeuss, who may worthily rank with Grimm and Diez among the greatest German philologists, rediscovered the Old Irish glosses on the continent, and on them he reared the magnificent structure which goes by his name. The *Grammatica Celtica* was first published in 1853. The material contained in this monumental work was greatly extended by a series of important publications by Whitley Stokes and Hermann Ebel, so much so that the latter was commissioned to prepare a second edition, which appeared in 1871. Stokes has rendered the greatest service to the cause of Celtic studies by the publication of countless texts in Irish, Cornish and Breton. In 1870 the *Revue celtique* (vol. xxviii. in 1908) was founded by Henri Gaidoz, whose mantle later fell upon H. d'Arbois de Jubainville. In 1879 E. Windisch facilitated the study of Irish by publishing a grammar of Old Irish, and a year later a volume of important Middle Irish texts with an exhaustive glossary, the first of its kind. Since then Windisch and Stokes have collaborated to bring out some of the greatest monuments of Irish literature in the series of *Irische Texte*. The text of the Würzburg glosses was published by Zimmer (1881) and by Stokes (1887), and that of the Milan glosses by Ascoli. An important step forward was the discovery of the laws of the Irish accent made simultaneously by Zimmer and Thurneysen. This discovery led to a thorough investigation of the difficult verb system of Old Irish—a task which has largely occupied the attention of Strachan in England, Thurneysen and Zimmer in Germany, and Pedersen and Sarauw in Denmark. In a sense the publication of the *Thesaurus Palaeohibernicus* (Cambridge, 1901–1903) may be regarded as marking the close of this epoch. The older stages of Irish have hitherto so monopolized the energies of scholars that other departments of Celtic philology save Breton have been left in large measure unworked. J. Strachan had begun to tap the mine of the Old Welsh poems when his career was cut short by death. J. Loth and E. Ernault have concentrated their attention on Breton, and can claim that the development of the speech of Brittany has been more thoroughly investigated than that of any other Celtic language. The number of periodicals devoted entirely to Celtic studies has increased considerably of recent years. In 1896 K. Meyer and L. C. Stern founded the *Zeitschrift für celtische Philologie* (now in its 7th volume), and in 1897 the *Archiv für celtische Lexikographie* began to appear under the direction of K. Meyer and W. Stokes. As a supplement to the latter Meyer has been publishing his invaluable contributions to Middle Irish lexicography. In Ireland a new periodical styled *Ériu* was started by the Irish School of Learning in 1904. The Scottish *Celtic Review*, dealing more particularly with Scottish and Irish Gaelic, began to appear in 1903, and the *Transactions of the Gaelic Society of Inverness* are in the 26th volume. For Wales we have *Y Cymmrodor* since 1877, and the *Transactions of the Hon. Society of Cymmrodorion* since 1892, and for Brittany the *Annales de Bretagne*, published by the Faculty of Letters at Rennes (founded 1886).

See V. Tourneur, *Esquisse d'une histoire des études celtiques* (Liége, 1905). (E. C. Q.)

Celtic Literature

1. Irish Literature.—In the absence of a native coinage it is extremely difficult to say when the use of letters was introduced into Ireland. It is probable that the Latin alphabet first came in with Christianity. With the exception of the one bilingual Ogam inscription as yet discovered in Ireland (that at Killeen Cormac) all the inscriptions in Roman letters are certainly later than 500. Indeed, apart from the stone reading "LIE LUGUAEDON MACCI MENUEH," they are all contemporary with or later than the Old Irish glosses. With regard to the Ogam inscriptions we cannot make any confident assertions. Owing to the lack of criteria for dating certain Irish sound-changes accurately it is impossible to assign chronological limits for the earlier stones. The latter cannot be later than the 5th century, but there is nothing to show whether they are Christian or not, and if pagan they may be a century or two earlier. It is true that the heroes and druids of the older epics are represented in the stories as making constant use of Ogam letters on wood and stone, and as the state of civilization described in the oldest versions of the Ulster sagas seems largely to go back to the beginning of the Christian era, it is not impossible that this peculiar system of writing had been

Ogam inscriptions.

framed by them. The Ogam system is certainly based on the Latin and not the Greek alphabet, and was probably invented by some person from the south of Ireland who received his knowledge of the Roman letters from traders from the mouth of the Loire. It may, however, be regarded as certain that the Ogam script was never employed in early times for literary purposes. We are told that the Gaulish druids disdained to commit their lore to writing, although they were familiar with the use of Greek letters, and their Irish confrères probably resembled them in this respect. Tradition connects the codification of the Brehon Laws with the name of Patrick, and there is reason for believing, as we shall see later, that the greatest Irish epic was first committed to writing in the 7th century.

Old Irish MSS.

The great bulk of Irish literature is contained in MSS. belonging to the Middle Irish period (1100–1550), and in order to be able to treat this literature as a whole it will be convenient for us to deal first with those documents which are termed Old Irish, especially as the contemporary remains of the literature of the earlier period are almost exclusively of a religious nature. Most of the Old Irish documents have been printed by Stokes and Strachan in the *Thesaurus Palaeohibernicus*, and where no reference is given the reader is referred to that monumental work. The extraordinary outburst of intellectual activity in Ireland from the 6th to the 9th centuries and the compositions of Irishmen in the Latin language, belong to the history of medieval European literature and fall outside the scope of this article. For the *Confession of St Patrick* and his "Letter to the Subjects of Coroticus" see PATRICK. The only Irish document ascribed to the saint is the strange so-called "Hymn," the *fáeth fiada*, more properly *fóid fiada*, "the cry of the deer." This is a rhythmical incantation which is said to have rendered the saint and his companions invisible to King Loigaire and his druids. The Trinity and powers of nature are invoked to help him to resist spells of women and smiths and wizards. The hymn, which contains a number of strange grammatical forms, is undoubtedly referred to in the Book of Armagh, and may very well go back to the 5th century. The Latin hymns contained in two MSS. dating from the end of the 11th or beginning of the 12th century, a Trinity College, Dublin, MS., and a MS. belonging to the Franciscan monastery in Dublin, are of interest to us as exhibiting the influence of the native metrical system. Quantity and elision are ignored, and rhymes, assonances, alliterations and harmonies abound in true Irish fashion. The line consists of two units which commonly contain either seven or eight syllables apiece. The earliest and best-known of these religious poems are the Hymn of Secundinus (Sechnall d. 447) on St Patrick, and the two hymns attributed to St Columba (d. 597) beginning "*Noli pater*" and "*Altus prosator*," the latter of which exhibits some of the peculiarities of the so-called Hibernian Latin of the *Hisperica Famina* and the *Lorica* of Gildas. The date of the Irish hymns in the *Liber Hymnorum* ranges, according to Stokes and Strachan, from the 7th to the 11th centuries. Ultán's hymn on St Brigit beginning "*Brigit bé bithmaith*," which is by far the most artistic of the collection, was perhaps composed in the 7th century. Definite metrical laws had evidently been elaborated when this poem was written. The beat is iambic, but the natural accent of the words is rigidly observed. The long line consists of two units of five syllables each. The rhymes are dissyllabic and perfect. Alliteration is always observed in the latter half of each line and assonances are found knitting up the half-lines. The short prayer ascribed to Ninine or to Fiacc is a highly alliterative piece without rhyme, the date of which cannot be fixed. The well-known hymn on St Patrick traditionally ascribed to Fiacc, bishop of Sletty, and the piece beginning "*Sén Dé*," traditionally ascribed to Colmán, are assigned on linguistic grounds to the beginning of the 9th century. The lines going by the name of "Sanctán's Hymn" probably belong to the same century, whilst the metrical catalogue of marvels performed by St Brigit contains such a medley of older and later forms, probably due to interpolation, that it is impossible to determine its age. The few lines entitled "Mael-Ísu's Hymn" are the most recent of all and probably belong to the 11th century (Mael-Ísu d. 1086). The Patrician documents by Muirchu Maccu Machthéni, who professed to write at the command of Bishop Aed of Sletty (d. 698), and by Tirechán, who is said to have received his information from Bishop Ultán (d. 656), are contained in the Book of Armagh, a MS. compiled by Ferdomnach in 807. These documents, like the *Life of St Columba* by Adamnan, the MS. of which was written by Dorbbéne, abbot of Hi (d. 713), contain a number of names and forms of great importance for the study of the language.

Hymns.

Earliest prose.

The earliest pieces of connected prose in Irish are three:—(1) the Cambray Homily, contained in an 8th-century codex at Cambray copied by a continental hand from a MS. in the Irish character; the language is very archaic and dates from the second half of the 7th or the beginning of the 8th century; (2) the additions to the notes of Tirechán on the life of St Patrick in the Book of Armagh; these seem to go back to the early 8th century; (3) the tract on the Mass in the Stowe Missal, which is in all probability nearly as old as the Cambray Homily, though contained in a 10th or 11th century MS. Of especial interest are the spells and poems found in the Stowe Missal and two continental MSS. The Stowe MS. (now deposited in the Royal Irish Academy) contains three rather badly preserved spells for a sore eye, a thorn and disease of the urine. A St Gall codex has preserved four Irish incantations of the 8th and 9th centuries. These are respectively against a thorn, urinary disease, headache and various ailments. Another charm, which is partly obscure, occurs in the 9th-century codex preserved at the monastery of St Paul in Carinthia. The same MS. also contains (1) a humorous poem treating of the doings of a bookish writer and his favourite cat Pangur Bán; (2) a riddling poem ascribed to Suibne Geilt, a king who is said to have lost his reason at the battle of Moira (A.D. 637); (3) verses extracted from a poem ascribed to St Moling (d. 697), who may very well have been the actual author; (4) a poem in praise of some Leinster princeling called Aed.

Old glosses.

For our knowledge of the older language, however, we have to rely mainly on the numerous glosses scattered about in a large number of MSS., which it is impossible to enumerate here. Indeed, such an enumeration is now rendered superfluous owing to the publication of the *Thesaurus Palaeohibernicus*, in which all the various glosses have been collected. For our purpose it will be sufficient to mention the three most important codices containing Old Irish glosses. These are as follows:—(1) The Codex Paulinus at Würzburg, which contains the thirteen epistles of St Paul, and the Epistle to the Hebrews, with a great mass of explanatory glosses, partly in Latin, partly in Irish, partly mixed. The chief source of the commentary is the commentary of Pelagius, who is often cited by name. The date of this highly important MS. is much disputed; part of the Irish glosses seem to date from about 700, whilst the rest may be placed a little before 800. (2) The Codex Ambrosianus, formerly at Bobbio, now at Milan, which contains a commentary on the psalter with a large number of Irish glosses. In their present state these glosses were copied in the first half of the 9th century. (3) Glosses on Priscian contained in four MSS., of which the most important is the Codex Sangallensis, dating from the middle of the 9th century. Apart from the biblical glosses and scholia the other chief texts or authors provided with Irish glosses are Augustine, Bede, the Canons, the Computus, Eutychius, Juvencus, Philargyrius, Prudentius and Servius.

The Milan and the St Gall codices just mentioned both contain several short poems in Irish. In two stanzas in the Swiss MS. we find expressed for the first time that keen sympathy with nature in all her moods which is so marked a feature of Irish and Welsh verse.

Two ponderous religious poems have now to be noticed. To Oengus the Culdee is attributed the lengthy *Félire* or Calendar of Church Festivals, consisting of 365 quatrains in *rinnard* metre, one for each day in the year. The language of this dry compilation, which is heavily glossed and annotated, points to 800 as the date of composition, and Oengus, who is stated to have

lived about that time, may well have been the author. This calendar has been twice edited by W. Stokes with an English translation, the first time for the Royal Irish Academy (Dublin, 1880), and again for the Bradshaw Society (London, 1905).

It may perhaps be as well to enumerate here the later Irish martyrologies. (1) The *Martyrology of Tallaght* (Tamlacht), founded on an 8th-century calendar, but containing additions down to 900 (ed. D. H. Kelly, Dublin, 1857). (2) The metrical *Martyrology of O'Gorman*, *c.* 1166–1174, edited by Stokes for the Bradshaw Society (London, 1895). (3) The *Martyrology of Donegal*, an important compilation in prose made by Michael O'Clery in 1630, edited by J. H. Todd (Dublin, 1864). A composition which is wrongly assigned to Oengus the Culdee is the *Saltair na Rann* or Psalter in Quatrains, contained in an Oxford MS. (Rawlinson B 502) and published without a translation by Stokes (Oxford, 1883). The work proper consists of 150 poems corresponding to the number of Psalms in the psalter, but 12 poems have been added, and in all it contains 2098 quatrains, chiefly in *deibide* metre of seven syllables. The poems are mainly based on biblical (Old Testament) history, but they preserve a large measure of medieval sacred lore and cosmogony. The psalter received additions as late as 998, and the Oxford MS. belongs to the 12th century. We should perhaps also mention here the famous *Amra* or Eulogy of St Columba, commonly attributed to Dallán Forgaill, a contemporary of the saint, but Stokes takes the view that it was written in the 9th century, and is intentionally obscure. The oldest but not the best copy of the *Amra* is preserved in the Trinity College, Dublin, MS. of the *Liber Hymnorum*, but it also occurs in LU. and elsewhere. It invariably appears heavily gloss-laden, and the glosses and commentary added thereto are out of all proportion to the text. This piece, which is not extant in its integrity, was probably intended as artificial alliterative prose, but, as we have it, it is a medley of isolated phrases and irrelevant comment.

During the 9th and 10th centuries Ireland was harassed by the Vikings, and a host of scholars seem to have fled to the continent, carrying with them their precious books, many of which are preserved in Italy, Switzerland, Germany and elsewhere. Hence very few early Irish MSS. are preserved in Ireland itself. When the fury of the storm was past, Irish scholars showed increased interest in the old literary documents, and copied all that they could lay hands on into miscellaneous codices. The earliest of these collections, such as the *Cin of Druim Snechta*, the *Yellow Book of Slane*, the *Book of Dubdaleithe*, the *Psalter of Cashel*, exist no longer, though their names have come down and certain of them were known in the 17th century. However, copies of a goodly portion of the contents of these old books are preserved to us in one form or another, but mainly in a series of huge miscellaneous codices ranging in date from the 12th to the 16th century. The oldest is *Lebor na h-uidre*, or Book of the Dun Cow, preserved in the Royal Irish Academy and published in facsimile (Dublin, 1870). This MS. was compiled in part in the monastery of Clonmacnoise by Moelmuire MacCelechair, who was slain in 1106. The Book of the Dun Cow (where necessary we shall abbreviate as LU.) derives its name from a legend that Ciarán of Clonmacnoise (d. 544) took down the story of the *Táin Bó Cualnge* on a parchment made from the hide of his favourite cow. The name seems to have been wrongly applied to the 12th-century MS. in the 15th century. LU. is almost entirely devoted to romance, the stories which it contains belonging mainly to the Ulster cycle. The next MS. in point of age is the Book of Leinster (abbreviated LL.) now in Trinity College, Dublin. It was transcribed by Finn, son of Gorman, bishop of Kildare (d. 1160). LL. also contains a large number of romances in addition to other important matter, mainly historical and genealogical, bearing more particularly on the affairs of Leinster. The Yellow Book of Lecan (YBL.), also in Trinity College, Dublin, was written at different times by the MacFirbis family, but chiefly by Gilla Isa, son of Donnchad Mór MacFirbis about 1391. The MacFirbises were hereditary scribes and genealogists to the O'Dowds, chiefs of the Hy Fiachrach (Co. Sligo). YBL. contains a vast amount of romance, and is indispensable as supplementing and checking the contents of LU. and LL. The most extensive collection of all is the Book of Ballymote (BB.), now belonging to the Royal Irish Academy, which was compiled about the beginning of the 15th century by various scribes. The book was in the possession of the chiefs of Ballymote for more than a century. In 1522 it was purchased by the O'Donnells for 140 milch cows. BB. only contains little romantic matter, but it has preserved much valuable historical and genealogical material. The contents of the *Leabhar Breac* (LB.), or Speckled Book, now in the Royal Irish Academy, are chiefly ecclesiastical and religious. LB. seems to have been compiled in large measure before 1544. All these five codices have been published in facsimile by the Royal Irish Academy with a description of their contents. Two important Mid. Ir. MSS. in the Bodleian (Rawlinson B 512 and Laud 610), containing a good deal of romantic material, are also published in facsimile by Henry Frowde.

Other MSS. which require special mention are (1) The Great Book of Lecan, compiled in the year 1417 by Gilla Isa Mór MacFirbis, in the Royal Irish Academy; (2) The Book of Lismore, the property of the duke of Devonshire at Lismore Castle. This codex was compiled in the latter half of the 15th century from the lost book of Monasterboice and other MSS. Its contents are described in the introduction to Stokes's *Lives of Saints from the Book of Lismore* (Oxford, 1890). (3) The Book of Fermoy in the Royal Irish Academy. The contents are described in the introduction to O'Beirne Crowe's edition of the *Táin Bó Fraich* (Dublin, 1870). (4) The Book of Hy Maine recently acquired by the Royal Irish Academy. The scribe who wrote it died in 1372. O'Curry, O'Longan and O'Beirne Crowe drew up a MS. catalogue of the Irish MSS. in the Royal Irish Academy, and O'Donovan performed the same service for the Trinity College, Dublin, collection. A briefer account of the Irish MSS. in TCD. will be found in Abbott's Catalogue of the MSS. in that library. O'Curry also drew up a list of the Irish MSS. in the British Museum, and S. H. O'Grady has printed part i. of a descriptive catalogue of this collection (London, 1901), part ii. by T. O'Maille. The twenty-six MSS. in the Franciscan monastery in Dublin are described by J. T. Gilbert in the *Fourth Report of the Royal Commission on Historical MSS.* W. F. Skene catalogued the collection of MSS. in the Advocates' Library, Edinburgh, a printed catalogue of which has been issued by D. Mackinnon (Edinburgh, 1909; see also *Trans. Gaelic Soc. of Inverness*, xvi. 285-309).

In order to give some idea of the enormous extent of Irish MS. material we may quote some calculations made by O'Curry, who states that if the five oldest vellum MSS. were printed the result would be 9400 quarto pages. Other vellum MSS. ranging in date from 1300 to 1600 would fill 9000 pages of the same size, whilst the innumerable paper MSS. belonging chiefly to the early 18th century would cover no less than 30,000 pages. The well-known French scholar, D'Arbois de Jubainville, published in 1883 a tentative catalogue of Irish epic literature. His work is by no means complete, but his figures are instructive. He mentions 953 Irish MSS. containing epic matter preserved in Irish and English libraries. To these have to be added another 56 in continental libraries. Of this mass of material 133 Irish and British MSS. and 35 continental MSS. were written before 1600. It should, however, be stated that the same subject is treated over and over again, and much of the later material is absolutely valueless.

Before we pass on to the consideration of the literature itself, it will be well to make a few preliminary observations on the nature of the language in which the pieces are written and on the status of the poet in medieval Ireland. The language in which the huge miscellaneous codices enumerated above are contained is called by the general name of Middle Irish, which is a very wide term. Irish scribes often copied their original somewhat mechanically, without

Old collectors.

Book of the Dun Cow.

Book of Leinster.

Yellow Book of Lecan.

Book of Ballymote.

Speckled Book.

Other MSS. material.

Character of Middle Irish.

being tempted to change the language to that of their own time. Thus in many parts of LU. we find a thin Middle Irish veneer on what is largely Old Irish of the 8th or 9th century. Hence such a MS. often preserves forms which had been current several centuries before, and it may even happen that a 14th or 15th century MS. such as YBL. contains much older forms than a corresponding passage in LL. Of recent years several scholars—notably Strachan—have devoted much attention to the Old Irish verb-forms, so that we have now safe criteria for establishing with some degree of certainty the age of recensions of stories and poems preserved in late MSS. In this way a number of compositions have been assigned to the 9th, 10th and 11th centuries, though actual written documents belonging to this period are comparatively rare.

It remains for us to say a few words about the *fili*, the professional literary man in Ireland. The *fili* (from the stem *vel-*, "to see," Welsh, Breton, *gwelet*, "to see") appears to have been originally a diviner and magician, and corresponds to the *vates*, *ὀυάτες*, of the ancient Gauls mentioned by classical writers. In Ireland he is represented as sole possessor of three methods of divination: the *imbas forosnai*, *teinm lóida* and *dichetal di chennaib cnâime*. The first two of these were forbidden by Patrick, but they seem to have survived as late as the 10th century. Part of the tremendous influence exercised by the *fili* was due to the belief in his powers of satire. By reciting a satirical poem or incantation he was able to raise blotches on the face of and so disfigure any person who aroused his displeasure. Numerous cases of this occur in Irish literature. The origin of the science of the *fili* is sometimes traced back to the *Dagda*, one of the figures of the Irish pantheon, and they were held in such esteem that the annalists give the obituaries of the head-ollams as if they were so many princes. With the introduction of Christianity they seem to have gradually superseded the druid, and their functions are therefore very wide. We are told that they acted in three capacities: (1) as story-tellers (*fer comgne* or *scélaige*); (2) as judges (*brithem*), including the professions of arbiters, legislators and lawyers; (3) as poets proper (*fercerte*). We are here only concerned with the *fili* in his capacity of story-teller and poet. In accordance with the minute classification of the various ranks of society in early Ireland, the social status of the literary man was very carefully defined. The degrees vary slightly in different documents, but the following list of ten from the *Senchus Mór* is very instructive: (1) The highest degree is the *ollam* (ollave), who knows 350 stories; (2) the *ánruth*, 175 stories; (3) the *clti*, 80 stories; (4) the *cana*, 60 stories; (5) the *doss*, 50 stories; (6) the *macfuirmid*, 40 stories; (7) the *fochlocon*, 30 stories; (8) the *drisac*, 20 stories; (9) the *taman*, 10 stories; (10) the *oblaire*, 7 stories. In LL. we are told that the stories (*scél*) are divided into primary and secondary, and that the latter are only obligatory on the first four of the grades enumerated. Again, certain styles of composition seem to have been the monopoly of certain grades. Thus the poem which was most highly rewarded and demanded the highest technical skill was called the *anomain*, and was the exclusive right of the *ollam*. A notable instance of this kind of composition is the *Amra* of Columba, attributed to Dallán Forgaill. The higher grades were allowed a number of attendants, whom the kings had to support along with the poet himself. Thus the *fochlocon* had two and the *doss* four attendants. In the 6th century Dallán Forgaill, the chief *fili* of Ireland, claimed the right to be attended by thirty *filid*, which was the number of the train allowed to the supreme king. The reigning monarch, Aed MacAinmirech, weary of the pretensions of the poets, attempted to banish them, which led to the famous assembly of Druim Ceta, where Columba intervened and reduced the number to twenty-four (the train of a provincial king). In the plan of the hall of Tara, preserved in LL. and YBL., the *sui littre* or doctor in theology has the seat of honour opposite the king. The *ollam brithem* or supreme judge or lawyer ranks with the highest rank of nobility, whilst the *ollam fili* is on a footing with the nobleman of the second degree.

The "fili."

We have already stated that the stories which formed the stock-in-trade of the poets were divided into primary and secondary stories. Of the latter there were 100, but little is known of them. However, several more or less complete lists of the primary stories have come down to us. The oldest catalogue (contained in LL.) gives the titles of 187 of these tales arranged under the following heads—destructions, cow-spoils, courtships, battles, caves, navigations, violent deaths, expeditions, elopements and conflagrations; together with the following, which also reckon as prime-stories—irruptions, visions, loves, hostings and migrations. Of these stories sixty-eight have been preserved in a more or less complete form. The tales enumerated in these catalogues, which in their substance doubtless go back to the 8th or even to the 7th century, fall into four main categories: (1) the mythological cycle, (2) the Cúchulinn cycle, (3) the Finn cycle, (4) pieces relating to events of the 5th, 6th and 7th centuries. Meyer has estimated that of the 550 titles of epic tales in D'Arbois's *Catalogue* about 400 are known to us, though many of them only occur in a very fragmentary state; and about 100 others have since been discovered which were not known in 1883.

The course of training undergone by the *fili* was a very lengthy one. It is commonly stated to have extended over twelve years, at the end of which time the student was thoroughly versed in all the legendary, legal, historical and topographical lore of his native country, in the use of the innumerable and excessively complicated Irish metres, in Ogam writing and Irish grammar. The instruction in the schools of poetry seems to have been entirely oral, and the course consisted largely in learning by heart the verses in which the native lore was enshrined. These schools of learning existed in one form or another down to the 17th century. In the early days the *fili* is represented as employing a mysterious archaic form of speech—doubtless full of obscure kennings—which was only intelligible to the initiated. An instance of this *bérla féine*, as it was termed, is the piece entitled *Acallam an Dá Shuad* (Colloquy of the Two Sages, *Rev. celt.* xxvi. 4 ff.). In this piece two *filid* of the 1st century A.D. are represented as contending in this dialect for the office of chief *ollam* of Ireland, much to the chagrin of King Conchobar, to whom their speeches were unintelligible. It was in consequence of this that Conchobar ruled that the office of *fili* should no longer carry with it of necessity the office of judge (*brithem*). It ought to be observed that the church never showed itself hostile to the *filid*, as it did to the druids. Dubthach, chief *fili* of Ireland in the time of St Patrick, is represented as the saint's constant companion, and the famous Flann Mainistrech (d. 1056), though a layman and *fili*, was head of the monastery school at Monasterboice.

Before leaving the subject of the literary classes, we must notice an inferior grade of poet—the bard. Like the official *filid*, the bards were divided into grades. There were both patrician and plebeian bards, each subdivided into eight degrees, having their own peculiar metres. Like the *fili* the bard had to go through a long course of study, and he was generally attached to the house of some chieftain whose praises he had to sing. In course of time the office of *fili* became extinct, owing to a variety of causes, and from the 13th to the 16th century we find the hitherto despised family bard stepping into the place of the most influential literary man in Ireland. His importance was fully realized by the English government, which did its best to suppress the order.

The bard.

The medieval romances form by far the most attractive part of Irish literature, and it is to them that we shall first turn our attention. Two main groups of stories have to be distinguished. The one is the Ulster cycle, with Conchobar and Cúchulinn as central figures. The other is the Southern or Leinster-Munster cycle, revolving round Finn and Ossian. Further stories dealing with mythological and historical personages will be mentioned in their turn.

Medieval romances.

The Ulster cycle may be regarded as Ireland's most important contribution to the world's literature. The chief and at the same time the lengthiest romance in which the heroes of this group figure is the great epic, the *Táin Bó Cualnge* or the

Cattle-raid of Cooley (Co. Louth). Here we find ourselves in a world of barbaric splendour, and we are constantly reminded of the Iliad, though the Irish epic from a purely literary point of view cannot bear comparison with the work of Homer. The main actors in the drama are Conchobar, king of Ulster, the great warrior Cúchulinn (see CÚCHULINN), Ailill and Medb, king and queen of Connaught, and Fergus, Conchobar's predecessor as king of Ulster, now in exile in Connaught. These persons may or may not have actually lived, but the Irish annalists and synchronists agree in placing them about the beginning of the Christian era. And there cannot be any doubt as to the antiquity of the state of civilization disclosed in this great saga. It has been repeatedly pointed out that the Irish heroes are equipped and conduct themselves in the same manner as the Gauls described by the Greek traveller Posidonius, and Prof. W. Ridgeway has shown recently that several articles of dress and armour correspond exactly to the La Tène types of the continent. To mention a few primitive traits among many—the Irish champions of the *Tâin* still fight in chariots, war-dogs are employed, whilst the heads of the slain are carried off in triumph and slung round the necks of the horses. It may also be mentioned that Emain Macha, Conchobar's residence, is reported by the annalists to have been destroyed in A.D. 323, and that portions of Meath, which is stated to have been made into a separate province in the 2nd century A.D., are in the *Tâin* regarded as forming part of Ulster. Noteworthy is the exalted position occupied by the druid in the Ulster sagas, showing how little the romances were influenced by Christianity. No Roman soldier ever set foot in Ireland, and this early epic literature is of supreme value as a monument of primitive Celtic civilization. Ireland has always been a pastoral country. In early times no native coins were in circulation: the land belonged to the tribe. Consequently a man's property consisted mainly of cattle. Cattle-raids were an event of daily occurrence, and Sir Walter Scott has made us familiar with similar expeditions on the part of the Scottish Highlanders in the 18th century. Hence it is not a matter for surprise that the theme of the greatest Irish epic is a cattle-raid. At the time there were two wonderful bulls in Ireland, the Dond or Brown Bull of Cualnge, and the Findbennach or White-horn, belonging to Medb. These two animals are of no ordinary nature. Other stories represent them as having existed under many different forms before they were reborn as bulls. First they appear as swineherds belonging to the supernatural people of the *sîd* of fairy mounds; then they are metamorphosed successively as ravens, warriors, sea-monsters and insects. It was Queen Medb's ambition to gain possession of the Brown Bull of Cualnge, and for this purpose she collected the united hosts of Ireland to raid the province of Ulster and carry him off. Medb chooses the season when she knows the Ulstermen are all incapacitated as the result of a curse laid upon them by a fairy woman. Cúchulinn alone is exempt from this debility.

Ulster cycle.

The "Tâin."

The story is divided into a number of sections, and has been summarized by Miss Hull as follows:— (1) the prologue, relating, in the form of a night dialogue between Ailill and Medb, the dispute between them which brought about the raid; (2) the collecting of Medb's hosts and the preliminary movements of the army, during which period she first became aware of the presence and powers of Cúchulinn. Her inquiry of Fergus as to who this formidable foe is leads to a long section called (3) Cúchulinn's boy-deeds, in which Fergus relates the remarkable prodigies of Cúchulinn's youth, and warns Medb that, though the hero is but a beardless youth of seventeen, he will be more than a match for all her forces. (4) A long series of single combats, of which the first part of the tale is made up; they are at first gay and bombastic in character, but become more grave as they proceed, and culminate in the combat of Cúchulinn with his old companion, Fer Diad. This section contains the account of Cúchulinn's "distortion" or frenzy, which always occurred before any great output of the hero's energy, and of the rout of the hosts of Medb which followed it. (5) The general awakening of the warriors of Ulster from their lethargy, and their gathering by septs upon the Hill of Slane, clan by clan being described as it comes up in order. (6) The final Battle of Gairech and Ilgairech, followed (7) by the rout of Medb's army and (8) the tragic death of the bulls.

The text of the *Tâin* has come down to us as a whole or in part in nearly a score of MSS., most of which, however, are modern. The most important MSS. containing the story are LU., LL. and YBL. Of these LU. and YBL. are substantially the same, whilst LL. contains a longer and fuller text later in both style and language. LL. attempts to give a complete and consistent narrative in more polished form. In ancient times there were doubtless other versions now lost, but from the middle of the 12th century the scribes seem to have taken few liberties with the text, whilst previously the *filid* were constantly transforming the material and adding fresh matter. The YBL. version preserves a number of forms as old as the O. Ir. glosses (*i.e.* 8th century or earlier), and a curious story contained in LL. seems to point to the fact that the *Tâin* was first committed to writing in the 7th century. Senchán Torpeist, who lived in the first half of the 7th century and succeeded Dallán Forgaill as chief *ollam* of Ireland, summoned the *filid* to inquire which of them knew the *Tâin* in its entirety. As they were only familiar with fragments he despatched them to discover it. One of them seated himself at the grave of Fergus MacRóig, who appeared to him in a mist and dictated the whole story to him in three days and three nights.

At this point it will be well to say a few words about the form of the *Tâin*. The old Irish epic is invariably in prose with poems of varying length interspersed. The narrative and descriptive portions are in prose and are frequently followed by a brief epitome in verse. Dialogues, eulogies and laments also appear in metrical form. The oldest poems, termed rhetoric, which are best represented in LU., seem to be declamatory passages in rhythmical prose, not unlike the poetical passages in the Old Testament, and the original *Tâin* may have consisted of such rhetorics bound together with short connecting pieces of prose. At a later date poems were inserted in the metres of the *filid* (particularly the quatrain of four heptasyllabic lines) which Thurneysen and Windisch consider to have been developed out of medieval Latin verse. When in course of time the old rhetorics became unintelligible they were often omitted altogether or new poems substituted. Thus the LL. version contains a larger number of poems than the LU.-YBL. copy, whilst LU. preserves a number of rhetorics which do not appear in the later MS. The prose portions in LU. are very poor from a literary point of view. These passages are abrupt, condensed and frequently obscure, with no striving after literary effect such as we find in LL. The form in which many episodes are cast is not unlike a mnemonic, leaving the story-teller to fill in the details himself. In the 11th century certain portions of the theme possessing great human interest were vastly extended, new poems were added, and in this manner such episodes come to form sagas complete in themselves. The most notable instance of this is the "Fight with Fer Diad," which is not contained in LU. The genesis of the *Tâin* may thus be briefly summarized as follows. The story was first committed to writing in the 7th or 8th century, after which it was worked up by the *filid*. Extended versions existing in the 10th or 11th century form the basis of the copies we now possess.

Though the sagas of the Ulster cycle are eminently Irish and pagan in character and origin, it cannot be denied that traces of foreign influence are to be observed. A number of Latin and Norse loan-words occur in them, and there can be little doubt that the monkish scribes consciously thrust the supernatural element into the background. However, although figures of Vikings are unmistakable in a few cases, and in one story Cúchulinn is made to fight with Hercules, such foreign elements can easily be detected in the older tales. They only affect minor details, and do not influence the body of the romances.

From what we have already said it will be plain that the Irish epic is in a fluid state. The *Tâin* is of interest in the history of literature as representing the preliminary stage through which the great verse epics of other nations have had to pass, but its

value as a work of art is limited by its form. We must now say a few words about the character and style of these romances. As already stated, the atmosphere is frankly pagan and barbaric, with none of that courtly element which we find in the Arthurian epics. The two features which strike one most forcibly in the medieval Irish romances are dramatic force and humour. The unexpected and weird is always happening, the effect of which is considerably heightened by the grim nature of the actors. In particular the dialogues are remarkably brilliant and clever, and it is a matter for surprise that this gifted race never developed a drama of its own. This is doubtless partly due to the political conditions of the island. And, moreover, we are constantly struck by the lack of sustained effort which prevented the *filid* from producing great epics in verse. Dramatic material is abundantly present in the old epics, but it has never been utilized. As one might expect from the vernacular literature of Ireland, these romances are pervaded by a keen sense of humour. We feel that the story-teller is continually expecting a laugh and he exaggerates in true Irish fashion, so that the stories are full of extravagantly grotesque passages. In the later LL. version we notice a tendency to linger over pathetic situations, but this is unknown in the earlier stage. Perhaps the most serious defect of all Irish literary products is the lack of any sense of proportion, which naturally goes hand in hand with the love of the grotesque. Far too much attention is paid to trivial incidents and minute descriptions, however valuable the latter may be to the antiquarian, to the detriment of the artistic effect. Further, the story-teller does not know when to stop. He goes meandering on long after the main portion of the story is finished, with the result that Irish romances are apt to end in a most uninteresting anticlimax. Finally we are wearied with a constant repetition of the same epithets and similes, and with turgid descriptions; even the grotesque exaggerations pall when we find them to be stereotyped. But the early epics do not offend our sense of propriety in expression to the same extent as the later Finn cycle.

The *Táin Bó Cualnge* formed a kind of nucleus round which a number of other tales clustered. A number of these are called *remscéla* or introductory stories to the *Táin*. Such are the "Revealing of the Táin" (already mentioned), the "Debility of the Ultonians" (giving the story of the curse), "The Cattle-Driving of Regamon, Dartaid and Flidais," "*Táin bó Regamna*," "The Cattle-Driving of Fraech," "The Dispute of the Swineherds," telling the previous history of the Bulls, "The Capture of the Fairy Mound," "The Dream of Mac oc," the "Adventures of Nera," the "Wooing of Ferb." Other stories form a kind of continuation of the *Táin*. Thus the "Battle of Rosnaree" ("*Cath Ruis na Rig*") relates how Conchobar, as a result of the loss of the Bull, sends an army against the kings of Leinster and Tara, and would have been routed but for the prowess of Cúchulinn. The "Great Rout of the Plain of Murthemne" and "Cúchulinn's Death" tell how the hero's downfall is compassed by a monstrous brood of ill-shapen beings whose father and brothers had been slain by him during the *Táin*. He finally meets with his end at the hands of Lugaid, son of Curói mac Daire (the central hero of a Munster cycle which has not come down to us), and Erc, king of Tara. We are also told of the terrible vengeance taken on the murderers by Conall Cernach. Other stories deal with the "Conception of Conchobar," the "Conception of Cúchulinn," "The Glories of Conchobar's Reign," with an account of how he acquired the Throne from Fergus, "The Wooing of Emer and the Hero's Education in Scotland under Scathach," "The Siege of Howth," "Bricriu's Feast and the Exile of the Sons of Doel Dermait," "The Battle of the Boyne" (*Ériu*, vol. ii.), "The Deaths of Ailill, Medb and Conall Cernach," "Destruction of Bruden Dá Choca," "The Tragical Death of Conlaech at the hands of Cúchulinn his father," "The Deaths of Goll and Garbh," "The Sickbed of Cúchulinn," in which the hero is lured away for a time into the invisible land by a fairy, Fand, wife of Manandán, "The Intoxication of the Ultonians," telling of a wild raid by night across the entire extent of the island from Dún-da-Benn near Coleraine to the fort of Curói MacDaire at Temair-Luachra in Kerry, "The Death of Conchobar," "The Phantom Chariot of Cúchulinn," in which the hero is brought up from the grave to witness before St Patrick and King Loigaire to the truth of the Christian doctrine.

Four other stories in connexion with the Ulster cycle remain to be mentioned. The first is "*Scél mucci Maic Datho*" ("The Story of MacDatho's Pig"). Various writers of antiquity inform us that at the feasts of the Gauls the champion received the best portion of meat, which frequently led to brawls. In this savage but picturesque Irish story we find the Ulstermen vaunting their achievements against the Connaughtmen, until at last the contest lies between Conall Cernach and Cet MacMagach. Nowhere, perhaps, is the dramatic element better brought out.

Apart from the *Táin* the greatest and at the same time the longest saga in which Cúchulinn figures is *Fled Bricrend* (Bricriu's Feast). Bricriu is the mischief-maker among the Ulstermen, and he conceives the idea of building a banqueting hall in order to invite Conchobar and his nobles to a feast. After much hesitation they consent. Bricriu in turn incites the three chief heroes, Cúchulinn, Conall Cernach and Loigaire Buadach, to claim the champion's portion. He does the same thing with the spouses of the three warriors, who declaim in obscure verse the achievements and excellences of their several husbands in a passage entitled the "Women's War of Words." Loosely attached to this story follows a wild series of adventures in which the powers of the three champions are tested, Cúchulinn always proving his superiority. In order to decide the dispute, visits are paid to Medb at Rath Cruachan and to Curói in Kerry, and the story ends with the "beheading incident," which occurs in the romance of "Sir Gawayne and the Green Knight." *Fled Bricrend* presents a number of textual difficulties. The text of the oldest MS. (LU.) shows signs of contamination, and several versions of the story seem to have been current.

But the story of the Ulster cycle which is better known than any other, is the story of the "Tragical Death of the Sons of Usnech, or the Life and Death of Deirdre," one of the "Three Sorrows of Story-telling." This is the only tale of the group which has survived in the minds of the common people down to the present day. It is foretold of Deirdre, a girl-child of great beauty, that she will be the cause of great misfortunes, but Conchobar, having lost his wife, determines to have her brought up in solitude and marry her himself. However, the maiden chances to see a noble youth named Naisi, one of the three sons of Usnech, and persuades him to carry her off to Scotland, where they live for many years. At length they are induced to return after several of the most prominent Ulster warriors have gone bail for their safety. But Conchobar resorts to treachery, and the three sons of Usnech are slain, whilst the account of Deirdre's end varies. The oldest version of the story is found in LL., and the characters are as rugged and unsophisticated as those of the *Táin*. But in the later versions the savage features are toned down.

Before passing on, we must mention several old stories which are independent of the Ulster cycle, but which deal with events which are represented as having taken place before the Christian era. Few of the old romances deal directly with what we may call Irish mythology. The "Battle of Moytura" tells of the tremendous struggle between the Tuatha Dé Danann and their enemies, the Fomorian pirates. Connected with the events of this saga is the story of the "Tragic Deaths of the Sons of Tuirenn," which, though mentioned in Cormac's glossary, is not found in any MS. older than the 18th century. The three sons of Tuirenn have slain Cian, father of Lug Lamfhada, who lays upon them a huge eric-fine. They go through terrific ordeals and accomplish their task, but return home to die. This is the second of the "Three Sorrows of Story-telling." An old story dealing with Tuatha Dé Danann personages, but having a certain bearing on the Cúchulinn cycle, is the "Courtship of Étáin," who, though of supernatural (*sid*) birth, is wedded to Eochaid Airem, a mortal king. In her previous existence she was the wife of the supernatural personage Midir of Brí-leith, who wins back Étáin from her mortal husband in a game of chess and carries her off to his fairy mound.

For sake of completeness we may add the titles of two other

well-known stories here. The one is the ".Story of Baile the Sweet-spoken," which tells of the deaths of two lovers for grief at the false tidings of each other's death. The other is the "Fate of the Children of Lir," the third of the "Three Sorrows of Story-telling," which is only known in a modern dress. It relates how the four daughters of Lir (father of the sea-god Manandán and the original of Shakespeare's Lear) were changed into swans by a cruel stepmother, and how, after 900 years of wandering on the ocean, they at length regain their human form through the instrumentality of St Mochaomhog.

A large number of sagas, which claim to be founded on historical events, present a great similarity to the tales of the Ulster cycle. Most of them are mentioned in the old catalogues. We can only name the more important here. The "Destruction of Dind-Rig and Exile of Labraid Loingsech" relates how the kingdom of Leinster was snatched by one brother from another in the 6th century B.C., and how the son of the murdered prince with the aid of a British force sacked Dind-Rig, the fortress of the usurper. The story of the visit of the pigmies to the court of Fergus MacLeite, king of Ulster in the 2nd century B.C., is only contained in a 15th-century MS. This tale is commonly stated to have given Swift the idea of his *Gulliver's Travels to Lilliput*. "*Caithréim Chonghail Claringnigh*," which only occurs in a modernized 17th-century version, deals with a revolution in the province of Ulster, supposed to have taken place before the Christian era.

The most important Old Irish saga after the *Táin* is beyond doubt the *Destruction of Dá Derga's Hostel*, contained in LU. It deals with events in the reign of the High-King Conaire Mór, who is said by the annalists to have been slain in 43 B.C. after a reign of seventy years. Conaire, who was a descendant of the Étáin mentioned above, was a just ruler, and had banished among other lawless persons his own five foster brothers. These latter devoted themselves to piracy and made common cause with one Ingcel, a son of the king of Britain, who had been outlawed by his father. The high-king was returning from Co. Clare when he found the whole of Meath in flames. He turned aside into Leinster and made for Dá Derga's hostel. The pirates perceive this, and Ingcel is sent to spy out the hostel and discover the size of Conaire's force. This gives the story-teller a chance for one of those lengthy minute descriptions of persons in which his soul delighted. This catalogue occupies one-half of the whole story. The pirates make their attack, and the king and most of his followers are butchered.

We can do no more than enumerate the titles of other historical tales: The "Destruction of the Hostel of MacDareo," describing the insurrection of the Aithech-Tuatha (1st century A.D.), "The Expulsion of the Déisi" and the "Battle of Mag Lemna" (2nd century A.D.), "Battle of Mag Mucrime" (A.D. 195 or A.D. 218), "Siege of Drom Damgaire" (3rd century), "Adventures of the Sons of Eochaid Muigmedóin, father of Niall Nóigiallach" (4th century), "Death of Crimthann" (reigned 366–378), "Death of Dathi" (d. 428), "Death of Murchertach, son of Erc," and "Death of Diarmait, son of Cerball" (6th century) "Wooing of Becfola, who became the wife of Diarmait, son of Aed Slane" (reigned 657–664), "Battle of Mag Rath" (637), "Battle of Carn Conaill" (*c.* 648), "Death of Maelfothartaig MacRonain" (7th century), who was a kind of Irish Hippolytus, "Battle of Allen" (722).

It will be well to deal here with another class of story in its various stages of development. We have seen that in the older romances there is a close connexion between mortals and supernatural beings. The latter are represented as either inhabiting the *síd* mounds or as dwelling in islands out in the ocean, which are pictured as abodes of bliss and variously called *Mag Mell* (Plain of Delight), *Tír na n-Óc* (Land of Youth) and *Tír Tairngiri* (Land of Promise). The visits of mortals to the Irish Elysium form the subject of three romances which we must now examine. The whole question has been exhaustively dealt with by Kuno Meyer and Alfred Nutt in the *Voyage of Bran* (London, 1895–1897). Condla Caem, son of Conn Cétchathach, was one day seated by his father on the hill of Usnech, when he saw a lady in strange attire approaching invisible to all but himself. She describes herself as coming from the "land of the living," a place of eternal delight, and invites the prince to return with her. Conn invokes the assistance of his druid to drive away the strange visitor, who in parting throws an apple to Condla. The young man partakes of no food save his apple, which does not diminish, and he is consumed with longing. At the end of a month the fairy-maiden again makes her appearance. Condla can hold out no longer. He jumps into the damsel's skiff of glass. They sail away and were seen no more. This is the *Imram* or Adventure of Condla Caem, the oldest text of which is found in LU. A similar story is entitled *Imram Brain maic Febail*, contained in YBL. and Rawlinson B 512 (the end also occurs in LU.), only with this difference that Bran, with twenty-seven companions, puts to sea to discover *tír na mban* (the land of maidens). After spending some time there, one of his comrades is seized with home-sickness. They return, and the home-sick man, on being set ashore, immediately turns to dust. A later story preserved in BB., YBL. and the Book of Fermoy, tells of the visit of Cormac, grandson of Conn Cétchathach, to Tír Tairngiri. These themes are also worked into tales belonging to the Ossianic cycle, and Finn and Ossian in later times become the typical warriors who achieve the quest of the Land of Youth. The romances we have just mentioned are almost entirely pagan in character, but a kindred class of story shows us how the old ideas were transformed under the influence of Christianity. A typical instance is *Imram curaig Maelduin*, contained in YBL. and in part in LU. Maelduin constructs a boat and sets out on a voyage with a large company to discover the murderer of his father. This forms the framework of the story. Numerous islands in the ocean are visited, each containing some great marvel. *Imram ua Corra* (Book of Fermoy) and *Imram Snedgusa ocus Mac Riagla* (YBL.) contain the same plan, but in this case the voyage is undertaken as an expiation for crime. In the 11th century an unknown monkish writer compiled the *Navigatio S. Brendani*, drawing the material for his episodes from *Imram curaig Maelduin*. This famous work only appears in an Irish dress in a confused and disconnected "Life of St Brendan" in the Book of Lismore. The same MS. contains yet another voyage, the "Adventure of Tadg MacCéin."

We must now turn our attention to the later heroic cycle, commonly called the Fenian or Ossianic. Unfortunately the origin of the stories and poems connected with Finn and his warriors is obscure, and scholars are by no means agreed over the question (see FINN MAC COOL). In the earlier cycle the figures and the age in which they live are sharply drawn, and we can have no hesitation in assuming that the *Táin* represents in the main the state of Ireland at the beginning of the Christian era. Finn and his companions are nebulous personages, and, although it is difficult to discover the actual starting-point of the legend, from the 12th century onwards we are able to trace the development of the saga with some degree of certainty. A remarkably small amount of space is devoted to this cycle in the oldest MSS. Of the 134 pages contained in LU. only half-a-dozen deal with Finn as against 58 with Cúchulinn. In LL. the figures are, Ulster cycle 100 pp., Ossianic 25 pp., the latter being mainly made up of short ballads, whilst in 15th-century MSS., such as the Book of Lismore and Laud 610, the proportion is overwhelmingly in favour of the later group. Again in Urard MacCoisi's list of tales, which seems to go back to the 10th century, only two appear to deal with subjects taken from the Ossianic cycle. In the first instance Finn seems to have been a poet, and as such he appears in the 12th-century MSS., LU. and LL. Thus the subjects of the Ossianic cycle in the earliest MSS. appear in a new dress. The vehicle of the older epic is prose, but the later cycle is clothed in ballad form. Of these ballads about a dozen, apart from poems in the *Dindsenchus* are preserved in LU., LL. and YBL., and none of these poems are probably much older than the 11th century. In the commentary to the *Amra* of Columbkille a beautiful poem on winter is attributed to Finn. At the same time we do find a few prose tales, *e.g.* "*Fotha catha*

Fenian or Ossianic cycle.

Cnucha " in LU., describing the death of Cumall, Finn's father, and in LL. and Rawlinson B 502, part of which Zimmer assigns to the 7th century, we have the first story in which Finn actually occurs. But it is remarkable that in no case do tales belonging to the Finn cycle contain any of the old rhetorics which occur in the oldest of the Ulster romances. Already in LL., by the side of Finn, Ossian, Cáilte and Fergus Finnbel are represented as poets, and the strain of lament over the glories of the past, so characteristic a feature of the later developments of the legend, is already sounded. Hence by the 12th century the stories of the Fiann and their destruction at the battle of Gabra must have been fully developed, and from this time onward they appear gradually to have supplanted the Cúchulinn cycle in popular favour. Several reasons have been assigned for this. In the first place until the time of Brian Boroime the high-kings of Ireland had almost without exception been drawn from Ulster, and consequently the northern traditions were pre-eminent. This exclusiveness on the part of the north was largely broken down by the Viking invasions, and during the 11th century the leading poets were attached to the court of Brian and his descendants. In this manner an opportunity was afforded to the Leinster-Munster Fenian cycle to develop into a national saga. John MacNeill has pointed out Finn's connexion with a Firbolg tribe, and maintains that the Fenian cycle was the property of the subject race. Zimmer has attempted to prove with great plausibility that Finn and his warriors were transformed on the model of the Ulster heroes. Thus one text deals with the boyish exploits of Finn in the manner of Cúchulinn's youthful feats recorded in the *Táin*. And it is possible that the *Siaburcharpat Conchulainn* gave rise to the idea of connecting Ossian and Cáilte with Patrick. As Cúchulinn was opposed to the whole of Ireland in the *Táin*, so Finn, representing Ireland, is pitted against the whole world in the *Battle of Ventry*.

We have already stated that the form assumed by the stories connected with Finn in the earliest MSS. is that of the ballad, and this continued down to the 18th century. But here again the Irish poets showed themselves incapable of rising from the ballad to the true epic in verse, and in the 14th century we find the prose narrative of the older cycle interspersed with verse again appearing. The oldest composition of any length which deals with the Ossianic legends is the *Acallam na Senórach* or Colloquy of the Old Men, which is mainly preserved in three 15th-century MSS., the Book of Lismore, Laud 610 and Rawlinson 487. In this text we have the framework common to so much of the later Ossianic literature. Ossian and Cáilte are represented as surviving the battle of Gabra and as living on until the time of Patrick. The two warriors get on the best of terms with the saint, and Cáilte is his constant companion on his journey through Ireland. Patrick inquires the significance of the names of the places they visit, and Cáilte recounts his reminiscences. In this manner we are given nearly a hundred stories, the subjects of some of which occur in the short ballads in older MSS., whilst others appear later as independent tales. A careful comparison of the *Acallam* with the Cúchulinn stories, whether from the point of view of civilization or language or art, discloses that the first lengthy composition of the Ossianic cycle is but a feeble imitation of the older group. All that had become unintelligible in the Ulster stories, owing to their primitive character, is omitted, and in return for that the reminiscences of the Viking age play a very prominent part.

With the 16th century we reach the later treatment of the legend in the *Battle of Ventry*. In this tedious story Daire, the king of the whole world, comes to invade Ireland with all his forces, but is repulsed by Finn and his heroes. The *Battle of Ventry*, like all later stories, is a regular medley of incidents taken from the writers of antiquity and European medieval romance. The inflated style to which the Irishman is so prone is here seen at its worst, and we are treated to a nauseous heaping up of epithet upon epithet, *e.g.* we sometimes find as many as twenty-seven adjectives accompanying a substantive running in alliterating sets of three.

Of greater literary interest are the later ballads connected with Finn and Ossian. The latter has become the typical mouthpiece of the departed glory of the Fenian warriors, and Nutt has pointed out that there is a striking difference in spirit between the *Acallam na Senórach* and the 15th–16th century poems. In the latter Ossian is represented as a " pagan, defiant and reckless, full of contempt and scorn for the howling clerics and their churlish low-bred deity," whilst Patrick is a sour and stupid fanatic, harping with wearisome monotony on the damnation of Finn and all his comrades. The earliest collection of these later Ossianic poems is that made in Scotland by James Macgregor, dean of Lismore, early in the 16th century. Another miscellany is the *Duanaire Finn*, a MS. in the Franciscan monastery in Dublin, compiled from earlier MSS. in 1627. This " song-book," which has been edited for the Irish Texts Society by John MacNeill (part i. 1908), contains no less than sixty-nine Ossianic ballads, amounting in all to some ten thousand lines. Other Ossianic poems of dates varying from the 15th to the 18th century have been published in the *Transactions of the Ossianic Society* (Dublin, 1854–1861), including amongst others " The Battle of Gabhra," " Lamentation of Oisin (Ossian) after the Fenians," " Dialogue between Oisin and Patrick," " The Battle of Cnoc an Air," and " The Chase of Sliabh Guilleann." These ballads still survive amongst the peasants at the present day. We further possess a number of prose romances, which in their present form date from the 16th to the 18th century; *e.g.* *The Pursuit of Diarmaid and Gráinne*, *Finn and Gráinne*, *Death of Finn*, *The Clown in the Drab Coat*, *Pursuit of the Gilla Decair*, *The Enchanted Fort of the Quicken-tree*, *The Enchanted Cave of Ceis Corann*, *The Feast in the House of Conan*.

At the present moment it is impossible to give a complete survey of the other branches of medieval Irish literature. The attention of scholars has been largely devoted to the publication of the sagas to the neglect of other portions of the wide field. An excellent survey of the subject is given by K. Meyer, *Die Kultur der Gegenwart*, i. xi. 1. pp. 78-95 (Berlin-Leipzig, 1909).

Nature poetry.

We have already pointed out that as early as the Old Irish period nameless Irish poets were singing the praises of nature in a strain which sounds to our ears peculiarly modern. At the present time it is difficult to say how much of what is really poetic in Irish literature has come down to us. Our MSS. preserve whole reams of the learned productions of the *filid* which were so much prized in medieval Ireland, but it is, generally speaking, quite an accident if any of the delightful little lyrics entered in the margins or on blank spaces in the MSS. have remained. The prose romances sometimes contain beautiful snatches of verse, such as the descriptions of Mag Mell in *Serglige Conculaind*, *Tochmarc Étáine*, and the *Voyage of Bran* or the *Lament of Cúchulinn over Fer Díad*. Mention has also been made of the exquisite nature poems ascribed to Finn, which have been collected into a pamphlet with English renderings by Kuno Meyer (under the title of " Four Old Irish Songs of Summer and Winter," London, 1903). The same writer points out that the ancient treatise on Irish prosody published by Thurneysen contains no less than 340 quotations from poems, very few of which have been preserved in their entirety. To Meyer we also owe editions of two charming little texts which sufficiently illustrate the lyrical powers of the early poets. The one is a poem referred to the 10th century in the form of a colloquy between Guaire of Aidne and his brother Marban. Guaire inquires of his brother why he prefers to live in a hut in the forest, keeping the herds and swine of the king, to dwelling in the king's palace. The question calls forth so wonderful a description of the delights of nature as viewed from a shieling that Guaire exclaims, " I would give my glorious kingship to be in thy company, Marban " (*King and Hermit*, ed. with trans. by K. Meyer, London, 1901). Another text full of passionate emotion and tender regret ascribed to the 9th century tells of the parting of a young poet and poetess, who after plighting their troth are separated for ever (*Liadain and Curithir*, ed. with trans. by K. Meyer, London, 1902). In the *Old Woman of Beare* (publ. K. Meyer in *Otia Merseiana*) an old hetaira laments her departed youth, comparing her life to the ebbing of the tide (10th century).

We must now step aside from pure literature and turn our attention to the various productions of the professional learned classes of Ireland during the middle ages. The range of subjects coming under this heading is a very wide one, comprising history, genealogies, hagiology, topography, grammar, lexicography and metre, law and medicine. It will perhaps be as well first of all to deal with the learned *filid* whose works have been preserved. Irish tradition preserves the names of a number of antiquarian poets of prehistoric or early medieval times, such as Amergin, one of the Milesian band of invaders; Moran Roigne, son of Ugaine Mór, Adna and his successor Ferceirtne, Torna (*c.* 400), tutor to Niall Nóigiallach, Dallán Forgaill, Senchán Torpéist, and Cennfaelad (d. 678), but the poems attributed to these writers are of much later date. We can only enumerate the chief of those whose works have been preserved. To Maelmura (d. 887) is attributed a poem on the Milesian migrations. About the same time lived Flanagan, son of Cellach, who wrote a long composition on the deaths of the kings of Ireland, preserved in YBL., and Flann MacLonáin (d. 918), called by the Four Masters the Virgil of Ireland, eight of whose poems have survived, containing in all about 1000 lines. Cormacan, son of Maelbrigde (d. 946), composed a vigorous poem on the circuit of Ireland performed by Muirchertach, son of Niall Glúndub. A poet whose poems are most valuable from an antiquarian point of view is Cinaed Ua h-Artacáin (d. 975). Some 800 lines of his have been preserved in LL. and elsewhere. Contemporary with him is Eochaid O'Flainn (d. *c.* 1003), whose chief work is a long chronological poem giving a list of the kings of Ulster from Cimbaeth down to the destruction of Emain in 331. A little later comes MacLiac (d. 1016), who celebrated in verse the glories of the reign of Brian Boroime. His best-known work is a lament over Kincora, the palace of Brian. Contemporary with MacLiac is MacGilla Coim Urard MacCoisi (d. 1023). To Cúán ua Lothcháin (d. 1024), chief poet in the reign of Maelsheachlainn II., are ascribed poems on the antiquities of Tara. Sixteen hundred lines of his have come down to us. A writer who enjoyed a tremendous reputation in medieval Ireland was Flann Mainstrech (d. 1056), who in spite of his being a layman was head of the monastery school at Monasterboice. He is the author of no fewer than 2000 lines in LL., and many other poems of his are contained in other MSS. His best-known work is a *Book of Synchronisms* of the kings of Ireland and those of the ancient world. We have also poems from his pen on the monarchs descended from Niall Nóigiallach and on the chronology of the high-kings and provincial kings from the time of Loigaire. Flann's successor, Gilla Coemgin (d. 1072), gives us a chronological poem dealing with the annals of the world down to A.D. 1014. He also is the author of the Irish version of Nennius which contains substantial additions dealing with early Ireland. Minor writers of the same nature whose works have come down to us are Colmán O'Sesnáin (d. 1050), Néide ua Maelchonaire (d. 1136), Gilla na noem ua Duinn (d. 1160), Gilla Moduda O'Cassidy (1143). In the 13th century these historical poems become very rare. In the next century we again find antiquarian poets of whom the best-known is John O'Dugan (d. 1372). His most valuable composition treats of the tribes of the northern half of Ireland at the time of the northern conquest. This work, containing 1660 lines in all in debide metre, was completed by his younger contemporary Gilla na naem O'Huidhrin. From the beginning of the 13th century the official poets began to give way to the hereditary bards and families of scribes. Among the chief bardic families we may mention the O'Dalys, the MacWards, the O'Higinns, the MacBrodys and the MacDaires. We must here content ourselves with glancing at a few of the more prominent names. Muiredach Albanach (*c.* 1214–1240), whose real name was O'Daly, has left behind in addition to the religious verses a considerable number of poems in praise of various patrons in Ireland and Scotland. He is said by Skene to be the first of the Macvurrichs, bards to Macdonald of Clanranald. A number of his compositions are preserved in the Book of the Dean of Lismore. Gilla Brigde MacConmidhe was a contemporary of the last-mentioned bard. He wrote a number of poems in praise of the O'Neills and O'Donnells. We may next mention the name of an abbot of Boyle, Donnchad Mór O'Dálaig (d. 1244), a writer whose extant poems are usually of a religious character. Many of them are addressed to the Virgin. Most of them appear in late MSS., but some few are preserved in the Book of the Hy Maine. Donnchad Mór is said to be the greatest religious poet that Ireland has produced. Many other members of the O'Daly family belonging to the 14th and 15th centuries have left poems behind them, but we cannot mention them here. Angus O'Daly, who lived in the second half of the 16th century, was employed by the English to satirize the chief Gaelic families in Ireland. Two members of the O'Higinn family deserve mention, Tadg mór O'Higinn (d. 1315), and Tadg Óg O'Higinn (d. 1448), a voluminous writer who eulogized the O'Neills, O'Connors and O'Kellys. Tadg Óg also composed a number of religious poems, which enjoyed enormous popularity in both Ireland and Scotland. A *duanaire* was inserted into YBL., which contains some forty poems by him.

Professional literature.

Closely connected with the compositions of the official poets are the works of native topography. Most of the sagas contain a number of explanations of the origins of place-names. The *Dindsenchus* is a compilation of such etymologies. But its chief value consists in the amount of legendary matter it contains, adduced in support of the etymologies given. The *Dindsenchus* has come down to us in various forms both in prose and in verse. Irish tradition ascribes it to Amergin MacAmalgaid, who lived in the 6th century, but if the kernel of the work goes back as early as this it must have been altered considerably in the course of the centuries. Both prose and verse forms of it are contained in LL. A kindred compilation is the *Cóir Anmann* (Fitness of Names), which does for personal names what the *Dindsenchus* does for geographical names. We further possess a versified compendium of geography for educational purposes dealing with the three continents, from the pen of Airbertach MacCosse-dobráin (10th century).

No people on the face of the globe have ever been more keenly interested in the past of their native country than the Irish. This will already have been patent from the compositions of the *filid*, and now we may describe briefly the historical works in prose which have come down to us. The latter may be divided into two classes, (1) works containing a connected narrative, (2) annals. Closely allied to these are the sagas dealing with the high-kings. Even in the serious historical compositions we often find the manner of the sagas imitated, *e.g.* the supernatural plays a prominent part, and we are treated to the same exaggerated descriptions. The earliest of these histories is the wars of the Gael and Gall (*Cogad Gaedel re Gallaib*), which gives an account of the Viking invasions of Ireland, the career of Brian Boroime and the overthrow of the Norsemen at the battle of Clontarf. This composition, a portion of which is contained in LL., is often supposed to be in part the work of MacLiac, and it is plain from internal evidence that it must have been written by an eye-witness of the battle, or from materials supplied by a person actually present. Numerous shorter tracts dealing with the same period exist, but as yet few of them have been published. *Caithreim Cellachâin Caisil* treats of the conflicts between the Vikings and the Irish, and the *Leabhar Oiris* gives an account of Irish history from 979 to 1027. Compilations relating to local history are the Book of Fenagh and the Book of Munster. Another ancient work also partly preserved in LL. is the Book of Invasions (*Leabhar Gabhála*). This deals with the five prehistoric invasions of Ireland (see IRELAND: *Early History*) and the legendary history of the Milesians. The most complete copy of the *Leabhar Gabhála* which has been preserved was compiled by Michael O'Clery about 1630. The *Boroma* or History of the Leinster Tribute contained in LL. belongs rather to romance. Another history is the *Triumphs of Turlough O'Brian*, written about the year 1459 by John MacCraith, a Munster historian (edited by S. H. O'Grady, Camb. Press). This inflated composition is an important source of information on Munster history from the landing of the Normans to the middle of the 14th century. We also possess

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several documents in Irish concerning the doings of the O'Neills and O'Donnells at the close of the 16th century. A life of Hugh Roe O'Donnell, by Lughaidh O'Clery, has been published, and a contemporary history of the *Flight of the Earls*, by Tadhg O'Cianan, was being prepared in 1908. But the most celebrated Irish historian is certainly Geoffrey Keating (*c.* 1570–1646), who is at the same time the greatest master of Irish prose. Keating was a Munster priest educated in France, who drew down upon himself the displeasure of the English authorities and had to go into hiding. He travelled up and down Ireland examining all the ancient records, and compiled a history of Ireland down to the Norman Conquest. His work, entitled *Forus Feasa ar Eirinn*, was never published, but it circulated from end to end of Ireland in MS. Keating's history is anything but critical. Its value for the scholar lies in the fact that the author had access to many important sources of information now lost, and has preserved accounts of events independent of and differing from those contained in the Four Masters. In addition to the history and a number of poems, Keating is also the author of two theological works in Irish, the Defence of the Mass (*Eochairsgiath an Aifrinn*) and a collection of sermons entitled the Three Shafts of Death (*Trí biorghaoithe an Bháis*), which are models of Irish prose.

From the writers of historical narrative we turn to the annalists, the most important sources of information with regard to Irish history. We have already mentioned the *Synchronisms* of Flann Mainistrech. Apart from this work the earliest collection of annals which has come down to us is the compilation by Tigernach O'Braein (d. 1088), abbot of Clonmacnoise. Tigernach, whose work is partly in Latin, partly in Irish, states that all Irish history previous to 305 B.C. is uncertain. No perfect copy is known of this work, but several fragments are in existence. The *Annals of Innisfallen* (a monastery on an island in the Lower Lake of Killarney), which are also in Latin and Irish, were perhaps compiled about 1215, though they may have begun two centuries earlier. The invaluable *Annals of Ulster* were compiled on Belle Isle on Upper Lough Erne by Cathal Maguire (d. 1498), and afterwards continued by two different writers down to 1604. This work, which deals with Irish affairs from A.D. 431, exists in several copies. The *Annals of Loch Cé* (near Boyle in Roscommon) were copied in 1588 and deal with Irish events from 1014 to 1636. The *Annals of Connaught* run from 1224 to 1562. The *Chronicon Scotorum*, one copy of which was transcribed about 1650 by the famous antiquary Duald MacFirbis, deals with Irish affairs down to 1135. The *Annals of Boyle* extend down to 1253. The *Annals of Clonmacnoise*, which come down to 1408, only exist in an English translation made by Connell MacGeoghegan in 1627. The most important of all these collections is the *Annals of the Four Masters* (so christened by Colgan), compiled in the Franciscan monastery of Donegal by Michael, Conary and Cucogry O'Clery and Ferfesa O'Mulconry. The O'Clerys were for a long period the hereditary ollams to the O'Donnells. Michael O'Clery (1575–1643), the greatest of the four, was a lay brother in the order of St Francis, and devoted his whole life to the history of Ireland. He collected all the historical MSS. he could find, and was encouraged in his undertaking by Fergal O'Gara, prince of Coolavin, who paid all expenses. The great work, which was begun in 1632 and finished in 1636, begins with the arrival in Ireland of Ceasair, granddaughter of Noah, and comes down to 1616. Nearly all the materials from which O'Clery drew his statements are now lost. O'Clery is also the author of a catalogue of the kings of Ireland, the genealogies of the Irish saints, and the Martyrology of Donegal and the Book of Invasions.

Of less interest, but every whit as important, are the lists of genealogies which occupy a great deal of space in LL., YBL. and BB., and two Trinity College, Dublin, MSS. (H. 3. 18 and H. 2. 4). But by far the most important collection of all is that made by the last great shanachie Duald MacFirbis, compiled between 1650 and 1666 in the college of St Nicholas at Galway. The only portions of any considerable length which have as yet been published deal with two Connaught tribes, viz. the Hy Fiachrach from Duald mac Firbis and the Hy Maine (O'Kellys), and a Munster tribe, the Corcalaidhe, both from YBL. Valuable information with regard to early Irish history is often contained in the prophecies or, as they are sometimes termed, *Baile* (*raptures, visions*), a notable example of which is *Baile in Scáil* (Vision of the Phantom).

When we turn from secular to religious themes we find that Ireland is also possessed of a very extensive Christian literature, which is extremely valuable for the comparative study of medieval literature. Apart from the martyrologies already mentioned in connexion with Oengus the Culdee, a number of lives of saints and other ecclesiastical literature have come down to us. One of the most important documents is the Tripartite Life of St Patrick, which cannot very well have been composed before the 10th or 11th century, as it is full of the extravagant miracles which occur in the later lives of saints. The work consists of three separate homilies, each complete in itself. A later version of the Tripartite Life was printed by Colgan in 1647. The *Leabhar Breac* contains a quantity of religious tracts, most of which have been published. R. Atkinson issued a number of them under the title of *Passions and Homilies from Leabhar Breac* (Dublin, 1887). These are not original Irish compilations, but translations from Latin lives of saints. Nor do they deal with the lives of any Irish saints. Stokes has published nine lives of Irish saints from the Book of Lismore, including Patrick, Brigit, Columba, Brendan, Findian (Clonard), Ciaran, Senan, Findchua and Mochua. They are written in the form of homilies preceded by short explanations of a text of scripture. These lives also occur in the *Leabhar Breac*. Other lives of saints have been published by O'Grady in *Silva Gadelica*. The longest life of St Columba was compiled in 1536 at the command of Manus O'Donnell. This tedious work is a specimen of hagiology at its worst. The *Leabhar Breac* further contains a number of legends, such as those on the childhood of Christ, and scattered through many MSS. are short anecdotes of saints which are very instructive. ***Religious literature.***

But the most interesting Irish religious text is the *Vision of Adamnan* (preserved in LU.), which Stokes assigns to the 11th century. The soul of Adamnan is represented as leaving his body for a space to visit heaven and hell under the conduct of an angel. The whole treatment of the theme challenges comparison with Dante's great poem, but the Irish composition contains many ideas peculiar to the land of its origin. Later specimens of this kind of literature tend to develop into grotesque buffoonery. We may mention the *Vision of Fursae*, the *Vision of Tundale* (Tnugdal), published by V. Friedel and K. Meyer (Paris, 1907), Laisrén's *Vision of Hell* and the *Vision of Merlino*. A further vision attributed to Adamnan contains a stern denunciation of the Irish of the 11th century. Another form of religious composition, which was very popular in medieval Ireland, was the prophecy in verse, but scarcely any specimens have as yet been published. Kuno Meyer edited a tract on the Psalter in his *Hibernica Minora* from a 15th century Oxford MS., but he holds that the text goes back to 750. A number of collections of monastic rules both in prose and verse have been edited in *Ériu*, and the MSS. contain numerous prayers, litanies and religious poems.

In LU. are preserved two sermons, *Scéla na esergi* (Tidings of Resurrection) and *Scéla lái brátha* (Tidings of Doomsday); and a number of other homilies have been published, such as the "Two Sorrows of the Kingdom of Heaven," "The Penance of Adam," the "Ever-new Tongue," and one on "Mortals' Sins." All the homilies contained in LB. have been published by R. Atkinson in his *Legends and Homilies from Leabhar Breac* (Dublin, 1887), and E. Hogan, *The Irish Nennius* (Dublin, 1895). The popular "Debate of the Body and the Soul" appears in Ireland in the form of a homily. A collection of maxims and a short moral treatise have been published by K. Meyer.

For the religious literature in general the reader may refer to O'Curry, *Lectures on the MS. Materials of Ancient Irish History* (pp. 339-434), and G. Dottin, "Notes bibliographiques sur l'ancienne littérature chrétienne de l'Irlande," in *Revue d'histoire et de littérature religieuses*, v. 162-167. See also *Revue celtique*, xi. 391-404, *ib.* xv. 79-91.

Here we may perhaps mention an extraordinary production entitled *Aisling Meic Conglinne*, the Vision of Mac Conglinne, found in LB. and ascribed to the twelfth century (ed. K. Meyer, London, 1892). Cathal MacFinguine, king of Munster (d. 737), was possessed by a demon of gluttony and is cured by the recital of a strange vision by a vagrant scholar named MacConglinne. The composition seems to be intended as a satire on the monks, and in particular as a travesty of medieval hagiology. Another famous satire, entitled the Proceedings of the Great Bardic Institution, holds up the professional bards and their extortionate methods to ridicule. This curious work contains the story of how the great epic, the *Táin bó Cualnge*, was recovered (see *Transactions of the Ossianic Society*, vol. v.).

Collections of pithy sayings in the form of proverbs and maxims must have been made at a very early period. Not the least remarkable are the so-called Triads (publ. K. Meyer, Dublin, 1906), which illustrate every statement with 3 examples. Over 200 such triads were brought together in the 9th century. There are also two documents attributed to 1st-century personages, "The Testament of Morann MacMóin to his son Feradach," which is quoted as early as the 8th century, and "The Instructions of Cúchulinn to his foster-son Lugaid." K. Meyer has published *Tecosca Cormaic* or the Precepts of Cormac MacAirt to his son Cairpre (Dublin, 1909). Other collections such as the *Senbriathra Fithail* still await publication.

Gnomic literature.

With that enthusiasm for the classics which is characteristic of the Irish, it is not strange that we should find medieval versions of some of the better-known authors of antiquity. It is interesting to note that only those works are translated that could be utilized by the professional story-teller. So much so, that in the ancient (10th century) catalogue of sagas enumerated by Urard MacCoisi we find mention of *Togail Troi* and *Scéla Alexandir maic Pilip*. We get descriptions of battle weapons and clothing similar to those occurring in the native sagas. *Togail Troi* is taken from the medieval prose version, *Historia de Excidio Troiae* of Dares Phrygius. The oldest Irish copy is found in LL. This version is exceedingly valuable, as it enables us to determine the meaning of words and formulas in the sagas which are otherwise obscure. An Irish abstract of the *Odyssey*, following an unknown source, and part of the story of Theseus have been published by K. Meyer. *Scéla Alexandir* is preserved in LB. and BB. *Imthechta Aeniusa*, taken from the *Aeneid*, is contained in BB. A number of MSS. contain the *Cath Catharda*, a version of books vi. and vii. (?) of Lucan's *Pharsalia*, which has been published by Wh. Stokes. There is further at least one MS. containing a version of Statius's *Thebaid* and of Heliodorus's *Aethiopica*. Somewhat later, the medieval literature of western Europe comes to be represented in translations. Thus we have Irish versions, amongst others of the *Gesta Romanorum*, the *Historia Brittonum*, the Wars of Charlemagne, the History of the Lombards, Sir John Maundeville's Travels (trans. by Fingin O'Mahony in 1475), the Book of Ser Marco Polo (abridged), Guy Earl of Warwick, Bevis of Southampton, the Quest of the Holy Grail, Octavian, the chronicle of Turpin, Barlaam and Josaphat, and the story of Fierabras. The Arthurian cycle is developed in independent fashion in the Adventures of the Eagle Boy and the Adventures of the Crop-eared Dog. For translation literature see M. Nettlau, *Revue celtique*, x. pp. 184, 460-461.

Classical stories.

Hand in hand with the interest of the medieval Irish scholars in the history of their island goes the cultivation of the native tongue. Owing to the profound changes produced by the working of the Irish laws of accent and initial mutation, it is doubtful if any other language lends itself so well to wild etymological speculation. By the beginning of the Middle Irish period a good part of the cumbrous Old Irish verb-system had become obsolete, and texts which were at all faithfully copied had to be plentifully supplied with glosses. Moreover, if, as is probable, all the historical and legal lore was in verse, a large part of it must have been unintelligible except to those who knew the *bérla féne*. But even before this Cormac mac Cuillenáin, the bishop-king of Cashel (d. 903), had compiled a glossary of archaic words which are accompanied by explanations, etymologies, and illustrative passages containing an amount of invaluable information concerning folk-lore and legendary history. This glossary has come down to us in various recensions all considerably later in date than the original work (the oldest copy is in LB.). Later collections of archaic words are O'Mulconry's Glossary (13th century), the Lecan Glossary (15th century), which draws principally from the glosses in the *Liber Hymnorum*, O'Davoren's Glossary (16th century), drawn principally from the Brehon Laws, a 16th century list of Latin and Irish names of plants employed in medicine, and O'Clery's Glossary (published at Louvain, 1643). BB. contains a curious tract on Ogamic writing. An Irish treatise on grammar, called *Uraicept na n-éces*, the Poet's Primer, traditionally ascribed to Cennfaelad and others, is contained in BB. and YBL. It appears to be a kind of medley of Donatus and the notions of the medieval Irish concerning the origin of their language. The St Gall glosses on Priscian contain Irish terms for all the nomenclature of the Latin grammarians, and show how extensive was the use made of Irish even in this department of learning.

Philology.

Thurneysen had edited from BB., Laud 610 and a TCD. MS. three treatises on metric which give an account of the countless metres practised by the *filid*. It is impossible for us here to enter into the question of Irish prosody in any great detail. We have seen that there is some reason for believing that the primitive form of Irish verse was a kind of rhythmical alliterative prose as contained in the oldest versions of the sagas. The *filid* early became acquainted with the metres of the Latin church hymns, whence rhyme was introduced into Ireland. (This is the view of Thurneysen and Windisch. Others like Zeuss have maintained that rhyme was an invention of the Irish.) In any case the *filid* evolved an intricate system of rhymes for which it is difficult to find a parallel. The medieval metres are called by the general name of *Dán Dírech*, "Direct Metre." Some of the more general principles were as follows. The verses are grouped in stanzas of four lines, each stanza being complete in itself. Each line must contain a fixed number of syllables, whilst the different metres vary as to the employment of internal and end rhyme, assonance and alliteration. The Irish elaborated a peculiar system of consonantal correspondence which counted as rhyme. The consonants were divided with a considerable degree of phonetic accuracy into six groups, so that a voiceless stop (*c*) rhymes with another voiceless stop (*t*, *p*), a voiced stop (*b*) with another voiced stop (*d*, *g*), and so forth. The commonest form of verse is the four-line stanza of seven syllables. Such a verse with rhymes *abab* and monosyllabic or dissyllabic finals belongs to the class *rannaigecht*. A similar stanza with *aabb* rhymes is the basis of the so-called *debide* (cut in two) metres. A peculiarity of the latter is that the rhyming word ending the second line must contain at least one syllable more than the rhyming word which ends the first. Another frequently employed metre is the *rindard*, consisting of lines of six syllables with dissyllabic endings. In the metrical treatises examples are given of some 200 odd metres. The result of the complicated technique evolved in Ireland was an inclination to sacrifice sense to musical harmony. See K. Meyer, *A Primer of Irish Metrics* (Dublin, 1909).

Prosody.

We can conclude this survey of medieval Irish literature by mentioning briefly two departments of learning to which much attention was paid in Ireland. These are law and medicine. The so-called Brehon Laws (*q.v.*) are represented as having been codified and committed to writing in the time of St Patrick. There is doubtless some grain of truth in this statement, as a fillip may have been given to this codification by the publication of the Theodosian Code, which was speedily followed by the codes of the various Teutonic tribes. The Brehon Laws were no doubt originally transmitted from teacher to pupil in the form of verse, and traces of this are to be found in the texts which have been preserved. But the Laws as we have them do not go back to the 5th century. In our texts isolated phrases or portions of phrases are given with a commentary, and this commentary is further explained by some

Law.

later commentators. Kuno Meyer has pointed out that in the commentary to one text, *Crith Gablach*, there are linguistic forms which must go back to the 8th century, and Arbois de Jubainville, who apart from Sir Henry Maine is the only scholar who has dealt with the subject, has attempted to prove from internal evidence that part of the oldest tract, the one on *Athgabáil* or Seizure, cannot, in its present form, be later than the close of the 6th century. Cormac's Glossary contains a number of quotations from the commentary to *Senchus Mór*, which would therefore seem to have been in existence about 900. The Irish Laws were transcribed by O'Donovan and O'Curry, and have been published with a faulty text and translation in five volumes by the government commissioners originally appointed in 1852. A number of other law tracts must have existed in early times, and several which have been preserved are still unedited. Kuno Meyer has published the *Cáin Adamnáin* or Adamnan's Law from an Oxford MS. Adamnan succeeded in getting a law passed which forbade women to go into battle. An interesting but little-investigated text in prose and verse called *Leabhar na gCeart* or Book of Rights was edited with an English translation by O'Donovan (1847). It deals with the rights to tribute of the high-king and the various provincial kings. The text of the Book of Rights is preserved in YBL. and BB. In its present form it shows distinct traces of the influence of the Viking invasions, and cannot go back much beyond the year 1000. At one time it was incorporated in a larger work now lost, the Psalter of Cashel. We also possess a 9th-century treatise on Sunday observance (*Cáin Domnaig*).

The medical profession in Ireland was hereditary in a number of families, such as the O'Lees (from Irish *liaig*, "a leech"), the O'Hickeys (Irish *icide*, "the healer"), the O'Shiels, the O'Cassidys, and many others. These families each had their own special leech-books, some of which are still preserved. In addition to these there are many others. The medical literature which has come down to us is contained in MSS. ranging from the 13th to the 18th centuries. The Irish MSS. are translations from the Latin with the invariable commentary, and they further contain additions derived from experience. YBL. contains four of these tracts, and amongst others we may mention the Book of the O'Hickeys, a translation of the *Lilium Medicinae* of Bernard Gordon (written 1303), the Book of the O'Lees (written in 1443), the Book of the O'Shiels, transcribed in 1657, and the Book of MacAnlega, transcribed in 1512. Of these texts only two have been published as yet from MSS. in Edinburgh. O'Curry drew up a MS. catalogue of the medical MSS. in the Royal Irish Academy, and many more are described in O'Grady's catalogue of Irish MSS. in the British Museum. Some few MSS. deal with the subject of astronomy, but up to the present no description of the texts has been published.

Medicine.

With the steady advance of the English power after 1600 it was only natural that the school of bardic poets should decline. But at the beginning of the 17th century for the last time they gave a great display of their resources. Tadhg MacDaire, the ollam of the earl of Thomond, composed a poem in elaborate verse exalting the line of Eber (represented by the reigning families of Munster) at the expense of the line of Eremon (represented by the reigning families of the other provinces). In a body of verse attributed to Torna Éces (*c.* 400), but obviously of more recent origin, the Eremonian, Niall Noigiallach, is lavishly praised, and Tadhg's attack takes the form of a refutation of Torna's pretensions. The challenge was immediately taken up by Lughaidh O'Clery. The recriminations of the two bards extend to nearly 3000 lines of verse, and naturally drew down the attention of the whole Irish world of letters. Soon all the hereditary poets were engaged in the conflict, which raged for many years, and the verses of both parties were collected into a volume of about 7000 lines in *debide* metre, known as the *Contention of the Poets*. Amongst the prominent poets of the period may be mentioned Tadhg Dall O'Higinn (d. shortly before 1617) and Eochaidh O'Hussey, who between them have left behind nearly 7000 lines in the classical metres, Bonaventura O'Hussey and Ferfesa O'Cainti.

Later Irish literature.

The intricate classical measures gradually broke down. Dr Douglas Hyde gives it as his opinion that the exceedingly numerous metres known in Middle Irish had become restricted to a couple of dozen, and these nearly all heptasyllabic. Nevertheless they continued to be employed till into the 18th century. However, during the 17th century we find a new school arising with new principles and new methods. These consisted in (1) the adoption of vowel rhyme in place of consonantal rhyme, (2) the adoption of a certain number of accents in each line in place of a certain number of syllables. Thus, according to what we have just said, the accented syllables in a line with four accents in one line will fall on, say, the following vowels *e,u,u,e*, and the line rhyming with it will have the same sounds in the same or a different sequence. (For English imitations see Hyde, *A Literary History of Ireland*, pp. 548 ff.)

The consequences of the changed political conditions were of the greatest importance. The bards, having lost their patrons in the general upheaval, threw behind them the old classical metres and turned to the general public. At the same time they had to abandon the countless chevilles and other characteristics of the old bardic language, which were only understood by the privileged few. But to compensate for this much more freedom of expression and naturalness were possible for the first time in Irish verse. The new metres made their appearance in Ireland about 1600, and the learned Keating himself was one of the first to discard the ancient prosody. During the latter half of the 17th century and throughout the 18th century the body of verse produced in Ireland voices the sorrows and aspirations of the whole nation, and the literary activity in almost every county was correspondingly great. It is only during the last few years that the works of any of the poets of this period have been published. Pierce Ferriter was the last chieftain who held out against Cromwell's army, and he was hanged in 1653. His poems have been edited by P. S. Dinneen (Dublin, 1903). The bard of the Williamite wars was David O'Bruadar (d. 1697–1698). From this period date three powerful satires on the state of affairs in Munster, and in particular on the Cromwellian settlers. They are of a coarse and savage nature, for which reason they have never been printed. Their titles are the Parliament of Clan Thomas, the Adventures of Clan Thomas, and the Adventures of Tadhg Dubh (by Egan O'Rahilly). A description of the parliament of Clan Thomas is given by Stern in the *Zeitschr. f. celt. Phil.* v. pp. 541 ff.

A little later we come across a band of Jacobite poets. The gallant figure of Charles Edward was so popular with Irish bards that a conventional stereotyped form arose in which the poet represents himself as wandering in a wood and meeting a beautiful lady. We are treated to a full description of all her charms, and the poet compares her to all the fair heroines of antiquity. But she replies that she is none of these. She is Erin seeking refuge from the insults of foreign suitors and looking for her mate. The idea of such poems is a beautiful one, but they become tedious when one has read a dozen of them only to find that there are scores of others in exactly the same strain. Besides the Visions (*Aisling*), as they are termed, there are several noteworthy war-songs, whilst other poems are valuable as giving a picture of the state of the country at the time. We can do no more than mention the names of John O'Neaghtan (d. *c.* 1720; edition of his poems by A. O'Farrelly, Dublin, 1908), Egan O'Rahilly, who flourished between 1700 and 1726; Tadhg O'Naghten, Andrew MacCurtin (d. 1479), Hugh MacCurtin, author of a grammar and part editor of O'Begley's *Dictionary*; John Clárach MacDonnell (1691–1754), John O'Tuomy (d. 1775), Andrew Magrath, Tadhg Gaolach O'Sullivan (d. *c.* 1795), author of a well-known volume of religious poems, a valuable source of information for the Munster dialect; and Owen Roe O'Sullivan (d. 1784), the cleverest of the Jacobite poets (his verses and *bons mots* are still well known in Munster). These poets hailed mostly from the south, and it is chiefly the works of the Munster poets that have been preserved. Ulster and Connaught also produced a number of writers, but very little beyond the mere names has been preserved except in the case of the Connaught poet Raftery

(1784–1835), whose compositions have been rescued by Hyde (*Abhráin an Reachtúire*, Dublin, 1903). Torlough O'Carolan (1670–1738), "the last of the bards," was really a musician. Having become blind he was educated as a harper and won great fame. His poems, which were composed to suit his music, are mostly addressed to patrons or fair ladies. His celebrated "Ode to Whisky" is one of the finest bacchanalian songs in any language. Michael Comyn (b. *c.* 1688) is well known as the author of a version based upon older matter of "Ossian in the Land of Youth." This appears to be the only bit of deliberate creation in the later Ossianic literature. Comyn also wrote a prose story called "The Adventures of Torlogh, son of Starn, and the Adventures of his Three Sons." Brian MacGiolla Meidhre or Merriman (d. 1808) is the author of perhaps the cleverest sustained poem in the Irish language. His work, which is entitled the *Midnight Court*, contains about 1000 lines with four rhymes in each line. It describes a vision in which Aoibhill, queen of the Munster fairies, is holding a court. A handsome girl defends herself against an old man, and complains to the queen that in spite of all her charms she is in danger of dying unwed. Merriman's poem, which was written in 1781, has recently been edited with a German translation by L. C. Stern (*Zeitschrift für celtische Philologie*, v. 193-415). Donough MacConmara (Macnamara) (d. *c.* 1814) is best known as the author of a famous lyric "The Fair Hills of Holy Ireland," but he also wrote a mock epic describing his voyage to America and how the ship was chased by a French cruiser. He is carried off in a dream by the queen of the Munster fairies to Elysium, where, instead of Charon, he finds Conan, the Thersites among the Fenians, acting as ferryman (*Eachtra Ghiolla an Amaráin, or The Adventures of a Luckless Fellow*, edited by T. Flannery, Dublin, 1901).

During the first half of the 19th century nothing new was produced of a high order, though the peasants retained their love for poetry and continued to copy the MSS. in their possession. Then came the famine and the consequent drain of population which gave Irish the death-blow as a living literary force. The modern movement has been dealt with above in the section on Irish language.

It remains for us to glance briefly at the later religious literature and the collections of folk-tales. The translation of the New Testament made by William O'Donnell and published in 1603 was first undertaken in the reign of Queen Elizabeth, who sent over to Dublin the first fount of Irish type. Bishop Bedell, one of the very few Protestant clergymen who undertook to learn Irish, translated the remainder of the Scriptures with the help of a couple of natives, but the whole Bible was not translated and published until 1686. This version naturally never became popular, but it is a valuable source of information with regard to Modern Irish. It is perhaps of interest to note that the earliest specimen of printing in Irish is a ballad on Doomsday (Dublin, 1571). A version of the English Prayer Book was published in 1716.

The scholars of the various Irish colleges on the continent were particularly active in the production of manuals of devotion mainly translated from Latin. We can mention only a few of the more important. *Sgathán an chrábhaidh* (The Mirror of the Pious), published in 1626 by Florence Conry; *Sgathán sacramente na h-Aithrighe* (Mirror of the Sacrament of Penance); by Hugh MacCathmhaoil, published at Louvain, 1618; *The Book of Christian Doctrine*, by Theobald Stapleton (Brussels, 1639); *Párrthas an Anma, or The Paradise of the Soul*, by Anthony Gernon (Louvain, 1645); a book on *Miracles*, by Richard MacGilla Cody (1667); *Lochrán na gcreidmheach, or Lucerna Fidelium*, by Francis O'Mulloy (Louvain, 1676); O'Donlevy's *Catechism* (1742). O'Gallagher, bishop of Raphoe, published a collection of sermons which went through twenty editions and are still known at the present day. He is one of the earliest writers in whom the characteristics of the speech of the north are noticeable. The only Catholic version of any considerable portion of the Scriptures up till quite recently was the translation of the Pentateuch by Archbishop MacHale, who also turned six books of the *Iliad* into Irish. It is only within recent years that attention has been paid to the collection of folk-songs and tales in Irish, although as long ago as 1825 Crofton Croker published three volumes of folk-lore in the south of Ireland which attracted the attention of Sir Walter Scott. Nor do the classic stories of Carleton fall within our province. We may mention among others Patrick O'Leary's *Sgeuluidheacht Chuige Mumhan* (Dublin, 1895); Hyde's *Beside the Fire* (London, 1890) and *An Sgeuluidhe Gaedhealach*, reprinted from vol. x. of the *Annales de Bretagne* (London, 1901); Daniel O'Fogharta's *Siamsa an Gheimhridh* (Dublin, 1892); J. Lloyd's *Sgéalaidhe Óirghiall* (Dublin, 1905); and Larminie's *West Irish Folk-Tales* (London, 1893). The most important collections of folk-songs are *Love-Songs of Connaught* (Dublin, 1893) and *Religious Songs of Connaught* (Dublin, 1906), both published by Hyde. The most extensive collection of proverbs is the one entitled *Seanfhocla Uladh* by Henry Morris (Dublin, 1907). See also T. O'Donoghue, *Sean-fhocail na Mumhan* (Dublin, 1902).

AUTHORITIES.—In the absence of a comprehensive history, the best manual is Eleanor Hull's *Text Book of Irish Literature* (2 parts, London, 1904–1908; vol. 2 contains a bibliographical appendix). D. Hyde's larger *History of Irish Literature* (London, 1899) is only trustworthy as regards the more *modern* period. A full bibliography of all published material is contained in G. Dottin's article "La littérature gaélique de l'Irlande" (*Revue de synthèse historique*, vol. iii. pp. 1 ff.). Dottin's article has been translated into English and supplemented by Joseph Dunn under the title of *The Gaelic Literature of Ireland* (Washington, 1906, privately printed). The following are important works:—W. Stokes and J. Strachan, *Thesaurus Palaeohibernicus* (2 vols., Cambridge, 1901–1903); J. H. Bernard and R. Atkinson, *Liber Hymnorum* (London, 1895); E. O'Curry, *Lectures on the MS. Materials of Ancient Irish History* (Dublin, 1873) and *Lectures on the Manners and Customs of the Ancient Irish* (3 vols., Dublin, 1873); P. W. Joyce, *A Social History of Ancient Ireland* (2 vols., London, 1903); E. O'Reilly, *Irish Writers* (Dublin, 1820); S. H. O'Grady, *Catalogue of Irish MSS. in the British Museum* (London, 1901); H. d'Arbois de Jubainville, *Introduction à l'étude de la littérature celtique* (Paris, 1883), *Essai d'un catalogue de la littérature épique de l'Irlande* (Paris, 1883), *L'Épopée celtique en Irlande* (Paris, 1892), *La Civilisation des Celtes et celle de l'épopée homérique* (Paris, 1899); E. Windisch, *Táin Bó Cualnge*, ed. with an introd. and German trans. (Leipzig, 1905); L. Winifred Faraday, *The Cattle-Raid of Cualnge* (London, 1904); the Irish text according to LU. and YBL. has been published as a supplement to *Ériu*; Eleanor Hull. *The Cuchulinn-saga* (London, 1899); W. Ridgeway, "The Date of the First Shaping of the Cuchulinn Cycle," *Proceedings of the British Academy*, vol. ii. (London, 1907); A. Nutt, *Cuchulin, the Irish Achilles* (London, 1899); H. Zimmer, "Keltische Beiträge" in *Zeitschrift f. deutsches Altertum*, vols. 32, 33 and 35, and "Über den compilatorischen Charakter der irischen Sagentexte in sogenannten Lebor na hUidre," Kuhn's *Zeitschr.* xxviii. pp. 417-689. We cannot here enumerate the numerous heroic texts which have been edited. For texts published before 1883 see d'Arbois's *Catalogue*, and the same writer gives a complete list in *Revue Celtique*, vol. xxiv. pp. 237 ff. The series of *Irische Texte*, vols. i.-iv. (Leipzig, 1880–1901), by E. Windisch (vols. ii.-iv. in conjunction with W. Stokes), contains a number of important texts. Others, more particularly those belonging to the Ossianic cycle, are to be found in S. H. O'Grady's *Silva Gadelica* (2 vols. London, 1892). See also R. Thurneysen, *Sagen aus dem alten Irland* (Berlin, 1901); P. W. Joyce, *Old Celtic Romances* (London[2], 1901).

For the Ossianic cycle see H. Zimmer, "Keltische Beiträge III." in vol. 35 of the *Zeitschr. f. deutsches Altertum*, also *Göttinger Gelehrte Anzeigen*, 1887, pp. 153-199; A. Nutt, *Ossian and the Ossianic Literature* (London, 1899); L. C. Stern, "Die ossianischen Heldenlieder," in *Zeitschr. f. vergleichende Litteraturgeschichte* for 1895, trans. by J. L. Robertson in *Transactions of the Inverness Gaelic Society*, vol. xxii.; J. MacNeill, *Duanaire Finn* (London, 1908); *Book of the Dean of Lismore*, ed. by T. Maclauchlan (Edinburgh, 1862), and in vol. i. of A. Cameron's *Reliquiae Celticae* (Edinburgh, 1892); *Transactions of the Ossianic Society* (6 vols., Dublin, 1854–1861); Miss Brooke, *Reliques of Ancient Irish Poetry* (Dublin, 1789).

Keating's *History* was translated by John O'Mahony (New York, 1866). The first part was edited with Eng. trans. by W. Halliday (Dublin, 1811) and the whole work in 3 vols. for the Irish Texts Society by D. Comyn and P. Dinneen (London, 1901–1908). Comparatively few specimens have been published of the older bards. Several from a Copenhagen MS. were printed by Stern in the *Zeitschr. f. celt. Phil.* vol. ii.; J. Hardiman, *Irish Minstrelsy* (2 vols., Dublin, 1831); J. C. Mangan, *The Poets and Poetry of Munster* (Dublin[4], no date); G. Sigerson, *The Bards of the Gael and Gall* (Dublin, 1906). Editions of the poems of Ferriter, Geoffrey O'Donoghue, O'Rahilly, John O'Tuomy, Andrew Magrath, John Claragh MacDonnell, Tadhg Gaolach and Owen Roe O'Sullivan by Dinneen, Gaelic League, Dublin, and Irish Texts Society, London, 1900–1903. (E. C. Q.)

II. Scottish Gaelic Literature.—It is not until after the Forty-five that we find any great manifestation of originality in the literature of the Scottish Highlands. The reasons for this are not far to seek. Just as the dialects of Low German in the middle ages were overshadowed by the more brilliant literary dialect of the south, so Scotch Gaelic was from the outset seriously handicapped by the great activity of the professional literary class in Ireland. We may say that down to the beginning of the 18th century the literary language of the Highlands was the Gaelic of Ireland. During the dark days of the penal laws and with the extinction of the men of letters and their patrons in Ireland, an opportunity was given to the native Scottish muse to develop her powers. Another potent factor also made itself felt. After Culloden the causes of the clan feuds and animosities of the past were removed. The Highlands, perhaps for the first time in history, formed a compact whole and settled down to peace and quietude. A remarkable outburst of literary activity ensued, and the latter half of the 18th century is the period which Scottish writers love to call the golden age of Gaelic poetry. But before we attempt to deal with this period in detail, we must examine the scanty literary products of Gaelic Scotland prior to the 18th century.

The earliest document containing Gaelic matter which Scotland can claim is the *Book of Deer*, now preserved in the Cambridge University Library. This MS. contains portions of the Gospels in Latin written in an Irish hand with illuminations of the well-known Irish type. At the end there occurs a colophon in Irish which is certainly as old as the 9th century. Inserted in the margins and blank spaces are later notes and memoranda partly in Latin, partly in Gaelic. The Gaelic entries were probably made between 1000 and 1150. They relate to grants of land and other privileges made from time to time to the monastery of Deer (Aberdeenshire). The most interesting portion deals with the legend of Deer and its traditional foundation by St Columba. The language of these entries shows a striking departure from the traditional orthography employed in contemporary Irish documents. The Advocates' Library in Edinburgh contains a number of MSS. probably written in Scotland between 1400 and 1600, but with one exception the language is Irish.

"Book of Deer."

The solitary exception just mentioned is the famous codex known as the *Book of the Dean of Lismore*. The pieces contained in this volume are written in the crabbed current Roman hand of the period, and the orthography is phonetic, both of which facts render the deciphering of this valuable MS. a task of supreme difficulty. The contents of this quarto volume of 311 pages are almost entirely verse compositions collected and written down by Sir James Macgregor, dean of Lismore in Argyllshire, and his brother Duncan, between the years 1512 and 1526. A disproportionate amount of space is allotted to the compositions of well-known Irish bards such as Donnchadh Mór O'Daly (d. 1244), Muiredhach Albanach (*c.* 1224), Tadhg Óg O'Higgin (d. 1448), Diarmaid O'Hiffernan, Torna O'Mulconry (d. 1468). But native bards are also represented. We can mention Allan Mac Rorie, Gillie Calum Mac an Ollav, John of Knoydart, who celebrates the murder of the young lord of the isles by his Irish harper in 1490, Finlay MacNab, and Duncan Macgregor, the transcriber of the greater part of the volume. The poems of the last-mentioned writer are in praise of the Macgregors. A few other poems are by Scottish authors such as Campbell, Knight of Glenorchy (d. 1513), the earl of Argyll and Countess Isabella. A number consist of satires on women. These Scottish writers are still under the influence of Irish metric, and regularly employ the four-lined stanza. They do not appear to adhere to the stricter Irish measures, but delight rather in the freer forms going by the name of *óglachas*. The Irish rules for alliteration and rhyme are not rigidly observed.

"Book of the Dean of Lismore."

The linguistic peculiarities of the Dean's Book await investigation, but among the pieces which represent the Scottish vernacular of the day are the *Ossianic Ballads*. These, twenty-eight in number, extend to upwards of 2500 lines, and form by far the most important part of the collection. Thus the Dean's Book was compiled a full hundred years before the earliest similar collection of heroic ballads was made in Ireland. In Scotland the term Ossianic is used loosely of both the Ulster and the Fenian cycles, and it may be as well to state that three of the pieces in the volume deal with Fraoch, Conlaoch and the Bloody Rout of Conall Cearnach. It is interesting to note that nine of the poems are directly attributed to Ossian, two to Ferghus File, one to Caoilte Mac Ronan, and one to Conall Cearnach, whilst others are ascribed to Allan MacRorie, Gillie Calum Mac an Ollav and Caoch O'Cluain, who are otherwise unknown. The Dean's Book was first transcribed by Ewen MacLachlan in 1813. Thomas MacLauchlan published the text of the Ossianic ballads with modern Gaelic and English renderings in 1862. In the same volume W. F. Skene gave a useful description of the MS. and its contents. Alexander Cameron revised the text of the portion printed by MacLauchlan, and his amended text is printed in his *Reliquiae Celticae*, vol. i. (See also L. C. Stern, *Zeitschr. f. celt. Phil.* i. 294-326.)

Between the Book of the Dean and the Forty-five we find another great gap, which is only bridged over by a collection which presents many points of resemblance to Macgregor's compilation. The *Book of Fernaig*, which is also written in a kind of phonetic script, was compiled by Duncan Macrae of Inverinate between 1688 and 1693. The MS. contains about 4200 lines of verse of different dates and by different authors. The contents of the collection are mainly political and religious, with a few poems which are termed didactic. As in the Dean's Book love-songs and drinking-songs are conspicuously absent, whilst the religious poetry forms about one-half of the contents. In state politics the authors are Jacobite, and in church politics Episcopalian. The Ossianic literature is represented by 36 lines. There are a number of poems by 16th-century writers, among whom is Bishop Carsewell. Mackinnon has pointed out that the language of the *Book of Fernaig* corresponds exactly to the dialect spoken in Kintail at the present day. The text of the *Book of Fernaig* is printed in its entirety in vol. ii. of Cameron's *Reliquiae Celticae*, and many of the poems are to be found in standard orthography in G. Henderson's *Leabhar nan Gleann*. The metres employed in the poems show the influence of the English system of versification. (See Stern, *Zeitschr. f. celt. Phil.* ii. pp. 566 ff.)

"Book of Fernaig."

Two other Highland MSS. remain to be noticed. These are the *Red* and *Black Books of Clanranald*, which are largely taken up with the histories of the families of Macdonald and with the achievements of Montrose, written in the ordinary Irish of the period by the Macvurichs, hereditary bards to the Clanranald chiefs. The *Red Book* was obtained by Macpherson in 1760 from Neil Macvurich, nephew of the last great bard, and it figured largely in the Ossianic controversy. In addition to poems in Irish by Neil Macvurich, who died at a great age some time after 1715, and other bardic matter, the MSS. now contain only three Ossianic poems, and these are in Irish. During the Ossianic controversy the *Red Book of Clanranald* was supposed to contain the originals of much of Macpherson's famous work; but, on the book coming into the hands of the enthusiastic Gaels of the closing years of the 18th century, and on its contents being examined and found wanting, the MS. was tampered with.

"Red and Black Books of Clanranald."

Mackenzie's *Beauties of Gaelic Poetry* contains poems written by a number of writers who flourished towards the end of the 17th century and at the beginning of the 18th. These are Mary Macleod, John Macdonald (Iain Lom), Archibald Macdonald, Dorothy Brown, Cicely Macdonald, Iain Dubh Iain 'Ic. Ailein (b. *c.* 1665), the Aosdan Matheson (one of his poems was rendered in English by Sir Walter Scott under the title of "Farewell to Mackenzie, High Chief of Kintail"), Hector Maclean (also known through a translation by Scott called "War-song of Lachlan, High Chief of Maclean"), Lachlan Mackinnon, Roderick Morrison (an Clarsair Dall), and John Mackay of Gairloch, but we can here only notice the first two. The famous Mary Macleod, better known as Mairi Nighean Alastair Ruaidh

Mary Macleod.

(*c.* 1588–1693), was family bard to Sir Norman Macleod of Bernera, and later to John "Breac" Macleod of Macleod, in honour of whom most of her poems were composed. Like very many of the Highland poets Mary had little or no education, and it would seem that none of the poems which have come down to us were composed before 1660. Her pieces are composed in the modern Irish metres with the characteristic vowel rhymes of the accented syllables. As might perhaps be expected it was only the Macvurichs (the professional bards of the Clanranald) who went on practising the classical *debide* metre. This they still continued to do during the first quarter of the 18th century. Mary Macleod's best-known pieces comprise a dirge on the drowning of Iain Garbh (Mac'Ille Chalum) in the Minch, a song "An Talla 'm bu ghnath le MacLeoid," and an ode to Sir Norman Macleod of Bernera, produced during her exile in Mull, which begins "'S mi'm shuidhe air an tulaich." For the details of her career, which are the subject of some dispute, the reader may be referred to a paper by Alexander Mackenzie in the *Transactions of the Gaelic Society of Inverness*, vol. xxii. pp. 43-66. Mary Macleod is accounted one of the most musical and original of the Highland bards.

John Macdonald, better known as Iain Lom (d. *c.* 1710), was a vigorous political poet whose verses exercised an extraordinary influence during his lifetime. He is said to have received a yearly pension from Charles II. for his services to the Stuart cause. His best-known poems are *Mort na Ceapach*, on the murder of the heir of Keppoch, who was eventually avenged through the poet's efforts, and a piece on the battle of Inverlochay (1645). However great the inspiration of Mary Macleod and Iain Lom, they were after all but political or family bards. In succession to them there arose a small band of men with loftier thoughts, a wider outlook and greater art. The literature of the Scottish Highlands culminates in the names of Alexander Macdonald, Duncan Bàn MacIntyre and Dugald Buchanan.

"Iain Lom."

Alexander Macdonald, commonly called Alasdair MacMaighstir Alasdair (b. *c.* 1700), was the son of an Episcopalian clergyman in Moidart. He was sent to Glasgow University to fit himself for a professional career. But an imprudent marriage caused him to abandon his studies, and about 1729 he received an appointment as a Presbyterian teacher in his native district. He was moved from place to place, and from 1739 to 1745 he taught at Corryvullin on the Sound of Mull, the scene of some of his most beautiful lyrics. About 1740 he was invited to compile a Gaelic vocabulary, which was published in 1741. Macdonald has thus the double distinction of being the author of the first book printed in Scotch Gaelic and of being the father of Highland lexicography. The news of the landing of the Pretender brought visions of release to the poverty-stricken poet, who was by this time heartily sick of teaching and farming. He turned Roman Catholic, and was present at the unfurling of the Stuart standard. He was given the rank of captain, but rendered greater services to the Jacobite cause with his stirring poems than with the sword. After Culloden he suffered great privations. But in 1751 he visited Edinburgh and brought out a collection of his poetry, which has the honour of being the first original work printed in Scotch Gaelic. His volume was therefore entitled *Ais-eiridh na Seann Chanain Albannaich* (Resurrection of the Ancient Scottish Tongue). Till the day of his death he led a more or less wandering life, as he was dependent on the generosity of Clanranald. Only a small part of Macdonald's compositions have been preserved (thirty-one in all). These naturally fall into three groups—love-songs, descriptive poems and patriotic and Jacobite poems. In his love-songs and descriptive poems Macdonald struck an entirely new note in Gaelic literature. His *Moladh Mòraig* and *Cuachag an Fhasaich* (also called *A' Bhanarach Dhonn*) are his best-known compositions in the amatory style. But he is distinctly at his best in the descriptive poems. We have already seen that even as early as the 8th century the poets of Ireland gave expression to that intimate love of nature which is perhaps the most striking feature in Celtic verse. Macdonald had a wonderful command of his native Gaelic. His verse is always musical, and his skilful use of epithet, often very lavishly strewn, enables him to express with marvellous effect the various aspects of nature in her gentler and sterner moods alike. His masterpiece, the *Birlinn of Clanranald*, which is at the same time, apart from Ossianic ballads, the longest poem in the language, describes a voyage from South Uist to Carrickfergus. Here Macdonald excels in describing the movement of the ship and the fury of the storm. In *Allt an t-Siucair* (The Sugar Brook) we are given an exquisite picture of a beautiful scene in the country on a summer morning. Other similar poems full of melody and colour are *Failte na Mòr-thir* (Hail to the Mainland), *Oran an t-Samhraidh* (Ode to Summer), and *Oran an Gheamhraidh* (Ode to Winter). When this gifted son of the muses identified himself with the Stuart cause he poured forth a stream of inspiring songs which have earned for him the title of the Tyrtaeus of the Rebellion. Among these we may mention *Oran nam Fineachan Gaelach* (The Song of the Clans), *Brosnachadh nam Fineachan gaidhealach* (A Call to the Highland Clans), and various songs to the prince. But incomparably the finest of all is *Oran Luaighe no Fucaidh* (Waulking Song). Here the prince is addressed as a young girl with flowing locks of yellow hair on her shoulders, and called Morag. She had gone away over the seas, and the poet invokes her to return with a party of maidens (*i.e.* soldiers) to dress the red cloth, in other words, to beat the English red-coats. The song contains forty-seven stanzas in all, with the characteristic refrain of the waulking-songs. *Am Breacan Uallach* is a spirited poem in praise of the kilt and plaid, which had been forbidden by the English government. Macdonald is also the author of a number of poems in MS. which have been called the quintessence of indecency. His works have gone through eight editions, the last of which is dated 1892.

Alexander Macdonald.

In connexion with Macdonald's Jacobite songs it will be well to mention here the name of a kindred spirit, John Roy Stuart (Iain Ruadh Stiubhart). Stuart was a gallant soldier who was serving in Flanders with the French against the English when the rebellion broke out. He hurried home and distinguished himself on the field of battle. After Culloden he gave vent to his dejection in two pathetic songs, one on the battle itself, while the other deals with the sad lot of the Gael.

The only poet of nature who can claim to rival Macdonald is a man of a totally different stamp. Duncan Bàn MacIntyre (Donnachadh Bàn, 1724–1812) was born of poor parents in Glenorchy, and never learned to read and write or to speak English. He was present on the English side at the battle of Falkirk, on which he wrote a famous ode, and shortly afterwards he was appointed gamekeeper to the earl of Breadalbane in Coire Cheathaich and Ben Dorain, where he lived for many years until he accepted a similar appointment from the duke of Argyll in Buachaill-Eite. Stewart of Luss is credited with having taken down the 6000 lines of verse of his own composition which MacIntyre had carried about with him for many years, and his works were published in 1768. In his later years he was first a volunteer and afterwards a member of the city guard in Edinburgh. In addition to his poems descriptive of nature MacIntyre composed a number of Jacobite martial songs, songs of love and sentiment, and comic and satiric pieces. The poem *Mairi bhàn òg* addressed to his wife is, on account of its grace and delicate sentiment, generally held to be the finest love-song in the language. But it is above all as the poet of ben and corrie that MacIntyre is remembered. He has been called the Burns of the Highlands, but the bitterness and intellectual power of the Ayrshire poet are absent in MacIntyre. Duncan Bàn describes fondly and tenderly the glories of his native mountains as only one can who spends his life in daily communion with them. His two great compositions are styled *Ben Dorain* and *Coire Cheathaich*. The former is a long poem of 550 lines divided into eight parts, alternating with a sort of strophe and antistrophe, one slow called *urlar* in stately trochees, the other swift called *siubhal* in a kind of galloping anapaests; the whole ending with the *crunluath* or final quick motion. It is said to follow very accurately the lilt of a pipe-tune. The poem, which might be called the "Song of the Deer," has been well

Duncan Bàn.

done into English by J. S. Blackie. *Coire Cheathaich* (The Misty Corrie), a much shorter poem than Ben Dorain, gives a loving description of all the prominent features in the landscape—the flowers, the bushes, the stones, the hillocks with the birds and game, and the whirling eddies with the glistening salmon. MacIntyre's works went through three editions in his lifetime, and a twelfth was issued in 1901.

From Duncan Bàn we pass on to consider the compositions of two men who hailed from the outlying parts of Gaeldom. Robert Mackay, or, as he is generally called, Rob Donn (1714–1778), was a native of Strathmore, Sutherlandshire, who, like Duncan Bàn, never learned to read or write. His life, which was uneventful, was spent almost entirely within the confines of the county of his birth. He left behind a large number of poems which may be roughly classified as elegiac, love and satiric poems. His elegies are of the typical Highland kind. The singer is overwhelmed with sadness and despairing in his loss. His best-known composition in this style is "The Death-Song of Hugh." Having just heard of the death of Pelham, the prime minister, Mackay finds a poor friend of his dying alone amid squalor in the heart of the mountains. In a poem composed on the spot the poet contrasts the positions of the two men and reflects on the vanity of human existence. Among his love-poems the "Shieling Song" is deservedly famous. But it was above all as a satirist that Mackay excelled during his lifetime. Indeed he seems to have had the sharpest tongue of all the Highland bards. We have already seen what powers were attributed to satirical poets in Ireland in medieval times, and though bodily disfigurements were no longer feared in the 18th century, nothing was more dreaded, both in Ireland and Scotland, than the lash of the bard. Hence many of Rob Donn's compositions have lost their point, and opinions have been greatly divided as to his merits as a poet. His collected poems were first published in 1829, a second edition appeared in 1871, and in 1899 two new editions were issued simultaneously, the one by Hew Morrison, the other by Adam Gunn and Malcolm Macfarlane. Another satirical poet who enjoyed a tremendous reputation in his own day was John MacCodrum, a native of North Uist and a contemporary of the men just mentioned. It is related of MacCodrum that the tailors of the Long Island refused to make any clothes for him in consequence of a satire he had directed against them. He was encountered in a ragged state by the Macdonald, who on learning the cause of his sorry condition promoted him to the dignity of bard to his family. Consequently a number of his compositions are addressed to his patrons, but one delightful poem entitled *Smeòrach Chlann-Domhnuill* (The Mavis of Clan Donald) describes in verses full of melody the beauties of his beloved island home.

Rob Donn.

John MacCodrum.

In the lyrical outburst which followed the Forty-five it was only to be expected that religious poetry should be represented. We have seen that much of the space in the Dean's Book and in the *Book of Fernaig* is allotted to verse of a pious order, though apart from the works of such Irish singers as Donnchadh O'Daly the poems do not reach a very high pitch of excellence. The first religious poem to be printed in Scotch Gaelic was a long hymn by David Mackellar, published in 1752. But incomparably the greatest writer of hymns and sacred poems is Dugald Buchanan (1716–1768). Buchanan was born in Strathyre in Perthshire and was the son of a miller. He received a desultory kind of education and tried his hand at various trades. In 1753 he was appointed schoolmaster at Drumcastle near Kinloch Rannoch. He was selected to assist Stewart of Killin in preparing the first Highland version of the New Testament for the Society for Propagating Christian Knowledge (published 1767), and at the same time he issued an edition of his own poems. Of all Gaelic books this has been far and away the most popular, having gone through no less than forty editions. Buchanan seems to have been very susceptible to religious influences, and the stern Puritan doctrines of retribution and eternal damnation preached around him so worked on his mind that from his ninth to his twenty-sixth year he was a prey to that mental anguish so eloquently described by Bunyan. The awful visions which presented themselves to his vivid imagination find expression in his poems, the most notable of which are "The Majesty of God," "The Dream," "The Sufferings of Christ," "The Day of Judgment," "The Hero," "The Skull," "Winter" and "Prayer." In the "Day of Judgment," a poem of about 120 stanzas, we are given in sublime verses a vivid delineation of the crack of doom as the archangel sounds the last trumpet. The poet then goes on to depict the awful scenes consequent upon the wreck of the elements, and pictures the gathering together of the whole human race before the Throne. But Buchanan's masterpiece is admittedly "The Skull." Traces of the influence of English writers have been observed in all the poet's writings, and it seems certain that the subject of his greatest poem was suggested by Shakespeare. The poet seated by a grave espies a skull. He takes it up and muses on its history. This poem in 44 stanzas concludes with a picture of the torments of hell and the glories of heaven.

Dugald Buchanan.

The writers whom we have been discussing are practically unknown save to those who are able to read them in the original. Now we have to turn our attention to a man whose works have never been popular in the Highlands, but who nevertheless plays a prominent part in the history of European literature. Though the precise origin of the Fenian cycle may remain a moot-point to all time, the development of the literature centring in the names of Finn and Ossian is at any rate clear from the 11th century onwards. The interest taken in Celtic studies since the middle of the 19th century in Ireland and Scotland and elsewhere has accumulated a body of evidence which has settled for all time the celebrated dispute as to the authenticity of Macpherson's Ossian. James Macpherson (1736–1796), a native of Kingussie, showed a turn for versification whilst yet a student at college. Whilst acting as tutor at Moffat he was asked by John Home as to the existence of ancient Gaelic literature in the Highlands. After some pressing Macpherson undertook to translate some of the more striking poems, and submitted to Home a rendering of "The Death of Oscar." Blair, Ferguson and Robertson, the foremost men in the Edinburgh literary circles of the day, were enthusiastic about the unearthing of such unsuspected treasures, and at their instance Macpherson published anonymously in 1760 his *Fragments of Ancient Poetry, collected in the Highlands of Scotland and translated from the Gaelic or Erse Language.* This publication contained in all fifteen translations, preceded by a preface from the pen of Blair. Published under such auspices, Macpherson's venture was bound to succeed. In the preface it was stated that among other ancient poems an epic of considerable length existed in Gaelic, and that if sufficient encouragement were forthcoming the author of the versions would undertake to recover and translate the same. A subscription was raised at once, and Macpherson set out on a journey of exploration in the Highlands and islands. As the result of this tour, on which he was accompanied by two or three competent Gaelic scholars, Macpherson published in London in 1762 a large quarto containing his epic styled *Fingal* with fifteen other smaller poems. In the following year a still larger epic appeared with the title of *Temora.* It was in eight books, and contained a number of notes in addition to *Cath-Loda* and other pieces, along with the seventh book of *Temora* in Gaelic as a specimen of the original. Ten years later a new edition of the whole was issued. The authenticity of Macpherson's translations was soon impugned by Dr Johnson, Hume and Malcolm Laing, and the author was urged by his friends to publish the originals. Macpherson prevaricated, even though the Highlanders of India sent him a cheque for £1000 to enable him to vindicate the antiquity of their native literature. Macpherson at different times, and particularly towards the end of his life, seems to have had some intention of publishing the Gaelic of his Ossian, but he was naturally deterred by the feeling that his knowledge of Gaelic was becoming shakier with his continued absence from the Highlands. At any rate he left behind a quantity of Gaelic matter in MS. which was ultimately

Macpherson's "Ossian."

published by the Highland Society of London in 1807. This MS., however, was revised and transcribed by Ross and afterwards destroyed, so that we are ignorant of its nature. The Highland Society also instituted an inquiry into the whole question, but their conclusions were somewhat negative. They succeeded in establishing that the characters introduced by Macpherson were familiar in the Highlands and that Ossianic ballads really existed, which Macpherson had utilized. Macpherson's claims still found ardent advocates, such as Clark, in the 'seventies, but the question was finally disposed of in papers by Alexander Macbain (1885) and L. C. Stern (1895). We can here only summarize briefly the main lines of argument. (1) Macpherson's Ossian is full of reminiscences of Homer, Milton and the Hebrew prophets. (2) He confuses the Ulster and the Fenian heroic cycles in unpardonable fashion. (3) The Gaelic text of 1807 only represents one-half of the English versions (11 poems out of 22 poems). Some Gaelic fragments from different pens appeared prior to 1807, but these differ considerably from the "official" version. (4) In the Gaelic text of 1807 the version of the passage from *Temora* is quite different from that published in 1763. (5) Macpherson's Gaelic is full of offences against idiom and unnaturally strained language. (6) The names Morven and Selma are entirely of his own invention (see also MACPHERSON, JAMES). As a result of the stir caused by Macpherson's work a number of men set about collecting the genuine popular literature of the Highlands. A few years before the appearance of *Fingal*, Jeremy Stone, a schoolmaster at Dunkeld, had collected ten Ossianic ballads and published one of them in an English versified translation. For this collection see a paper by D. Mackinnon in the *Transactions of the Gaelic Society of Inverness*, vol. xiv. pp. 314 ff. Unfortunately other persons were led to follow Macpherson's example. The chief of these imitators were (1) John Clark, who in 1778 published, along with several others, an English poem *Mordubh*, later translated into Gaelic by Gillies; (2) R. Macdonald, son of Alexander Macdonald, who is the author of *The Wish of the Aged Bard*; (3) John Smith of Campbeltown (d. 1807), author of fourteen Ossianic poems styled *Scandàna*, published in English in 1780 and in Gaelic in 1787; (4) D. MacCallum of Arisaig, who in 1821 published *Collath* and a complete *Mordubh* "by an ancient bard Fonar."

We have now reviewed in turn the greatest writers of the Scottish Highlands. The men we have dealt with created a kind of tradition which others have attempted to carry on. Ewen Maclachlan (1775–1822), the first transcriber of the Dean's Book, was assistant librarian of King's College and rector of the grammar school of Aberdeen. Amongst other things he translated the greater part of seven books of Homer's *Iliad* into Gaelic heroic verse, and he also had a large share in the compilation of the Gaelic-English part of the Highland Society's *Dictionary*. A number of Gaelic poems were published by him in 1816. These consist of poems of nature, *e.g. Dàin nan Aimsirean*, *Dàn mu chonaltradh*, *Smeòrach Chloinn-Lachuinn*, and of a well-known love-song, the *Ealaidh Ghaoil*. William Ross (1762–1790), a schoolmaster at Gairloch, is the typical Highland poet of the tender passion, and he is commonly represented as having gone to an early grave in consequence of unrequited affection. His finest compositions are *Feasgar Luain* and *Moladh na h-òighe Gaelich*. Another exquisite song *Cuachag nan Craobh*, is usually attributed to this poet, but it seems to go back to the beginning of the 18th century. A fifth edition of Ross's poems appeared in 1902. The most popular writer of sacred poems after Buchanan is undoubtedly Peter Grant, a Baptist minister in Strathspey, whose *Dàin Spioradail* (first published in 1809) reached a twentieth edition in 1904. Sweetness, grace and simplicity are the characteristics which have endeared him to the heart of the Gael. Two other well-known hymn-writers spent their lives in Nova Scotia—James Macgregor (1759–1830) and John Maclean, a native of Tiree. The compositions of the latter have been published under the title *Clarsach na Coille* (Glasgow, 1881). But John Morrison (1790–1852), the poet-blacksmith of Rodel, Harris, is the most worthy of the name of successor to Buchanan. His works have been carefully edited in two volumes by George Henderson (2nd edition, 1896). His poems are remarkably musical and imaginative. Two of the most characteristic are *An Iondruinn* and *Tha duin' òg agus scann duin' agam*. William Livingston or MacDhunleibhe (1808–1870) was a native of Islay. He received scarcely any education, and was apprenticed as a tailor, but he early made his way to the mainland. He was ever a fierce Anglophobe, and did his best to make up for the deficiencies of his early training. He published in English a *Vindication of the Celtic Character*, and attempted to issue a *History of Scotland* in parts. His poems, which have been at least twice published (1858, 1882), are equally powerful in the expression of ruthless fierceness and tearful sorrow. In *Fios thun a' Bhaird* he sings pathetically of the passing of the older order in Islay, and another powerful poem entitled *Duan Geall* deals with the campaign of the Highlanders under Sir Colin Campbell in the Crimea. Livingston's contemporary, Evan Maccoll (1808–1898), the son of a small farmer on Lochfyneside, in his early years devoured eagerly all the English literature and Gaelic lore that came in his way. In 1836 he issued a volume of songs called the *Mountain Minstrel*, containing his productions in Gaelic and English. Two years later two volumes appeared, one entirely in Gaelic, styled *Clarsach nam Beann*, the other in English under the old title. A third edition of the Gaelic collection was published in 1886. Maccoll acted for many years as clerk in the custom-house at Liverpool, and afterwards he filled a similar post at Kingston, Canada. He has been called the Moore of Highland song. His spirit is altogether modern, and his poems are much nearer the Lowland type than those of the older bards. Among his best-known pieces are *Bàs Mairi* and *Duanag Ghaoil*. We can do no more than mention the names of John Maclachlan of Rahoy (1804–1874), James Munro (1794–1870), well known as a grammarian, Dugald Macphail (b. 1818), Mrs Mary Macpherson, Angus Macdonald (1804–1874), Mrs Mary Mackellar (1834–1890) and Neil Macleod (b. 1843), author of a popular collection *Clarsach an Doire* (1st ed., 1883; 3rd ed., 1904). Neil Macleod is also the writer of the popular song *An Gleann 's an robh mi òg*. Others whom we cannot mention here are known as the authors of one or more songs which have become popular. It is natural to compare the state of affairs at the beginning of the 20th century with that obtaining in 1800. In the dawn of the 19th century every district in the Highlands had its native poet, whilst a century later not a single Gaelic bard of known reputation existed anywhere within its borders. It is only too evident that the new writers prefer English to Gaelic as a medium of literature, partly because they know it better, but also because in it they appeal to a far wider public.

Later poets.

It will have been observed that we have said nothing about prose works written in Gaelic. Original Gaelic prose is conspicuous by its absence. The first printed work is the translation of Knox's *Liturgy* by Bishop Carsewell, published in 1567 (reprinted in 1873). Calvin's Catechism is said to have been issued in 1631. The Psalms and Shorter Catechism appeared in 1659, while two other psalters saw the light before the end of the century, one by Kirke (1684), the other issued by the Synod of Argyll (1694). The language of all these publications may, however, be termed Irish. Apart from reprints of the catechism and psalter, the only other Gaelic matter which appeared in print before 1750 were Kirke's Irish version of the Bible in Roman type with a vocabulary (1690), and the *Vocabulary* by Alexander Macdonald (1741). But from the middle of the 18th century translations of the works of English religious writers streamed from the various presses. Alleine, Baxter, Boston, Bunyan, Doddridge and Jonathan Edwards were all prime favourites, and their works have gone through many editions. Apart from a well-meant but wholly inadequate version of Schiller's *Tell*, the only non-religious work which can be termed literature existing in a Gaelic translation is a portion of the *Arabian Nights*, though fragments of other classics such as Lamb's *Tales from Shakespeare* have appeared in magazines. The one-sided character of Gaelic literature, in addition to exercising a baneful influence on Highland character, has in the

Prose writers.

long run of necessity proved adverse to the vitality of the language. The best standard of Gaelic is by common consent the language of the Scriptures. James Stewart of Killin's version of the New Testament, published by the Society for Propagating Christian Knowledge, was followed by a translation of the Old Testament in four parts (1783–1801), the work of John Stewart of Luss and John Smith of Campbeltown. The whole Gaelic Bible saw the light in 1807. But the revision of 1826 is regarded as standard. The translators and revisers had no norm to follow, and it is difficult to say how far they were influenced by Irish tradition. Much in the Gaelic version seems to savour of Irish idiom, and it is a pity that some competent scholar such as Henderson has not investigated the question. Of original prose works we can mention two. The one is a *History of the Forty-five* (*Eachdraidh a' Phrionnsa, no Bliadhna Thearlaich*), published in 1845 by John Mackenzie, the compiler of the *Beauties of Gaelic Poetry* (1806–1848). A second edition of this book appeared in 1906. The other is the more famous *Caraid nan Gaedheal*, by Norman Macleod (new edition, 1899). This volume consists mainly of a number of dialogues dealing with various departments of Highland life, which were originally contributed to various magazines from 1829 to 1848. Macleod's style is racy and elegant, and his work is deservedly popular.

In conclusion we must take notice of the more important collections of folklore. Gaelic, like Irish, is extraordinarily rich in proverbs. The first collection of Gaelic proverbs was published in 1785 by Donald Macintosh. This work was supplemented and enlarged in 1881 by Alexander Nicholson, whose book contains no fewer than 3900 short sayings. A large collection of Gaelic folk-tales was gleaned and published by J. F. Campbell under the title of *Popular Tales of the West Highlands* (4 vols., Edinburgh, 1862). Alexander Carmichael published a version of the *Táin Bó Calnge*, called *Toirioc na Táine*, which he collected in South Uist (*Transactions of the Gaelic Society of Inverness*, ii. 25-42), also the story of Deirdre and the sons of Uisneach in prose taken down in Barra (*ib.* xiii. 241-257). Five volumes of popular stories, collected by J. G. Campbell, D. MacInnes, J. Macdougall and Lord Archibald Campbell, have been published (1889–1895) by Nutt under the title *Waifs and Strays of Celtic Tradition*. These collections contain a good deal of matter pertaining to the old heroic cycles. Seven ballads dealing with the Ulster cycle were collected and printed by Hector Maclean under the title *Ultonian Hero-ballads* (Glasgow, 1892). Macpherson gave a fillip to collectors of Ossianic lore, and a number of MSS. going back to his time are deposited in the Advocates' Library at Edinburgh. J. F. Campbell spent twelve years searching for variants, and his results were published in his *Leabhar na Feinne* (1872). This volume contains 54,000 lines of heroic verse. The Edinburgh MSS. were transcribed by Alexander Cameron, and published after his death by Alexander Macbain and John Kennedy in his *Reliquiae Celticae*. This work is therefore a complete corpus of Gaelic heroic verse. Finally the charms and incantations of the Highlands have been collected and published by Alexander Carmichael in two sumptuous volumes under the title *Carmina Gadelica* (1900).

AUTHORITIES.—The standard work is Magnus Maclean, *The Literature of the Highlands* (London, 1904); see also various chapters in the same writer's *Literature of the Celts* (London, 1902); L. C. Stern, *Die Kultur der Gegenwart*, i. xi. 1, pp. 98-109; Nigel MacNeill, *The Literature of the Highlanders* (Inverness, 1892); J. S. Blackie, *The Language and Literature of the Scottish Highlands* (Edinburgh, 1876); P. T. Pattison, *Gaelic Bards* (1890); L. Macbean, *Songs and Hymns of the Scottish Highlands* (Edinburgh, 1888); John Mackenzie, *Sàr-obair nam Bàrd Gaelach*, or *The Beauties of Gaelic Poetry* (new ed., Edinburgh, 1904); A. Sinclair, *An t-Oranaiche* (Glasgow, 1879); *The Book of Deer*, edited for the Spalding Club by Dr Stuart (1869); Alexander Macbain, *Transactions of the Gaelic Society of Inverness*, vols. xi. and xii.; *The Book of the Dean of Lismore*, edited by T. Maclauchlan (1862); Alexander Cameron, *Reliquiae Celticae* (Inverness, 1892–1894); John Reid, *Bibliotheca Scoto-Celtica* (Glasgow, 1832); *Catalogue* of the books in the Celtic department, Aberdeen University Library (1897); George Henderson, *Leabhar nan Gleann* (Inverness, 1898); D. MacKinnon, "The Fernaig MS." in *Transactions of the Gaelic Society of Inverness*, xi. 311-339; J. S. Smart, *James Macpherson, An Episode in Literature* (London, 1905); L. C. Stern, "Die Ossianischen Heldenlieder" in *Zeitschrift für vergleichende Litteraturgeschichte* (1895), translated by J. L. Robertson in *Transactions of the Gaelic Society of Inverness*, xxv. 257-325; G. Dottin, *Revue de synthèse historique*, viii. 79-91; M. C. Macleod, *Modern Gaelic Bards* (Stirling, 1908). (E. C. Q.)

III. MANX LITERATURE.—The literary remains written in the Manx language are much slighter than those of any other Celtic dialect. With one small exception nothing pertaining to the saga literature of Ireland has been preserved. The little we possess naturally falls under two heads—original compositions and translations. With regard to the first category we must give the place of honour to an Ossianic poem contained in a MS. in the British Museum (written in 1789), which relates how Orree, Finn's enemy, was tormented by the women of Finn's household when the latter was away hunting, how he in revenge set fire to the house, and how Finn had him torn in pieces by wild horses. Most of the existing literature of native origin, however, consists of ballads and carols, locally called carvels. These used to be sung on Christmas eve in the churches, the members of the congregation each bringing a candle. Any one who pleased could get up and sing one. These carvels deal largely with the end of the world, the judgment-day and the horrors of hell. About eighty of them were published under the title of *Carvalyn Gailckagh* (Douglas, 1891). An attempt is being made by *Yn Cheshaght Gailckagh* to revive the *Oiel Voirrey* (=Irish *Oidhche Fhéile Mhuire*), "the feast of Mary," as the festival used to be called, and gatherings in the old style have been held in Peel for the last two or three years. Apart from the carvels there are other ballads in existence, the most important of which were printed in vol. xvi. of the *Publications of the Manx Society*. The earliest is an 18th-century song of Manannan Mac y Lheir, traditionally supposed to have been written in the 16th century, and which tells of the conversion of the island by St Patrick. Then comes *Baase Illiam Dhône* (The Death of Brown William), dealing with the death of William Christian, who was shot as a traitor in 1662. The best-known Manx song is *Mylacharane* (=Irish *Maolchiaráin*). It is directed against a man of this name who was the first to give a dowry to his daughter, the custom having previously been for the bridegroom to pay money to the father of the bride. Others are *Ny Kirree fo Sniaghtey* (The Sheep under the Snow), a song about the loss of the Douglas herring fleet in 1787 (reprinted at Douglas, 1872), and *Vannin Veg Veen* (Dear little Mona). A further ballad was taken down by J. Strachan and is published in the *Zeitschrift für celtische Philologie*, i. 79. In 1760 Joseph Bridson wrote a "Short Account of the Isle of Man" in Manx (*Coontey Ghiare jeh Ellan Vannin ayns Gailck*), which was reprinted in vol. xx. of the *Publications of the Manx Society*. The translated literature is almost entirely of a religious character. Jenner prints a list of twenty-three volumes in his article referred to below, but we can only here mention the most important. The first is the translation of the English Prayer-Book by Bishop Phillips, 1610 (published by A. W. Moore, Oxford, 1895). The *Sermons* of Bishop Wilson in 3 vols. (1783) are a very rare work, highly important for our knowledge of Manx prose, and it is to be hoped that *Yn Cheshaght Gailckagh* will see their way to reprint it. A translation of parts of Milton's *Paradise Lost* (*Pargys Caillit*) by Thomas Christian, 1796, is reprinted in vol. xx. of the *Publications of the Manx Society*. The later translation of the Church of England Prayer-Book was printed in 1765 and again in 1777 and 1840. But by far the most important of all is the translation of the Bible. The energetic Bishop Wilson managed to get parts of the Scriptures translated and the Gospel of St Matthew was printed in 1748. Wilson's successor, Bishop Hildesley, completed the work, and in 1775 the whole Bible appeared. The last reprint of the Bible appeared in 1819, that of the New Testament in 1810 (?). As a curiosity it may be mentioned that recently *Aesop's Fables* have been translated into the vernacular (Douglas, 1901).

AUTHORITIES.—H. Jenner, "The Manx Language: its Grammar, Literature and Present State," *Transactions of the London Philological Society* (1875), pp. 172 ff.; *Publications of the Manx Society*, vols. xvi., xx., xxi.; L. C. Stern, *Die Kultur d. Gegenwart*, i. xi. 1, pp. 110-11.

IV. Welsh Literature.—The oldest documents consist of glosses of the 9th and 10th centuries found in four MSS.—Oxoniensis prior and posterior, the Cambridge Juvencus and Martianus Capella. These glosses were published by J. Loth in his *Vocabulaire vieux-breton* (1884), but their value is entirely philological. In addition, we possess two short verses, written in Irish characters, preserved in the Juvencus Manuscript in the University Library at Cambridge (printed in Skene's *Four Ancient Books of Wales*). This manuscript is a versification of the Gospels dating from the 9th century. The value of these two verses is threefold: they give us, in the first place, a specimen of the Welsh language at a time when the modern laws of euphony were in a comparatively elementary stage; secondly, they are of the utmost importance to the historian tracing the development of Welsh versification, and, in future research, they must be taken into account by the historian of modern metres in other languages; and, thirdly, the similarity of their form and diction to other verses, attributed to Llywarch Hen, and preserved in a much later orthography, will be a serious consideration to the higher critic in Welsh literature.

Early MSS.

All the prose and verse of the succeeding centuries, that is to say from the 10th to the beginning of the 14th, is preserved in four important manuscripts, written during the latter half of the period. The first of these manuscripts is the *Black Book of Carmarthen*, a small quarto vellum manuscript of fifty leaves, written in Gothic letters by various hands during the reign of Henry II. (published in facsimile by Gwenogvryn Evans, Oxford, 1907). This book belonged originally to the priory of Black Canons at Carmarthen, from whom it passed to the church of St David; at the suppression of the monasteries in the reign of Henry VIII. it was presented by the treasurer of that church to Sir John Price, one of the king's commissioners, and from him it passed eventually into the hands of Sir Robert Vaughan, the owner of the famous Hengwrt collection. It is now among the Peniarth Manuscripts, undoubtedly the most valuable collection of Welsh manuscripts in the United Kingdom. The second manuscript is the *Book of Aneirin*, a small quarto manuscript of nineteen leaves of vellum, written about 1250. It was at one time in the possession of Sir Thomas Phillips of Middlehill, and now belongs to the free library of the city of Cardiff. The third is the *Book of Taliessin*, in the Hengwrt and subsequently in the Peniarth collection. It is a small quarto manuscript containing thirty-eight leaves, written in Gothic letters, about the early part of the 14th century. The fourth manuscript, and in some respects the most important, is the *Red Book of Hergest*, so called from Hergest Court, one of the seats of the Vaughans. It is a folio volume of 360 leaves written by different hands between the beginning of the 14th and the middle of the 15th century. This manuscript, which is the most extensive compilation of the medieval prose and verse of Wales, is now in the possession of Jesus College, Oxford, and is kept in the Bodleian Library of that university. The main body of the poems contained in these four MSS. was printed by W. F. Skene with a tentative English version in his *Four Ancient Books of Wales*.

"Black Book of Carmarthen."

"Book of Aneirin."

"Book of Taliesin."

"Red Book of Hergest."

The other Welsh manuscripts, ranging down from the 15th to the 18th century, are far too numerous to notice, and it is outside the scope of this article to deal minutely with the original sources of the text of Welsh writings.

We will now only endeavour to sketch the history of Welsh literature from these early centuries down to our own times, and to show how the Celtic people of Wales have developed a literature true to their own genius, and how that literature stands to this day both a minister to the culture of the Welsh people and a sure indication of it.

1. *Early Latin Writers.*—The works now known as those of Gildas (*q.v.*) and Nennius (*q.v.*) are written in Latin; they throw considerable light on the origin of Welsh romantic literature and on the history of the earlier poems. Gildas was born at Ailclyd, the modern Dumbarton, that part of Britain which is called by Welsh writers *Y Gogledd*, or the North. Several dates have been assigned for his birth and death, but he probably flourished between 500 and 580, and his book, *De Excidio Britanniae* seems to have been written about 560. This work is a sketch of British history under the Romans and in the period after their withdrawal from the country, and includes the period of the wars of the Britons with the Picts, Scots and Saxons. Mr Skene suggests very reasonably that the well-known letter of the Britons to Aetius, asking for Roman aid, is misplaced, and that if put in its own place some of the anachronisms of Gildas will disappear. This work, which contains some spirited attacks on the leaders of the Britons for their sins, is strangely full of contradictions. It seems to be the work of some person well versed in the facts of that part of British history, to which he had an easy access, but who supplemented them with traditional details and with dates which were mere guess-work. Mr Skene thinks that the work of Nennius was originally written in Welsh in the north and was afterwards translated into Latin. To this nucleus was added the genealogies of the Saxon kings down to 738. Afterwards some person, called Marc in the Vatican manuscript, appended probably about 823 the life of St Germanus and the legends of St Patrick, which were subsequently incorporated with the history. Some South Welshman added to the oldest manuscript of the history in these countries, about 977, a chronicle of events from 444 to 954, in which there are genealogies beginning with Owain, son of Hywel Dda, king of South Wales. This chronicle, which is not found in other manuscripts, has been made the basis of two later chronicles brought down to 1286 and 1288 respectively. It is consequently not the work of one author. A learned Irishman named Gilla Coemgin, who died in 1072, translated it into Irish and added many things concerning the Irish and the Picts. The *Historia Britonum* is more valuable for the legendary matter which it contains than for what may be accepted as history, for it gives us the British legends of the colonization of Great Britain and Ireland, the exploits of King Arthur and the prophecies of Merlin, which are not found elsewhere before the 12th century. The date of the book is of the greatest importance to the history of medieval romance, and there can be no doubt that it is earlier than the Norman Conquest and that the legends themselves are of British origin.

Gildas.

2. *The Epic Period, 700–950.*—The higher criticism of the early poetry of Wales contained in the four ancient manuscripts already mentioned has undergone a good many changes since their contents first excited the curiosity of English scholars. In turn Welshmen, with more zeal than discretion, have displayed an amazing charlatanism in the extraordinary theories which they put forth, and Englishmen have shown an utmost meanness in belittling what is undoubtedly a most valuable monument of the past. But now the labours of Zeuss and others who have made a study of Celtic philology furnish us with much safer canons of criticism than existed in 1849, when even a learned Welshman, the late Thomas Stephens, who did more than any one else to establish the claims of his country to a real literature, doubted the authenticity of a large number of the poems said to have been written by Taliessin, Aneirin, Myrddin and Llywarch Hen, who are supposed to have lived in the 5th century. A great service was done to Welsh literature by the publication of the texts of those poems from the four ancient manuscripts by W. F. Skene. In addition to the text, translations of the poems were furnished by Dr Silvan Evans and the Rev. Robert Williams, but the translation, though on the whole a very creditable work, is full of mistakes which few men, writing at that time, could have avoided. The publication of the text of the Black Book, with notes by Dr Gwenogvryn Evans, will be of great service towards clearing up the mist which envelops this older literature.

Most of the poems in these four manuscripts are attributed to four poets, Aneirin, Llywarch Hen, Taliessin and Myrddin, who are said to have lived and written in Cumbria or Y Gogledd, where the actors in the events referred to also lived. The greater part of this region enjoyed substantial independence down to the end of the 9th century, with the exception of the

interval from 655, when they were subjected to the kingdom of Northumbria by Oswy after the defeat of Cadwallawn and Penda, to the battle of Dunnichen in 686, when Ecfrid, king of Northumbria, was defeated. From the 7th to the 9th century Cumbria, including under that name all the British territory from the Ribble to the Clyde, was the principal theatre of British and Saxon conflict. The rise of the dynasty of Maelgwn Gwynedd, who, according to Welsh tradition, was a descendant of Cunedda Wledig, one of the Picts of the north, brought Wales into close connexion with the Cumbrian kingdom, and prepared both North and South Wales for the reception of the northern traditions and the rise of a true Welsh literature.

Whether the poets of the north really wrote any of the poems which in a modified form have come down to us or not, there can be no doubt that a number of lays attributed to them lived in popular tradition, and that under the sudden burst of glory which the deeds of Cadwallawn called forth and which ended in the disastrous defeat of 655, a British literature began to spring up, and was nourished by the hopes of a future resurrection under his son Cadwaladr, whose death was disbelieved in for such a long time. These floating lays and traditions gradually gathered into North Wales, brought thither by the nobility and the bards who fled before advancing hosts of the victorious Saxon kings of the north. The heroes of the north became now the heroes of Wales, and the sites of the battles they fought were identified with places of similar name in Wales and England.

By far the longest and the most famous poem of this series is attributed to Aneurin. This spelling of his name is comparatively modern, and in the old manuscripts it is given as Aneirin. The later form seems to have been affected by the form *eurin*, "golden," and to owe the continuation of the misspelling to a belief that the poet and Gildas, whose name is supposed to be the Latin form of the Old English *gylden*, were one and the same person. This poem, called the *Gododin* (with notes by T. Stephens and published by Prof. Powel for the Cymmrodorion Society, London, 1888), is extremely obscure, both on account of its vocabulary and its topography and allusions. It deals mainly with "the men who went to Cattraeth," which is supposed to have been fought between the Britons and the Scots under Aedan, king of Dalriada, and the pagan Saxons and their British subjects in *Devyr* (Deira) and *Brynaich* (Bernicia), and the half-pagan Picts of Guotodin, a district corresponding to the northern half of the Lothians along the Firth of Forth. Critics have attempted with partial success to cast some light on its obscurity by supposing that the poem as a whole is made up of two parts dealing with two distinct battles. This may or may not be, but there is no doubt that many of the stanzas of the poem as found in the manuscript are not in their proper places, and a critical readjustment of the different stanzas and lines would do much towards solving its problem. It seems probable, too, that the original nucleus of the poem was handed down orally, and recited or sung by the bards and minstrels at the courts of different noblemen. It thus became the common stock-in-trade of the Welsh rhapsodist, and in time the bards, using it as a kind of framework, added to it here and there pieces of their own composition formed on the original model, especially when the heroes named happened to be the traditional forefathers of their patrons, and occasionally introduced the names of new heroes and new places as it suited their purpose; and all this seems to have been done in early times. Older fragments dealing too with the legendary heroes of the Welsh were afterwards incorporated with the poem, and some of these fragments undoubtedly preserve the orthographical and grammatical forms of the 9th century. So that, on the whole, it seems as fruitless to look for a definite record of historical events in this poem as it would be to do so in the Homeric poems, but like them, though it cannot any longer be regarded as a correct and definite account of a particular battle or war, it still stands to this day the epic of the warriors of its own nation. It matters not whether these heroes fought at far Cattraeth or on some other forgotten field of disaster; this song still reflects, as a true national epic, the sad defeats and the brave but desperate rallies of the early Welsh. Like the music of the Welsh, its dominant note is that of sadness, expressing the exultation of battle and the very joy of life in minor notes. To a great extent Welsh poets are to this day true and faithful disciples of this early master.

Aneurin.

Many of the poems attributed to Taliessin are undoubtedly late. Indeed, both Taliessin and Myrddin,[1] the one as the mythological chief of all Welsh bards and the other as a great magician, seem pre-eminently suited to attract a great deal of later Welsh poetry under their aegis; but the older poems attributed to them are worthy of any literature. Sometimes, as in the verses attributed to Llywarch Hen beginning *Stafell Cynddylan*, an early specimen of poetic grief over departed glory, we find that gentle elegiac note which is so common in early English poetry. In the Taliessinic poems, the *Battle of Argoed Llwyvain* and others, we have that boldness of portraiture which is found in the *Gododin*, whilst in many a noble line we seem to hear again the ravens screaming shrilly over their sword-feasts, and the strong strokes of the advancing warriors.

Taliessin.

It was but natural that all the pseudo-prophetic poems, written of course after the events which they foretold, should be attributed to the chief among seers, Myrddin, or, as his name is written in English, Merlin; so that all the poems accredited to him, with the exception perhaps of the *Avallenau*, were not written before the 12th century.

Merlin.

In most of the poems attributed to Llywarch Hen and in some of the Myrddin poems, the verses begin with the same line, which, though it has no direct reference to the subject of the poem itself, is used as a refrain or catch-word, exactly like the refrains employed by Mr Swinburne and others in their ballads. These lines generally refer to some natural object or objects, as, for instance, "the snow of the mountain" or "bright are the tops of the broom."

The first period, then, of Welsh literature lies between 700 and 950. It is in most respects the epic period, the period in which poets wrote of great men and their deeds, the legendary and the historic heroes of the Cymry, men like Urien Rheged, and heroes like Hyveidd Hir. Even in the next period the epic note had not quite died out.

3. *The Prose Romances and the Poet Princes, 1100–1290.*—It will be seen that there is a considerable gap between the first and second period of Welsh literature. It must not be supposed, however, that nothing was composed or written during these years. Indeed, it may well be that some of the poetry attributed to the minor bards of the last period was composed between 900 and 1100, and that some other poetry too was written and lost. But there are abundant reasons for believing that Welsh poetry was at a very low ebb during those years. The progress of Wales as a political unit had suffered a check after the battle of Chester in 613. The effects of this defeat were not immediate, as the Welsh had still enough of their characteristic hopefulness to expect ultimate victory; we therefore have reasons for believing that the Gododin series of poems were still used—or perhaps used then for the first time—to spur on "the hawks of war" to greater efforts. Gradually, however, the Angles, hemming them in on all sides from the Clyde to the Severn, began to press nearer and nearer; the Welsh at last seem to have lost heart, and no one any longer "had the desire of song." Content with their old epics and their older myths, which owe perhaps to these years a darker and more sombre tinge, they allowed their song to be hushed. The great lords had hardly chosen their final abodes; the smaller lords had all been killed in war and their places taken now by one, now by another, so that the warrior prince himself had not the leisure, and hardly the inspiration necessary, for song, and the bards found but scanty patronage among such a diminished and poverty-stricken nobility. The only order that seemed to prosper was that of the monks, and we owe them our gratitude for

The Gododin series.

[1] It is indeed probable that Myrddin is a purely fictitious character, whose name has been made up from Caer Fyrddin (= Maridunum), which was certainly not a personal name.

preserving the ancient writings and the ancient traditions; but they were simply copyists, though they had undoubtedly some hand in giving the *Gododin* its final form and in setting in its convenient framework the names of the forefathers of their aristocratic abbots.

In the year 1044 Gruffydd ab Llewelyn conquered Hywel ab Edwin and became king of Wales. By means of his diplomacy and his arms he succeeded in stemming the tide of Saxon invasion that was threatening to overflow even the little remnant of land that was left to the Welsh, and his strong rule gave the Welsh muse another opportunity. Gruffydd, however, died in 1063, and was eventually succeeded in 1073 by Trahaern in North Wales, and Rhys ab Owen in South Wales. The rule of these two princes was destined to be the last period of literary inertness in the long interval following the confinement of Wales to her inaccessible highlands.

During these years a man was hiding in Ireland, called Gruffydd ab Cynan, a scion of the old branch of Welsh kings. In Brittany, too, Rhys ab Tewdwr, a claimant to the throne of South Wales, had sought the protection of his Breton kinsmen. In 1073 Rhys ab Tewdwr obtained the throne of Rhys ab Owen, and, after many years of hard fighting, Gruffydd ab Cynan, with the help of Rhys ab Tewdwr, defeated Trahaern at the battle of Myrydd Carn in 1081. On the accession of these two powerful princes the whole country broke forth into songs of praise and jubilation, and the long night was at an end.

It is important to remember that both Gruffydd and Rhys had a direct personal influence on the literary revival of their times. Gruffydd ab Cynan while in exile had seen how the Irish *Oenach* was held, and had seen prizes given for poetry and song. We have it on the authority of Welsh writers that he reorganized the bards and improved the music, and in many other ways gave a great and beneficial impulse to Welsh literature. He may have brought over some of the later Irish legends which have had such a powerful effect on the literature of Wales.

Rhys ab Tewdwr, too, brought with him from Brittany an enthusiasm for the old Celtic tales, and perhaps some of the tales themselves which had been by that time forgotten in Wales, tales of the Round Table, and Arthur "begirt with British and Armoric knights," of knightly deeds and magical metamorphoses, which were destined to influence profoundly all the literatures of the West. We find, therefore, in this period that poetry flourished mostly in the North under Gruffydd ab Cynan, and prose in the south under Rhys ab Tewdwr, where the new enthusiasm for the old Welsh legends resulted in the *History of Britain* of Geoffrey of Monmouth, which is an expansion of the books attributed to Gildas and Nennius. It was written in Latin sometime before 1147, and is dedicated to Robert, earl of Gloucester, the grandson of Rhys ab Tewdwr. In the introductory epistle, Geoffrey states that Walter, archdeacon of Oxford, had given him a very ancient book in the British tongue, giving an account of the kings of Britain from Brutus to Cadwaladr, and that he had translated it into Latin at the archdeacon's request. The book, however, is a compilation and not a translation, but the materials were probably drawn from British sources. In this history Geoffrey asserts that the deeds of Arthur "were commonly related in a pleasing manner." He was perhaps originally but the hero of some popular ballad, or of a forgotten stanza of the *Gododin*, and the importance of his name in the literature of the world seems to be due to an accident. We cannot, however, in this article consider the Arthurian Legend (*q.v.*) as a whole; we must be content with dealing with the most important of the romantic tales which are contained in the *Red Book of Hergest*. They may be divided into four classes:—

Geoffrey of Monmouth.

(i.) The *Mabinogi* proper, containing (1) *Pwyll*, prince of Dyvet; (2) *Branwen*, daughter of Llyr; (3) *Manawyddan*, son of *Llyr*; (4) *Math*, son of Mathonwy.

(ii.) Old British tales referring to Roman times, viz. (1) *Lludd* and *Llevelys*; (2) The Dream of *Macsen Wledic*.

(iii.) British Arthurian tales, viz. (1) *Kilhwch* and *Olwen*; (2) The Dream of *Rhonabwy*.

(iv.) Later tales of chivalry, viz. (1) The Lady of the Fountain; (2) *Peredur*, son of *Evrawc*; (3) *Geraint*, son of *Erbin*.

The group of four romances in the first class forms a cycle of legends and is called in the manuscript *Pedeir Keinc y Mabinogi* —the Four Branches of the Mabinogi; so it is only these four tales that can, strictly speaking, be called *Mabinogion*. In these stories we have the relics of the ancient Irish mythology of the *Tuatha Dê Danann*, sometimes mixed with later myths. The *Caer Sidi*, where neither disease nor old age affects any one, is the *Sîd* of Irish mythology, the residence of the gods of the *Aes Side*. It is called in one of the old poems the prison of *Gweir*, who no doubt represents *Gaiar*, son of Manandán MacLir, the Atropos who cut the thread of life of Irish mythology. *Llyr* is the Irish sea-god Lir, and was called *Llyr Llediaith*, or the half-tongued, implying that he spoke a language only partially intelligible to the people of the country. *Bran*, the son of Llyr, is the Irish Bran MacAllait, Allait being one of the names of Lir. *Manawyddan* is clearly the Manandán or Manannán MacLir of Irish mythology. These tales contain other characters which may not have been borrowed from Irish mythology but which are common to both mythologies; for example, Rhiannon, the wife of Pwyll who possessed marvellous birds which held warriors spell-bound for eighty years by their singing, comes from *Annwn*, or the unseen world, and her son Pryderi gives her, on the death of Pwyll, as a wife to Manawyddan.

The Mabinogion.

Of the second class the first story relates to Lludd, son of Beli the Great, son of Manogan, who became king after his father's death, while his brother Llevelys becomes king of France and shows his brother how to get rid of the three plagues which devastated Britain:—first, a strange race, the Coranians, whose knowledge was so great that they heard everything no matter how low soever it might be spoken; second, a shriek which came into every house on May eve, caused by the fighting of two dragons; and third, a great giant who carried off all the provisions of the king's palace every day. The second tale relates how Maxen, emperor of Rome, has a dream while hunting, in which he imagines that he visits Britain, and in *Caer Seint* or Carnarvon sees a beautiful damsel, Helen, whom he ultimately finds and marries. Both tales are British in origin and are founded on traditions referring to Roman times.

The most important of these tales are undoubtedly those contained in the first class, and the story of *Kilhwch* and *Olwen*. The form in which they are found in the *Red Book of Hergest* is, as we have already said, comparatively speaking, modern. But it is apparent to any one reading these tales that the writers or compilers, as Matthew Arnold has suggested, are "pillaging an antiquity, the secret of which they do not fully possess." The foundations of the tales are the old Celtic traditions of the gods and the older heroes, and they clearly show Goidelic influence both in the persons they introduce and in their incidents. The tales would at first exist only in oral tradition, and after the advent of Christianity the characters they contain lost their title of divinity and became simply heroes—warriors and magicians. In time the monks began to write these ancient traditions, embellishing them and suppressing no doubt what they considered to be most objectionable. These then are the tales which we now possess—the traditional doings of the old heroes as set in order by Christian writers.

The changes which these later copyists wrought in the substance of the tales fall into two main divisions. In the first place, they attempted to find some connexion between tales or cycles of tales which originally had no connexion whatever, and were therefore forced to invent new incidents or to introduce other incidents from the outside in order to establish this connexion; and secondly, as in the case of the *Gododin*, the tales were twisted and altered to support references to and explanations of names known to the writer. So we find in the tale of *Math vab Mathonwy* the incident of the pigs is expanded to explain some place-names which the writer knew. It is this also that gives a local interest to the tales; for instance, *Dyvet*, the land of *Pwyll*, has come to be regarded as the home of *Hud a Lledrith*, of magic and

enchantment. Some places in North Wales, especially in the vicinity of Carnarvon, seem to be well known to the writers, and, therefore, to have associated with them to all time the glamour of the Mabinogion.

Besides the scholastic efforts of the monks, which in course of time so greatly changed these old legends, there was another class of men who had no little influence on the form and matter of Welsh, and consequently of European, romance. These were the Welsh jongleurs—the professional story-tellers, against whom the bards proper nursed a deadly hatred because, presumably, their tales drew larger audiences and won greater rewards than the *awdlau* of the poets. There is little doubt that this order existed in Wales at a very early period, being quite a natural evolution of the older poet who sang in comparatively free metres of the deeds of the great dead. It is these men who invented the term *Mabinogi*, which is supposed to mean a "tale for young people"; but whatever the word may mean, the fact that they were the stock-in-trade of the professional story-teller will explain a good many of their structural peculiarities.

Thus there existed two distinct classes of tales, though it is to be supposed that the subject matter of both was more or less common; there are, in the first place, the "four branches" and the tales of the second class, and, secondly, tales like those of the third class. With the exception of the Irish influence, which we have already referred to, and some later additions from early continental romance in the third class, we may take it that these three classes are of purely British origin. The *pedair cainc* are the old tales which were first committed to writing at an early period before the influence of the Armoric Arthur began to be felt, that is to say, about the beginning of the reign of Rhys ab Tewdwr in 1073. The other tales, that is those we have put in the third class, remained for a much longer time unwritten and were not set in writing before the early Arthur of Armoric and British romance had been evolved. This will account for the fact that Arthur is not mentioned in the first class of tales, and that in the third class he is simply a British Arthur. The third class is, therefore, in a sense later than the first and second, but its materials are as old as the oldest of the Mabinogion proper, and they show the influence of Irish mythology to the same extent. In the first class Irish names like *Penardim*, which have not been assimilated, show conclusively that the tale is a written one, while the eloquence of the descriptions in *Kilhwch ac Olwen* seem to point to the fact that it was up to a late period a *spoken* tale. Other such tales there were once, but they have now been lost.

The romances of the fourth class do not claim much notice. They are mostly imitations or translations of Norman French originals, and they belong to the history of European chivalry rather than to the history of Welsh literature.

As literature the Mabinogion may rank among the world's classics. We cannot here point out their beauties, but it will be sufficient to notice that the unknown writer who gave them their final form was a true artist in every sense of the word. In *Branwen verch Lyr*, for instance, the whole setting of the story is that of a great tragedy, a tragedy neither Hellenic nor Shakespearean, but the strong and ruthless tragedy of the Celts,—the tragedy of nature among unnatural surroundings, the tragedy which in our times Mr Thomas Hardy has so successfully developed. In this tale, Branwen is introduced as the sister of Manawyddan, the king of all Britain, and as the "fairest maid in the world." But as the tragedy deepens we read how this woman, dowered with beauty and goodness and nobility of lineage, is simply used as a pawn in a political game, and the full force of the tragedy falls on her own undeserving head. She is subjected to all kinds of indignities in her husband's court in Ireland, but throughout all her severe trials she preserves the cold and detached haughtiness which characterizes the full-bosomed heroines of the northern sagas; and, in the end, when her brother has delivered her and punished the Irish, and when she has safely reached the shores of her own Môn, she raises her eyes and beholds the two islands, Britain and Ireland. "'Ah God!' said she, 'is it well that two islands have been made desolate for my sake?' And she gave a deep groan and died." So was her tragedy consummated, and the writer, with a superb tragic touch, mentions the very shape of the grave in which they left her on the bank of the Alaw in Môn.

One of the earliest poets of this period whose productions we can be certain of is Meilir, bard of Trahaern, whom Gruffydd ab Cynan defeated at the battle of Carn, and afterwards of the conqueror Gruffydd himself. His best piece is the *Death-bed of the Bard*, a semi-religious poem which is distinguished by the structure of the verse, poetic feeling and religious thought. Meilir was the head of a family of bards; his son was Gwalchmai, one of the best Welsh poets; the latter had two sons, Einion and Meilir, some of whose poetry has reached us. In *Gorhoffedd Gwalchmai*, Gwalchmai's Delight, there is an appreciation of the charms of nature, medieval parallels to which are only to be found in Ireland. His *Arwyrain i Owain* is an ode of considerable beauty and full of vigour in praise of Owain Gwynedd, king of North Wales, on account of his victory of Tal y Moelvre, part of which has been translated by Gray under the name of "The Triumphs of Owen.' Kynddelw, who lived in the second half of the 12th century, was a contemporary of Gwalchmai, and wrote on a great number of subjects including religious ones; indeed some of his eulogies have a kind of religious prelude. He had a command of words and much skill in versification, but he is pleonastic and fond of complicated metres and of ending his lines with the same syllable.

Among the other poets of the second half of the 12th century may be mentioned Owain Kyveiliog and Howel ab Owain Gwynedd. The first named was prince of Powys, and was distinguished also as a soldier. The *Hirlas*, or drinking-horn, is a long poem where the prince represents himself as carousing in his hall after a fight; bidding his cup-bearer fill his great drinking-horn, he orders him to present it in turn to each of the assembled warriors. As the horn passes from hand to hand he eulogizes each in a verse beginning *Diwallaw di venestr*, "Fill, cup-bearer." Having thus praised the deeds of two warriors, Tudyr and Moreiddig, he turns round to challenge them, but suddenly recollecting that they had fallen in the fray, and listening, as it were, to their dying groans, he bursts into a broken lamentation for their loss. The second was also a prince; he was the eldest of the many sons of Owain Gwynedd, and ruled for two years after his father until he fell in a battle between himself and his step-brother Dafydd. He was a young man of conspicuous merit, and one of the most charming poets of Wales, his poems being especially free from the conceits, trivial commonplaces, and complicated metres of the professional bards, while full of a gay humour, a love of nature and a delicate appreciation of women. The Welsh poets went on circuit like their Irish brethren, staying in each place according as hospitality was extended to them. When departing, a bard was expected to leave a sample of his versification behind him. In this way many manuscripts came to be written, as we find them in different hands. Llywarch ab Llywelyn has left us one of those departing eulogies addressed to Rhys Gryg, prince of South Wales, which affords a favourable specimen of his style.

13th century poets.

The following are a few of the poets of the 13th century whose poems are still extant. Davydd Benvras was the author of a poem in praise of Llywelyn ab Iorwerth; his works, though not so verbose or trite as bardic poems of this class usually are, do not rise much above the bardic level, and are full of alliteration. Elidir Sais was, as his name implies, able to speak the English language, and wrote chiefly religious poetry. Einiawn ab Gwgawn is the author of an extant address to Llywelyn ab Iorwerth of considerable merit. Phylip Brydydd, or Philip the poet, was household bard to Rhys Gryg (Rhys the hoarse), lord of South Wales. One of his pieces, an apology to Rhys Gryg, is a striking example of the fulsome epithets a household bard was expected to bestow upon his patron, and of the privileged domesticity in which the bards lived, which, as in Ireland, must have been fatal to genius. Prydydd Bychan, the Little Poet, was a South Wales bard whose extant work consists of short poems all addressed to his own princes. The chief feature of his *Englynion* is the use of a

kind of assonance in which in some cases the final vowels agreed alternately in each quatrain, and in others each line ended in a different vowel, in both cases with alliteration and consonance of final consonants or full rhyme. Llygad Gŵr is known by an ode in five parts to Llywelyn ab Gruffydd, written about the year 1270, which is a good type of the conventional flattery of a family bard. Howel Voel, who was of Irish extraction, possessed some poetical merit; his remonstrance to Llywelyn against the imprisonment of his brother Owain is a pleasing variety upon the conventional eulogy. It has many lines beginning with the same word, *e.g. gŵr*, man. The poems of Bleddyn Vardd, or Bleddyn the Bard, which have come down to us are all short eulogies and elegies. One of the latter on Llywelyn ab Gruffydd is a good example of the elaborate and artificial nature of Welsh versification.

The most illustrious name among the poets of this century is Gruffydd ab yr Ynad Coch, " Gruffydd, son of the Red Justice," who wrote many religious poems of great merit. His greatest work, however, is the elegy to Llywelyn ab Gruffydd, the last prince of Wales. It is easily first among all the elegies written in the Welsh language. We do not find in it that artficial grief which is too evident in the *Marwnadau* of the Welsh poets; it re-echoes an intense personal grief, and throughout the whole piece the poet feels that he stands at the end of all things,—the end of his own ideals, the extinction of all Cymric hopes. So poignant is his grief, and in so universal a manner does the catastrophe of Llywelyn's death present itself to him, that he imagines that all the natural features of the Welsh fatherland know that the last great Welshman is dead; the winds howl over the mountains, the rain-clouds gather thick, the waves rage with grief against the Welsh coasts, and far away on the hills the giant oak-trees beat against each other in the fury of their passion. Sadly, in this manner, closes the second period of Welsh literature.

4. *The Golden Age of the Cywydd, 1340–1440.*—Just as, after the loss of the North, the Welsh muse was hushed, so after the final subjugation of Wales in 1282, hardly a note was heard for many a long year. The ancient patrons of literature were dead, and the country had not yet settled down to the steady rule of England. Indeed, the conquest of Wales effectively put an end to the older Welsh poetry of that type which we noticed in the last period. These older bards were without exception subjects of the princes of North Wales, where the old heroic poetry was still popular, and when the power of these princes came to an end the old poetry too ceased. When the Welsh muse emerges again from the darkness of this interval she is no longer of the North; the new poets are drawn from the Welshmen of the South, a land which had practically ceased to be a part of an independent Wales shortly after the Norman conquest of England. We find, too, that the poetry which poured forth from the Welsh bards of the south is of an altogether different type; it is modern in all its essentials, in diction, in language, and, comparatively speaking, in sentiment. Indeed, there is an infinitely greater difference between Dafydd ab Gwilym and Gruffydd ab yr Ynad Coch than there is between him and any poet writing in the alliterative metres in the 19th century. So that we must suppose that at the time when the poets of North Wales still sang of war and mead-drinking in a style and diction that was an inheritance from the times of the *Gododin*, the poets of the South, unharassed by wars, were developing a new poetry of their own, a poetry that had relinquished for ever the Old Welsh models and was at last in line with the great poetical movements of Europe. And, judging from the fact that the earliest of these poets whose works are accessible to us are in the full zenith of their poetical development, we must believe that their work is the consummation of a period, that is to say, that they must have had a long line of predecessors whose works were lost during the period intervening between the loss of Welsh independence and the rise of Dafydd ab Gwilym. These men wrote, as we have already said, in South Wales, a country which was then under the rule of the Norman lords, who, with the lapse of years and the rise of new systems, were fast becoming Welsh. It is no wonder, then, that the poets who wrote under their patronage should show unmistakable traces of Norman influence. Most of the barons still spoke French, and it was only natural that they should be well versed in French poetry. The poets followed the lead of their patrons, and their work was modelled to a very great extent on French and Provençal poetry. Nor does this account altogether for the wonderful similarity between Welsh *cywyddau* and other poems of this period and the French lays; we must remember that the Welsh poets lived under conditions similar to those under which the troubadours and the trouvères lived, and it was natural that the same environments should produce the same kind of work. The Provençal *alba* and the French *aube*, the *serenade* and other forms, became well known in South Wales and were of course read by the Welsh poets. We find continual references in the poets to " books of love " under the name of *llyfr Ofydd*, or the " book of Ovid," and a reference in one of Dafydd ab Gwilym's poems shows conclusively that one particular *llyfr Ofydd* was a work of the French poet Chrestien de Troyes. Indeed, one of the commonest names among the poets of this period—the *llatai*,[1] or love-messenger—may be a Romance word borrowed through the Norman-French from the Italian *Galeotto*, originally the name of the book of the loves of Galahaad, but afterwards the ordinary word for a go-between. This book of Galeotto, by the way, was the book which taught Paolo and Francesca da Rimini, in Dante's *Divina Commedia*, the tragic secret of love.

Another movement also was favourable to the rise of the new Welsh poetry. The iron hand of the church, which had been the censor of poetry for so many centuries, was slowly relaxing its grasp, and the men who a few years before would have sung religious hymns to the Virgin, now laid their tributes at the feet of divine womanhood as they saw it in the Welsh maidens and matrons living among them. The pale queen of heaven no longer held hearts captive; they had transferred their allegiance to the " brow that was as the snow of yesternight," and " the cheeks that were like the passion-flower." The Iolo MSS. assert that some time between January 1327 and November 1330 there were held, under the patronage of Ivor Hael, Dafydd ab Gwilym's patron, and others, the three *Eisteddfodau Dadeni*, or the Eisteddfods of the Revival of the Muse, to reorganize the bards, and to set in order all matters pertaining to Welsh poetry. The most important bards who are reported as present at some or all of these meetings were Dafydd ab Gwilym, Sion Cent, Rhys Goch of Eryri, and Iolo Goch. It is now, however, generally agreed that this account is a fabrication and that the date of all the poets is later.

Dafydd ab Gwilym.

Dafydd ab Gwilym is certainly the most distinguished of all the Welsh poets, and were it not for the absolute impossibility of adequately translating his *cywyddau* he would rank amongst the greatest poets of medieval times. By far the greater part of his poetry is written in the metre called *cywydd*, with heptasyllabic lines rhyming in couplets. It was he who imparted so much lustre to this metre that it became the vehicle of all the most important poetry from his time to the 19th century, and he is generally referred to by his contemporaries as the special poet of the cywydd—*Dafydd gywydd gwin*, " Dafydd of the wine-sweet cywydd." Most of his poems deal with love in the spirit of the medieval writers of France and of Provence, but with this very important difference, that the French writers must base their reputation on their treatment of love as a theme, whereas Dafydd's claim to fame is based on his treatment of nature and of out-door life. In many cases, indeed, love is only a conventional peg whereon he may hang his observations on nature, and Welsh literature may claim the distinction of having had its Wordsworth in the 14th century. His treatment of nature is not merely realistic and objective, it has a certain quaint and elusive symbolism and a subjectiveness which come as a revelation to those who are acquainted with the medieval poetry of other nations. Many

[1] Another derivation of this word is from *llad*, " profit " + *hai*, a suffix denoting the agent. Others derive it from or connect it with the Irish *slad-*.

of the poems attributed to him are undoubtedly the work of later hands, but even after making all possible deductions, there is still an infinite variety among what remains, ranging as his poems do from a sturdy denunciation of monkish fraudulence to the most delicate and pathetic recollections of departed joys. He has, besides, considerable importance as a teacher, as when, for instance, he invites the nun "to leave her watercress and paternosters of Romish monks," and to come with him "to the cathedral of the birch to listen to the cuckoo's sermons," for, "were it not an equally worthy deed to save his (Dafydd's) soul in the birch-grove as to do so by following the ritual of Rome and St James of Compostella"? Even in his old age, when he is beginning to repent of his rash and merry youth, nature has not deserted him,—the very tree under which in the old days he used to meet his sweetheart has become bent and withered in sympathy with him. Though Dafydd yields not the palm to any poet of his class throughout the world, and though his influence is still a potent factor in the literature of Wales, we are certain of hardly a single fact about his life. He flourished between 1340 and 1390. His works were published in London in 1789. This edition was reprinted by Ffoulkes of Liverpool in 1870. See L. C. Stern, *Zeitschr. f. celt. Phil.* vol. vii.

Sion Cent was chaplain to the Scudamores of Kentchurch in Herefordshire, and though, therefore, in orders, was a most bitter opponent of the pretentious and the evil life of the monks of his time. All his writings show signs of the influence of the moralists of the middle ages, and treat of religious or of moral subjects. His poetry is strong and austere, interfused here and there with the most biting satire. He died about 1400. Like many of his contemporaries, Dunbar, Villon, Menot and Manrique, his dominant note is that of sadness and regret.

Rhys Goch Eryri had a sprightly muse which deals with fanciful subjects. His themes are often similar to those of Dafydd ab Gwilym, but whereas the subject of Dafydd's muse was nature and his treatment universal, Rhys Goch's are simply natural objects which he treats in a vigorous but narrow and cold manner.

Iolo Goch, that is, Iorwerth the Red, deserves a special mention as the poet who voiced the aspirations of a new Wales when Owen Glyndwr began to rise into power, and it is to one of his poems that we owe a most minute description of Sycharth, Owen Glyndwr's home. His poetry is slightly more archaic in diction than that of his contemporaries, as his subject—war and the glory of Welsh heroes—belonged more properly to the age before his own. In one very striking *cywydd* composed after Glyndwr's downfall, he calls upon this hero to come again and claim his own, and addresses himself fancifully to all the countries of the world where his hero may be in hiding. He died after 1405, and, if the dates generally given for his birth be even approximately correct, he must have lived to a prodigious age (cf. *Gweithiau Iolo Goch*, by Charles Ashton, London, 1896).

Rhys Goch ap Rhiccert claims to be named with Dafydd ab Gwilym as a writer of lyrics in praise of beautiful women. He has one advantage, however, over his more famous contemporary in the variety of his metres. The musical lilt and the delicate workmanship of his poems, with their recurring refrain, give him a unique position among his medieval contemporaries as the first purely lyrical poet. His *floreat* is probably a little later than that of Dafydd ab Gwilym, for we must not be misled by the late orthography of his poems.

Dafydd Nanmor is chiefly famous for two exquisite cywyddau, *Cywydd Marwnad Merch*, or Elegy of a Maiden, and *Cywydd i wallt Llio*, or Cywydd to Llio's Hair. In both these poems he shows elegance rather than depth, and a fancy as bold as that of his great master Dafydd. In the first of these cywyddau his grief is so great that he wishes that he were but the shroud around his dead sweetheart, and, in the second, Llio Rhydderch's golden hair over her white brow is compared to the refulgence of lightning over the fine snow. He is supposed to be a younger contemporary of Rhys Goch Eryri, but there are many facts to warrant a supposition that he lived much later, even as late as 1490.

Llywelyn Goch ap Meurig Hen deserves to be mentioned as the author of the famous *Marwnad Llewelyn Llwyd*, an elegy which is far more convincing in its sincerity than Dafydd Nanmor's *cywydd*. Few of his compositions are extant, but the one already mentioned is sufficient to place him in the first rank of the poets of the period. He lived approximately from 1330 to 1390.

The other poets of this period who deserve some mention are Dafydd Ddu o Hiraddug, who wrote poems on religious subjects, and who is supposed to have translated part of the *Officium Beatae Mariae* into Welsh; Gruffydd Grug, between whom and Dafydd ab Gwilym a most fierce poetic quarrel raged, but who is the author of a beautiful elegy on his opponent; Gruffydd Llwyd ab Dafydd, who was the poet of Owen Glyndwr, and whose cywydd in praise of his patron is one of the best of that type; Hywel Swrdwal and Gwilym ab Ieuan Hen.

5. *The Silver Age of the Cywydd, 1440–1550.*—The insurrection of Owen Glyndwr, though originally the result of a private quarrel, was the general revolt of a nation against the conquerors whom it hated, and the English king knew well enough that the discontent with his rule was fanned by the older and more national Welsh institutions, and by none more than by the system of wandering bards. The conditions which had given rise to this system were fast dying out, but the noblemen, who fortunately were still intensely Welsh, were loth to give up their family bards, and the bards themselves, never a too industrious class, were too glad of their freedom and easy life to turn to more profitable work. We find, therefore, that a law was passed in 1403, the fourth year of Henry IV.'s reign, prohibiting bards "and other vagrants" from exercising their profession in Gwynedd or North Wales. This law, however, like its predecessor in the reign of Edward I., failed utterly in its purpose. By prohibiting the Welsh noblemen from giving their patronage to the bards, and, therefore, from distinguishing between the real bards and the mendicant rhymesters, this law took away the only safeguard against the latter class, with the result that by about 1450 they had become a pest to the country. About that time there flourished a poet called Llawdden, who, noticing the very unsatisfactory state of poetry in Wales, induced his kinsman, Gruffydd ab Nicolas, a nobleman living in Y Drenewydd (Newtown), to petition Henry VI. for permission to hold an eisteddfod similar in purpose to the three *Eisteddfodau Dadeni* of the last period. This famous eisteddfod was held at Caerfyrddin (Carmarthen) in 1451, and shortly before the actual eisteddfod was held a "statute" was drawn up under the direction of Llawdden, regulating the different orders of bards and musicians and setting in order the *cynghaneddion a mesurau*, the different kinds of alliterative verse to be presented to the assembled bards at the meeting. Among those present at that eisteddfod the most distinguished was Dafydd ab Edmwnd, who then made famous the dictum that the purpose of an eisteddfod was "to bring to mind the past, to consider the present, and to deliberate about the future." He, therefore, proposed emendations in "the rules of Welsh verse," making them more strict, so as to keep the unlearned rhymesters from the privileged bardic class. This measure had a most important effect on Welsh literature. It effectively put an end to the charming spontaneity which distinguishes the poetry of Dafydd ab Gwilym and his contemporaries, and by introducing an arbitrary set of rules gave an artificial tone to almost all the poetry of the next two hundred years. It had, indeed, exactly the same retarding effect on Welsh poetry as the Unities had on the French drama. So that, whereas the poems of Dafydd ab Gwilym, though written in the difficult alliterative metres, are nearly all light and have a sweet lyrical re-echo, the poetry of Dafydd ab Edmwnd and his successors is often heavy and nearly always artificial. After making, however, all these deductions, it is a debatable point whether the hard and fast rules which now regulated Welsh poetry did not eventually justify their existence. They have helped, by inciting to carefulness, to keep the idiom and the language pure and undefiled, and to this day style in Welsh

Eisteddfod of 1451.

poetry is not necessarily a striving after the uncommon as it too often is in English.

There are some poets included in this period who belong more properly to the last, but even these show signs of the attempt at correctness and distinction which was supplanting the old simplicity. Ieuan ap Rhydderch ab Ieuan Llwyd, who is supposed to be a brother of the Llio Rhydderch of Dafydd Nanmor's poem, is the author of some cywyddau and other poems addressed to the Virgin, the structure of which shows great skill accompanied by force and clearness. He flourished about 1425. Dafydd ab Meredydd ap Tudur, who flourished about 1420, is the author of a cywydd "to Our Saviour." About the same time lived Rhys Nanmor, Ieuan Gethin ab Ieuan, and Ieuan Llwyd ab Gwilym. Among the earliest of the poets who belong properly to this period is Meredydd ap Rhys, whose cywyddau are a fair specimen of the generality of poems written in these years. Among the most famous of his works is a cywydd "begging for a fishing-net," and another giving thanks for the same. We shall find that many of his contemporaries were able to write long and interesting poems on such seemingly dry and uninteresting subjects, but it is vain to look for anything beyond good verse in such compositions. Of poetry, as generally understood, there is none.

The commanding figure in this period is, of course, Dafydd ab Edmwnd, who was a disciple of Meredydd ap Rhys. He bears somewhat the same relation to his contemporaries as Dafydd ab Gwilym does to his, and to strain an analogy, we might say that as Dryden was to Milton, so Dafydd ab Edmwnd was to Dafydd ab Gwilym. He was regarded by his contemporaries as the greatest poet that North Wales had ever produced, and some would set him up as a rival even to Dafydd ab Gwilym himself. He would probably have produced much greater poetry had he understood that the cywydd and the other metres were strait and shackled enough without the *cymeriadau* and other devices which he introduced, or at least sanctioned and made popular. He begins many of his cywyddau and odes with the same letter; he is the chief among Welsh formalists, but in spite of his self-imposed restrictions he is a great poet also. His most famous poems are three *Cywyddau Merch* or "Poems to a Lady," and his *Cywydd i Wallt Merch*, "cywydd to a lady's hair." He is the author of the lines already quoted: "thy brow," he sings, "is as the snow of yesternight, and thy cheeks like a shower of roses." He died about 1480. Dafydd ab Edmwnd's disciples were Gutyn Owain and Tudur Aled, who was also his nephew. Gutyn Owain lived between 1420 and 1500, and was one of the men appointed by the king's commissioners to trace, or perhaps to manufacture, the Welsh pedigree of Henry VII. He belonged entirely to the school inaugurated by Dafydd ab Edmwnd, and though he was by no means wanting in imagination, the highest distinction of his verse is its intricacy of form and very often the felicity of his couplets.

Dafydd ab Edmwnd.

Just as the rise of Owen Glyndwr in the beginning of the century had given a new impulse and a new interest to poetry, so in 1485, when Henry VII.—the "little bull" as he is called by the poets—ascended the throne of England, a particular kind of poetry called *brud*, half history and half prophecy, became popular, and we have in the manuscripts much writing of this description, a good deal of it worthless as poetry. Occasionally, however, some of these "bruts" may claim to be called poetry, especially the compositions of Robin Ddu o Fon, who wrote poems in praise of the Tudors and hailed them as the deliverers of the nation, even before Henry VII. had landed in England, and Dafydd Llwyd ab Llywelyn, whose works deserve to be much better known than they are at present. One of the best cywyddau among his works is the "Address to the Raven," to whom he promises a right royal feast when the hero whom all Wales is expecting has met his royal enemy. Tudur Aled, too, was a zealous partisan of Henry VII. and wrote many cywyddau in praise of Sir Rhys ap Thomas, the great champion of Henry's cause in South Wales. He is also famous as having supplemented and made a new recension of Dafydd ab Edmwnd's rules of poetry in the eisteddfod held at Caerwys in 1524. Tudur Aled has always been more widely known in Wales than almost any other of the earlier poets except Dafydd ab Gwilym. This is perhaps due to the quotability and sententiousness of his couplets. There is a certain refreshing dryness about his poetry which partly makes up for his want of imagination. One of the most interesting poets of this century is Lewis Glyn Cothi, who lived between 1410 and 1490. During the Wars of the Roses he was a zealous Lancastrian, and his bitterest enemies were the men of Chester, who had treated him scurvily while he was there in hiding, and his *awdl*, satirizing the men of that city, is one of the most vigorous compositions in the language. Indeed, among so many *cywyddau* of this period in conventional praise of different patrons, it is most refreshing to find such an outburst of sincere personal feeling, boldly and fiercely expressed. He wrote an *awdl* also rejoicing in the victory of Henry VII. Most of his work, however, consists of *cywyddau mawl*—praise of patrons—containing weary and unpoetical pedigrees. Gruffydd Hiraethog, who flourished about 1540, was a disciple of Tudur Aled. A fierce poetical dispute raged between him and Sion Brwynog of Anglesey, who was a contemporary of his. About this time there were many poets in Wales who were imitators of Dafydd ab Gwilym, and who did not follow implicitly the lead of Dafydd ab Edmwnd, like those whom we have mentioned. Much of their poetry is feeble, but Bedo Brwynllysg especially stands out from among the rest, and his poetry, though highly imitative and often over fanciful, is of a much higher order than the genealogical poems of Lewis Glyn Cothi and others. In the same way the only poem of any merit of Ieuan Denlwyn printed in the *Gorchestion* is written in this imitative strain. Other poets of the middle of this period are Deio ap Ieuan Du, Iorwerth Fynglwyd, Lewys Morganwg, Ieuan Brydydd Hir, and Tudur Penllyn, who wrote a superb *cywydd* to Dafydd ab Siencyn, the outlaw.

Towards the end of the period we begin to breathe a literary atmosphere that is gradually but surely changing,—it is the change from the misty Wales of Roman Catholic times to the modern Wales after the Reformation. The poetical incoherencies of the old metres and the tricks of fancy of the old stylists occasionally form a somewhat incongruous dress for the thoughts of later poets. The old spirit and the glamour were gradually wearing away, only to be momentarily revived in the poetry of Goronwy Owen, nearly two centuries later. Two or three figures, indeed, stand out prominently during these years, among whom are some of the bards ordained *penceirddiaid* (master-poets) in the second Caerwys Eisteddfod held in 1568, viz. William Llŷn, William Cynwal, Sion Tudur, and Sion Phylip. William Llyn (1530?–1580) was a pupil of Gruffydd Hiraethog. His complicated *awdlau* are marvels of ingenuity, but many of them are on that very account almost unintelligible. He was, however, a complete master of the *cywydd*, in which he sometimes displays a sense of style and a sweetness of imagery allied to a melodiousness of language unequalled by the other poets of the period. His best-known work is the famous *marwnad* to his master, Gruffydd Hiraethog. Sion Tudur (d. 1602), also a disciple of G. Hiraethog, was connected in some capacity or other with the cathedral at St Asaph. He is a realist, and delights in giving vivid word pictures in a less fanciful strain than his predecessors. Sion Phylip (1543–1620) wrote a famous *marwnad* to his father and a *cywydd* "to a sea-gull," which is a superb piece of nature-painting in the style of Dafydd ab Gwilym. While dealing with this second Eisteddfod at Caerwys, we may note that Simwnt Fychan's "Laws of Poetry" were accepted at this festival.

Two poets of this period, whom an English writer describes a "the two filthy Welshmen who first smoked publicly in the streets," were captains in Queen Elizabeth's navy, viz. Thomas Prys (d. 1634) of Plas Iolyn, and William Myddleton (1556–1621), called in Welsh Gwilym Canoldref. The former wrote, among other things, humorous *cywyddau* descriptive of life in London and in the English navy of those days, in a style which was afterwards attempted by Lewys Morys. The work of

Myddleton, by which he is best known, is his translation of the Psalms (1603) into Welsh *cywydd* metre, a difficult and profitless experiment.

With Edmwnd Prys (1541–1624), the famous archdeacon of Merioneth, we come to distinctly modern times. He is hardly a great poet, if we judge him by the canons which are now popular. His gift was a gift of terse and biting statement, and his *cywyddau* on the whole have more of literary than of poetical merit. He was a man of vast learning, and his works are full of scholastic and often difficult allusions. His most famous *cywyddau* are those written in the literary quarrel between him and Wiliam Cynwal. "Wiliam Cynwal," says Goronwy Owen, "though the greater poet, was like a man fighting with bare fists against complete armour," and it may be freely granted that in this, the most famous quarrel in Welsh literature, the palm of victory rested with the contentious old ecclesiastic. We shall deal with the rest of Edmwnd Prys's literary work in the section on the rise of popular poetry.

Here the age of the *cywydd* and the *awdl*, as the chief forms of verse, ends. They appear again in the succeeding centuries, but as aliens among a nation that no longer paid them homage. The distinctly Welsh fashion in song was dying out.

6. *Prose, 1550–1750.*—One of the most striking features of Welsh literature is the almost entire absence of prose between 1300 and 1550. The genius of the people has always been an eminently poetical and imaginative one, and the history of Wales, politically and socially, has always been a fitter subject for poetry than for prose. During this period, Wales enjoyed a rest from propagandists and revolutionaries which has seldom been the happy lot of any other nation—they lay content with their own old traditions, acquiescing proudly in their separation from the other nations of Europe, and in their aloofness from all the movements which shook England and the continent during those years. Dynasties came and went, one religion ousted another religion, a new learning exposed the absurdities of the old, but the Welsh, among their hills, knew nothing of it; and when new ideas began to brood over the consciousness of the nation, they never got beyond the stage of providing new subjects for *cywyddau*. The Peasant Revolt, for instance, had but little effect on Welsh history, its most important contribution to the heritage of the nation being Iolo Goch's superb "*Cywydd* to the Labourer." Even the Reformation, which helped to change the whole fabric of English literature, had little effect on that of Wales, and the age of the *cywydd* dragged out wearily its last years without experiencing the slightest quickening from the great movement which was remaking Europe. Hardly a prophet or reactionary raised his voice in defence or condemnation, and the Welsh went on serenely making and reading poetry. The two political movements in which Wales was really interested, the revolt of Glyndŵr and the accession of Henry VII., paid their tribute to its poetry alone, and both enterprises had sufficient of romance in them to repel the historian and to capture the poet. Naturally, therefore, we have no prose in this period, because there was no cause strong enough to produce it. What prose the nation required they found in the tales of romance, in the legends of Arthur and Charlemagne and the Grail, and, as for pedigrees and history, were they not written in the *cywyddau* of the poets?

The little prose that was produced during this period (1300–1550) was of an extraordinary kind. It was simply an exercise in long sentences and in curiously built compounds, and therefore more nearly allied to poetry. It generally took the form of *dewisbethau*, a list of the "choice things" of such and such a person, or of the later triads (*trioedd*), which, starting from an ancient nucleus, gradually grew till, at the present day, Wales has a gnomic literature out of all proportion to the rest of its prose. Modern Welsh prose, however, is only very indirectly connected with these compositions. It is almost altogether a product of the Biblical literature which began to appear after the Reformation, and we shall proceed to give here the main facts and dates in its development. The first Welsh book was printed in 1546. It consisted of extracts in Welsh from the Bible and the Prayer Book, and a calendar. The author was Sir John Prys (1502–1555). The most important name in the early part of this period is William Salesbury (1520?–1600?). His chief books were, *A Dictionary in Englyshe and Welshe* (printed in 1547, and published in facsimile reprint by the Cymmrodorion Society), *Kynniver Llith a Ban* (1551), the Prayer Book in Welsh (1567), and the most important of all his works, the translation of the New Testament (1567). It is difficult to form any estimate, at this distance of time, of the impetus which William Salesbury gave to Welsh prose, but it must be regretfully admitted that his great work was marred by many defects. He had a theory that Welsh ought to be written as much like Latin as possible, and the result is that his language is very poor Welsh, both in spelling and idiom; it is an artificial dialect. It is a striking testimony, however, to his influence that many of the constructions and words which he manufactured are found to this day in correct literary Welsh.

In 1567 was published a *Welsh Grammar* by Dr Gruffydd Roberts, a Roman Catholic priest living at Milan (reprinted in facsimile, Paris, 1883), and in 1583, under the direction of Dr Rhosier Smyth, his *Drych Cristionogawl* was published at Rouen. Many other important Welsh books were produced during these years, but the work which may be regarded as having the greatest influence on the subsequent literature of Wales was the translation of the *Welsh Bible* (1588) by Dr William Morgan (1547?–1604), bishop of Llandaff, and afterwards of St Asaph. The Authorized Version (1620) now in use is a revision of this work by Dr Richard Parry, bishop of St Asaph (1560–1623). In 1592 the *Welsh Grammar* of Sion Dafydd Rhŷs (1534–1609) was published—a most valuable treatise on the language and on the rules of Welsh poetry. It was followed in 1621 by the *Welsh Grammar*, and in 1632 by the *Welsh Dictionary* of Dr John Davies o Fallwyd (1570?–1644).

There are two prose compositions which stand entirely by themselves in this period of Bibles and grammars—the *History* of Ellis Gruffydd, and Morris Kyffin's *Deffyniad y Ffydd*. The former was a soldier in the English army during the reign of Queen Elizabeth, and wrote a long history of England from the earliest times to his own day. This document, which has never been published, and which lies hidden away among the Mostyn MSS., is a most important and valuable original contribution to the history of the author's contemporaries, and it sheds considerable light on the inner life of the court and the army. It is written in a delightfully easy style, contrasting favourably with the stiff diction of this period of translations. The work of Morris Kyffin (1555?–1598?) which we have mentioned is a translation of Bishop Jewel's *Apologia Ecclesiae Anglicanae* (1562) and was published in 1595. This work is the first piece of modern Welsh prose within reach of the ordinary reader, written in the rich idiom of the spoken Welsh. It is a precursor of many other books of its kind, a long series culminating in the immortal *Bardd Cwsc*. In this sense Morris Kyffin may with perfect justice be hailed as the father of modern Welsh prose.

Most of the works which were afterwards written in the strong idiomatic Welsh of Morris Kyffin were on religious subjects, and many of them were translated from the English. The first was *Ymarfer o Dduwioldeb* (1630) by Rowland Vychan o Gaergai (a translation of Bailey's *Practice of Piety*), which was followed in 1632 by Dr John Davies's *Llyfr y Resolution*, and in 1666 by *Hanes y Ffydd Ddiffuant* (A History of the True Faith) by Charles Edwards. All these authors and many of their successors were strong adherents of the Established Church, which was then intensely Welsh in sentiment. But in the midst of these churchmen, a flame-bearer of dissent appeared—Morgan Llwyd o Wynedd, who published in 1653 "a mystery to be understood of some, and scorned of others"—*Llyfr y Tri Aderyn* (The Book of the Three Birds). It is in the form of a discussion between the eagle (Cromwell), the dove (Dissent) and the raven (the Established Church). This book is certainly the most important original composition published during the 17th century, and to this day remains one of the widely-read classics of the Welsh

tongue. Morgan Llwyd wrote many other books in Welsh and English, all more or less in the vein of the first book.

During the remaining years of this period, the prose output of the Welsh press consisted mainly of devotional books, written or translated for or at the instigation of the Society for Promoting Christian Knowledge. The Established Church, with the help of this society, made a gallant attempt to lighten the darkness of Wales by publishing books of this description, and it is mainly due to its exertions that the lamp of Welsh prose was kept burning during these years. Among the clergy who produced books of this description were Edward Samuel (1674–1748), who published among other works *Holl Ddyledswydd Dyn*, a translation of *The Whole Duty of Man* (1718); Moses Williams (1684–1742), a most diligent searcher into Welsh MSS. and translator; Griffith Jones of Llanddowror (1683–1761), the father of Welsh popular education; Iago ab Dewi (1644 ?–1722) and Theophilus Evans (1694–1769), the famous author of *Drych y Prif Oesoedd* (1716 and 1740). This book, like *Llyfr y Tri Aderyn* and *Y Bardd Cwsc*, has an established position for all time in the annals of Welsh literature.

We come now to the greatest of all Welsh prose writers, Ellis Wyn o Lasynys (1671–1734). His first work was a translation of Jeremy Taylor's *Holy Living*, under the title of *Rheol Buchedd Sanctaidd* (1701). His next work was the immortal *Gweledigaethau y Bardd Cwsc* (1703). The foundation of this work was L'Estrange's translation of the *Suenos* of the Spaniard Quevedo. Ellis Wyn has certainly followed his original closely, even as Shakespeare followed his, but by his inimitable magic he has transmuted the characters and the scenery of the Spaniard into Welsh characters and scenery of the 17th century. No writer before or after him has used the Welsh language with such force and skill, and he will ever remain the stylist whom all Welsh writers will strive to imitate. The magic of his work has endowed the stately idiom of Gwynedd with such glamour that it has now become the standard idiom of Welsh prose. See Stern, *Z. f. celt. Phil.* iii. 165 ff.

7. *The Rise of Popular Poetry, 1600–1750.*—When Henry VII. ascended the throne, the old hostility of the Welsh towards the English disappeared. They had realized their wildest hope, that of seeing a Welshman wearing "the crown of London." Naturally enough, therefore, the descendants of the old Welsh gentry began to look towards England for recognition and preferment, and their interest in their own little country necessarily began to wane. The result was that the traditional patrons of the Welsh muse could no longer understand the language of the poets, and the poets were forced to seek some more profitable employment. Besides, the old conditions were changing; the medieval traditions were indeed dying hard, but it gradually and imperceptibly came about that the poets of the older school had no audience. The only poets who still followed the old traditions were the rich farmers who "sang on their own land," as the Welsh phrase goes. A new school, however, was rising. The nation at large had a vast store of folk-poetry, full of all the poetical characteristics of the Celt, and it was this very poetry, despised as it was, that became ultimately the groundwork of the new literature.

The first landmark in this new development was the publication in 1621 of Edmwnd Prys's metrical version of the Psalms (followed by later editions in 1628, 1630, 1638 and 1648), and of the first poem of the *Welshmen's Candle* (*Cannwyll y Cymry*) of Rhys Pritchard, vicar of Llandovery (1569–1644). This was published in 1646. These works were not written in the old metres peculiar to Wales, but in the free metres, like those of English poetry. The former work is of the utmost importance, as these Psalms were about the first metrical hymns in use. They are often rugged and uncouth, but many of the verses—such as the 23rd Psalm—have a haunting melody of their own, which grips the mind once and for ever. The second work, the first complete edition of which was published in 1672, consisted of moral verses in the metres of the old folk-songs (*Penillion Telyn*), and for nearly two centuries was the "guide, philosopher and friend" of the common people. Many other poets of the early part of this period wrote in these metres, such as Edward Dafydd o Fargam (fl. 1640), Rowland Fychan, Morgan Llwyd o Wynedd and William Phylip (d. 1669). Poetry in the free metres, however, was generally very crude, until it was given a new dignity by the greatest poet of the period, Huw Morus o Bont y Meibion (1622–1709). Most of his earlier compositions, which are among his best, and which were influenced to a great extent by the cavalier poetry of England, are love poems, perfect marvels of felicitous ingenuity and sweetness. He fixed the poetic canons of the free metres, and made what was before homely and uncouth, courtly and dignified. He wrote a *cywydd marwnad* to his contemporary, Edward Morus o'r Perthi Llwydion (d. 1689), who was also a poet of considerable merit. Most of his work is composed of "moral pieces" and carols. Other poets of the period were Sion Dafydd Las (1650–1691), who was among the last of the family bards, and Dafydd Jones o Drefriw (fl. 1750). Towards the end of the period comes Lewys Morys (1700–1765). His poetry alone does not seem to warrant his fame, but he was the creator of a new period, the inspirer and the patron of Goronwy Owen. According to the lights of the 18th century, he was, like his brothers Richard and William, a scholar. His poetry, except a few well-known pieces, will never be popular, because it does not conform to modern canons of taste. His greatest merit is that he wrote the popular poetry then in vogue with a scholar's elegance.

8. *The Revival, 1750–1830.*—The two leading figures in this period are Goronwy Owen (1722–1769) and William Williams, Pantycelyn (1717–1791). Goronwy Owen wrote all his poetry in the *cynghanedd*, and his work gave the old metres a new life. He raised them from the neglect into which they had fallen, and caused them to be, till this day, the vehicle of half the poetical thought of Wales. But he was in no way a representative of his age; he, like Milton, sang among a crowd of inferior poets themes quite detached from the life of his time, so that he also, like his English brother, lacks "human interest." After Dafydd ab Gwilym, he is the greatest poet who sang in the old metres, and the influence of his correct and fastidious muse remains to this day. William Williams, however, wrote in the free metres in a way that was astoundingly fresh. It is not enough to say of him that he was a hymnologist; he is much more, he is the national poet of Wales. He had certainly the loftiest imagination of all the poets of five centuries, and his influence on the Welsh people can be gauged by the fact that a good deal of his idiom and dialect has fixed itself indelibly on modern literary Welsh. Besides the hymns, he wrote a religious epic, *Theomemphus*, which is to this day the national epic of evangelical Wales. Even as Goronwy Owen is the father of modern Welsh poetry in the old metres, so William Williams is the great fountain-head of the free metres, because he set aflame the imagination of every poet that succeeded him. With two such pioneers, it is natural that the rest of this period should contain many great names. Thomas Edwards (Twm o'r Nant) (1739–1810) has been called by an unwarrantably bold hyperbole, "the Welsh Shakespeare." Most of his works are interludes and ballads, and he used to be very popular with the common people; he is, to this day, probably the oftenest quoted of all the Welsh poets. William Wynn, rector of Llangynhafal (1704–1760), is the author of a "*Cywydd* of the Great Judgment," which bears comparison with Goronwy Owen's masterpiece. Evan Evans (Ieuan Brydydd Hir) (1731–1789) was famous both as a poet and as a scholar and antiquarian. Edward Rhisiart (1714–1777), the schoolmaster of Ystradmeurig, was a scholar and a writer of pastorals in the manner of Theocritus. Most of the other poets who flourished towards the end of this period—Dafydd Ddu Eryri (1760–1822), Gwallter Mechain (1761–1849), Robert ab Gwilym Ddu (1767–1850), Dafydd Ionawr (1751–1827), Dewi Wyn o Eifion (1784–1841)—were brought into prominence by the Eisteddfod, which began to increase in influence during this period until it has become to-day the national festival. They all wrote for the most part in *cynghanedd*, and the work of nearly all of them is marked by correctness rather than by poetical inspiration.

9. *Prose after 1830.*—In the preceding periods, we have seen that Welsh prose, though abundant in quantity, had a very narrow range. Few writers rose above theological controversy or moral treatises, and the humaner side of literature was almost entirely neglected. In this period, however, we find a prose literature that, with the exception of scientific works, is as wide in its range as that of England, and all departments are well and competently represented, though by but few names. Dr Lewis Edwards (1809–1887) struck a new note when he began to contribute his literary and theological essays to the periodicals, but, though many have equalled and even surpassed him as theological essayists, few, if any, of his followers have attempted the literary and critical essays on which his fame as writer must mainly rest. Together with Gwilym Hiraethog (1802–1883), the author of the inimitable *Llythyrau Hen Ffarmwr*, he may be regarded as the pioneer of the new literature. Samuel Roberts (1800–1885), generally known as S.R., wrote numerous tracts and books on politics and economics, and as a political thinker he was in many respects far in advance of his English contemporaries. It was in this period, too, that Wales had her national novelist, Daniel Owen (1836–1895). He was a novelist of the Dickens school, and delighted like his great master "in writing mythology rather than fiction." He has created a new literary atmosphere, in which the characters of Puritanical and plebeian Wales move freely and without restraint. He can never be eclipsed just as Sir Walter Scott cannot be eclipsed, because the Wales which he describes is slowly passing away. He has many worthy disciples, among whom Miss Winnie Parry is easily first. Indeed, in her finer taste and greater firmness of touch, she stands on a higher plane than even her great master. The inspiring genius of the latter part of this period is Owen M. Edwards (b. 1858), and, as a stylist, all writers of Welsh prose since Ellis Wynn have to concede him the laurel. His little books of travel and history and anecdote have created, or rather, are creating a new school of writers, scrupulously and almost pedantically careful and correct, an ideal which, on its philological side is the outcome of the scientific study of the language as inaugurated by Sir John Rhŷs and Professor Morris Jones. One of the earliest, if not the ablest writer of this "new Welsh" was the independent and original Emrys ap Iwan (d. 1906), whose *Homiliau* was published in 1907.

10. *Poetry after 1820.*—The origins of this period are really placed in the last period. Its great characteristics are the development of the lyric, and the influence of English and continental ideas. Just as the *cywydd* was among the older writers the favourite form of poetry, so the lyric becomes now paramount, almost to the exclusion of other forms. The first great name, after those already mentioned in the development of this form of poetry, is that of Anne Griffiths (1776–1805). Her poetry is exclusively composed of hymns, but to the English mind, the word "hymn" is entirely inadequate to give any idea of the passion, the mysticism and the rich symbolistic grace of her poems. She gave to the Welsh lyric the depth and the rather melancholy intensity which has always characterized it. Evan Evans (Ieuan Glan Geirionydd) (1795–1855) was also a hymnologist, but he wrote many secular lyrics and *awdlau*—among the former being the famous *Morfa Rhuddlan*. Ebenezer Thomas (Eben Fardd) (1802–1863) was a famous *Eisteddfodwr*; his best work is his *awdlau*, and no one will deny him the distinction of being the master poet of the *awdl* in the 19th century. Gwilym Cawrdaf (1795–1848), also a writer of *awdlau*, has the gift of simple and direct expression, well exemplified in *Hiraeth Cymro am ei wlad*. Daniel Ddu (1792–1846) was a scholar who wrote some touching lyrics and hymns. Gwilym Hiraethog (1802–1883) attempted an epic, *Emmanuel*, with indifferent success. His shorter works and some of his *awdlau* are of a much higher order. Caledfryn (1801–1869) was a direct successor of Dewi Wyn and the earlier writers of *awdlau*, but his *Drylliad y Rothsay Castle* is superior to anything which his master wrote. Similar in genius, though not on quite as high a plane, were Nicander (1809–1874), Cynddelw (1812–1875), Gwalchmai (1803–1897) and Tudno (1844–1895).

John Blackwell (Alun) (1797–1840) was a lyricist of the first order. With Ieuan Glan Geirionydd, he is the pioneer of the secular lyric of the 19th century. Succeeding to this group of lyricists, we have another later group, Ceiriog (1832–1887), Talhaiarn (1810–1869) and Mynyddog (1833–1877), who certainly had the advantage over their predecessors in freshness, in vigour and in human interest, but they lacked the scholastic training of the earlier group, and so their work is often uneven, and cannot therefore be fairly compared with that of the earlier poets. Ceiriog, of course, is the greater name of the three, and is to Wales what Robert Burns was to Scotland, sharing with him his poetical faults and merits. He is called the national poet of Wales, because he was the first to sing of the land and the nation he knew, and he cast the glamour of his genius over the life of the *gwerin*, the peasants of Wales.

Somewhat higher flights were essayed by Gwilym Marles (1834–1879) and Islwyn (1832–1878). Their poetry is Wordsworthian and mystical, and well exemplifies the love of metaphysics and speculation which is growing in Wales. Islwyn's *Ystorm*, though uneven, is full of powerful passages, and he was a master of blank verse. Of the remaining poets of the period living in 1908, the most distinguished was the Rev. Elvet Lewis in the older generation, and Eifion Wyn in the younger—both writers of lyrics. Other lyrical poets of the first class are Gwylfa and Silyn Roberts. In the old metres, two poets stand out prominent above all others—J. Morris Jones and T. Gwynn Jones. The *Awdl i Famon* of the former, and the *Ymadawiad Arthur* of the latter, gave reason to believe that Welsh poetry was only entering on its golden period.

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V. Breton Literature.—Unlike the literature of Wales, the literature of Brittany is destitute of originality, and we find nothing to compare with the *Mabinogion*. Till the 19th century all the monuments which have come down to us are copies of French models, though the retention down to the 17th century of that intricate system of versification found in Welsh and Cornish may indicate that what was really Breton in spirit has not been preserved (v. J. Loth, *La Métrique galloise*, ii. 177-203). It is usual to divide the literature into three periods in conformity with the language in which the monuments are written—Old, Middle, and Modern Breton. No connected monuments of the first period (8th to 11th centuries) have come down to us. For our knowledge of the language of this period we must have recourse to the manuscripts containing glosses and the names occurring in ancient documents. The chief collections of glosses are (1) the Oxford glosses on Eutychius; (2) the Luxemburg glosses; (3) the Bern glosses on Virgil; (4) the glosses on Amalarius (Corpus Christi, Cambridge); (5) five *Collationes Canonum*, the chief manuscripts being at Paris and Orleans. All these glosses have been published in one volume by J. Loth (*Vocabulaire Vieux-Breton*, Paris, 1884). From a linguistic point of view the Breton names in the Latin lives of saints are very important, particularly those of St Samson, St Paul, Aurelian, St Winwaloe, St Ninnoc, St Gildas and St Brieuc. Of even greater value are the names in the Charter of Redon, which was written in the 11th century, but dates largely from the 9th (published by A. de Courson, 1865); we may also mention the Charter of Landevennec (11th century). In the Middle Breton period, which extends from the 11th to the 17th centuries, we are obliged, down to the 15th century, to rely on official documents such as the Charter of Quimperlé. French seems to have been the language of the aristocracy and the medium of culture. Hence the oldest connected texts are either translated or imitated from French, and are full of French words. We might mention a Book of Hours belonging to the 16th century, published by Whitley Stokes, and three religious poems bound up with the *Grand Mystère de Jésus*; further, the *Life of St Catherine* (1576) in prose (published by Ernault, *Revue celtique*, viii. 76), translated from the *Golden Legend*, the *Mirror of Death*, containing 3360 verses, which was composed in 1519 and printed in 1576, the *Mirror of Confession*, a translation from the French in prose (1621), the *Christian Doctrine*, a translation in verse (1622), a collection of carols (*An Nouelou ancien*, 1650, *Rev. celt.* vols. x.-xiii.) and the *Christian Meditations* of J. Cadec, 1651 (*Rev. Celt*, xx. 56). The earliest Breton printed work is the *Catholicon* of Jean Lagadeuc, a Breton-Latin-French dictionary, dated 1464 but printed first in 1499 (reprinted by R. F. Le Men, Lorient, 1867). Modern Breton begins with the orthographical reforms of the Jesuit, Julien Maunoir, whose grammar (*Le Sacré Collège de Jésus*) and dictionary appeared in 1659. Throughout the modern period we find numerous collections of religious poems and manuals of devotion in prose and verse, which we cannot here attempt to enumerate. But the bulk of Breton literature before the 19th century consists of mysteries and miracle plays. This class of literature had a tremendous vogue in Brittany, and the native stage was only killed about 1850. It is stated, for instance, that no less than 15,000 copies were sold of the *Tragedy of the Four Sons of Aymon*, first published in 1815. It is impossible to give the titles of all the dramas which have come down to us (about 120). The manuscript collection of the Bibliothèque Nationale in Paris is described in the *Revue celtique*, xi. 389-423 (many since published) and Le Braz gives a useful list of other manuscripts in the bibliographical appendix to his *Théâtre celtique*. A few of these plays belong to the Middle Breton period. The *Life of St Nonn*, the mother of St David, belongs to the end of the 15th century, and follows the Latin life (published by Ernault in the *Revue celtique*, viii. 230 ff., 405 ff.). *Le Grand Mystère de Jésus* (1513) follows the French play of Arnoul Gresban and Jean Michel (published by H. de la Villemarqué, Paris, 1865). A French original is also followed in the *Mystère de Sainte Barbe* (1st ed., 1557, 2nd ed., 1647, reprinted by Ernault, Nantes, (1885). These mystery plays may be divided into four categories according to the subjects with which they deal: (1) Old Testament subjects; (2) New Testament subjects; (3) lives of saints; (4) romances of chivalry. There is occasionally a dash of local colouring in these plays; but the subject matter is taken from French sources or, in the case of the third category, from Latin lives. Even when the life of a Breton saint, *e.g.* St Gwennolé, is dramatized, the treatment is the traditional one accorded to all saints of whatever origin. Amongst the most favourite subjects in addition to those already mentioned we may note the following: *Vie des quatre fils Aymon, Ste Tryphine et le roi Arthur, Huon de Bordeaux, Vie de Louis Eunius, Robert le Diable.* These mysteries commonly contain from 5000 to 9000 lines of either 12 or 8 syllables apiece. For the sake of completeness we may add the names of three farces, described by Le Braz: *Ar Farvel goapaer* (*Le bouffon moqueur*), *Ian Melargé* (*Mardi-gras*), *La Vie de Mardi-gras, de triste Mine, sa femme, et de ses enfants.* The actors, who were always peasants, came to be regarded with an unfavourable eye by the clergy, who finally succeeded in killing the Breton stage.

We look in vain for any manifestation of originality in Breton literature until we reach the 19th century. The consciousness of nationality then awakened and found expression in verse.

The movement led by Le Gonidec (described above in the section on Breton language) caused ardent patriots to endeavour to create a national literature, more especially when the attention of the whole world of letters was directed to Brittany after the publication of the *Barzas Breiz*. The most prominent of these pioneers were Auguste Brizeux, F. M. Luzel and Prosper Proux. Brizeux (1803–1858), better known as a French poet, wrote a collection of lyrics entitled *Telen Arvor*, or the *Armorican Harp* (Lorient, 1844, reprinted Paris, 1903). Luzel's original compositions were published under the title of *Bepred Breizad, Toujours Breton* (Morlaix, 1865), and Prosper Proux is known as the author of *Canaouenno grêt gant eur C'hernewod* (1838) and *Ar Bombard Kerne*, or *The Hautboy of Cornouailles* (Guingamp, 1866). Dottin also mentions *Telenn Remengol*, by J. Lescour (Brest, 1867); *Telenn Gwengam*, by the same writer (Brest, 1869), a volume of *Chansoniou* by Y. M. Thomas (Lannion, 1870), and another by C. Rannou. This was a very creditable beginning, but the themes of these writers are apt to be somewhat conventional and the constant recurrence of the same situation or the same idea grows monotonous. An anthology of poems connected with this movement appeared at Quimperlé in 1862 under the title of *Bleuniou Breiz, Poésies anciennes et modernes de la Basse-Bretagne* (reprinted, Paris, 1905). Several of La Fontaine's fables were published in a Breton dress by P. D. de Goesbriand (Morlaix, 1836), and a collection of fables in verse which is thought very highly of by cultivated Bretons appeared under the title of *Marvaillou Grac'h koz* by G. Milin (Brest, 1867). A book of Georgics in the dialect of Vannes appeared under the title of *Levr al labourer* (The Farmer's Book) by l'Abbé Guillome (Vannes, 1849), and Le Gonidec prepared a translation of the Scriptures, which was revised by Troude and Milin, and published at St Brieuc in 1868. But the real literature of Brittany consists of legends, folk-tales and ballads. The first to tap this source was

Hersart de la Villemarqué (1815–1895), who issued in 1839 his famous collection of ballads entitled *Barzas Breis*, but which cannot be regarded as an anthology of Breton popular poetry. The publication of this work gave rise to a controversy which is almost as famous as that caused by Macpherson's forgeries. De la Villemarqué was endowed with considerable poetic gifts, and, coming as he did at a time when folk-poetry was the fashion, he determined to collect the popular literature of his own country. However, he was not content to publish the poems as he found them circulating in Brittany. With the aid of several collaborators he transformed his material, eliminating anything that was crude and gross. The poems included in his collection may be divided into three classes: (1) Poems rearranged by himself or others. These consist mainly of love-songs and ballads. (2) Modern poems transferred to medieval times. (3) Spurious poems dealing with such personages as Nominoe and Merlin. The compiler of the *Barzas Breis* unfortunately laboured under the delusion that these Breton folk-songs were in the first instance the work of medieval bards corresponding to Taliessin and Llywarch Hen in Wales, and that it was possible to make them appear in their primitive dress. The very title of the collection indicates the artificial nature of the contents. For *Barzas* (in the 2nd edition of 1867 spelt *Barzaz*) is not a Breton word at all but is formed on Welsh *barddas* (bardic poems). For the whole controversy the reader may consult H. Gaidoz and P. Sébillot, "Bibliographie des traditions et de la littérature populaire de la Bretagne" (*Revue celtique*, v. 277 ff., and G. Dottin in the *Revue de synthèse historique*, viii. 95 ff.). In Brittany it is usual to divide the popular poetry into *gwerziou* and *soniou*. The *gwerziou* (complaintes) deal with local history, folk-lore, religious legends and superstitions, and are in general much more original than the other class. The *soniou* consist of love-songs, satires, carols and marriage-lays, as well as others dealing with professional occupations, and seem in many cases to show traces of French influence. The first scholar who published the genuine ballad literature of Brittany was F. M. Luzel, who issued two volumes under the title of *Gwerziou Breiz-Izel, chants populaires de la Basse-Bretagne* (Lorient and Paris, 1868, 1874). This collection contains several of the originals of poems in the *Barzas Breiz*. Luzel is also the author of a collection of Breton tales in French translation, *Contes bretons recueillis et traduits par F. M. Luzel* (Quimperlé, 1870). The same author published *Les Légendes chrétiennes de la Basse-Bretagne* (Paris, 1881) and *Veillées bretonnes, mœurs, chants, contes et récits populaires des Bretons-Armoricains* (Morlaix, 1879). Another indefatigable collector of Breton legends is Anatole le Braz, who was commissioned by the minister of public instruction to investigate the stories current with reference to *An Ankou* (death). Le Braz's results are to be found in his *La Légende de la mort* (1902[2]). A well-known collection of stories with a French translation was issued by the lexicographer Troude under the title of *Ar marvailler brezounek* (Brest, 1870), and one of the most popular books at the present day is *Pipi Gonto*, by A. le Moal (St Brieuc, vol. i. 1902, vol. ii. 1908). A recent collection of stories with a religious tendency is C. M. le Prat's *Marvailhou ar Vretoned* (Brest, 1907). The modern movement, which started in the 'nineties of last century, has already produced numerous dramas and volumes of lyrics, and it may now be affirmed in all seriousness that Brittany is producing something really national. The scope of the writers of the earlier movement was very limited and little originality was displayed in their productions. The literary output of the last ten years in Brittany may truly be termed prodigious, and much of it reaches quite a high level. The dramas which are being produced are mainly propagandist in the interests either of the *Union Régionaliste Bretonne* or of temperance reform. These are for the most part very crude, but they have been received with great enthusiasm, and this has led to the revival of the old mysteries, though in a somewhat modified form. The foremost living writer is Fanch Jaffrennou, who writes under the name of "*Taldir*" (Brow of Steel) and is the author of two very striking volumes of lyrics—*An Hirvoudou* or *Sighs* (St Brieuc, 1899) and *An Delen Dir* or *The Harp of Steel* (St Brieuc, 1900). The latter is the most interesting outcome of the modern movement. Among other poets we may mention N. Quellien (*Annaïk*, Paris, 1880; *Breiz, Poésies bretonnes*, Paris, 1898), Erwan Berthou (*Dre an Delen hag ar c'horn-boud, Par la harpe et par le cor de guerre*, St Brieuc, 1904), C. M. le Prat, who writes under the name of Klaoda (*Mouez Reier Plougastel*, "The Voice of the Cliffs of Plougastel," St Brieuc, 1905), J. Cuillandre (*Mouez an Aochou, La Voix des grèves*, Rennes, 1903), abbé Lec'hvien, *Gwerziou ha soniou* (St Brieuc, 1900), and, further, two anonymous volumes of verse, *An Tremener, Gwerziou ha soniou* (Brest, 1900), and *Kanaouennou Kerne* (Brest, 1900). Two older collections are mentioned by Dottin—J. Cadiou, *En Breiz-Izel* (Morlaix, 1885) and *Ivona* (Morlaix, 1886). An anthology of latter-day lyrics appeared at Rennes in 1902 under the title of *Bleuniou Breiz-Izel, Dibab Barzoniezou*. Of the numerous plays those most deserving of mention from a literary point of view are perhaps *Ar Vezventi* by T. le Garrec; the comedy *Alanik al Louarn* by J. M. Perrot (Brest, 1905) based on the farce of Pathelin; Tanguy Malmanche, *Le Conte de l'âme qui a faim*, in which Breton superstitions connected with the spirits of the dead are introduced with strange effect; J. le Bayon, *En Eutru Keriolet* (Vannes, 1902), which deals with the life and death of a blaspheming Breton nobleman of the early part of the 17th century; F. Jaffrennou, *Pontkallek* (Brest, 1903), which tells of the betrayal of a noble Breton who was put to death by the French in 1720; and the farce *Eur Pesk-Ebrel* by L. Rennadis (Morlaix, 1900).

AUTHORITIES.—A history of Breton literature does not exist, though we possess ample materials for such a work. The following works and articles may be consulted: G. Dottin, *Revue de synthèse historique*, viii, 93-104, contains a full bibliography; J. Loth, *Chrestomathie bretonne* (Paris, 1890); L. C. Stern in *Die Kultur d. Gegenwart*, i. xi. 1, pp. 132-137; A. le Braz, *Le Théâtre celtique* (Paris, 1904); H. Gaidoz and P. Sébillot, "Bibliographie des traditions et de la littérature populaire de la Bretagne" (*Revue celtique*, v. 277-338; supplement by P. Sébillot, *Revue de Bretagne, de Vendée, et d'Anjou*, 1894); F. M. Luzel, "Formules initiales et finales des conteurs en Basse-Bretagne" (*Revue celtique*, iii. 336 ff.); L. F. Sauvé, "Formulettes et traditions diverses de la Basse-Bretagne" (*Revue celtique*, v. 157 ff.); *Charmes*, "Oraisons et conjurations magiques," *ib* vi. 66 ff.; "Devinettes bretonnes," *ib.* iv 60 ff.; "Proverbes et dictons de la Basse-Bretagne," *ib.* i.–iii. For Breton proverbs see also A. Brizeux, "Furnez Breiz," in *Œuvres de A. Brizeux* (Paris, 1903); J. Loth, "Chansons en bas-vannetais" (*Revue celtique*, vii. 171 ff.); N. Quellien, *Chansons et danses des Bretons* (Paris, 1889); E. Ernault, "Chansons populaires" (*Revue celtique*, xxiii. 121 ff.); P. le Roux, "Une Chanson bretonne du xviiie siècle" (*Revue celtique*, xix. 1). Since 1901 a complete bibliography of modern works pertaining to Breton language and literature appears from time to time in the *Annales de Bretagne*. (E. C. Q.)

VI. CORNISH LITERATURE.—The literature of Cornwall is more destitute of originality and more limited in scope than that of Brittany, and it is remarkable that the medieval drama should occupy the most prominent place in both. The earliest Cornish we know consists of proper names and a vocabulary. About 200 Cornish names occur among the manumissions of serfs in the Bodmin Gospels (10th century). They were printed by Whitley Stokes in the *Revue celtique*, i. 232. Next comes the Cottonian Vocabulary, which seems to follow a similar Anglo-Saxon collection and is contained in a 12th-century MS. at the British Museum. It consists of seven pages and the words are classified under various headings, such as heaven and earth, different parts of the human body, birds, beasts, fishes, trees, herbs, ecclesiastical and liturgical terms. At the end we find a number of adjectives. This vocabulary was printed by Zeuss[2], p. 1065, and again in alphabetical order by Norris in the *Ordinalia*. The language of this document is termed Old Cornish, although the forms it contains correspond to those of Mid. Welsh and Mid. Breton.

The first piece of connected Cornish which we know consists of a poem, or portion of a play (?), of forty-one lines discovered by Jenner in the British Museum. This fragment was probably written about 1400 and deals with the subject of marriage (edited by W. Stokes in the *Revue celtique*, iv. 258). A little later is the *Poem of Mount Calvary* or *the Passion*, of which five MSS. are in existence. The poem has been twice printed,

first by Davies Gilbert with English translation by John Keigwin (1826), and again by W. Stokes for the London Philological Society in 1862. It consists of 259 stanzas of eight lines of seven syllables apiece, and contains a versified narrative of the events of the Passion made up from the Gospels and apocryphal sources, notably the Gospel of Nicodemus. But the bulk of Cornish literature is made up of plays, and in this connexion it may be noted that there still exist in the west of Cornwall the remains of a number of open-air amphitheatres, locally called *plan an guari*, where the plays seem to have been acted. The earliest representatives of this kind of literature in Cornwall form a trilogy going under the name of *Ordinalia*, of which three MSS. are known, one a 15th-century Oxford MS. from which the two others are copied. The *Ordinalia* were published by Edwin Norris under the title of *The Ancient Cornish Drama* (Oxford, 1859). The first play is called *Origo Mundi* and deals with events from the Old Testament down to the building of Solomon's temple. The second play, the *Passio Domini*, goes on without interruption into the third, the *Resurrectio Domini*, which embraces the Harrowing of Hell, the Resurrection and Ascension, the legend of St Veronica and Tiberius, and the death of Pilate. Here again the pseudo-Gospel of Nicodemus is drawn upon, and interwoven with the Scriptural narrative we find the Legend of the Cross. As the title *Ordinalia* indicates, these plays are of learned origin and are imitated from English sources. The popular name for these dramas, *quari-mirkle*, is a literal translation of the English term miracle play, and Norris shows that whole passages were translated word for word. Many of the events are represented as having taken place in well-known Cornish localities, but apart from this scarcely any traces of originality can be discovered. The same remark holds good in the case of another play, *Beunans Meriasek* or the *Life of St Meriasek*. This deals in an incoherent manner with the life and death of Meriasek (in Breton *Meriadek*), the son of a duke of Brittany, and interwoven with this theme is the legend of St Silvester and the emperor Constantine, quite regardless of the circumstance that St Silvester lived in the 4th and St Meriasek in the 7th century. The MS. of this play was written by "Dominus Hadton" in the year 1504, and is preserved in the Peniarth library. The language is more recent than that of the *Ordinalia*, and there is a certain admixture of English. The *Life of St Meriasek* falls into two parts, and at the end of each the spectators are invited to carouse. St Meriasek was in earlier times the patron saint of Camborne, where his fountain is still to be seen and pilgrims to it were known by the name of *Merrasickers*. In this play, consequently, we might expect to find something really Cornish. But le Braz has shown that the author of this motley drama was content to draw his materials from Latin and English lives of saints. The story of Meriasek himself was taken from a Breton source and closely resembles the narrative of the 17th-century Breton hagiographer, Albert le Grand. The last play we have to mention is *Gwreans an Bys* (The Creation of the World), of which five complete copies are known. Two of these are in the Bodleian and one in the British Museum, which also possesses a further fragment. The oldest text was revised by William Jordan of Helston in 1611, but there are indications that parts of it at any rate are older than the Reformation. This play bears a great resemblance to the first part of the *Origo Mundi*, and may have been imitated from it. It was printed first by Davies Gilbert in 1827 with a translation by John Keigwin, and again by W. Stokes in the *Transactions of the London Philological Society* for 1864. The language shows considerable signs of decay, and Lucifer and his angels are often made to speak English. The only other original compositions of any length written in Cornish are *Nebbaz Gerriau dro tho Carnoack* (A Few Words about Cornish), by John Boson (printed in the *Journal of the Royal Institution of Cornwall*, 1879), and the *Story of John of Chy-an-Hur* (Ram's House), a folk-tale which appears in Ireland and elsewhere. The latter was printed in Lhuyd's *Grammar* and in Pryce's *Archaeologia*. Andrew Borde's *Booke of the Introduction of Knowledge* (1542) contains some Cornish conversations (see *Archiv f. celt. Lexikographie*, vol. i.), and in Carew's *Survey of Cornwall* a number of words and phrases are to be found. Apart from the Cornish preface to Lhuyd's *Grammar*, the other remains of the language consist of a few songs, verses, proverbs, epigrams, epitaphs, maxims, letters, conversations, mottoes and translations of chapters and passages of Scripture, the Lord's Prayer, the Creed, the Commandments, King Charles's Letter, &c. These fragments are to be found (1) in the Gwavas MS. in the British Museum, a collection ranging in date from 1709 to 1736; (2) in the Borlase MS. (1750); (3) in Pryce's *Archaeologia Cornu-Britannica* (1790); (4) in D. Gilbert's editions of the *Poem of the Passion* (1826) and the Creation of the World (1827). They are enumerated, classified and described by Jenner in his *Handbook*.

AUTHORITIES.—H. Jenner, *Handbook of the Cornish Language* (London, 1904); A. le Braz, *Le Théâtre celtique* (Paris, 1905); E. Norris, *The Ancient Cornish Drama* (2 vols., Oxford, 1859); T. C. Peter, *The Old Cornish Drama* (London, 1906); L. C. Stern, *Die Kultur d. Gegenwart*, i. xi. 1, pp. 131-132. (E. C. Q.)

CELT, a word in common use among British and French archaeologists to describe the hatchets, adzes or chisels of chipped or shaped stone used by primitive man. The word is variously derived from the Welsh *cellt*, a flintstone (that being the material of which the weapons are chiefly made, though celts of basalt felstone and jade are found); from being supposed to be the implement peculiar to the Celtic peoples; or from a Low Latin word *celtis*, a chisel. The last derivation is more probably correct. The word has come to be somewhat loosely applied to metal as well as stone axe-heads. The general form of stone celts is that of blades approaching an oval in section, with sides more or less straight and one end broader and sharper than the other. In length they vary from about 2 to as much as 16 in. The largest and finest specimens are found in Denmark: one in an English collection being of beautiful white flint 13 in. long, 1½ in. thick and 3½ in. broad. Those found in Denmark are sometimes polished, but usually are left rough. Those found in north-western Europe are ground to a more or less smooth surface. That some were held in the hand and others fixed in wooden handles is clear from the presence of peculiar polished spaces produced by the friction of the wood. In the later stone adzes holes are sometimes found pierced to receive the handles.

The bronze celts vary in size from an inch to a foot in length. The earlier specimens are much like the stone ones in shape and design, but the later manufactures show a marked improvement, the metal being usually pierced to receive the handles. It is noteworthy that the celtmakers never cast their axes with a transverse hole through which the handle might pass. Bronze celts are usually plain, but some are ornamented with ridges, dots or lines. That they were made in the countries where they are found is proved by the presence of moulds.

A point worthy of mention is the position which stone celts hold in the folk-lore and superstitious beliefs of many lands. In the West of England the country folks believe the weapons fell originally from the sky as "thunderbolts," and that the water in which they are boiled is a specific for rheumatism. In the North and Scotland they are preservatives against cattle diseases. In Brittany a stone celt is thrown into a well to purify the water. In Sweden they are regarded as a protection against lightning. In Norway the belief is that, if they are genuine thunderbolts, a thread tied round them when placed on hot coals will not burn but will become moist. In Germany, Spain, Italy, the same beliefs prevail. In Japan the stones are accounted of medicinal value, while in Burma and Assam they are infallible specifics for ophthalmia. In Africa they are the weapons of the Thunder-God. In India and among the Greeks the hatchet appears to have had a sacred importance, derived, doubtless, from the universal superstitious awe with which these weapons of pre-historic man were regarded.

See Sir J. Evans's *Ancient Stone Implements of Great Britain*; Lord Avebury's *Prehistoric Times* (1865–1900) and *Origin of Civilization* (1870); E. B. Tylor's *Anthropology, and Primitive Culture*, &c. For the history of polished stone axes up to the 17th century see Dr Marcel Bandouin and Lionel Bonnemère in the *Bulletin de la Société d'Anthropologie de Paris*, April–May 1905.

CELTES, KONRAD (1459–1508), German humanist and Latin poet, the son of a vintner named Pickel (of which Celtes is the Greek translation), was born at Wipfeld near Schweinfurt. He early ran away from home to avoid being set to his father's trade, and at Heidelberg was lucky enough to find a generous patron in Johann von Dalberg and a teacher in Agricola. After the death of the latter (1485) Celtes led the wandering life of a scholar of the Renaissance, visiting most of the countries of the continent, teaching in various universities, and everywhere establishing learned societies on the model of the academy of Pomponius Laetus at Rome. Among these was the *Sodalitas litteraria Rhenana* or *Celtica* at Mainz (1491). In 1486 he published his first book, *Ars versificandi et carminum*, which created an immense sensation and gained him the honour of being crowned as the first poet laureate of Germany, the ceremony being performed by the emperor Frederick III. at the diet of Nuremberg in 1487. In 1497 he was appointed by the emperor Maximilian I. professor of poetry and rhetoric at Vienna, and in 1502 was made head of the new Collegium Poetarum et Mathematicorum, with the right of conferring the laureateship. He did much to introduce system into the methods of teaching, to purify the Latin of learned intercourse, and to further the study of the classics, especially the Greek. But he was more than a mere classicist of the Renaissance. He was keenly interested in history and topography, especially in that of his native country. It was he who first unearthed (in the convent of St Emmeran at Regensburg) the remarkable Latin poems of the nun Hrosvitha of Gandersheim, of which he published an edition (Nuremberg, 1501), the historical poem *Ligurinus sive de rebus gestis Frederici primi imperatoris libri x.* (Augsburg, 1507), and the celebrated map of the Roman empire known as the *Tabula Peutingeriana* (after Konrad Peutinger, to whom he left it). He projected a great work on Germany; but of this only the *Germania generalis* and an historical work in prose, *De origine, situ, moribus et institutis Nurimbergae libellus*, saw the light. As a writer of Latin verse Celtes far surpassed any of his predecessors. He composed odes, elegies, epigrams, dramatic pieces and an unfinished epic, the *Theodoriceis*. His epigrams, edited by Hartfelder, were published at Berlin in 1881. His editions of the classics are now, of course, out of date. He died at Vienna on the 4th of February 1508.

For a full list of Celtes's works see Engelbert Klüpfel, *De vita et scriptis Conradi Celtis* (2 vols., Freiburg, 1827); also Johann Aschbach, *Die früheren Wanderjahre des Conrad Celtes* (Vienna, 1869); Hartmann, *Konrad Celtes in Nürnberg* (Nuremberg, 1889).

CELTIBERIA, a term used by Greek and Roman writers to denote, sometimes the whole north-east of Spain, and sometimes the north-east part of the central plateau of the peninsula. The latter was probably the correct use. The Celtiberi, in this narrower sense, were not so much one tribe as a group of cantons—Arevaci, Pelendones, Berones and four or five others. They were the most warlike people in Spain, and for a long time offered a stubborn resistance to the Romans. Originally Carthaginian mercenaries, they were induced to serve the Romans in a similar capacity, and Livy (xxiv. 49) distinctly states that they were the first mercenaries in the Roman army. They did not, however, keep faith, and several campaigns were undertaken against them. In 179 B.C. the whole country was subdued by T. Sempronius Gracchus, who by his generous treatment of the vanquished gained their esteem and affection. In 153 they again revolted, and were not finally overcome until the capture of Numantia (133). The twenty years' war waged round this city, and its siege and destruction by Scipio the Younger (133 B.C.) form only the most famous episode in the long struggle, which has left its mark in entrenchments near Numantia excavated in 1906–1907 by German archaeologists. After the fall of Numantia, and still more after the death of Sertorius (72 B.C.), the Celtiberians became gradually romanized, and town life grew up among their valleys; Clunia, for instance, became a Roman municipality, and ruins of its walls, gates and theatre testify to its civilization; while Bilbilis (Bambola), another municipality, was the birthplace of the eminently Roman poet Martial. The Celtiberians may have been so called because they were thought to be the descendants of Celtic immigrants from Gaul into Iberia (Spain), or because they were regarded (cf. Lucan iv. 9) as a mixed race of Celts and Spaniards (Iberians); in either case the name represents a geographer's theory rather than an ascertained fact. That a strong Celtic element existed in Spain is proved both by numerous traditions and by the more trustworthy evidence of place-names. The Celtic place-names of Spain, however, are not confined to Celtiberia or even to the north and east; they occur even in the south and west.

A long description of the manners and customs of the Celtiberi is given by Diodorus Siculus (v. 33, 34). Their country was rough and unfruitful as a whole (barley, however, was cultivated), being chiefly used for the pasture of sheep. Its inhabitants either led a nomadic life or occupied small villages; large towns were few. Their infantry and cavalry were both excellent. In battle, they adopted the wedge-shaped formation of the column. They carried double-edged swords and short daggers for use hand to hand, the steel of which was hardened by being buried underground; their defensive armour was a light Gallic shield or a round wicker buckler, and greaves of felt round their legs. They wore brazen helmets with purple crests, and rough-haired black cloaks, in which they slept on the bare ground. Like the Cantabri, they washed themselves with urine instead of water. They were said to offer sacrifice to a nameless god (Strabo iii. p. 164) at the time of the full moon when all the household danced together before the doors of the houses. Although cruel to their enemies, they were hospitable to strangers. They ate meat of all kinds, and drank a kind of mead. E. Hübner's article in Pauly-Wissowa's *Realencyclopädie*, iii. (1886–1893), collects all the ancient references, which are almost all brief. Strabo's notice (bk. iii.), based perhaps on Poseidonius, is fullest. (F. J. H.)

CEMENT (from Lat. *caementum*, rough pieces of stone, a shortened form of *caedimentum*, from *caedere*, to cut), apparently first used of a mixture of broken stone, tiles, &c., with some binding material, and hence of any material capable of adhering to, and uniting into a coherent mass, fragments of a substance not in itself adhesive. The term is often applied to adhesive mixtures employed to unite objects or parts of objects (see below), but in engineering, when used without qualification, it means Portland cement, its modifications and congeners; these are all hydraulic cements, *i.e.* when set they resist the action of water, and can, under favourable conditions, be allowed to set under water.

Hydraulic Cements.—It was well known to builders in the earliest historic times that certain limes would, when set, resist the action of water, *i.e.* were hydraulic; it was also known that this property could be conferred on ordinary lime by admixture of silicious materials such as pozzuolana or tufa. We have here the two classes into which hydraulic cements are divided.

Pozzuolanic cement.

When pure chalk or limestone is "burned," *i.e.* heated in a kiln until its carbonic acid has been driven off, it yields pure lime. This slakes violently with water, giving slaked lime, which can be made into a smooth paste with water and mixed with sand to form common mortar. The setting of the mortar is due to the drying of the lime (a purely physical phenomenon, no chemical action occurring between the lime and the sand). The function of the sand is simply that of a diluent to prevent undue shrinkage and cracking in drying. Subsequent hardening of the mortar is caused by the gradual absorption of carbonic acid from the air by the lime, a skin of carbonate of lime being formed; but the action is superficial. Mortar made from pure or "fat" lime cannot withstand the action of water, and is only used for work done above water-level. If, however, such "fat" lime is mixed in the presence of water, not with sand but with silica in an active form, *i.e.* amorphous and (generally) hydrated, or with a silicate containing silica in an active condition, it will unite with the silica and form a silicate of lime capable of resisting the action of water. The mixture of the lime and active silica or silicate is a pozzuolanic cement. The simplest of all pozzuolanic cements would be a mixture of pure lime and hydrated silica, but though the latter is prepared artificially for various purposes, it is too expensive to be used as a cement material. A similar obstacle lies in the way of using a certain native form of active silica, viz. kieselguhr, for it is too valuable as an absorbent of nitroglycerine, for the manufacture of dynamite, to be available for making pozzuolanic cement. There are, however, many silicious

substances occurring abundantly in nature which can thus be used. They are mostly of volcanic origin, and include pumice, tufa, santorin earth, trass and pozzuolana itself. The following analyses show their general composition:—

	Neapolitan Pozzuolana (per cent).	Roman Pozzuolana (per cent).	Trass (per cent).
Soluble silica (SiO_2)	27·80	32·64	19·32
Insoluble silicious residue	35·38	25·94	50·40
Alumina (Al_2O_3)	19·80	22·74	13·86
Ferric oxide (Fe_2O_3)			3·10
Lime (CaO)	5·68	4·06	..
Magnesia (MgO)	0·35	1·37	0·13
Sulphuric anhydride (SO_3)	Trace	Trace	..
Combined water (H_2O)	4·27	8·92	7·57
Carbonic anhydride (CO_2)			..
Moisture	..	..	5·04
Alkalis and loss	6·72	4·33	0·58
	100·00	100·00	100·00

An artificial product which serves perfectly as a pozzuolana is granulated blast-furnace slag. The slag, which must contain a high percentage of lime, is granulated by being run while fused into abundance of water. This granulated slag differs from the same slag allowed to cool slowly, in that a portion of the energy which it possesses while fused is retained after it has solidified. It bears to ordinary slowly-cooled slag a similar relation to that borne by plastic sulphur to ordinary crystalline sulphur. This potential energy becomes kinetic when the slag is brought into contact with lime in the presence of water, and causes the formation of a true hydraulic silicate of lime. The following analysis shows the composition of a typical slag:—

	Per cent.
Insoluble residue	1·04
Silica (SiO_2)	31·50
Alumina (Al_2O_3)	18·56
Manganous oxide (MnO)	0·44
Lime (CaO)	42·22
Magnesia (MgO)	3·18
Soda (Na_2O)	0·70
Sulphuric anhydride (SO_3)	0·45
Sulphur (S)	2·21
	100·30
Deduct oxygen equivalent to sulphur	1·10
	99·20

Granulated slag of this character is ground with slaked lime until both materials are in a state of fine division and intimately mixed. The usual proportions are three of slag to one of slaked lime by weight. The product termed slag cement sets slowly, but ultimately attains a strength scarcely inferior to that of Portland cement. Although it is cheap and suitable for many purposes, its use is not large and tends to decrease. Pozzuolanic cements are little used in England. Generally speaking, they are only of local importance, their cheapness depending largely on the nearness and abundance of some suitable volcanic deposit of the trass or tufa class. They are not usually manufactured by the careful grinding together of the pozzuolana and the lime, but are mixed roughly, a great excess of pozzuolana being employed. This excess does no harm, for that part which fails to unite with the lime serves as a diluent, much as does sand in mortar. In fact, ordinary pozzuolanic cement made on the spot where it is to be used may be regarded as a better kind of common mortar having hydraulic qualities. Good hydraulic mortars may be made from lime mixed with furnace ashes or burnt clay as the pozzuolanic constituent.

Portland Cement.

Cements of the Portland type differ in kind from those of the pozzuolanic class; they are not mechanical mixtures of lime and active silica ready to unite under suitable conditions, but consist of definite chemical compounds of lime and silica and lime and alumina, which, when mixed with water, combine therewith, forming crystalline substances of great mechanical strength, and capable of adhering firmly to clean inert material, such as stone and sand. They are made by heating to a high temperature an intimate mixture of a calcareous substance and an argillaceous substance. The commonest of such substances in England are chalk and clay, but where local conditions demand it, limestone, marl, shale, slag or any similar material may be used, provided that the correct proportions of lime, silica and alumina are maintained. The earliest forms of cements of the Portland class were the hydraulic limes. These are still largely used, and are prepared by burning limestones containing clayey matter. Some of these naturally possess a composition differing but little from that of the mixture of raw materials artificially prepared for the manufacture of Portland cement itself. Although hydraulic limes have been in use from the most ancient times, their true nature and the reason of their resistance to water have only become known since 1791. Next in antiquity to hydraulic lime is Roman cement, prepared by heating an indurated marl occurring naturally in nodules. Its name must not be taken to imply that it was used by the ancients; in point of fact the manufacture of this substance dates back only to 1796.

With the growth of engineering in the early part of the 19th century arose a great demand for hydraulic cement. The supply of materials containing naturally suitable proportions of calcium carbonate and clay being limited, attempts were made to produce artificial mixtures which would serve a similar end. Among those who experimented in this direction was Joseph Aspdin, of Leeds, who added clay to finely ground limestone, calcined the mixture, and ground the product, which he called Portland cement. The only connexion between Portland cement and the place Portland is that the cement when set somewhat resembles Portland stone in colour. True, it is possible to manufacture Portland cement from Portland stone (after adding a suitable quantity of clay), but this is merely because Portland stone is substantially carbonate of lime; any other limestone would serve equally well. Although Portland cement is later in date than either Roman cement or hydraulic lime, yet on account of its greater industrial importance, and of the fact that, being an artificial product, it is of approximately uniform composition and properties, it may conveniently be treated of first. The greater part of the Portland cement made in England is manufactured on the Thames and Medway. The materials are chalk and Medway mud; in a few works the latter is replaced by gault.

The composition of typical samples of chalk and clay is shown in the following analyses:—

Chalk.		Clay.				
	Per cent.		Per cent.			
Silica (SiO_2)	0·92	Insoluble silicious matter	26·67	Consisting of		
Alumina + ferric oxide (Al_2O_3 + Fe_2O_3)	0·24	Silica (SiO_2)	31·24	Quartz (SiO_2)	19·33	
Lime (CaO)	55·00	Alumina (Al_2O_3)	16·60	Silica (SiO_2)	5·19	Felspar 7·34 %
Magnesia (MgO)	0·36	Ferric oxide (Fe_2O_3)	8·66	Alumina (Al_2O_3)	1·47	
Carbonic anhydride (CO_2)	43·40	Lime (CaO)	0·25	Magnesia (MgO)	0·03	
	99·92	Magnesia (MgO)	1·91	Soda (Na_2O)	0·65	
		Soda (Na_2O)	1·00		26·67	
		Potash (K_2O)	0·45			
		Sodium chloride (NaCl)	1·86			
		Combined water, organic matter, and loss	11·36			
			100·00			

These materials are mixed in the proportion of about 3:1 by weight so that the dried mixture contains approximately 75% of calcium carbonate, the balance being clay. The mixing may be effected in several ways. The method once exclusively used consists in mixing the raw materials with a large quantity of water in a wash mill, a machine having radial horizontal arms driven from a central vertical spindle and carrying harrows which stir up and intermix any soft material placed in the pit in which the apparatus revolves. The raw materials in the correct proportion are fed into this mill together with a large quantity of water. The thin watery "slip" or slurry flows into large settling tanks ("backs") where the solids in suspension are deposited; the water is drawn off, leaving behind an intimate mixture of chalk and clay in the form of a wet paste. This is dug out, and after being dried on floors heated by flues is ready for burning. This process is now almost obsolete. According to present practice the raw materials are mixed in a wash mill with so much water that the resulting slurry contains 40 to 50% of water. The slurry, which is wet enough to flow, is ground between millstones so as to complete the process of comminution begun in the wash mill. Thorough grinding and mixing are of the utmost importance, as otherwise the cement ultimately produced will be unsound and of inferior quality. The drying of the slurry is generally effected by the waste heat of the kilns, so that while one charge is burning another is drying ready for the next loading of the kilns. The kilns commonly employed are "chamber kilns," circular structures not unlike an ordinary running lime kiln, but having the top closed and connected at the side with a wide flue in which the slurry is exposed to the hot products of combustion from the kiln. The farther ends of the flues of several such kilns are connected with a chimney shaft. The slurry, in drying on the floor of the flue, forms a fairly tough cake which cracks spontaneously in the process of drying into rough blocks suitable for loading into the kiln. At the bottom of the kiln is a grate of iron bars, and on this wood and coke are piled to start the fire. A layer of dried slurry is loaded on this, then a layer of coke, then a layer of slurry, and so on until the kiln is filled with coke and slurry evenly distributed. Fresh slurry is run on to the drying floors, and the kiln is started. The construction of an ordinary chamber kiln may be gathered from the accompanying diagram (fig. 1). The

Mixing.

Loading the kiln.

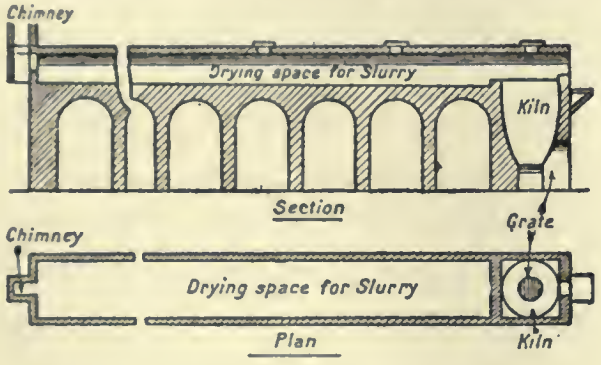

FIG. 1.

operation of burning is a slow one. An ordinary kiln, which will contain about 50 tons of slurry and 12 tons of coke, will take two days to get fairly alight, and will be another two or three days in burning out. Therefore, allowing adequate time for loading and unloading, each kiln will require about one week for a complete run. The output will be about 30 tons of "clinker" ready to be ground into cement. The grinding of the hard rock-like masses of clinker is effected between millstones, or in modern plants in ball-mills, tube-mills and edge-runners. It is an important part of the manufacture, because the finished cement should be as fine and "floury" as possible. The foregoing description represents the procedure in use in many English factories. There are various modifications in practice according to local conditions: a few of these may be described. In all cases, however, the main operations are the same, viz. intimately mixing the raw materials, drying the mixture, if necessary, and burning it at a clinkering temperature (about 1500° C. = 2732° F.). Thus when hard limestone is the form of calcium carbonate locally available, it is ground dry and mixed with the correct proportion of clay also dried and ground. The mixture is slightly damped, moulded into rough bricks, dried and burned. A possible alternative is to burn the limestone first and mix the resulting lime with clay, the mixture being burned as before. By this method grinding the hard limestone is avoided, but there is an extra expenditure of fuel in the double burning.

Many different forms of kiln are used for burning Portland cement. Besides the chamber kilns which have been described, there are the old-fashioned bottle kilns, which are similar to the chamber kilns, but are bottle-shaped and open at the top; they do not dry the slurry for their next charge. Their use is becoming obsolete. There are also stage kilns of the Dietzsch type, which consist of two vertical shafts, one above the other, but not in the same vertical line, connected by a horizontal chanael. At this middle portion and in the upper part of the lower shaft the burning proper proceeds; the upper shaft is full of unburnt raw material which is heated by the hot gases coming from the burning zone, and the lower shaft contains clinker already burned and hot enough to heat the incoming air which supplies that necessary for combustion at the clinkering zone. A pair of Dietzsch kilns, built back to back, are shown in fig. 2. There are other forms of shaft kiln, such as the Schneider, in which there is a burning zone, a heating and cooling zone as in the Dietzsch, but no horizontal stage, the whole shaft being in the same vertical plane. Another form is the Hoffmann or ring kiln, made up of a number of compartments arranged in a ring and connected with a central chimney; in these compartments rough brick-shaped masses of the raw materials are stacked, and between these bricks fuel is sprinkled. At a given moment one of these compartments is burning and at its full temperature; the air for combustion is drawn in through one or more compartments behind it which have just finished burning, and is thereby strongly heated; the products of combustion pass away through one or more compartments in front of it and heat their contents before they are subjected to actual combustion. It will be seen that the principle of the ring kiln is similar to that of the stage kiln. In each case the clinker which has just been burned and is fully hot serves to heat the air-supply to the compartment where combustion is actually proceeding; in like manner the raw materials about to be burned are well heated by the waste gases from the compartment in full activity before they themselves are burned. (It may be noted that here and generally in this article "burn" is used in the technical sense; it is technically correct to speak of cement clinker being "burned," although it is not a fuel; in accurate terms it is the fuel which is burned, and it is the heat it generates which raises the clinker to a high temperature, *i.e.* technically "burns" it.) By this device a great part of the heat is regenerated and a saving of fuel is effected.

Other kilns.

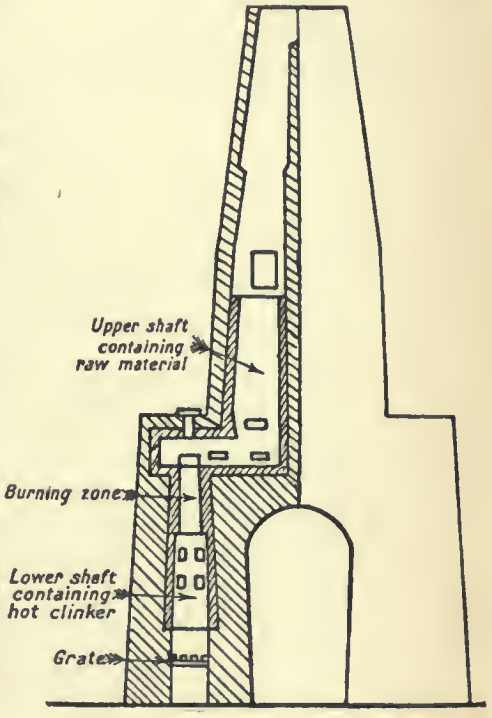

FIG. 2.

The methods of burning cement described above are obsolescent. They are being replaced by the rotatory process, so called because the cement is burned in rotating cylinders instead of in fixed kilns. These cylinders vary from 60 to 150 ft. in length, an ordinary length in modern practice being 100 to 120 ft.; their diameter correspondingly varies from 6 ft. to 7 ft. 6 in. The cylinders are made of steel plate, lined with refractory bricks, are carried on rollers at a slight angle with the horizontal, and are rotated by power. At the upper end the raw material is fed in either as a dry powder or as a slurry; at the lower end is a powerful burner. In the early days of rotatory kilns producer gas was used as a fuel, but with little success; about 1895 petroleum was used in the United States with complete success, but at a relatively heavy cost. At the present time, finely powdered coal injected by a blast of air is almost universally employed, petroleum being used only where it is actually cheaper than coal. In the working of this type of kiln the rotation and slight inclination of the cylinder cause the raw material to descend towards the lower end. At the upper end the raw material is dried and heated moderately. As it descends it reaches a part of the kiln where the temperature is higher; here the carbonic acid of the carbonate of lime, and the combined water of the clay are driven off, and the resulting lime begins to act chemically on the dehydrated clay. The material is then in a partially burnt and slightly sintered state, but it is not fully clinkered and would not make Portland cement. The material continues to descend by the rotation of the kiln and reaches the lower end nearest

Rotatory kilns.

the burner where the temperature is highest, and is there heated so highly that the union of the lime, silica and alumina is complete, and fully burnt clinker falls out of the kiln. It is extremely hot, and is cooled usually by being passed down one or more rotating cylinders, similar to the first, but smaller, and acting as coolers instead of kilns. On its way down the cylinders the clinker meets a current of cold air and is cooled, the air being correspondingly warmed and passing on to aid in the combustion of the fuel used in heating the kiln. This regenerative heating is similar in principle and effect to that obtained by means of the shaft and ring kilns described above. The output of these kilns varies from 200 to 400 tons per kiln per week according to their size and the nature of the raw materials burned, as against 30 tons per week for an ordinary chamber kiln. A large saving in labour is also secured. The rotatory system presents many advantages and is rapidly replacing the older methods of cement making. Fig. 3 represents diagrammatically a

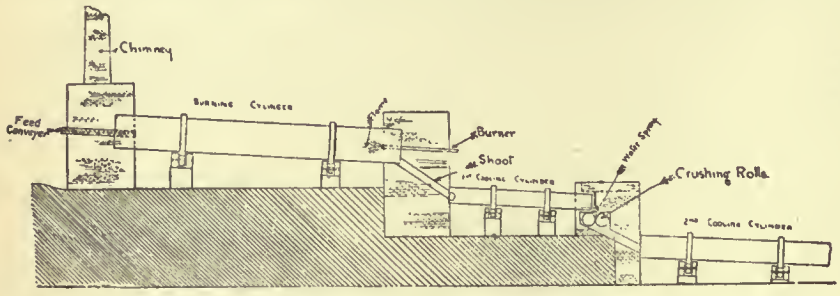

FIG. 3.

rotatory cement plant on the Hurry & Seaman system, which was one of the first to make cement by the rotatory process successfully on a large scale, using powdered coal as fuel. Rotatory kilns of various other makes are now in use, but the same principles are embodied, namely, the employment of a rotating inclined cylinder for burning the raw materials, a burner fed with powdered coal and a blast of air, and some device such as a cooling cylinder or cooling tower by which the clinker may be cooled and the air correspondingly heated on its way to the burner.

Another method of making Portland cement which has been proposed and tried with some success consists in fusing the raw materials together in an apparatus of the type of a blast furnace. The high temperature necessary to fuse cement clinker makes this process difficult to accomplish commercially, but it has many inherent merits and may be the process of the future, displacing the rotatory method.

Cement clinker.

Portland cement clinker, however produced, is a hard, rock-like substance of semi-vitrified appearance and very dark colour. The product from a well-run rotatory kiln is all evenly burnt and properly vitrified; that from an ordinary fixed kiln of whatever type is apt to contain a certain amount (5 to 15%) of underburnt material, which is yellowish and friable and is not properly clinkered. This material must be picked out, as such underburnt stuff contains free lime or unsaturated lime compounds. These may slake slowly in the finished cement and cause such expansion as may destroy the work of which it forms part. Well-burnt, well-picked clinker when ground yields good Portland cement. Nothing is added during or after grinding save a small amount (1 to 2%) of calcium sulphate in the form either of gypsum or of plaster of Paris, which is sometimes needed to make the cement slower-setting. For the same purpose a small quantity of water (up to 2%) may be added either by moistening the clinker or by blowing steam into the mills in which the clinker is ground. This small addition for this specified purpose is recognized as legitimate, but the employment of various cheap materials such as ragstone and blast-furnace slag, sometimes added as diluents or make-weights, is adulteration and therefore fraudulent.

Composition.

The composition of Portland cement varies within comparatively narrow limits, and for given raw materials the variations are tending to become smaller as regularity and skill in manufacture increase. The following analysis may be taken as typical of cements made from chalk and clay on the Thames and Medway:—

	Per cent.
Silica (SiO_2)	22·0
Insoluble residue	1·0
Alumina (Al_2O_3)	7·5
Ferric oxide (Fe_2O_3)	3·5
Lime (CaO)	62·0
Magnesia (MgO)	1·0
Sulphuric anhydride (SO_3)	1·5
Carbonic anhydride (CO_2)	0·5
Water (H_2O)	0·5
Alkalis	0·5
	100·0

There may be variations from this composition according to the nature of the raw materials employed. Thus the silica may range from 19 to 27%, the alumina and ferric oxide jointly from 7 to 14%, the lime from 60 to 67%. All such variations are permissible provided that the quantity of silica and alumina is sufficient to saturate the whole of the lime and to leave none of it in a "free" condition, likely to cause the cement to expand after setting. Other things being equal, the higher the percentage of lime within the limits indicated above the stronger is the cement, but such highly limed cement is less easy to burn than cement containing about 62% of lime; and unless the burning is thorough and the raw materials are intimately mixed, the cement is apt to be unsound. Although the ultimate composition of cement, that is, the percentage of each base and acid present, can be accurately determined by analysis, its proximate composition, *i.e.* the nature and amount of the compounds formed from these acids and bases, can only be ascertained indirectly and with difficulty. The foundations of our knowledge on this subject were laid by H. le Chatelier, whose work has since been supplemented by that of Spenser B. Newberry, W. B. Newberry and Clifford Richardson. As the outcome of these inquiries it has been established that tricalcium silicate $3CaO{\cdot}SiO_2$ is the essential constituent of Portland cement. The constituent of next importance is an aluminate, but whether this is dicalcium aluminate, $2CaO{\cdot}Al_2O_3$, or tricalcium aluminate, $3CaO{\cdot}Al_2O_3$, is still in doubt. In the following description it is assumed to be the tricalcium aluminate. The remaining silicates and aluminates present, and ferric oxide and magnesia, if existing in the moderate quantities which are usual in Portland cement of good quality, are of minor importance and may be regarded as little more than impurities. The silicates and aluminates of which Portland cement is composed are believed to exist not as individual units but as solid solutions of each other, these solid solutions taking the form of minerals recognizable as individuals. The two principal minerals are termed alite and celite; according to the best opinion, alite consists of a solid solution of tricalcium aluminate in tricalcium silicate, and celite of a solid solution of dicalcium aluminate in dicalcium silicate. Celite is little affected by water, and has but small influence on the setting; alite is decomposed and hydrated, this action constituting the main part of the setting of Portland cement. Both the components of alite react, and for simplicity their reactions may be stated in separate equations, thus:—

(1) $2(3CaO{\cdot}SiO_2)+9H_2O=2(CaO{\cdot}SiO_2){\cdot}5H_2O+4Ca(OH)_2$
Tricalcium silicate. Hydrated monocalcium silicate. Calcium hydroxide.

(2) $3CaO{\cdot}Al_2O_3+12H_2O=3CaO{\cdot}Al_2O_3{\cdot}12H_2O$
Tricalcium aluminate. Hydrated tricalcium aluminate.

Since alite is a solid solution and, although an individual mineral, is not a chemical unit, the proportion of tricalcium silicate to tricalcium aluminate in a given specimen of alite will vary; but, whatever the proportions, each of these substances will react in its characteristic manner according to the equations given above.

The precise mechanism of the process of setting of Portland cement is not known with certainty, but it is probably analogous to that of the setting of plaster of Paris, consisting in the dissolution of the compounds produced by hydration while they are in a more soluble form, their transition to a less soluble form, the consequent supersaturation of the solution, and the deposition of the surplus of the dissolved substance in crystals which interlock and form a coherent mass. This theory being accepted, it is evident that a small quantity of water, by successive dissolution and deposition of a substance capable of existing in a more soluble and in a less soluble form, is able to bring about the crystallization of an indefinitely large quantity of material. It is not necessary that there should be present sufficient water to dissolve the whole of the reacting substance at any one time; it is sufficient if there is enough for hydration and a small surplus for the crystallization by successive stages as above described. It is generally admitted that the aluminate is the chief agent in the first setting of the cement, and that its ultimate hardening and attainment of strength are due to the tricalcium silicate.

As mentioned above, the constituents other than the tricalcium silicate and tricalcium aluminate of which alite is composed, are of minor importance. The function of the ferric oxide present in ordinary cement is little more than that of a flux to aid the union of silica, alumina and lime in the clinker; its rôle in the setting of the cement is altogether secondary. In fact, excellent Portland cement can be prepared from materials free from iron. Such cement, if free also from manganese, is white, and its manufacture has been proposed for exterior decorative use. Magnesia, if present in Portland cement in quantity not exceeding 5%, appears to be inert, but there is evidence that in larger proportion, *e.g.* 10-15%, it may hydrate and set after the general setting of the cement, and may give rise to disruptive strains causing the cement to "blow" and fail. In so-called natural cement which is comparatively lightly burnt, the magnesia appears to be inert, and as much as 20 to 30% may be present. Another constituent of Portland cement which influences

its setting time is calcium sulphate, naturally formed from the sulphur in the raw materials or fuel, or intentionally added to the finished cement as gypsum or plaster of Paris. It has a remarkable retarding effect on the hydration of the calcium aluminate, and consequently on the setting of the cement; thus it is that a little gypsum is often added to convert a naturally quick-setting cement into one which sets slowly. It will be observed that in the hydration of tricalcium silicate, the main constituent of Portland cement, a large portion of the lime appears as calcium hydroxide, *i.e.* slaked lime. It is evident that this will form a pozzuolanic cement if a suitable silicious material such as trass is added to the cement. The ultimate product when set may be regarded as a mixed Portland and pozzuolanic cement. The use of trass in this manner as an adjunct to Portland cement has been advocated by W. Michaelis, and undoubtedly increases the strength of the material, but it has not become general.

Testing. The quality of Portland cement is ascertained by its analysis and by determining its specific gravity, fineness, mechanical strength and soundness. A good sample will usually have a composition within the limits cited above and approximating to the typical figures given above. It will be ground so finely that not more than 3% will be left on a sieve of 76×76 meshes per sq. in., the wires of the sieve being 0·005 in. in diameter. It will have, when freshly burned, a specific gravity not lower than 3·15, and briquettes made from it and kept in water will possess a tensile strength of 400-500 lb per sq. in. seven days after they are made, while briquettes made from a mixture of 3 parts by weight of sand and 1 of cement will give about 225 lb per sq. in. at twenty-eight days. Formerly the soundness of cement was determined by keeping thin parts of the cement in cold water for twenty-eight days, or in warm water (110°-120° F.) for twenty-four hours, and examining for cracks or other signs of expansion. Modern practice is to measure the expansion of a test piece of cement kept in water at a temperature of 212° F. The simplest and most generally used method is due to H. L. le Châtelier, and consists in measuring the increase in circumference of a cylinder of cement 30 mm. in diameter by means of a split ring encircling the cylinder, the motion of which is magnified by two light rods extending radially. Another quantitative test for soundness is that formulated by L. Deval, who has shown that briquettes of 3 of sand and 1 of cement kept in water for two days at 80° C. = 176° F. attain approximately the same strength as similar briquettes attain at seven days in water at the ordinary temperature. In like manner briquettes kept at 176° F. for seven days are approximately equal in strength to those kept at the ordinary temperature for twenty-eight days. A cement not perfectly sound will give low results in the hot test, and a cement of indifferent soundness will crack and go to pieces. The test is admittedly severe, but can be passed without difficulty by cement made with proper care and skill. There are many modifications and elaborations of all the tests which have been mentioned. Cement for all important work is submitted to a rigorous system of testing and analysis before it is accepted and used.

Hydraulic Lime is a cement of the Portland as distinct from the pozzuolanic class. The most typical hydraulic lime is that known as Chaux du Theil, made from a limestone found at Ardèche in France. This limestone consists of calcium carbonate most intimately intermixed with very finely divided silica. It contains but little alumina and oxide of iron, which are the constituents generally necessary to bring about the union of silica and lime to form a cement, but in spite of this the silica is so finely divided and so well distributed that it unites readily with the lime when the limestone is burned at a sufficiently high temperature. English hydraulic limes are of a different class; they contain a good deal of alumina and ferric oxide, and in composition resemble somewhat irregular Portland cement.

Analyses of the two classes of hydraulic lime are as follows:—

	Chaux de Theil. Per cent.	Blue Lias. Per cent.
Insoluble silicious matter	0·3	2·39
Silica (SiO_2)	21·7	14·17
Alumina (Al_2O_3)	1·8	6·79
Ferric oxide (Fe_2O_3)	0·6	2·34
Lime (CaO)	74·0	63·43
Magnesia (MgO)	0·7	1·54
Sulphuric anhydride (SO_2)	0·3	1·63
Carbonic anhydride (CO_2) / Water (H_2O)	0·6	3·64 / 2·69
Alkalis and loss	..	1·38
	100·0	100·00

Hydraulic lime contains a good deal of uncombined lime, and has to be slaked before it is used as a cement. In France this slaking is conducted systematically by the makers, the freshly burned lime being sprinkled with water and stored in large bins where slaking proceeds slowly and regularly until the whole of the surplus uncombined lime is slaked and rendered harmless, while the cementitious compounds, notably tricalcium silicate, remain untouched. In English practice hydraulic lime is slaked by the user. Seeing that regular and perfect slaking is more easily attained when working systematically on a large scale and by storing the material for a long period, the French method is the better and more rational. The product may then be regarded as a cement of the Portland class mixed with slaked lime. When gauged with water and made into a mortar it sets slowly, but ultimately becomes almost as strong as Portland cement. Its slow setting is an advantage for some purposes, *e.g.* for foundations and abutments where settlements may occur. The structure is free to take its permanent position before the lime sets, and cracks are thus avoided. A case in point is the employment of hydraulic lime in place of Portland cement as grouting outside the cast-iron tubes used for lining tunnels made by the shield system.

Roman Cement is another cement of the Portland class which came into use shortly before the manufacture of artificial Portland cement was attempted. It is still in use, though only for special purposes where a quick-setting material is required. It is made from septaria nodules which are dredged up on the Kent and Essex coasts and consist of about 60 % of calcium carbonate mixed with clay, the mass being sufficiently indurated to remain coherent under water. The nodules are not prepared in any way, but simply burned at a moderate red heat.

The resulting cement varies somewhat in composition, but approximates to the following figures:—

	Per cent.
Insoluble silicious matter	5·86
Silica (SiO_2)	19·62
Alumina (Al_2O_3)	10·30
Ferric oxide (Fe_2O_3)	7·44
Manganese dioxide (MnO_2)	1·57
Lime (CaO)	44·54
Magnesia (MgO)	2·92
Sulphuric anhydride (SO_2)	2·61
Carbonic anhydride (CO_2)	3·43
Water (H_2O)	0·25
Alkalis and loss	1·46
	100·00

The most characteristic constituent is the oxide of iron, which gives the cement a reddish colour, and the presence of manganese also differentiates Roman from Portland cement, which rarely contains appreciable quantities of that element. The high percentage of alumina causes the cement to be quick-setting, and it becomes hard in about five minutes. It resists the action of water, salt or fresh, very well, and is therefore useful in situations where the work is likely to be submerged immediately after it has been put in place.

The term *Natural Cements* is applied to cements made by burning mixtures of clay and carbonate of lime naturally occurring in approximately suitable proportions. They may be regarded as badly-mixed Portland cements, and need no special description. American "natural" cements are of a somewhat different class. They are usually made from a silicious limestone containing magnesia, and are comparatively lightly burned.

The following analysis is typical of a cement of this kind:—

	Per cent.
Silica (SiO_2)	24·30
Alumina (Al_2O_3)	7·22
Ferric oxide (Fe_2O_3)	5·06
Lime (CaO)	33·70
Magnesia (MgO)	20·94
Water, carbonic anhydride, and loss	8·78
	100·00

These irregular cements of the Portland class are good building materials for ordinary purposes, but are not so suitable as good artificial Portland cement for heavy and important undertakings.

Passow Cement is a recent product which is in a class by itself. It is made by granulating blast furnace slag of suitable composition and finely grinding the product, either alone or with an admixture of about 10 % of Portland cement clinker. It differs from ordinary slag cement (see above) in that it is not a pozzuolanic cement depending on the interaction of granulated slag and lime. The particular method of granulating slag for Passow cement produces a material which sets *per se* and attains a strength comparable with that of Portland cement. Passow cement has been successfully made from slag of different compositions in Germany, England and America.

The chief use of hydraulic cements, whether of the pozzuolanic or Portland class, is to act as an adhesive material in work which is to be exposed to water. No doubt in times of remote antiquity it was found that the jointing of masonry which was to be immersed required the use of a cement indifferent to the action of water. Ordinary mortar failed in such positions; mortar made from lime prepared from limestones or chalks containing a little clay was found to stand; mortar made from lime mixed with trass or similar active silicious material was also found to stand. On this observation rests the whole of the present enormous employment of hydraulic cements. It was a natural transition to utilize these cements not merely for jointing masonry but also for making concrete, and the only reason why hydraulic cements, as distinct from cements which are not hydraulic (*e.g.* ordinary mortar), are used for the latter purpose is their great mechanical strength. Their use in above-water work is checked by the low price of common brick. Even in such work, where it would be thought that masses of burnt clay would be the cheapest conceivable material, concrete is at least on level terms with its rival. It must be remembered that one of the great advantages of concrete is that five-sixths of its total mass may be provided from local sand and gravel, on which no carriage has to be paid. The cement, on which alone freight is to be reckoned, converts these from loose incoherent material into a solid stone. Thus it comes about that the largest use of cement is for manufacturing concrete for dock and harbour work, and for the making of foundations. It is also employed for the building of light bridges, floors, and pipes constructed of cement mortar disposed round a skeleton of iron rods. Such composite structures take advantage at once of the high tensile strength of iron and of the high compressive strength of cement mortar. (See also CONCRETE.)

Uses of hydraulic cements.

Good hydraulic cements are highly permanent materials provided certain conditions be observed. It might be supposed that hydraulic cements from their nature would be indifferent to the action of water, but this is only true if the structures of which they form part are sufficiently compact. In this case the action of the water is checked by the film of carbonate of lime which eventually forms on the surface of calcareous cement. This, together with the compactness of the mortar, hinders the ingress and egress of water, and prevents the dissolution and ultimate destruction of the cement. But where the concrete or mortar is not well made and is porous, the continual passage of water through it will gradually break up and dissolve away the calcareous constituents of the cement until its strength is utterly destroyed. This destructive action is increased if the water contains sulphates or magnesium salts, both of which act chemically on the calcareous constituents of the cement. As sea-water contains both sulphates and magnesium salts, it is especially necessary in concrete for harbour work to take every care to produce an impervious structure. There are various minor external causes for the failure and ultimate destruction of cement mortar and concrete, but their discussion is a matter for the specialist. Failure from inherent vice in the cement has been already touched on; it can always be traced to want of skill and care in manufacture.

Calcium Sulphate Cements.—Under this term are comprehended all cements whose setting properties primarily depend on the hydration of calcium sulphate. They include plaster of Paris, Keene's cement and many variants of these two types. The raw material is gypsum (*q.v.*). This may be almost chemically pure, when it is generally used for Keene's cement; or it may contain smaller or greater quantities of impurities, in which case it is suitable for the preparation of cements of the plaster of Paris class. The mode of preparation is to calcine the gypsum at temperatures which depend on the class of cement to be produced. If plaster of Paris is to be made, calcination is carried out at about 204° C. (=400° F.); at this temperature, gypsum, $CaSO_4 \cdot 2H_2O$, loses three-quarters of its combined water and becomes $2CaSO_4 \cdot H_2O$. If a cement of the Keene's cement class is to be prepared the temperature used is higher, *e.g.* 500° C. (=932° F.), and the whole of the combined water of the gypsum is expelled, the anhydrous sulphate $CaSO_4$ being obtained.

To produce plaster of Paris European practice consists in baking the mineral in ovens, and in America in heating it in kettles. Both processes are inferior in economy to calcination in rotatory kilns, a process which may be regarded as the method of the present and the immediate future. Keene's cement and its congeners are made in fixed kilns so constructed that only the gaseous products of combustion come into contact with the gypsum to be burnt, in order to avoid contamination with the ash of the fuel.

Plaster of Paris; Keene's cement.

The setting of plaster of Paris depends on the fact that when $2CaSO_4 \cdot H_2O$ is treated with water it dissolves, forming a supersaturated solution of $CaSO_4 \cdot 2H_2O$. The excess held temporarily in solution is then deposited in crystals of $CaSO_4 \cdot 2H_2O$. In the light of this knowledge the mode of setting of plaster of Paris becomes clear. The plaster is mixed with a quantity of water sufficient to make it into a smooth paste; this quantity of water is quite insufficient to dissolve the whole of it, but it dissolves a small part, and gives a supersaturated solution of $CaSO_4 \cdot 2H_2O$. In a few minutes the surplus hydrated calcium sulphate is deposited from the solution, and the water is capable again of dissolving $2CaSO_4 \cdot H_2O$, which in turn is fully hydrated and deposited as $CaSO_4 \cdot 2H_2O$. The process goes on until a relatively small quantity of water has by instalments dissolved and hydrated the $2CaSO_4 \cdot H_2O$, and has deposited $CaSO_4 \cdot 2H_2O$ in felted crystals forming a solid mass well cemented together. The setting is rapid, occupying only a few minutes, and is accompanied by a considerable expansion of the mass. There is reason to suppose that the change described takes place in two stages, the gypsum first forming orthorhombic crystals and then crystallizing in the monosymmetric system. Gypsum thus crystallized is in its normal monosymmetric form, more stable under ordinary conditions than the orthorhombic form. Correlatively in its process of dehydration to form plaster of Paris, monosymmetric gypsum is converted into the orthorhombic form before it begins to be dehydrated.

The principles which govern the preparation and setting of the other class of calcium sulphate cements, that is, cements of the Keene class, are not fully understood, but there is a fair amount of knowledge on the subject, both empirical and scientific. The essential difference between the setting of Keene's cement and that of plaster of Paris is that the former takes place much more slowly, occupying hours instead of minutes, and the considerable heating and expansion which characterize the setting of plaster of Paris are much less marked.

It is the practice in Great Britain to burn pure gypsum at a low temperature so as to convert it into the hydrate $2CaSO_4 \cdot H_2O$, to soak the lumps in a solution of alum or of aluminium sulphate, and to recalcine them at about 500° C. On grinding they give Keene's cement. Instead of alum various other salts, *e.g.* borax, may be used. The quantity of these materials is so small that analyses of Keene's cement show it to be almost pure anhydrous calcium sulphate, and make it difficult to explain what, if any, influence these minute amounts of alum and the like can exert on the setting of the cement. It seems probable that the effect of the salts is inconsiderable, and that the governing condition is the temperature at which the cement has been burnt. The setting of Keene's cement takes place by the same sort of process which has been described for the setting of plaster of Paris, the chief differences being that the substance dissolved is anhydrous calcium sulphate and that the operation takes a longer time.

All cements having calcium sulphate as their base are suitable only for indoor work because of the solubility of this substance. They form excellent decorative plasters on account of their clean white colour and the sharpness of castings made from them, this latter quantity being due to their expansion when setting.

See D. B. Butler, *Portland Cement* (London, 1905); E. C. Eckel, *Cements, Limes and Plasters* (New York, 1905); G. R. Redgrave and Charles Spackman, *Calcareous Cements* (London, 1905); F. H. Lewis, "Manufacture of Hydraulic Cements in the United States," *The Mineral Industry* (New York, 1898); W. H. Stanger and Bertram Blount, "Cement Manufacture in Great Britain," *The Mineral Industry*, New York, 1897 and 1905; *Id.* "The Testing of Hydraulic Cements," *Journ. Soc. Chem. Ind.*, 1894, 13, p. 455; *Id.*, *Proc. Inst. Civ. Eng.*, 1901; B. Blount, "Recent Progress in the Cement Industry," *Journ. Soc. Chem. Ind.*, 1906, 25, p. 1020; H. L. le Chatelier, *Recherches expérimentales sur la constitution des mortiers hydrauliques*; Desch, *Concrete*, No. 2, pp. 101-102; Davis, *Journ. Soc. Chem. Ind.*, 1905, 26, p. 727. (B. BL.)

Adhesive Cements.—Mixtures of animal, vegetable and mineral substances are employed in great variety in the arts for making joints, mending broken china and other objects, &c. A strong cement for alabaster and marble, which sets in a day, may be prepared by mixing 12 parts of Portland cement, 8 of fine sand and 1 of infusorial earth, and making them into a thick paste with silicate of soda; the object to be cemented need not be heated. For stone, marble, and earthenware a strong cement, insoluble in water, can be made as follows:—skimmed-milk cheese is boiled in water till of a gluey consistency, washed, kneaded well in cold water, and incorporated

with quicklime; the composition is warmed for use. A similar cement is a mixture of dried fresh curd with $\frac{1}{10}$th of its weight of quicklime and a little camphor; it is made into a paste with water when employed. A cement for Derbyshire spar and china, &c., is composed of 7 parts of rosin and 1 of wax, with a little plaster of Paris; a small quantity only should be applied to the surfaces to be united, for, as a general rule, the thinner the stratum of a cement, the more powerful its action. Quicklime mixed with white of egg, hardened Canada balsam, and thick copal or mastic varnish are also useful for cementing broken china, which should be warmed before their application. For small articles, shellac dissolved in spirits of wine is a very convenient cement. Cements such as marine glue are solutions of shellac, india-rubber or asphaltum in benzene or naphtha. For use with wood which is exposed to moisture, as in the case of wooden cisterns, a mixture may be made of 4 parts of linseed oil boiled with litharge, and 8 parts of melted glue; other strong cements for the same purpose are prepared by softening gelatine in cold water and dissolving it by heat in linseed oil, or by mixing glue with one-fourth of its weight of turpentine, or with a little bichromate of potash. *Mahogany cement*, for filling up cracks in wood, consists of 4 parts of beeswax, 1 of Indian red and yellow-ochre to give colour. *Cutler's cement*, used for fixing knife-blades in their hafts, is made of equal parts of brick-dust and melted rosin, or of 4 parts of rosin with 1 each of beeswax and brick-dust. For covering bottle-corks a mixture of pitch, brick-dust and rosin is employed. A cheap cement, sometimes employed to fix iron rails in stone-work, is melted brimstone, or brimstone and brick-dust. For pipe-joints, a mixture of iron turnings, sulphur and sal ammoniac, moistened with water, is employed. *Japanese cement*, for uniting surfaces of paper, is made by mixing rice-flour with water and boiling it. *Jewellers'* or *Armenian cement* consists of isinglass with mastic and gum ammoniac dissolved in spirit. Gold and silver chasers keep their work firm by means of a cement of pitch and rosin, a little tallow, and brick-dust to thicken. *Temporary cement* for lathe-work, such as the polishing and grinding of jewelry and optical glasses, is compounded thus:—rosin, 4 oz.; whitening previously made red-hot, 4 oz.; wax, $\frac{1}{2}$ oz.

CEMETERY (Gr. κοιμητήριον, from κοιμᾶν, to sleep), literally a sleeping-place, the name applied by the early Christians to the places set apart for the burial of their dead. These were generally extra-mural and unconnected with churches, the practice of interment in churches or churchyards being unknown in the first centuries of the Christian era. The term cemetery has, therefore, been appropriately applied in modern times to the burial-grounds, generally extra-mural, which have been substituted for the overcrowded churchyards (*q.v.*) of populous parishes both urban and rural.

From 1840 to 1855, attention was repeatedly called to the condition of the London churchyards by correspondence in the press and by the reports of parliamentary committees, the first of which, that of Mr Chadwick, appeared in 1843. The vaults under the pavement of the churches, and the small spaces of open ground surrounding them, were crammed with coffins. In many of the buildings the air was so tainted with the products of corruption as to be a direct and palpable source of disease and death to those who frequented them. In the churchyards coffins were placed tier above tier in the graves until they were within a few feet (or sometimes even a few inches) of the surface, and the level of the ground was often raised to that of the lower windows of the church. To make room for fresh interments the sextons had recourse to the surreptitious removal of bones and partially-decayed remains, and in some cases the contents of the graves were systematically transferred to pits adjacent to the site, the grave-diggers appropriating the coffin-plates, handles and nails to be sold as waste metal. The neighbourhood of the churchyards was always unhealthy, the air being vitiated by the gaseous emanations from the graves, and the water, wherever it was obtained from wells, containing organic matter, the source of which could not be mistaken. In all the large towns the evil prevailed in a greater or less degree, but in London, on account of the immense population and the consequent mortality, it forced itself more readily upon public attention, and after more than one partial measure of relief had been passed the churchyards were, with a few exceptions, finally closed by the act of 1855, and the cemeteries which now occupy a large extent of ground to the north, south, east and west became henceforth the burial-places of the metropolis. Several of them had been already established by private enterprise before the passing of the Burial Act of 1855 (Kensal Green cemetery dates from 1832), but that enactment forms the epoch from which the general development of cemeteries in Great Britain and Ireland began. Burial within the limits of cities and towns is now almost everywhere abolished, and where it is still in use it is surrounded by such safeguards as make it practically innocuous. This tendency has been conspicuous both in the United Kingdom and the United States. The increasing practice of cremation (*q.v.*) has assisted in the movement for disposing of the dead in more sanitary conditions; and the proposals of Sir Seymour Haden and others for burying the dead in more open coffins, and abandoning the old system of family graves, have had considerable effect. The tendency has therefore been, while improving the sanitary aspects of the disposal of the dead, to make the cemeteries themselves as fit as possible for this purpose, and beautiful in arrangement and decoration.

The chief cemeteries of London are Kensal Green cemetery on the Harrow Road; Highgate cemetery on the slope of Highgate Hill; the cemetery at Abney Park (once the residence of Dr Watts); the Norwood and Nunhead cemeteries to the south of London; the West London cemetery at Brompton; the cemeteries at Ilford and Leytonstone in Essex; the Victoria cemetery and the Tower Hamlets cemetery in East London; and at a greater distance, accessible by railway, the great cemetery at Brookwood near Woking in Surrey, and the cemetery at New Southgate. The general plan of all these cemeteries is the same, a park with broad paths either laid out in curved lines as at Kensal Green and Highgate, or crossing each other at right angles as in the case of the West London cemetery. The ground on each side of these paths is marked off into grave spaces, and trees and shrubs are planted in the intervals between them. The buildings consist of a curator's residence and one or more chapels, and usually there is also a range of family graves with imposing tombs, massive structures containing in their corridors recesses for the reception of coffins, generally closed only by an iron grating. The provincial cemeteries in the main features of their arrangements resemble those of the metropolis. One of the most remarkable is St James's cemetery at Liverpool, which occupies a deserted quarry. The face of the eastern side of the quarry is traversed by ascending gradients off which open catacombs formed in the living rock,—a soft sandstone; the ground below is planted with trees, amongst which stand hundreds of gravestones. The main approach on the north side is through a tunnel, above which, on a projecting rock, stands the cemetery chapel, built in the form of a small Doric temple with tetrastyle porticos.

Many of the cities of America possess very fine cemeteries. One of the largest, and also the oldest, is that of Mount Auburn near Boston. Others of importance are the Laurel Hill cemetery (1836) at Philadelphia; the Greenwood cemetery (1838) at Brooklyn (New York); the Lake View cemetery at Cleveland, Ohio; while the cemeteries at New Orleans (*q.v.*) are famous for their beauty.

The chief cemetery of Paris is that of Père la Chaise, the prototype of the garden cemeteries of western Europe. It takes its name from the celebrated confessor of Louis XIV., to whom as rector of the Jesuits of Paris it once belonged. It was laid out as a cemetery in 1804. It has an area of about 200 acres, and contains about 20,000 monuments, including those of all the great men of France of the 19th century—marshals, generals, ministers, poets, painters, men of science and letters, actors and musicians. Twice the cemetery and the adjacent heights have been the scene of a desperate struggle; in 1814 they were stormed by a Russian column during the attack on Paris by the allies, and in 1871 the Communists made their last stand among the tombs of Père la Chaise; 900 of them fell in the defence of the cemetery or were shot there after its capture, and 200 of them were buried in quicklime in one huge grave and 700 in another. There are other cemeteries at Mont Parnasse and Montmartre, besides the minor burying-grounds at Auteuil, Batignolles, Passy, La Villette, &c. In consequence of all these cemeteries being more or less crowded, a great cemetery was laid out in 1874 on the plateau of Méry sur Oise, 16 m. to the north of Paris, with which

it is connected by a railway line. It includes within its circuit fully 2 sq. m. of ground. The French cemetery system differs in many respects from the English. Every city and town is required by law to provide a burial-ground beyond its barriers, properly laid out and planted, and situated if possible on a rising ground. Each interment must take place in a separate grave. This, however, does not apply to Paris, where the dead are buried, forty or fifty at a time, in the *fosses communes*, the poor being interred gratuitously, and a charge of 20 francs being made in all other cases. The *fosse* is filled and left undisturbed for five years, then all crosses and other memorials are removed, the level of the ground is raised 4 or 5 ft. by fresh earth, and interments begin again. For a fee of 50 francs a *concession temporaire* for ten years can be obtained, but where it is desired to erect a permanent monument the ground must be bought by the executors of the deceased. In Paris the undertakers' trade is the monopoly of a company, the *Société des pompes funèbres*, which in return for its privileges is required to give a free burial to the poor.

The *Leichenhäuser*, or dead-houses, of Frankfort and Munich form a remarkable feature of the cemeteries of these cities. The object of their founders was twofold—(1) to obviate even the remotest danger of premature interment, and (2) to offer a respectable place for the reception of the dead, in order to remove the corpse from the confined dwellings of the survivors. At Frankfort the dead-house occupies one of the wings of the propylaeum, which forms the main entrance to the cemetery. It consists of the warder's room, where an attendant is always on duty, on each side of which there are five rooms, well ventilated, kept at an even temperature, and each provided with a bier on which a corpse can be laid. On one of the fingers is placed a ring connected by a light cord with a bell which hangs outside in the warder's room. The use of the dead-house is voluntary. The bodies deposited there are inspected at regular intervals by a medical officer, and the warder is always on the watch for the ringing of the warning bell. One revival, that of a child, has been known to take place at Frankfort. The Leichenhaus of Munich is situated in the southern cemetery outside the Sendling Gate. At one end of the cemetery there is a semicircular building with an open colonnade in front and a projection behind, which contains three large rooms for the reception of the dead. At both Frankfort and Munich great care is taken that the attendants receive the dead confided to them with respect, and no interment is permitted until the first signs of decomposition appear; the relatives then assemble in one of the halls adjoining the Leichenhaus, and the funeral takes place. In any case there is, with ordinary care, little fear of premature interment, but in another way such places of deposit for the dead are of great use in large towns, as they prevent the evil effects which result from the prolonged retention of the dead among the living. Mortuaries for this purpose have also been established in many places in England.

In Italy the *Campo Santo* (Holy Field) is best illustrated by the famous one at Pisa, from which the name has been given to other Italian burying-grounds. Of the cemeteries still in use in southern Europe the catacombs (*q.v.*) of Sicily are the most curious. There is one of these under the old Capuchin monastery of Ziza near Palermo, where in four large airy subterranean corridors 2000 corpses are ranged in niches in the wall, many of them shrunk up into the most grotesque attitudes, or hanging with pendent limbs and head from their places. As a preparation for the niche, the body is desiccated in a kind of oven, and then dressed as in life and raised into its place in the wall. At the end of the principal corridor at Ziza there is an altar strangely ornamented with a kind of mosaic of human skulls and bones.

Cemeteries have been in use among many Eastern nations from time immemorial. In China, the high grounds near Canton and Macao are crowded with tombs, many of them being in the form of small tumuli, with a low encircling wall, forcibly recalling the ringed barrows of western Europe. But the most picturesque cemeteries in the world are those of the Turks. From them it was, perhaps, that the first idea of the modern cemetery, with its ornamental plantations, was derived. Around Constantinople the cemeteries form vast tracts of cypress woods under whose branches stand thousands of tombstones. A grave is never reopened; a new resting-place is formed for every one, and so the dead now occupy a wider territory than that which is covered by the homes of the living. The Turks believe that till the body is buried the soul is in a state of discomfort, and the funeral, therefore, takes place as soon as possible after death. No coffin is used, the body is laid in the grave, a few boards are arranged round it, and then the earth is shovelled in, care being taken to leave a small opening extending from the head of the corpse to the surface of the ground, an opening not unfrequently enlarged by dogs and other beasts which plunder the grave. A tombstone of white marble is then erected, surmounted by a carved turban in the case of a man, and ornamented by a palm branch in low relief if the grave is that of a woman. The turban by its varying form indicates not only the rank of the sleeper below but also the period of his death, for the fashion of the Turkish head-dress is always changing. A cypress is usually planted beside the grave, its odour being supposed to neutralize any noxious exhalations from the ground, and thus every cemetery is a forest, where by day hundreds of turtle doves are on the wing or perching on the trees, and where bats and owls swarm undisturbed at night. Especially for the Turkish women the cemeteries are a favourite resort, and some of them are always to be seen praying beside the narrow openings that lead down into a parent's, a husband's, or a brother's grave. Some of the other cemeteries of Constantinople contrast rather unfavourably with the simple dignity of those which belong to the Turks. That of the Armenians abounds with bas-reliefs which show the manner of the death of whoever is buried below, and on these singular tombstones there are frequent representations of men being decapitated or hanging on the gallows.

See also the articles Burial and Burial Acts; Cremation; Funeral Rites; Churchyard.

CENCI, BEATRICE (1577–1599), a Roman woman, famous for her tragic story; poetic fancy has woven a halo of romance about her, which modern historic research has to a large extent destroyed. Born at Rome, she was the daughter of Francesco Cenci (1549–1598), the bastard son of a priest, and a man of great wealth but dissolute habits and violent temper. He seems to have been guilty of various offences and to have got off with short terms of imprisonment by bribery; but the monstrous cruelty which popular tradition has attributed to him is purely legendary. His first wife, Ersilia Santa Croce, bore him twelve children, and nine years after her death he married Lucrezia Petroni, a widow with three daughters, by whom he had no offspring. He was very quarrelsome and lived on the worst possible terms with his children, who, however, were all of them more or less disreputable. He kept various mistresses and was even prosecuted for unnatural vice, but his sons were equally dissolute. His harsh treatment of his daughter Beatrice was probably due to his discovery that she had had an illegitimate child as the result of an intrigue with one of his stewards (A. Bertolotti, in his *Francesco Cenci*, publishes Beatrice's will in which she provides for this child), but there is no evidence that he tried to commit incest with her, as has been alleged. The eldest son Giacomo was a riotous, dishonest young scoundrel, who cheated his own father and even attempted to murder him (1595). Two other sons, Rocco and Cristoforo, both of them notorious rakes, were killed in brawls. Finally Francesco's wife Lucrezia and his children Giacomo, Bernardo and Beatrice, assisted by a certain Monsignor Guerra, plotted to murder him. Two bravos were hired (one of them named Olimpio, according to Bertolotti, was probably Beatrice's lover), and Francesco was assassinated while asleep in his castle of Petrella in the kingdom of Naples (1598). Giacomo afterwards had one of the bravos murdered, but the other was arrested by the Neapolitan authorities and confessed everything. Information having been communicated to Rome, the whole of the Cenci family were arrested early in 1599; but the story of the hardships they underwent in prison is greatly exaggerated. Guerra escaped;

Lucrezia, Giacomo and Bernardo confessed the crime; and Beatrice, who at first denied everything, even under torture, also ended by confessing. Great efforts were made to obtain mercy for the accused, but the crime was considered too heinous, and the pope (Clement VIII.) refused to grant a pardon; on the 11th of September 1599, Beatrice and Lucrezia were beheaded, and Giacomo, after having been tortured with red-hot pincers, was killed with a mace, drawn and quartered. Bernardo's penalty, on account of his youth, was commuted to perpetual imprisonment, and after a year's confinement he was pardoned. The property of the family was confiscated.

The romantic character of the history of this family has been the subject of poems, dramas and novels. Shelley's tragedy is well known as a magnificent piece of writing, although the author adopts a purely fictitious version of the story. Nor is F. D. Guerrazzi's novel, *Beatrice Cenci* (Milan, 1872), more trustworthy. The first attempt to deal with the subject on documentary evidence is A. Bertolotti's *Francesco Cenci e la sua famiglia* (2nd ed., Florence, 1879), containing a number of interesting documents which place the events in their true light; cf. Labruzzi's article in the *Nuova Antologia*, 1879, vol. xiv., and another in the *Edinburgh Review*, January 1879.

CENOBITES (from Gr. *κοινός*, common, and *βίος*, life), monks who lived together in a convent or community under a rule and a superior,—in contrast to hermits or anchorets who live in isolation. The Basilians (*q.v.*) in the East and the Benedictines (*q.v.*) in the West are the chief cenobitical orders (see MONASTICISM).

CENOMANI, a branch of the Aulerci in Gallia Celtica, whose territory corresponded generally to Maine in the modern department of Sarthe. Their chief town was Vindinum or Suindinum (corrupted into Subdinnum), afterwards Civitas Cenomanorum (whence Le Mans), the original name of the town, as usual in the case of Gallic cities, being replaced by that of the people. According to Caesar (*Bell. Gall.* vii. 75. 3), they assisted Vercingetorix in the great rising (52 B.C.) with a force of 5000 men. Under Augustus they formed a *civitas stipendiaria* of Gallia Lugdunensis, and in the 4th century part of Gallia Lugdunensis iii. About 400 B.C., under the leadership of Elitovius (Livy v. 35), a large number of the Cenomani crossed into Italy, drove the Etruscans southwards, and occupied their territory. The statement of Cato (in Pliny, *Nat. Hist.* iii. 130), that some of them settled near Massilia in the territory of the Volcae, may indicate the route taken by them. The limits of their territory are not clearly defined, but were probably the Athesis (Adige or Etsch) on the east, the Ollius (Oglio, or perhaps the Addua) on the west, and the Padus on the south. Livy gives their chief towns as Brixia (Brescia) and Verona; Pliny, Brixia and Cremona. The Cenomani nearly always appear in history as loyal friends and allies of the Romans, whom they assisted in the Gallic war (225 B.C.), when the Boii and Insubres took up arms against Rome, and during the war against Hannibal. They certainly joined in the revolt of the Gauls under Hamilcar (200), but after they had been defeated by the consul Gaius Cornelius (197) they finally submitted. In 49, with the rest of Gallia Transpadana, they acquired the rights of citizenship.

The orthography and the quantity of the penultimate vowel of Cenomani have given rise to discussion. According to Arbois de Jubainville, the Cenomăni of Italy are not identical with the Cenomāni (or Cenomanni) of Gaul. In the case of the latter, the survival of the syllable "man" in Le Mans is due to the stress laid on the vowel; had the vowel been short and unaccented, it would have disappeared. In Italy, Cenomani is the name of a people; in Gaul, merely a surname of the Aulerci.

See A. Voisin, *Les Cénomans anciens et modernes* (Le Mans, 1862); A. Desjardins, *Géographie historique de la Gaule romaine*, ii. (1876–1893); Arbois de Jubainville, *Les Premiers Habitants de l'Europe* (1889–1894); article and authorities in *La Grande Encyclopédie*; C. Hülsen in Pauly-Wissowa's *Realencyclopädie*, iii. pt. 2 (1899); full ancient authorities in A. Holder, *Alt-celtischer Sprachschatz*, i. (1896).

CENOTAPH (Gr. *κενός*, empty, *τάφος*, tomb), a monument or tablet to the memory of a person whose body is buried elsewhere. The custom arose from the erection of monuments to those whose bodies could not be recovered, as in the case of drowning.

CENSOR (from Lat. *censere*, assess, estimate; in Gr. *τιμητής*). I. *In ancient Rome*, the title of the two Roman officials who presided over the census, the registration of individual citizens for the purpose of determining the duties which they owed to the community. In the etymology of the word lurks the idea of the arbitrary assignment of burdens or duties. Varro defines *census* as *arbitrium*, and derives the name *censores* from the position of these magistrates as *arbitri populi* (Varro, *de Ling. Lat.* v. 81; *ap.* Non. p. 519). This original idea of "discretionary power" was never entirely lost; although ultimately it came to be more intimately associated with the appreciation of morals than with the assignment of burdens. From the point of view of its moral significance the censorship was the Roman manifestation of that state control of conduct which was a not unusual feature of ancient societies. It is true that Rome possessed sumptuary laws, and laws dealing with moral offences, which it was the duty of other magistrates to enforce; but the organization for the control of conduct was mainly exhibited in the censorship, and, as thus exhibited, was at once simple and comprehensive.

The censorship was believed to have been instituted in 443 B.C. to relieve the consuls of the duties of registration. Since the periods of registration were quinquennial, it was not a continuous office; but its tenure does not seem to have been fixed until 434 B.C., when a *lex Aemilia* provided that the censors should hold office for eighteen months. This magistracy was at first confined to patricians; a plebeian censor is first mentioned in 351 B.C. A *lex Publilia* of 339 B.C. is said to have enacted that one censor must be a plebeian. Two plebeian censors were for the first time elected in 131 B.C. The election always took place in the Comitia Centuriata (see COMITIA). The censorship, although lacking the powers implied in the imperium and the right of summoning the senate and the people, was not only one of the higher magistracies, but was regarded as the crown of a political career. It was an irresponsible office; and the only limitations on its powers were created by the restriction of tenure to a year and a half, the fact that re-election was forbidden, and the restraint imposed on each censor by the fact that no act of his was valid without the assent of his colleague.

The original functions of the censors were (1) the registration of citizens in the state-divisions, such as tribes and centuries; (2) the taxation of such citizens based on an estimate of their property; (3) the right of exclusion from public functions on moral grounds, known as the *regimen morum*; (4) the solemn act of purification (*lustrum*) which closed the census. Two other functions were subsequently added:—(5) the selection of the senate (*lectio senatus*, see SENATE), and (6) certain financial duties such as the leasing of the contracts for tax-collecting and for the repair of public buildings. The first four of these functions were those of the census, which was a detailed examination of the citizen body as represented by heads of families (*patres familiarum*) in the Campus Martius. The equites were a select portion of this citizen body; but the review of these knights took place, not in the Campus, but in the Forum (see EQUITES). It was in connexion with this review of the ordinary citizens and the knights, as well as with the choice of senators, that the censors published their edicts stating the moral rules which they intended to enforce. The offences which they punished were sometimes concerned with family life and private relations, sometimes with breaches of political duty. Certain professions, such as that of an actor or gladiator, also invoked their stigma, and at times the disqualifications they pronounced were the consequence of a previous judicial condemnation. *Infamia* was the general name given to the disabilities pronounced by the censor. These varied in degree from the deprivation of a senator of his seat, or a knight's loss of his horse, to exclusion from the tribes or centuries, an exclusion which entailed the loss of voting power. All the disabilities pronounced by one pair of censors might be removed by their successors.

The censorship, although its control over the senate came to

be weakened (see SENATE), lasted as long as the republic; and it was only suspended, not abolished, during the principate. Although the princeps exercised censorial functions, he was seldom censor. Yet the office itself was held by Claudius I. and Vespasian. Domitian assumed the title of life censor (*censor perpetuus*), but the precedent was not followed. A fruitless attempt to galvanize the republican office into new life was made in A.D. 251, during the reign of the emperor Decius.

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(A. H. J. G.)

II. In modern times the word "censor" is used generally for one who exercises supervision over, or criticizes, the conduct of other persons. In the universities of Oxford and Cambridge it is the title of the official head or supervisor of the non-collegiate students (*i.e.* those who are not attached to a college, hall or hostel). In Oxford the censor is nominated by the vice-chancellor and the proctors, and holds office for five years; in Cambridge he is similarly appointed, and holds office for life. The censors of the Royal College of Physicians are the officials who grant licences.

Council of Censors, in American constitutional history, is the name given to a council provided by the constitution of Pennsylvania from 1776 to 1790, and by the constitution of Vermont from 1777 to 1870. Under both constitutions the council of censors was elected once in seven years, for the purpose of inquiring into the working of the governmental departments, the conduct of the state officers, and the working of the laws, and as to whether the constitution had been violated in any particular. The Vermont council of censors, limited in number to thirteen, had power, if they thought the constitution required amending in any particular, to call a convention for the purpose. A convention summoned by the council in 1870 amended the constitution by abolishing the censors.

For the censorship of the press, see PRESS LAWS; for the censorship of plays, THEATRE: *Law*, and LORD CHAMBERLAIN.

CENSORINUS, Roman grammarian and miscellaneous writer, flourished during the 3rd century A.D. He was the author of a lost work *De Accentibus*, and of an extant treatise *De Die Natali*, written in 238, and dedicated to his patron Quintus Caerellius as a birthday gift. The contents are of a varied character: the natural history of man, the influence of the stars and genii, music, religious rites, astronomy, the doctrines of the Greek philosophers. The second part deals with chronological and mathematical questions, and has been of great service in determining the principal epochs of ancient history. The whole is full of curious and interesting information. The style is clear and concise, although somewhat rhetorical, and the Latinity, for the period, good. The chief authorities used were Varro and Suetonius. Some scholars, indeed, hold that the entire work is practically an adaptation of the lost *Pratum* of Suetonius. The fragments of a work *De Natali Institutione*, dealing with astronomy, geometry, music and versification, and usually printed with the *De Die Natali* of Censorinus, are not by him. Part of the original MS., containing the end of the genuine work, and the title and name of the author of the fragment are lost.

The only good edition with commentary is still that of H. Lindenbrog (1614); the most recent critical editions are by O. Jahn (1845), F. Hultsch (1867), and J. Cholodniak (1889). There is an English translation of the *De Die Natali* (the first eleven chapters being omitted) with notes by W. Maude (New York, 1900).

CENSUS (from Lat. *censere*, to estimate or assess; connected by some with *centum*, *i.e.* a count by hundreds), a term used to denote a periodical enumeration restricted, in modern times, to population, and occasionally to industries and agricultural resources, but formerly extending to property of all kinds, for the purpose of assessment.

Operations of this character have been conducted with different objects from very ancient times. The fighting strength of the children of Israel at the Exodus was ascertained by a count of all males of twenty years old and upwards, made by enumerators appointed for each clan. The Levites, who were exempted from military duties, were separately enumerated from the age of thirty upwards, and a similar process was ordained subsequently by Solomon, in order to distribute amongst them the functions assigned to the priestly body in connexion with the temple. The census unwillingly carried out by Joab at the behest of David related exclusively to the fighting men of the community, and the dire consequences ascribed to it were quoted in reprobation of such inquiries as late as the middle of the 18th century. It appears, too, that a register of the population of each clan was kept during the Babylonian captivity and its totals were published on their return to Jerusalem. In the Persian empire there was apparently some method in force by which the resources of each province were ascertained for the purpose of fixing the tribute. In China, moreover, an enumeration of somewhat the same nature was an ancient institution in connexion with the provincial revenues and military liabilities. In Egypt, Amasis had the occupation of each individual annually registered, nominally to aid the official supervision of morals by discouraging disreputable means of subsistence; and this ordinance, according to Herodotus, was introduced by Solon into the Athenian scheme of administration, where it developed later into an electoral record.

It was in Rome, however, that the system from which the name of the inquiry is derived was first established upon a regular footing. The original census was ascribed to Servius Tullius, and in the constitution which goes by his name it was decreed that every fifth year the population should be enumerated along with the property of each family—land, live-stock, slaves and freedmen. The main object was to ensure the accurate division of the people into the six main classes and their respective centuries, which were based upon considerations of combined numbers and wealth. With the increase of the city the operation grew in importance, and was followed by an official *lustrum*, or purificatory sacrifice, offered on behalf of the people by the censors or functionaries in charge of the classification. Hence the name of lustrum came to denote the intercensal term, or a period of five years. The word census, too, came to mean the property qualification of the class, as well as the process of registering the resources of the individual. Later, it was used in the sense of the imposition itself, in which it has survived in the contracted form of *cess*. Unfortunately the statistics of population thus collected were subordinated to the fiscal interests of the inquiry, and no record has been handed down relating to the population of the city and its neighbourhood. In the time of Augustus the census was extended to the whole empire. In the words of the Gospel of St Luke, he ordered "the whole world to be *taxed*," or, according to the revised version, to be *enrolled*. The compilation of the results of this the most comprehensive enumeration till then attempted was engaging the attention of the emperor, it is said, just before his death, but was never completed. The various inquiries instituted during the middle ages, such as the Domesday Book and the Breviary of Charlemagne, were so far on the Roman model that they took little or no account of the population, the feudal system probably rendering information regarding it unnecessary for the purposes of taxation or military service.

The foundations of the census on the modern system were laid in Europe towards the middle or end of the 17th century. Sweden led the way, by making compulsory the parish record of births, deaths and marriages, kept by the clergy, and extending it to include the whole of the domiciled population of the parish. In France, Colbert, in 1670, ordered the extension to the rural communes of the system which had for many years been in force in Paris of registering and periodically publishing the domestic occurrences of the locality. Five years before this, however, a periodical enumeration by families and individuals had been established in the colony of New France, and was continued in

Quebec from 1665 till 1754. This, therefore, may be considered to be the earliest of modern censuses.

Efforts have been almost unceasingly made since 1872 by statistical experts in periodical conference to bring about a general understanding, first, as to the subjects which may be considered most likely to be ascertained with approximate accuracy at a census, and secondly—a point of scarcely less importance—as to the form in which the results of the inquiry should be compiled in order to render comparison possible between the facts recorded in the different areas. In regard to the scope of the inquiry, it is recognized that much is practicable in a country where the agency of trained officials is employed throughout the operation which cannot be expected to be adequately recorded where the responsibility for the correctness of the replies is thrown upon the householder. The standard set up by eminent statisticians, therefore, may be taken to represent an ideal, not likely to be attained anywhere under present conditions, but towards which each successive census may be expected to advance. The subjects to which most importance is attached from the international standpoint are age, sex, civil condition, birthplace, illiteracy and certain infirmities. Occupation, too, should be included, but the record of so detailed a subject is usually considered to be better obtained by a special inquiry, rather than by the rough and ready methods of a synchronous enumeration. This course has been adopted in Germany, Belgium and France, and an approach to it is made in the decennial census of Canada and the United States. Religious denomination, another of the general subjects suggested, is of considerably more importance in some countries than in others, and the same may be said of nationality, which is often usefully supplemented by the return of mother-tongue. Nor should it be forgotten that the internal classification and the combinations of the above subjects are also matters to be treated upon some uniform plan, if the full value of the statistics is to be extracted from the raw material. On the whole, the progress towards a general understanding on many, if not most, of the questions here mentioned which has been made in the present generation, is a gratifying tribute to those who have long laboured in the cause of efficient enumeration.

The British Empire

England and Wales.—Up to the beginning of the 19th century the number of the population was a matter of estimate and conjecture. In 1753 a bill was introduced by a private member of the House of Commons, backed by official support, to provide for the annual enumeration of the people and of the persons in receipt of parochial relief. It was violently opposed as "subversive of the last remains of English liberty" and as likely to result in "some public misfortune or an epidemical distemper." After passing that House, however, the bill was thrown out by the House of Lords. The fear of disclosing to the enemies of England the weakness of the country in fighting-material was one of the main objections offered to the proposal. By the end of the century, however, owing to a great extent to the publication of the essays of Malthus, the pendulum had swung far in the opposite direction, it was thought desirable to possess the means of judging from time to time the relations between an increasing population and the means of subsistence. A census bill, accordingly, again brought in by a private member, became law without opposition at the end of 1800, and the first enumeration under it took place in March of the following year, the operations being confined to Great Britain. The inquiry was entrusted in England to the overseers, acting under the justices of the peace and the high constables, and in Scotland, to village schoolmasters, under the sheriffs. A supplementary statement of births, deaths and marriages for each parish was required from the clergy, who transmitted it to parliament through the bishops and primates successively. There was no central office or control. The schedule required the number of houses, inhabited and otherwise, the population of each family, by sex, and the occupation, under one of the three heads, (*a*) agriculture, (*b*) trade, manufacture or industry, or (*c*) other than these two. The results, which were not satisfactory, were published without comment. Ten years later, the chief alteration in the inquiry was the substitution of the main occupation of the family for that of the individual. The report on this census contained a very valuable exposition of the difficulties involved in such operations and the numerous sources of error latent in an apparently simple set of questions. In 1821 an attempt to get a return of ages was made, but it was not repeated in 1831, when the attention of the enumerators was concentrated upon greater detail in the occupation record. Their efforts were successful in getting a better, but still far from complete result. The creation, in 1834, of poor law unions, and the establishment, in 1836, of civil registration districts, as a rule coterminous with them, provided a new basis for the taking of a census, and the operations in 1841 were made over accordingly to the supervision of the registrar-general and his staff. The inquiry was extended to the sex, age and occupation of every individual; those born in the district were distinguished from others, foreigners being also separately returned. The number of houses inhabited, uninhabited and under construction respectively, was noted in the return. The parish statement of births, deaths and marriages was sent up by the clergy for the last time. The most important innovation, however, was the transfer of the responsibility for filling up the schedule from the overseers to the householders, thereby rendering possible a synchronous record.

With some modification in detail, the system then inaugurated has been since maintained. In 1851 the relationship to the head of the family, civil condition, and the blind and deaf-mute were included in the inquiry. On this occasion, the act providing for the census was interpreted to authorize the collection of details regarding accommodation in places of public worship and the attendance thereat, as well as corresponding information about educational establishments. A separate report was published on the former subject which proved something of a storm centre. The census of 1871 obtained for the first time a return of persons of unsound mind not confined in asylums. During the next ten years, the separate areas for which population returns had to be prepared were seriously multiplied by the creation of sanitary districts, to the number of 966. The necessity, for administrative or other purposes, of tabulating separately the returns for so many cross-divisions of the country constitutes one of the main difficulties of the English census operations, more particularly as the boundaries of these areas are frequently altered. In anticipation of the census of 1891, a treasury committee was appointed to consider the various suggestions made in regard to the form and scope of the inquiry. Its proposals were adopted as to the subdivision of the occupation column into employer, employed and independent worker, and as to the record upon the schedule of the number of rooms occupied by the family, where not more than five. Separate entry was also made of the persons living upon property or resources, but not following any occupation. No action was taken, however, upon the more important recommendation that midway between two censuses a simple enumeration by sex and age should be effected. A return was also prepared in 1891, for Wales, of those who could speak only Welsh, only English, and both languages, but, owing to the inclusion of infants, the results were of little value. In 1901 the same information was called for, excluding all under three years of age. The term tenement, too, was substituted for that of storey, as the subdivision of a house, whilst in addition to inhabited and uninhabited houses, those occupied by day, but not by night, were separately recorded. The nationality of those born abroad, which used to be returned only for British subjects, was called for from all not born within the kingdom.

Scotland.—In the acts relating to the census from 1801 to 1851, provision for the enumeration of Scotland was made with that for England and Wales, allowance being made for the differences in procedure, which mainly concerned the agency to be employed. In 1855, however, civil registration of births and deaths was established in Scotland, and the conduct of the census of 1861 was, by a separate act, entrusted to the registrar-

general of that country. The same course was followed at the three succeeding enumerations, but in 1901 the former practice was resumed. The complexity of administrative areas, though far less than in England, was simplified, and the census compilation proportionately facilitated, by the passing of the Local Government Act for Scotland, in 1889. In 1881, the definition of a house in Scotland was made identical with that in England, since previously what was called a house in the northern portion of Great Britain was known as a tenement in the south, and vice versa. Since 1861 a return has been called for in Scotland of the number of rooms with one or more windows, and that of children of school-age under instruction is also included in the inquiry. The number of persons speaking Gaelic was recorded for the first time in 1881. The question was somewhat expanded at the next census, and in 1901 was brought into harmony with the similar inquiry as to Welsh and Manx.

Ireland.—An estimate of the population of Ireland was made as early as 1672, by Sir W. Petty, and another in 1712, in connexion with the hearth-money, but the first attempt to take a regular census was made in 1811, through the Grand Juries. It was not successful, and in 1821 again, the inquiry was considered to be but little more satisfactory. The census of 1831 was better, but the results were considered exaggerated, owing to the system of paying enumerators according to the numbers they returned. The census, therefore, was supplemented by a revisional inquiry three years afterwards, in order to get a good basis for the newly introduced system of public instruction. The completion of the ordnance survey and the establishment of an educated constabulary force brought the operations of 1841 up to the level of those of the sister kingdom. The main difference in procedure between the two inquiries is that in Ireland the schedule is filled in by the enumerator, a member of the constabulary, or, in Dublin, of the metropolitan police, instead of being left to the householder. The tabulation of the returns, again, is carried out at the central office from the original schedule, and not, as in England, from the book into which the former has been copied by the enumerating agency. The inquiry in Ireland is more extensive than that in Great Britain. It includes, for instance, a considerable amount of information regarding holdings and stock. The details of house accommodation are fuller. A column is provided for the degree of education, and another for religious denomination, an addition which has always been successfully resisted in England. This last information was made voluntary in 1881 and the following enumerations without materially affecting the extent of the record. The inquiry as to infirmities, too, is made to extend to those *temporarily* incapacitated from work, whether at home or in a hospital. There is also a column for the entry of persons speaking the Irish language only or able to speak both that and English. In the report of 1901 for England and Wales (p. 170) a table is given showing, for the three divisions of the United Kingdom, the relative number of persons speaking the ancient languages either exclusively or in addition to English.

British Colonies and Dependencies.—A simultaneous and uniform census of the British empire is an ideal which appeals to many, but its practical advantages are by no means commensurate with the difficulties to be surmounted. Scattered as are the colonies and dependencies over the world, the date found most suitable for the inquiry in the mother country and the temperate regions of the north is the opposite in the tropics and inconvenient at the antipodes. Then, again, as to the scope of the inquiry, the administrative purposes for which information is thus collected vary greatly in the different countries, and the inquiry, too, has to be limited to what the conditions of the locality allow, and the population dealt with is likely to be able and willing to answer. By prearrangement, no doubt, uniformity may be obtained in regard to most of the main statistical facts ascertainable at a census, at all events in the more advanced units of the empire, and proposals to this effect were made by the registrar-general of England and Wales in his report upon the figures for 1901. Previous to that date, the only step towards compilation of the census results of the empire had been a bare statement of area and population, appended without analysis, comparison or comment, to the reports for England and Wales, from the year 1861 onwards. In 1905, however, the returns published in the colonial reports were combined with those of the United Kingdom, and the subjects of house-room, sex, age, civil condition, birthplace, occupation, and, where available, instruction, religion and infirmities, were reviewed as fully as the want of uniformity in the material permitted (Command paper, 2860, 1906). The measures taken by the principal states, colonies and dependencies for the periodical enumeration of their population are set forth below.

Canada.—The first enumeration of what was afterwards called Lower Canada, took place, as above stated, in 1665, and dealt with the legal, or domiciled, population, not with that actually present at the time of the census, a practice still maintained, in contrast to that prevailing in the rest of the empire. The record was by families, and included the sex, age and civil condition of each individual, with a partial return of profession or trade. Later on, the last item was abandoned in favour of a fuller return of agricultural resources, a feature which has remained a prominent part of the inquiry. After the British occupation, a census was taken in 1765 and 1784, and annually from 1824 to 1842, the information asked for differing from time to time. Enumerations were conducted independently by the different states until 1871, when the first federal census was taken of the older parts of the Dominion. Since then, the enumeration has been decennial, except in the case of the more recently colonized territories of Manitoba and the North-West, where an intermediate census was found necessary in 1885–1886. The census of Canada is organized on the plan adopted in the United States rather than in accordance with British practice, and includes much which is the subject of annual returns in the latter country, or is not officially collected at all. The details of deaths in the year preceding the census, for instance, are called for, there being no registration of such occurrences in the rural tracts. In consideration of the large immigrant population again, the birthplace of each parent is recorded, with details as to nationality, naturalization and date of immigration. Occupation is dealt with minutely, in conjunction with temporary unemployment, average wage or salary earned, and other particulars. No less than eleven schedules are employed, most of them relating to details of industries and production. The duty of filling up so comprehensive a return, involving an answer to 561 questions, is not left to the householder, but entrusted to enumerators specially engaged, working under the supervision of the Department of Agriculture. Owing to the sparse population and difficulties of communication in a great part of the dominion, the inquiry, though referred to a single date, is not completed on that day, a month being allowed to the enumerator for the collection of his returns and their revision and transmission to the central office. A special feature in the operations is the provision, necessitated by the record of the *legal* population, for the inclusion in the local return of the persons temporarily absent on the date of the census, and their adjustment in the general aggregates, a matter to which considerable attention is paid. The very large mass of detail collected at these inquiries entails an unusually long time spent in compilation; the statistics of population, accordingly, are available considerably in advance of those relating to production and industries.

Australasia.—As the sphere of the census operations in Canada has been gradually spreading from the small beginnings on the east coast to the immense territories of the north-west, so, in the island continent, colonization, first concentrated in the south-east, has extended along the coasts and thence into the interior, except in the northern region. The first act of effective occupation of the country having been the establishment of a penal settlement, the only population to be dealt with in the earlier years of British administration was that under restraint, with its guardians and a few scattered immigrants in the immediate neighbourhood of Sydney Cove. This was enumerated from 1788 onwards by official "musters," at first weekly, and afterwards at lengthening intervals. The record was so inaccurate

that it had no statistical value until 1820, when the muster was taken after due preparation and with greater care, approximating to the system of a regular census. The first operation, however, called by the latter name, was the enumeration of 1828, when an act was passed providing for the enumeration of the whole population, the occupied area and the live-stock. The details of population included sex, children and adults respectively, religion and *status*, that is whether free (immigrants or liberated convicts), on ticket-of-leave, or under restraint. A similar inquiry was made in 1833 and again in 1836. In 1841 a separate census was taken of New Zealand and Tasmania respectively. The scope of the inquiry in New South Wales was somewhat extended and made to include occupations other than agriculture and stock-breeding. Five years later, the increase of the population justified the further addition of particulars regarding birthplace and education. The record of *status*, too, was made optional, and in 1856 was omitted from the schedule. In that year, moreover, Victoria, which had become a separate colony, took its own census. South Australia, too, was enumerated in 1846, ten years after its foundation as a colony. From 1861 the census has been taken decennially by all the states except Queensland, where, as in New Zealand, it has been quinquennial since 1875 and 1881 respectively. Up to and including the census of 1901 each state conducted separately its own inquiries. The scheme of enumeration is based on that of Great Britain, modified to suit the conditions of a thin and widely scattered population. The schedules are distributed by enumerators acting under district supervisors; but it is found impossible to collect the whole number in a single day, nor does the mobility of the population in the rural tracts make such expedition necessary. In more than one state the police are employed as enumerators, but elsewhere, a staff has to be specially recruited for the purpose. The operations were improved and facilitated by means of an interstatal conference held before the census of 1891, at which a standard schedule was adopted and a series of general tables agreed upon, to be supplemented in greater detail according to the requirements of each state. The standard schedule, in addition to the leading facts of sex, age, civil condition, birthplace, occupation and house-room, includes education and sickness as well as infirmities, and leaves the return of religious denomination optional with the householder. Under the head of occupation, the bread-winner is distinguished from his dependants and is returned as employer, employed, or working on his own account, as is now the usual practice in census-taking. Each state issues its own report, in which the returns are worked up in the detail required for both local administrative purposes, and for comparison with the corresponding returns for the neighbouring territory. The reports for New South Wales and Victoria are especially valuable in their statistical aspect from the analysis they contain of the vital conditions of a comparatively young community under modern conditions of progress.

South Africa.—Almost from the date of their taking possession of the Cape of Good Hope and its vicinity, the Netherlands East Indian Company instituted annual returns of population, live-stock and agricultural produce. The results from 1687 for nearly a century were recorded, but do not appear to have been more accurate than those subsequently obtained on the same method by the British government, by whom they were discontinued in 1856. The information was collected by district officials, unguided by any general instructions as to form or procedure. The first synchronous census of the colony, as it was then constituted, took place in 1865, on a fairly comprehensive schedule. Ten years later the inquiry was extended to religion and civil condition, and for the census of 1891, again, a rather more elaborate schedule was used. The next census was deferred till 1904, in consequence of the disorganization produced by the Boer war. The inquiry was on the same lines as its predecessors, with a little more detail as to industries and religious denomination. Speaking generally, the administration of the operations is conducted upon the Australian plan, with special attention to allaying the distrust of the native and more ignorant classes, for which purpose the influence of the clergy was enlisted. In some tracts it was found advisable to substitute a less elaborate schedule for that generally prescribed. In Natal, indeed, where the first independent census was taken in 1891, the Kaffir population was not on that occasion enumerated at all. In 1904, however, they were counted on a very simple schedule, by sex and by large age-groups up to 40 years old, with a return of birthplace, in a form affording a fair indication of race. Natives of India, an element of considerable extent and importance in this colony, are enumerated apart from the white population, but in full detail, recognizing the remarkable difference between the European and the Oriental in the matter of age distribution and civil condition. The Transvaal and the Orange River colonies were enumerated in 1904. In the latter, a census had been taken in 1890, in considerable detail, but that of the Transvaal, in 1896, seems to have been far from complete or accurate even in regard to the white population. In Southern Rhodesia the white residents were enumerated in 1891, but it was not until 1904 that the whole population was included in the census. The difficulty in all these cases is that of procuring a sufficient quantity of efficient agency, especially where a large and illiterate native population has to be taken into account. For this reason, amongst others, no census had been taken up to 1906 of Northern Rhodesia, the British possessions and protectorates of eastern Africa, or, again, of Nigeria and the protectorates attached to the West African colonies of Gambia, Sierra Leone and Lagos.

The West Indies.—Each of the small administrative groups here included takes its census independently of the rest, though since 1871 all take it about the date fixed for that of the United Kingdom. The information required differs in each group, but the schedule is, as a rule, of a simple character, and the results of the inquiry are usually set forth with comparatively little comment or analysis. In some of the groups distinctions of colour are returned in general terms; in others, not at all. On the other hand, considerable detail is included regarding the indentured labourers recruited from India, and those of this class who are permanently settled on the land in Guiana and Trinidad. No census was taken in the former, or in Jamaica and Barbados, in 1901.

Ceylon.—Here the census is taken decennially, on the same date as in India, in consideration of the constant stream of migration between the two countries. The schedule is much the same as in India with the substitution of race for caste. Until 1901, however, it was not filled in by the enumerator, as in India, but was distributed before and collected after the appointed date as in Great Britain.

India.—The population of India is the largest aggregate yet brought within the scope of a synchronous and uniform enumeration. It amounts to three-fourths of that of the British Empire, and but little less than a fifth of the estimated population of the world. Between 1853 and 1881 each province conducted its own census operations independently, with little or no attempt at uniformity in date, schedule or tabulation. In the latter year the operations were placed for the first time under central administration, and the like procedure was adopted in 1891 and 1901, with such modification of detail as was suggested by the experience of the preceding census. On each occasion new areas had to be brought within the sphere of enumeration, whilst the necessity for the use in the wilder tracts of a schedule simpler in its demands than the standard, grew less as the country got more accustomed to the inquiry, and the efficiency of the administrative agency increased. Not more than 5% of the householders in India can read and write, and the proportion capable of fully understanding the schedule and of making the entries in it correctly is still lower. From the literate minority, therefore, agency has to be drawn in sufficient strength to take down every particle of the information dictated by the heads of families. As it would be impossible for an enumerator to get through this task in the course of the census night for more than a comparatively small number of houses, the operation is divided into two processes. First a preliminary record is made a short time before the night in question, of the persons ordinarily residing in each house.

Then, on that night, the enumerator, reinforced if necessary by aid drafted from outside, revisits his beat, and brings the record up to date by striking out the absent and entering the new arrivals. The average extent of each beat is arranged to include about 300 persons. Thus, in 1901, not far from a million men were required for enumeration alone. To this army must be added the controlling agency, of at least a tenth of the above number, charged with the instruction of their subordinates, the inspection and correction of the preliminary record, and the transmission of the schedule books to the local centre after the census has been taken. The supply of agency for these duties is, fortunately, not deficient. Irrespective of the large number of clerks, village scribes and state and municipal employés which can be drawn upon with but slight interruption of official routine, there is a fair supply of casual literary labour up to the moderate standard required. The services, too, of the educated public are often voluntarily placed at the disposal of the local authorities for the census night, with no desire for remuneration beyond out-of-pocket expenses, and the addition, perhaps, of a personal letter of thanks from the chief official of the district. By means of a well-organized chain of tabulating centres, the preliminary totals, by sexes, of the 294 millions enumerated in 1901 were given to the public within a fortnight of the census, and differed from the final results by no more than 94,000, or ·03%. The schedule adopted contains in addition to the standard subjects of sex, age, civil condition, birthplace, occupation and infirmities, columns for mother-tongue, religion and sect, and caste and sub-caste. It is printed in about 20 languages. The results for each province or large state are tabulated locally, by districts or linguistic divisions. The final compilation is done by a provincial superintendent, who prepares his own report upon the operations and results. This work has usually an interest not found in corresponding reports elsewhere, in the prominent place necessarily occupied in it by the ethnographical variety of the population.

Foreign Countries

Inquiries by local officials in connexion with measures of taxation, such as the hearth-tax in France, were instituted in continental Europe as early as the 14th century; but as the basis of an estimate of population they were intrinsically untrustworthy. Going outside Europe, an extreme instance of the results of combining a census with more definite administrative objects may be found in the census of China in 1711, when the population enumerated in connexion with a poll-tax and liability to military service, was returned as 28 millions; but forty years later, when the question was that of the measures for the relief of widespread distress, the corresponding total rose to 103 millions! The notion of obtaining a periodical record of population and its movement, dissociated from fiscal or other liabilities, originated, as stated above, in Sweden, where, in 1686, the birth and death registers, till then kept voluntarily by the parish clergy, were made compulsory and general, the results for each year being communicated to a central office. A census, as a special undertaking, was not, however, carried out in that country until 1749. The example of Sweden was followed in the next year by Finland, and twenty years later, by Norway, where the parish register was an existing institution, as in the neighbouring state. Several other countries followed suit in the course of the 18th century, though the results were either partial or inaccurate. Amongst them was Spain, though here a trustworthy census was not obtained until 1857, or perhaps 1887. Some of the small states of Italy, too, recorded their population in the middle of the above century, but the first general census of that country took place in 1861, after its unification. In Austria, a census was taken in 1754 by the parish clergy, concurrently with the civil authorities and the military commandants. Hungary was in part enumerated thirty years later. The starting-point of the modern census, however, in either part of the dual monarchy, was not until 1857. Speaking generally, most of the principal countries began the current series of their censuses between 1825 and 1860. The German empire has taken its census quinquennially since its foundation, but long before 1871 a census at short intervals used to be taken in all the states of the Zollverein, for the purpose of ascertaining the contribution to the federal revenue, the amount of which was revisable every three years. The last great country to enter the census field was Russia. From 1721, what are known as revisions of the population were periodically carried out, for military, fiscal and police purposes; but these were conducted by local officials without central direction or systematic organization. In 1897 a general census was taken as synchronously throughout the empire as was found possible. It embraced a population second to that of India alone, as China, probably the most populous country in the world, has not yet been subjected to this test. The inquiry was made in great detail, under central control, and on a plan sufficiently elastic to suit the requirements of so varied a country and population. As in India, the schedules had to be issued in an unusual number of languages, and were dealt with locally in the earlier stages of tabulation. The principal regions of which the population is still a matter of mere conjecture are the Turkish empire, Persia, Afghanistan, China and the Indo-Chinese peninsula, in Asia, nearly nine-tenths of Africa, and a considerable portion of South America. (J. A. B.)

United States

Modern census-taking seems to have originated in the United States. Professor von Mayr declares in a recent and authoritative work, "It was no European state, but the United States of America that made a beginning of census-taking in the large and true sense of that word," and Professor H. Wagner, writing of the censuses of Sweden, said to have been taken in the 18th century, uses these words, "Since 1749 careful parish registers have been kept by the clergy and have in general the value of censuses." The same authority, although mentioning a reported census of Norway in 1769, indicates his conviction that the first real census of that country was in 1815. Sweden, Norway and the United States are the only countries with any claim to have taken the first modern census, as distinguished from a register of tax-payers, &c., the lineal descendant of the old Roman census, and the innovation seems to be due to the United States. If so, the first modern census was the American census of 1790. At the present date more than three-fifths of the estimated population of the world has been enumerated in this way. It is of interest accordingly to note how and why the device originated.

The Federal census, which began in 1790 and has been taken every ten years since under a mandate contained in the Constitution of the United States, was the outgrowth of a controversy in the convention which prepared the document. Representatives of the smaller states as a rule claimed that the vote, and so the influence, of the states in the proposed government should be equal. Representatives of the larger states as a rule claimed that their greater population and wealth were entitled to recognition. The controversy ended in the creation of a bicameral legislature in the lower branch of which the claim of the larger states found recognition, while in the upper, the Senate, each state had two votes. In the House of Representatives seats were to be distributed in proportion to the population, and the convention, foreseeing rapid changes of population, ordained an enumeration of the inhabitants and a redistribution or reapportionment of seats in the House of Representatives every ten years.

The provision of the Constitution on the subject is as follows:— "Representatives and direct taxes shall be apportioned among the several states which may be included within this Union according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct."

In 1790 the population was reported classed as slaves and free, the free classed as white and others, the free whites as males and females, and the free white males as under or above sixteen

years of age. In 1800 and 1810 the same classification was preserved, except that five age-groups instead of two were given for free white males and the same five were applied also to free white females. In connexion with the census of 1810 an attempt, perhaps the earliest in any country, was made to gather certain industrial statistics showing "the number, nature, extent, situation and value of the arts and manufactures of the United States." In 1820 a sixth age class was introduced for free white males, an age classification of four periods was applied to the free coloured and the slaves of each sex, and the number of aliens and of persons engaged in agriculture, in manufactures and in commerce was called for. The inquiry into industrial statistics begun in 1810 was also repeated and extended.

In 1830 thirteen age classes were employed for free whites of each sex, and six for the free coloured and the slaves of each sex. The number of aliens, of the deaf and dumb and the blind were also gathered.

The law under which the census of 1840 was taken contained a novel provision for the preparation in connexion with the census of statistical tables giving "such information in relation to mines, agriculture, commerce, manufactures and schools as will exhibit a full view of the pursuits, industry, education and resources of the country." This was about the first indication of a tendency, which grew in strength for half a century, to load the Federal census with inquiries having no essential or necessary connexion with its main purpose, which was to secure an accurate enumeration of the population as a basis for a reapportionment of seats in the House of Representatives. This tendency was largely due to a doubt whether the Federal government under the Constitution possessed the power to initiate general statistical inquiries, a doubt well expressed in the 9th edition of the *Encyclopaedia Britannica* by Francis A. Walker, himself a prominent member of the party whose contention he states:—

"The reservation by the states of all rights not granted to the general government makes it fairly a matter of question whether purely statistical inquiries, other than for the single purpose of apportioning representation, could be initiated by any other authority than that of the states themselves. That large party which advocates a strict and jealous construction of the constitution would certainly oppose any independent legislation by the national Congress for providing a registration of births, marriages and deaths, or for obtaining social and industrial statistics, whether for the satisfaction of the publicist or for the guidance of the legislature. Even though the supreme court should decide such legislation to be within the grant of powers to the general government, the distrust and opposition, on constitutional grounds, of so large a portion of the people, could not but go far to defeat the object sought."

The difficulty stated in the foregoing quotation, although now mainly of historic importance, exerted great influence upon the development of the American census prior to 1900.

The pioneer work of the census of 1840 in the fields of educational statistics, statistics of occupations, of defective classes and of causes of death, suffered from numerous errors and defects. Public discussion of them contributed to secure radical modifications of scope and method at the census of 1850. Before the census law was passed, a census board, consisting of three members of the president's cabinet, was appointed to draft plans for the inquiry, and the essential features of its report prepared after consultation with a number of leading statisticians were embodied in the law.

The census of 1850 was taken on six schedules, one for free inhabitants, one for slaves, one for deaths during the preceding year, one for agriculture, one for manufactures and one for social statistics. The last asked for returns regarding valuation, taxation, educational and religious statistics, pauperism, crime and the prevailing rates of wages in each municipal division. It was also the first American census to give a line of the schedule to each person, death or establishment enumerated, and thus to make the returns in the individual form indispensable for a detailed classification and compilation. The results of this census were tabulated with care and skill, and a preliminary analysis gave the salient results and in some cases compared them with European figures.

The census of 1860 followed the model of its predecessor with slight changes. When the time for the next census approached it was felt that new legislation was needed, and a committee of the House of Representatives, with James A. Garfield, afterwards president of the United States, at its head, made a careful and thorough study of the situation and reported an excellent bill, which passed the House, but was defeated by untoward influences in the Senate. In consequence the census of 1870 was taken with the outgrown machinery established twenty years earlier, a law characterized by Francis A. Walker, the superintendent of the census, who administered it, as "clumsy, antiquated and barbarous." It suffered also from the fact that large parts of the country had not recovered from the ruin wrought by four years of civil war. In consequence this census marks the lowest ebb of American census work. The accuracy of the results is generally denied by competent experts. The serious errors were errors of omission, were probably confined in the main to the Southern states, and were especially frequent among the negroes.

Since 1870 the development of census work in the United States has been steady and rapid. The law, which had been prepared for the census of 1870 by the House committee, furnished a basis for greatly improved legislation in 1879, under which the tenth census was taken. By this law the census office for the first time was allowed to call into existence and to control an adequate local staff of supervisors and enumerators. The scope of the work was so extended as to make the twenty-two quarto volumes of the tenth census almost an encyclopaedia, not only of the population, but also of the products and resources of the United States. Probably no other census in the world has ever covered so wide a range of subjects, and perhaps none except that of India and the eleventh American census has extended through so many volumes. The topics usually contained in a census suffered from the great addition of other and less pertinent matter, and the reputation of the work was unfavourably affected by the length of time required to prepare and publish the volumes (the last ones not appearing until near the end of the decade), the original underestimate of the cost of the work, which made frequent supplementary appropriations necessary, the resignation of the superintendent, Francis A. Walker, in 1882, and the disability and death of his successor, Charles W. Seaton. The eleventh census was taken under a law almost identical with that of the tenth, and extended through twenty-five large volumes, presenting a work almost as encyclopaedic, but much more distinctively statistical.

The popular opinion of a census, at least in the United States, depends largely upon the degree to which its figures for the population of the country, of states, and especially of cities, meet or fail to meet the expectations of the interested public. Judged by this standard, the census of 1890 was less favourably received than that of 1880. The enumerated population of the country in 1880 was larger than had been anticipated; and in the face of these figures it was difficult for local complaints, even where they were made, to find hearing and acceptance. But according to the eleventh census the decennial rate of growth of population fell suddenly from over 30%, which the figures had shown between 1870 and 1880, and in every preceding decade of the century, except that of the Civil War, to less than 25%, in spite of an immigration nearly double that of any preceding decade. For this change no adequate explanation was offered by the census office. Hence the protests of those who believed that the figures for population were too small swelled into a general chorus of dissatisfaction. But the census was probably more correct than the critics. Most of the motives influencing popular estimates of population in the United States tend to exaggeration. The convention which drafted the Constitution of the United States attempted to secure a balance of interests by apportioning both representatives in Congress and direct taxes according to population. A passage in *The Federalist* suggests the motives of the convention as follows:—

"As the accuracy of the census to be obtained by Congress will necessarily depend in a considerable degree on the disposition if not co-operation of the states, it is of great importance that the states should feel as little bias as possible to swell or reduce the

amount of their numbers. Were their share of representation alone to be governed by this rule, they would have an interest in exaggerating their inhabitants. Were the rule to decide their share of taxation alone, a contrary temptation would prevail. By extending the rule to both objects the states will have opposite interests, which will control and balance each other, and produce a requisite impartiality."

With the disappearance of direct taxation as a source of federal revenue, the motive mentioned for understating the population disappeared. On the other hand, the desire for many representatives in Congress has been reinforced by the more influential feelings of local pride and of rivalry with other cities of somewhat similar size. Hence a complaint that the population is overstated is seldom heard, and hence, also, popular charges of an undercount afford little evidence that the population was really larger than stated by the census.

After the detailed tabulation had been completed, it was shown that the number of persons under ten years of age in 1890 was surprisingly small, and that this deficiency in children was a leading cause of the slow growth in population. Before the tabulation had been made Francis A. Walker wrote:—"If the birth-rate among the previously existing population did not suffer a sharp decline . . . the census of 1890 cannot be vindicated. To ascertain the facts we must await the tabulation of the population by periods of life, and ascertain how many of the inhabitants of the United States of 1890 were under ten years of age." These results thus confirmed the accuracy of the count of 1890. Efforts to invalidate the census returns by comparison with the registration records of Massachusetts cannot be deemed conclusive, since in the United States, as in Great Britain, the census must be deemed more accurate and less subject to error than registration records. A strong argument in favour of the eleventh census, apart from its self-consistency, is that its results as a whole fit in with the subsequent state enumerations. In eleven cases such enumerations have been taken; and on computing from them and the results of the federal census of 1880 what the population at the date of the eleventh census should have been, if the annual rate of increase had been uniform, it appears that in no case, except New York City and Oregon, was the difference between the enumerations and these estimates over 4%. In Oregon about 30,000 more people were found in 1890 than the estimate would lead one to expect; in New York city, about 100,000 less. It seems not improbable that in the latter, where the difficulties incident to a count during the summer are almost insurmountable, serious omissions occurred. Still, such a comparison confirms the accuracy of the eleventh census as a whole.

The results of the twelfth census (1900) further refute the argument that would maintain the eleventh census to be inaccurate because it showed a smaller rate of increase in population during the preceding decade than had been recorded by other censuses during earlier decades. The rate of increase during the decade ending in 1900 was even less than that for the preceding decade; and it is impossible that a falling off so marked could in two successive enumerations be the result of sheer inaccuracy. The rate of increase from 1890 to 1900, eliminating from the computation the population of Alaska, Hawaii, Indian Territory and Indian reservations, was 20·7; the rate of increase if these places are included—in which case the figures of the population of Hawaii in 1890 must be taken from the census of the Hawaiian government in that year—was 21%.

The law regulating the twelfth census deserves to rank with those of 1790, 1850 and 1879 as one of the four important laws relative to census work. By this law the census office was far more independent than ever before. Appointments and removals were made by the director of the census rather than by the secretary of the interior, and in all plans for the execution of the law the head of the office was responsible for success. The law divided the subjects of census inquiry into two parts—first, those of primary importance, requiring the aid of the enumerator; and, secondly, those of subsidiary importance, capable of production without the aid of the enumerator. The former had to be finished and published by 1st July 1902; the latter were not to be undertaken until the former were well advanced towards completion. By this means the attention of the office could be concentrated on a small number of subjects rather than distributed over the long list treated in the volumes of the tenth and eleventh censuses.

Under the federal form of government, with its delegation of all residuary powers to the several states, the United States have no system of recording deaths, births and marriages. Hence there is no such basis as exists in nearly every other civilized state for a national system of registration, and the country depends upon the crude method of enumerators' returns for its information on vital statistics, except in the states and cities which have established a trustworthy registration system of their own. These are the New England states and a few others in their vicinity or influenced by their example. Enumerators' returns in this field are so incomplete that hardly two-thirds of the deaths which have occurred in any community during the preceding year are obtained by an enumerator visiting the families, no satisfactory basis for the computation of death-rates is afforded, and the returns have comparatively little scientific value. In the regions where census tables and interpretations are derived from registration records kept by the several states or cities they are often made more complete than those in the state or municipal documents. The census of agriculture is also liable to a wide margin of error, owing to defects in farm accounts and the inability of many farmers to state the amount or the value even of the leading crops. The census figures relate to the calendar year preceding 1st June 1900, and hurried and careless answers about the preceding year's crop are almost sure to have been given by many farmers in the midst of the summer's work.

The difficulties facing the manufacturing census were of a different character. A large proportion of the industries of the country keep satisfactory accounts, and can answer the questions with some correctness. But manufacturers are likely to suspect the objects of the census, and to fear that the information given will be open to the public or betrayed to competitors. Furthermore, the manufacturing schedule presupposes some uniformity in the method of accounting among different companies or lines of business, and this is often lacking. Another source of error in the manufacturing census of the United States is that the words of the census law are construed as requiring an enumeration of the various trades and handicrafts, such as carpentering. The deficiencies in such returns are gross and notorious, but the census office feels obliged to seek for them and to report what it finds, however incomplete or incorrect the results may be. Even on the population returns certain answers, such as the number of the divorced or the number unable to read and write, may be open to question.

The wide range of the American census, and the publication of uncertain figures, find a justification in the fact that the development of accurate census work requires a long educational process in the office, and, above all, in the community. Rough approximations must always precede accurate measurements; and these returns, while often inaccurate, are better than nothing, and probably improve with each decade.

Besides the breadth of its scope, in which the American census stands unrivalled, the most important American contribution to census work has been the application of electricity to the tabulation of the results, as was first done in 1890. The main difficulties which this method reduced were two. The production of tables for so enormous a population as that of the United States through the method of tallying by hand requires a great number of clerks and a long period of time, and when complete cannot be verified except by a repetition of the process. The new method abbreviates the time, since an electric current can tally almost simultaneously the data, the tallying of which by hand would be separated by appreciable intervals. The method also renders comparatively easy the verification of the results of certain selected parts.

Judged by European standards the cost of the American census is very great. The following table gives the total and the per capita cost of each enumeration.

Date.	Cost.		Date.	Cost.	
	Total in dollars.	Per Capita in cents.		Total in dollars.	Per Capita in cents.
1790	44,377	1·12	1850	1,423,351	6·13
1800	66,109	1·24	1860	1,969,377	6·26
1810	178,445	2·46	1870	3,421,198	8·87
1820	208,526	2·16	1880	5,790,678	11·48
1830	378,545	2·94	1890	11,547,127	18·33
1840	833,371	4·88	1900	16,116,930	21·16

For the sake of comparison it may be stated that the per capita cost of the English census of 1901 was 2·24 cents, or little more than one-tenth that of the American census. This difference is due in part to the greater scope and complexity of the American census, and in part to the fact that in the United States the field work is done by well-paid enumerators, while in England it is done in most cases by the heads of families, who are not paid.

The course of events has clearly established the fact that the authority of the Federal government in this field is greater than the strict constructionists of a previous generation as represented

by General Walker in the passage already quoted believed it to be. Decision after decision of individual instances has made it a settled practice for the Federal government to co-operate with or to supplement the state governments in the gathering of statistics that may furnish a basis for state or Federal legislation. The law has allowed the Federal census office in its discretion to compile and publish the birth statistics of divisions in which they are accurately kept; one Federal report on the statistics of marriages and divorces throughout the country from 1867 to 1886 inclusive was published in 1889, and a second for the succeeding twenty-year period was published in part in 1908; an annual volume gives the statistics of deaths for about half the population of the country, including all the states and cities which have approximately complete records of deaths; Federal agencies like the bureau of labour and the bureau of corporations have been created for the purpose of gathering certain social and industrial statistics, and the bureau of the census has been made a permanent statistical office.

The Federal census office has been engaged in the compilation and publication of statistics of many sorts. Among its important lines of work may be mentioned frequent reports during the cotton ginning season upon the amount of cotton ginned, supplemental census reports upon occupations, on employees and wages, and on further interpretation of various population tables, reports on street and electric railways, on mines and quarries, on electric light and power plants, on deaths in the registration area 1900–1904, on benevolent institutions, on the insane, on paupers in almshouses, on the social statistics of cities and on the census of manufactures in 1905. Congress has recently entrusted it with still further duties, and it has developed into the main statistical office of the Federal government, finding its nearest analogue probably in the Imperial Statistical Office in Berlin. (W. F. W.)

CENTAUREA, in botany, a genus of the natural order Compositae, containing between four and five hundred species, and of wide distribution, but with its principal centre in the Mediterranean region. The plants are herbs with entire or cut often spiny-toothed leaves, and ovoid or globose involucres surrounding a number of tubular, oblique or two-lipped florets, the outer of which are usually larger and neuter, the inner bisexual. Four species are native in Britain. *C. nigra* is knapweed, common in meadows and pastureland; *C. Cyanus* is the bluebottle or cornflower, a well-known cornfield weed; *C. Calcitrapa* is star-thistle, a rare plant, found in dry waste places in the south of England, and characterized by the rose-purple flower-heads enveloped by involucral bracts which end in a long, stiff spine. Besides cornflower, a few other species are worth growing as garden plants; they are readily grown in ordinary soil:—*C. Cineraria*, a half-hardy perennial, native of Italy, is remarkable for its white downy foliage; *C. babylonica* (Levant) has large downy leaves and a tall spike of small yellow flowers; *C. dealbata* (Caucasus) is a low-growing plant with larger rose-coloured heads; *C. macrocephala* (Caucasus) has large yellow heads; *C. montana* (Pyrenees) large handsome blue heads; and *C. ragusina* (S.E. Europe) beautiful silver-haired leaves and yellow flowers.

CENTAURS, in Greek mythology, a race of beings part horse part man, dwelling in the mountains of Thessaly and Arcadia. The name has been derived (1) from κεντεῖν (goad) and ταῦρος (bull), implying a people who were primarily herdsmen, (2) from κεντεῖν and the common termination -αυρος or αὖρα ("air") *i.e.* "spearmen." The former is unsatisfactory partly from the philological standpoint, and the latter, though not certain, is preferable. The centaurs were the offspring of Ixion and Nephele (the rain-cloud), or of Kentauros (the son of these two) and some Magnesian mares or of Apollo and Hebe. They are best known for their fight with the Lapithae, caused by their attempt to carry off Deidameia on the day of her marriage to Peirithous, king of the Lapithae, himself the son of Ixion. Theseus, who happened to be present, assisted Peirithous, and the Centaurs were driven off (Plutarch, *Theseus*, 30; Ovid, *Metam.* xii. 210; Diod. Sic. iv. 69, 70). In later times they are often represented drawing the car of Dionysus, or bound and ridden by Eros, in allusion to their drunken and amorous habits. Their general character is that of wild, lawless and inhospitable beings, the slaves of their animal passions, with the exception of Pholus and Chiron. They are variously explained by a fancied resemblance to the shapes of clouds, or as spirits of the rushing mountain torrents or winds. As children of Apollo, they are taken to signify the rays of the sun. It is suggested as the origin of the legend, that the Greeks in early times, to whom riding was unfamiliar, regarded the horsemen of the northern hordes as one and the same with their horses; hence the idea of the Centaur as half-man, half-animal. Like the defeat of the Titans by Zeus, the contests with the Centaurs typified the struggle between civilization and barbarism.

In early art they were represented as human beings in front, with the body and hind legs of a horse attached to the back: later, they were men only as far as the waist. The battle with the Lapithae, and the adventure of Heracles with Pholus (Apollodorus, ii. 5; Diod. Sic. iv. 11) are favourite subjects of Greek art (see Sidney Colvin, *Journal of Hellenic Studies*, i. 1881, and the exhaustive article in Roscher's *Lexikon der Mythologie*). Fig. 34 in article GREEK ART (the west pediment of the temple of Zeus at Olympia) represents the attempt of the Centaurs to carry off the bride of Peirithous.

CENTAURUS ("THE CENTAUR"), in astronomy, a constellation of the southern hemisphere, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.), Ptolemy catalogued thirty-seven stars in it. *α-Centauri* is a splendid binary star. Its components are of the 1st magnitude, and revolve in a period of eighty-one years; and since its parallax is 0·75″, it is the nearest star to the earth; *ω-Centauri*, the finest globular star-cluster in the heavens, consists of about 6000 stars in a space of about 20′ diameter, of which about 125 variables have been examined. *Nova Centauri*, a "new" star, was discovered in 1895 by Mrs Fleming in photographs taken at Harvard.

CENTAURY (*Erythraea Centaurium*, natural order Gentianaceae), an annual herb with erect, smooth stem, usually branched above, and a terminal inflorescence with numerous small red or pink regular flowers with a funnel-shaped corolla. The plant occurs in dry pastures and on sandy coasts in Britain, and presents many varieties, differing in length of stem, degree of branching, width and shape of leaves, and laxity or closeness of the inflorescence. Several other species of the genus are grown as rock-plants.

CENTENARY (from Lat. *centenarius*, of or belonging to a hundred, from *centeni*, distributive of *centum*, hundred), a space of a hundred years, and particularly the celebration of an event on the lapse of a hundred years, a centennial anniversary. The word "centennial" (from Lat. *centennis*, from *centum*, and *annus*, a year), though usually an adjective as in "the Centennial State," the name given to Colorado on its admission to statehood in 1876, is also used as a synonym of centenary.

CENTERVILLE, a city and the county-seat of Appanoose county, Iowa, U.S.A., in the south part of the state, about 90 m. N.W. of Keokuk. Pop. (1890) 3668; (1900) 5256; (1905, state census) 5967, of whom 487 were foreign-born. Centerville is served by the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Iowa Central railways. Among the principal buildings are the county court-house and the Federal building, and the city has a public library and a hospital. It is in one of the most productive coal regions of the state; it ships coal, limestone and livestock, has large bottling works, and manufactures iron, brick and tile, machine-shop products, woollen goods, shirts, cigars and flour. The place was platted in 1846, was called Chaldea until 1849, when the present name was adopted, was incorporated as a town in 1855, and in 1870 was chartered as a city of the second class. The city limits were extended in 1906–1907.

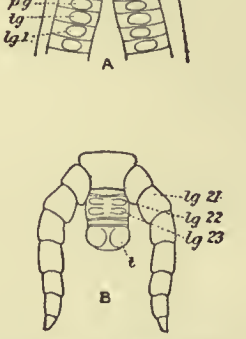
CENTIPEDE, the characteristic member of the group Chilopoda, a class of the Arthropoda, formerly associated with the Diplopoda (Millipedes), the Pauropoda and the Symphyla, to constitute the now abandoned group Myriapoda. The resemblance between the Chilopoda and the Diplopoda is principally superficial and due to the elongation and vermiform shape of the body, which in both is composed of a number of similar or subsimilar somites not differentiated as are those of Insecta, existing Arachnida and most Crustacea, into series or "tagmata" of varying function. Until 1893 no one doubted the correctness of the assumption that the Chilopoda and Diplopoda were orders of a class Myriapoda of the same systematic status as the Arachnida or Hexapoda. But in that year, R. I. Pocock and J. S. Kingsley independently pointed out that they differ as much from each other as either differs from the Hexapoda; and should, therefore,

rank as distinct classes of Arthropods. Pocock, indeed, definitely associated the Chilopoda with the Hexapoda in a group, the Opisthogoneata (Opisthogonea), equivalent to a group, the Progoneata (Prosogonea), comprising the Diplopoda, Pauropoda and Symphyla. As the basis for this classification was taken the position of the generative orifices which open in the Opisthogonea at the posterior end and in the Prosogonea near the anterior end of the body. As a matter of fact, in the Chilopoda they are situated on the penultimate or pretelsonic somite; in the Hexapoda upon the antepenultimate somite (male) or a little farther forward (female). Moreover, the recent researches of Heymons into the embryology of *Scolopendra*, one of the Chilopods, has shown a close correspondence in the number of cephalic metameres between the Chilopoda and Hexapoda, a correspondence which has not yet been established in the case of the Diplopoda or Symphyla. This last discovery bears out the view of relationship between the centipedes and insects, to the exclusion of the Diplopoda, Symphyla and Pauropoda. But even if in the future it can be shown that all these groups can be brought into line with respect to the metamerism of the head, the position of the generative orifices will remain as a fundamental and constant character, distinguishing the Chilopoda from the other groups of so-called "Myriapods" and the Hexapoda from the Symphyla, which in many particulars they resemble.

Structure of the Chilopoda.—The exoskeletal elements of a typical somite consist of a dorsal plate or tergum, a ventral plate or sternum, a lateral or pleural membrane, often strengthened with chitinous sclerites, and a pair of appendages. At the anterior extremity there is a head-shield or cephalite, which bears eyes, when present, and a pair of antennae. In all centipedes, except the *Scutigeridae*, the preantennal portion of the cephalite is sharply reflexed, ventrally forming an area called the clypeus. The inferior edge of this bears the labrum, which is usually represented by a small median, and two large lateral plates. The appendages are modified as a single pair of antennae, four pairs of jaws or gnathites, a variable number of walking legs and a single pair of generative limbs or gonopods. The antennae, articulated to the forepart of the head and preoral in position, are long and flexible and consist of fourteen or more segments. The jaws of the first pair of mandibles are stout and bisegmented, with a dentate cutting edge. Those of the second pair or maxillae vary considerably in structure in different groups. They are foliaceous and are usually regarded as biramous. In some genera (*Scutigera*, *Lithobius*) the inner branch consists of two distinct segments meeting those of the opposite side in the middle line. The outer branch, which is always larger, consists of three or four segments. Generally, however, the basal segments of the two branches are coalesced with each other and with the corresponding segments of the opposite side to form a single broad transverse plate. The above described condition seen in *Scutigera* suggests that two pairs of jaws may be involved in the formation of the maxillae in the Chilopoda. The jaws of the third pair, the palpognaths or second pair of maxillae, resemble dwarfed walking legs, and consist of five or six segments, of which the basal or coxa is united mesially to its fellow. The jaws of the fourth pair, the toxicognaths or poison-jaws, are long and powerful, and consist like the legs primarily of six segments, whereof the basal is large and usually fused with its fellow to form a large coxal plate, the second is small and generally suppressed by fusion with the third, the fourth and fifth are also small, while the sixth is transformed into a great piercing fang, at the tip of which opens the duct of a poison gland lodged within the appendage.

The tergal elements of the somites bearing the antennae, mandibles and maxillae appear to be represented by the head-shield or cephalite. The tergal element of the somite bearing the palpognath is usually suppressed; that of the toxicognath is sometimes of large size as in some Geophilomorpha (*Himantarium*), sometimes small as in *Scutigera*, *Lithobius*, *Craterostigmus*, sometimes suppressed probably by fusion with the tergum of the first leg-bearing somite as in the Scolopendromorpha. The sternal plates of all the jaw-bearing somites have disappeared, except in the case of the somite of the toxicognath, where it may be vestigial. In the case of the somites bearing the walking legs the tergal and sternal elements are preserved without fusion with the corresponding plates of the preceding or succeeding somites, so that great flexibility of the body is retained. The only exception to this is presented by *Scutigera*, where the terga corresponding to the somites bearing the fifteen pairs of legs are reduced by fusion and suppression to seven. The walking legs are articulated to the inferior portion of the pleural or lateral area of the somites close to the external margins of the sterna, which widely separate those of the left from those of the right side. Generally speaking the legs resemble each other, although as a rule they progressively increase in length towards the posterior end of the body. They consist typically of six segments, of which the basal is termed the coxa and the apical the tarsus. The tarsus is armed with a single terminal claw, and, except in the Geophilomorpha and a few genera of other orders, is divided by a mesial transverse joint into two segments, as is the case in *Scolopendra* and *Lithobius* for example. But in some of the longer-legged, swift-footed centipedes of the order Lithobiomorpha (*e.g. Henicops*, *Cermatobius*) the tarsi are further subdivided. The multiplication of sub-segments reaches its maximum in *Scutigera*, where the tarsi are extremely long, slender, flexible and annulated. The legs of the last pair are directed backwards in a line parallel with the long axis of the body, so that their coxae, fused in some cases with the pleural sclerites (*Scolopendra*, *Geophilus*), or free and of large size (*Scutigera*, *Lithobius*), serve to protect the small genital and anal somites. They are often greatly modified. In the males of some species of *Lithobius* one or more of the segments is inflated or furnished with tubercle-bearing, tactile bristles; in some Geophilomorpha the whole limb is thickened in the male sex. In most Scolopendromorpha the basal segment is armed beneath with spines or spikes (*Dacetum*, *Scolopocryptops*); sometimes the whole appendage is thickened and terminated by a sharp and serrate claw (*Theatops*, *Plutonium*). In these cases the legs act as weapons of defence and offence. In other cases (*Newportia*) the tarsi lose the claw, become many-jointed and act as feelers, while in *Alipes* the terminal segments are flattened, leaf-like and furnished with a peculiar stridulating organ. The genital somite is always small and sometimes retractile within the somite bearing the last pair of legs. Its tergal plate is usually retained, but its sternal plate is generally suppressed. In females of the Lithobiomorpha and Scutigeromorpha the appendages of this somite—the gonopods—are jointed, forcipate and relatively well developed although small. In the females of the other orders they are greatly reduced or absent. In the males their development varies considerably. They are well developed in *Scutigera*, where they form two pairs of digitiform sclerites, whereas in the Geophilomorpha they are reduced to a pair of very short, two-jointed limbs. The anal somite is always small and limbless. In *Craterostigmus* the genital and anal somites are represented by a pair of elongate valves projecting between the legs of the last pair. The structure of the gonopods is unknown, and the homology between the two valves and the skeletal elements of the somites in question not clearly understood.

A study of the development of *Scolopendra* has shown that the antennae of the adult are the appendages of the second postoral metamere and the mandibles those of the fourth, the first postoral metamere, which has a pair of transient preantennal appendages, and the third, which has no appendages, being excalated at an early stage of embryonic growth. Furthermore, behind the legs of the last pair two pairs of appendages are present. The second of these persists as the gonopods of the adult, but the first is suppressed. Possibly, however, it is represented in the male of *Scutigera* by the anterior branches of the gonopods. The cerebral or cephalic portion of the nervous system consists of a quadrilobate mass. From the two upper lobes, which are set transversely, arise the ocular nerves; from the two lower lobes, which are united by a transverse commissure, spring the antennal nerves in front and the chords which form the oesophageal collar behind. These chords unite below the oesophagus to form the compound suboesophageal ganglion, whence the nerves for the four pairs of jaws arise. The ventral system consists of a double chord uniting in each of the leg-bearing segments in a ganglionic swelling which gives off four pairs of nerves to the limbs and tissues of the somite. There is a single ganglion in the genital segment.



Modified from Heymons, *Bib. Zool.*, 1901, by permission of E. Nägele.

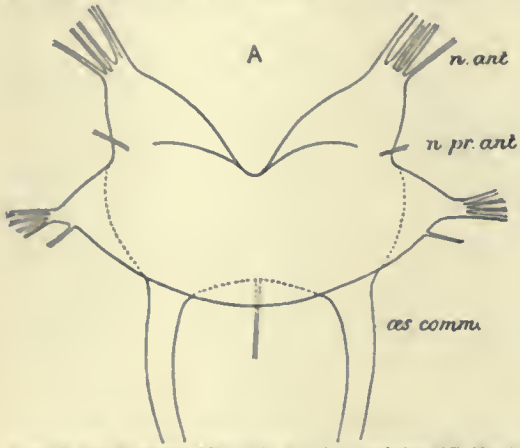
FIG. 1.

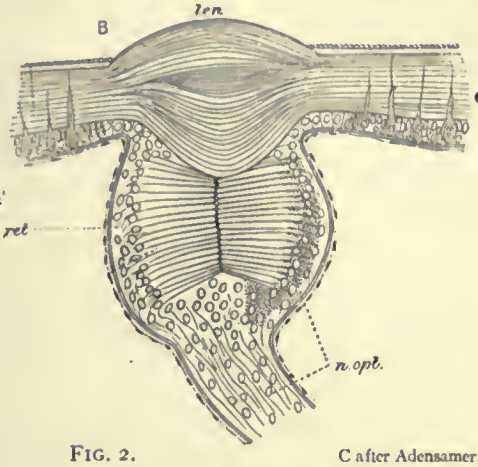
A, Diagram of anterior extremity of an early embryo of *Scolopendra*, ventral view; *cl*, clypeus; *lb*, labrum; *m*, mouth; *p.a*, preantennal appendage; *a*, antenna; *int*, premandibular rudiment; *mdl*, mandible; *mx*, maxilla; *p.g*, palpognath; *t.g*, toxicognath; *lg.* 1, first pair of walking legs.

B, Posterior end of a later embryo of *Scolopendra*, ventral view, showing the anal segment or telson (*t*); the legs of the last pair in the adult (*lg.* 21) and the two rudimentary pairs of legs (*lg.* 22, *lg.* 23).

Eyes are frequently absent. When present they may be either simple or compound, *i.e.* consisting externally of a single lens (monomeniscous) of or an aggregation of lenses (polymeniscous). Simple eyes vary in number on each side of the head from one, as in *Henicops*, to as many as forty, as in some species of *Lithobius*. In

Scolopendra, where there are four, the corneal lens is a biconvex thickening of the cuticle. The soft or retinal portion of the eye beneath the lens consists of an aggregation of large cells forming a single layer continuous with the epidermic cells of the circumocular area. Thus the eye is monostichous. The arrangement of the cells, however, is peculiar. They are invaginated to form what may be described as a very deep cup with exceedingly thick walls and correspondingly narrow median space, the outer surface of the cup being formed by the inner or proximal ends of the cells and the inner surface by their outer or distal ends. It results from this arrangement that the cells forming all but the bottom of the invagination lie horizontally, *i.e.* at right angles to the vertical axis of the eye. From the distal ends of the cells are secreted chitinous rhabdomeres, forming a rhabdom which occupies and fills up the central portion of the cup beneath the middle of the corneal lens. The outer ends of the cells are nucleated and are continuous with the fibres of the optic nerve, which passes from the outer surface of the bottom of the cup to the brain. Compound eyes are found only in the *Scutigeridae*. Externally the eye consists of one hundred or more little lenses or lenticles. The retinal portion is composed of a corresponding number of ocular units or ommatidia. Each ommatidium is an elongated cone with its broad extremity abutting against the corneal lenticle. It consists of a non-nucleated crystalline cone developed from embryonic cells, and is enveloped in three tiers of large nucleated cells. The cells of the outermost tier are heavily pigmented; those of the middle and innermost (proximal) tiers, the retinal cells, are at their inner extremities produced into threads continuous with the fibres of the optic nerve. In the space between these cells and the crystalline cone which they surround, there is a layer of rhabdomeres deposited apparently by the cells.



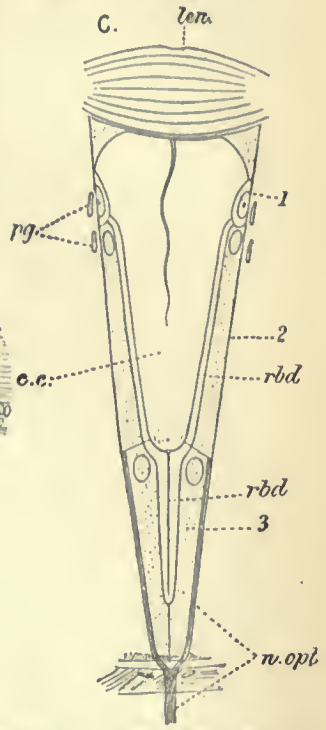


A and B after Heymons, *Bibl. Zool.*, 1901, by permission of E. Nägele.

FIG. 2.

A, Brain of *Scolopendra*. *n.ant*, Antennal nerves; *n.opt*, ocular nerves; *n.pr.ant*, preantennal nerves; *oes.comm*, oesophageal commissure.

B, Section of Eye of Scolopendra. *len*, Corneal lens; *ret*, retinal or visual cells; *n.opt*, optic nerve.



C after Adensamer, *Verh. z. b. Verein*, Vienna, 1893, pl. vii.

C, Ocular unit or ommatidium of compound Eye of *Scutigera*. *len*, corneal lenticle; *c.c*, crystalline cone; 1, pigmented cells of outermost tier; 2, 3, retinular cells of middle and innermost tiers; *rbd*, rhabdomeres; *n.opt*, optic nerve; *pg*, pigment cells.

The alimentary canal is a simple tube running without convolutions from the mouth to the anus. Its anterior portion or pharynx, which arises from the stomodaeal invagination in the embryo, is short; a pair of large, so-called salivary glands open into it. The mesenteric part of the canal is relatively wide and receives at its junction with the hind-gut the excretory products of a pair of very long and slender malpighian tubes of proctodaeal origin. The posterior end of the canal, arising from the proctodaeum, is relatively short and narrow.

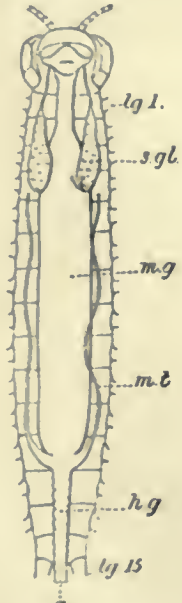
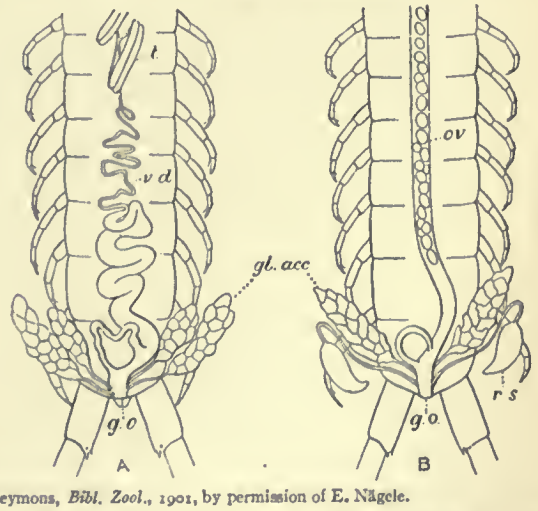


FIG. 3.—Diagram of Alimentary Canal of *Lithobius*.

a, Anus.
mg, Mid-gut.
hg, Hind-gut.
mt, Malpighian tubule.
s.gl, Salivary gland.
lg.1, *lg.15*, Legs of first and fifteenth pairs.

The generative organs vary in structural details in different centipedes. In the male of *Lithobius* the testes consist of a single coiled tube lying above the alimentary canal. The slender vas deferens which proceeds from its hinder end divides posteriorly into a right and left branch, embracing the gut and uniting beneath it to form a common chamber or atrium within the genital orifice. The atrium receives the secretion of two pairs of large accessory glands; and a pair of tubes, or vesiculae seminales, open, one on each side, into the divided sperm ducts close to their point of origin above the intestine.

The organs of the female are very similar. There is a large median ovary followed by a short oviduct forming a circum-intestinal collar and a common atrium. Into the latter open a pair of short receptacula seminis and the slender duct of two pairs of large accessory glands. There is nothing in the female corresponding to the supra-intestinal vesiculae seminales of the male. In the male of *Scolopendra*, on the contrary, there are as many as twelve pairs of somewhat sausage-shaped testes, approximated two by two. From each pair proceed two slender ducts which open into a median duct coiled in the posterior third of the body and much expanded in the last three of the leg-bearing segments. The right and left portions of the intestinal ring of the genital duct are unequally developed, and there are no vesiculae seminales, but two pairs of accessory glands communicate with the genital atrium as in *Lithobius*. In the female *Scolopendra* the right and left portions of the intestinal collar are also unequally developed, and only a single pair of accessory glands besides the receptacula seminis open into the atrium.

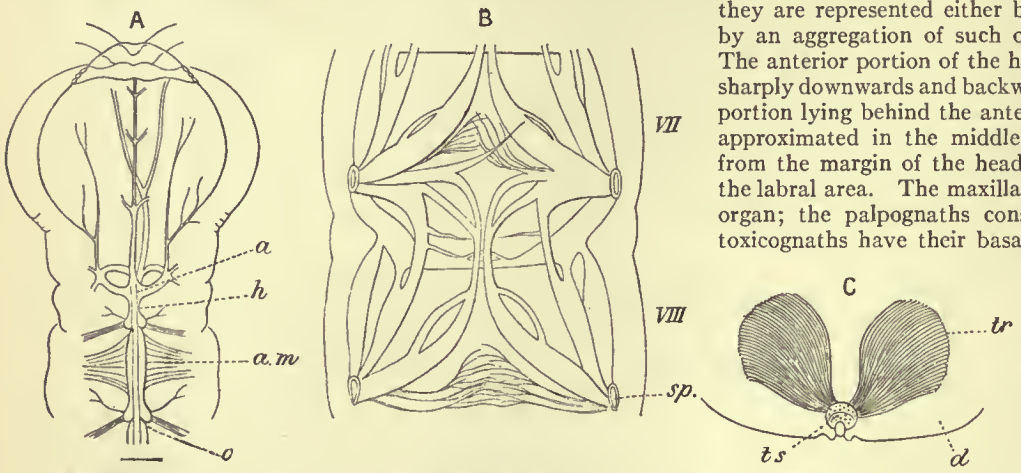


After Heymons, *Bibl. Zool.*, 1901, by permission of E. Nägele.

FIG. 4.—Posterior portion of generative organs of male of *Scolopendra* (A), of female (B). *t*, Testes; *v.d*, vas deferens; *ov*, ovary; *r.s*, receptaculum seminis; *gl.acc*, accessory glands; *g.o*, generative orifice.

The heart is tubular and lies in the middle dorsal line immediately

beneath the integument. It consists of a series of chambers corresponding roughly to the leg-bearing segments, and lies in a blood-sinus formed by a pericardial membrane whence large alary muscles extend to the sides of the body. Each chamber gives off in *Scolopendra* a pair of fine lateral vessels, and is furnished at its posterior extremity with a pair of orifices by which the blood re-enters the organ from the pericardial space. From the anterior chamber, which lies in the first or second leg-bearing segment, procced three arteries, a median which runs forwards into the head to supply the brain and other organs, and a lateral which with its fellow of the opposite side forms an oesophageal aortic collar. From the sides of the latter arise vessels to the gnathites, and from its inferior portion an unpaired vessel passes forwards into the head and another backwards above the nerve chord to the posterior end of the body, supplying each segment in its course with a delicate lateral branch. In *Scolopendra* the chambers of the heart, excepting the first and last, which are small, are subequal in size; but in forms like *Scutigera* where the terga are very unequal in size a corresponding inequality in the size of the chambers is manifested.



A after Newport, *Phil. Trans.*, 1843. B after Haase, *Zool. Beiträge*, i. pt. 65, 1884, by permission of J. N. Kern. C after Haase, *loc. cit.*

FIG. 5.

A, Anterior extremity of *Scolopendra*, showing two chambers of the heart (*h*), the aortic ring (*a*), the alae cordis (*a.m*) and a cardiac orifice (*o*).

B, Two segments of *Scolopendra*, showing the branching and anastomosing tracheae and a spiracle (*sp*).

C, A pair of tufted tracheae of *Scutigera*. *d*, Dorsal plate; *t.s*, tracheal sac; *tr*, tracheal tubes.

In all centipedes, except *Scutigera*, respiration is effected by chitinized tracheal tubes which extend with their ramifications throughout the body and open to the exterior by means of spiracles perforating the lateral or pleural membrane of more or fewer of the somites below the edge of the terga. Spiracles are never present upon the anal, genital and last leg-bearing somites, and only rarely, as in *Henicops*, upon the somite bearing the legs of the first pair. In the majority of cases the spiracles are circular, sigmoid or slit-like orifices, with chitinized rim, leading into a pocket-like integumental infolding, from which emanate numerous small tracheal tubes which soon anastomose to form the main tracheal trunks. In *Dacetum*, one of the *Scolopendridae*, there is no pocket-like infolding, the small tracheal tubes opening direct to the exterior on a large subcircular plate where their apertures fuse to form a complicated network. The apertures, as in the case of other genera, are protected by fine hairs; and the tracheae themselves are strengthened by a fine spiral filament. In the *Lithobiidae* the tracheae do not anastomose; but in *Scolopendra* and *Geophilus* the main trunks in each segment fuse transversely with those of the opposite side and also longitudinally with those of the preceding and succeeding segments.

In *Scutigera* the tracheae differ both in structure and position from those of all other Chilopoda. The spiracles, unpaired and seven in number, open in the median dorsal line. Each leads into a short sac from which five tracheal tubes depend into the pericardial blood-sinus.

Existing Chilopoda may be classified as follows, into five orders referable to two subclasses—

Subclass I.		Pleurostigma.
Order	1	Geophilomorpha.
,,	2	Scolopendromorpha.
,,	3	Craterostigmomorpha.
,,	4	Lithobiomorpha.
Subclass II.		Notostigma.
Order	5	Scutigeromorpha.

SUBCLASS 1, PLEUROSTIGMA.—Chilopods furnished with a rich system of branching tracheal tubes, the spiracles of which are paired and open upon the pleural area of more or fewer of the somites. Each leg-bearing somite contains a distinct tergum and sternum, the number of sterna never exceeding that of the terga. Eyes are either preserved or lost; when preserved they are represented either by a single one-lensed ocellus or by an aggregation of such ocelli on each side of the head. The anterior portion of the head, bearing the labrum, is bent sharply downwards and backwards beneath the larger posterior portion lying behind the antennae, so that these appendages, approximated in the middle line, project directly forwards from the margin of the head formed by this retroversion of the labral area. The maxillae are short and have no sensory organ; the palpognaths consist of four segments, and the toxicognaths have their basal segments fused to form a single coxal plate.

Order 1. *Geophilomorpha.*—Chilopods with a large and indefinite number of somites, most of which are partially or completely divided into a smaller anterior segment, represented by a pretergal and two presternal sclerites, and a larger posterior segment bearing the spiracles and legs. Spiracles are present upon all the leg-bearing somites except the first and last; and the legs which are short and subequal in length consist of six segments, the basal of which remains small. There are no eyes, and the antennae consist invariably of fourteen segments. The tergal plate of the somite bearing the toxicognaths always remains distinct and separates the head-shield from the tergum of the first leg-bearing somite. The penultimate and antepenultimate segments of the toxicognaths are reduced on the preaxial side of the appendage to the condition of arthrodial integumental folds and suppressed on the postaxial side where the distal segment or fang is firmly jointed to the femoral segment. In the last leg-bearing somite the pleural sclerites coalesce with the coxa of the appendage; but the second segment (trochanter) of this appendage does not fuse with the third (femur). The genital and anal somites are not retractile within the last leg-bearing somite, and the gonopods typically persist in the male as small two-jointed appendages and in the female as jointed or unjointed sclerites. The young are hatched with the full number of segments.

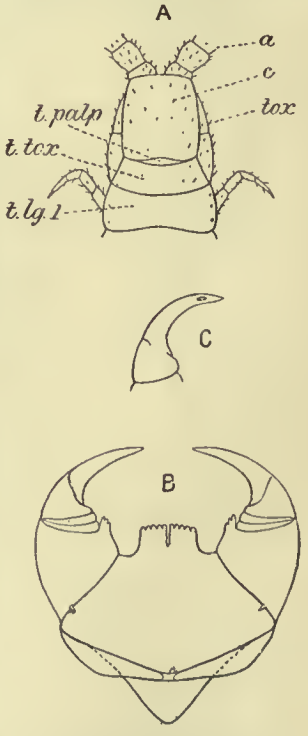


FIG. 6.

A, Upper view of anterior extremity in *Geophilus*.
a, Basal segments of antennae.
c, Cephalic plate.
t.palp, Tergal plate of somite, bearing palpognaths.
t.tox, Tergal plate of somite, bearing toxicognaths (*tox*).
*t.lg.*1, Tergal plate of somite, bearing legs of first pair.
B, Toxicognaths of *Scolopendra*, showing the large coxal plate and the reduced penultimate and antepenultimate segments.
C, Terminal segment or fang of the same, showing the orifice of the poison gland.
(After Latzel, *Die Myr. öst.-ung. Mon.* vol. i. "Chilopoda," Vienna, 1880.)

Remarks.—The Geophilomorpha are universally distributed in suitable localities. The number of families into which the order should be divided is as yet unsettled, some authors admitting several groups of this rank, others referring all the genera to a single family, *Geophilidae*. In habits the *Geophilidae* are mostly subterranean, living in the earth and feeding principally upon earthworms. Occasionally they may be found eating fruit or fungi, probably for the sake of moisture. Although without eyes, they are extremely sensitive to light, and when exposed to it crawl away in serpentine fashion to the nearest sheltered spot, feeling the way with their antennae. They

can, however, progress with almost equal facility backwards, using the legs of the posterior pair as feelers. Differing from the majority of the family in habits are the two species *Linotaenia maritima* and *Schendyla submarina*, which live under stones or seaweed between tide-marks on the coasts of western Europe. Most, if not all, the species are provided with glands, which open upon the sterna and secrete a fluid which in some forms (*Himantarium*) is blood-red, while in others it is phosphorescent. In the tropical form *Orphnaeus phosphoreus* the fluid is known to possess this property; and its luminosity has been repeatedly observed in England in the autumn in the case of *Linotaenia acuminata* and *L. crassipes*.

The number of pairs of legs within this family varies from between thirty and forty to over one hundred and seventy. Corresponding discrepancies are observable in size, the smallest specimens being less than 1 in. long and barely 1 mm. wide, while the largest example recorded, a specimen of *Notiphilides* from Venezuela, was 11 in. long and ¼ of an inch wide.

When pairing takes place the female fertilizes herself by taking up a spermatophore which a male has left upon a sheet of web for that purpose. The female lays a cluster of eggs in some sheltered spot, sometimes in a specially prepared nest, and encircling them with her body, keeps guard until the young disperse and shift for themselves.

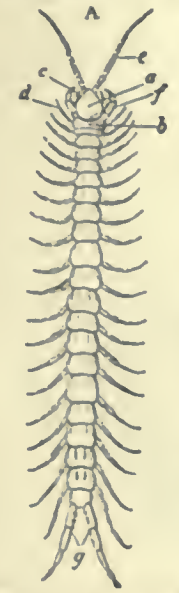


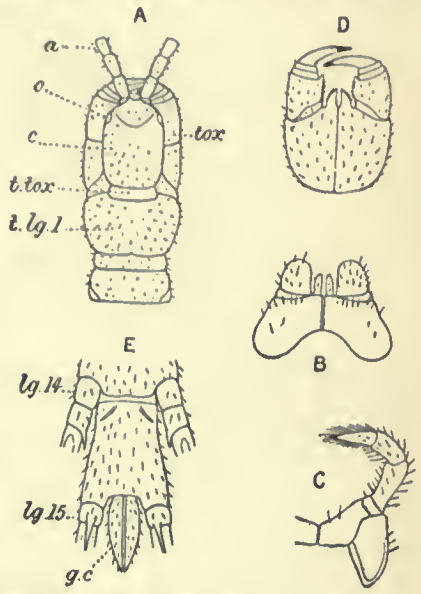
FIG. 7.—*Scolopendra morsitans* (after Buffon).
A, *a*, Cephalic plate.
b, Tergum of segment, bearing first pair of legs (*d*).
c, Tip of palpognath.
e, Antenna.
f, Toxicognath.
g, Last pair of appendages, enlarged and directed backwards.

Order 2. *Scolopendromorpha*.—Chilopods differing principally from the Geophilomorpha in that the number of leg-bearing somites is definitely fixed at twenty-three or twenty-one. These are differentiated into larger and smaller, which alternate with nearly complete regularity. The anterior portion of each somite is only partially cut off as a subsegment. The tergal plate of the somite bearing the toxicognaths is suppressed, probably by fusion with the tergum of the first leg-bearing somite. The antennae consist of a number of segments varying from seventeen to about thirty, and usually differing in the individuals of a species. The second segment (trochanter) of the legs of the last pair is coalesced with the third (femur). In only one genus, namely *Plutonium*, which occurs in Italy, is there a pair of spiracles for each leg-bearing segment, except the first and last, as in the Geophilomorpha. In most genera there are only nine pairs of spiracles situated upon the 3rd, 5th, 8th, 10th, 12th, 14th, 16th, 18th and 20th leg-bearing segments, as in *Scolopendra*, *Cormocephalus*, *Cryptops*, &c. In genera with twenty-three pairs of legs, like *Scolopocryptops*, there is an additional pair of spiracles on the twenty-second pedigerous segment; and a few genera such as *Rhysida*, *Edentistoma*, possess a pair upon the 7th segment. Eyes, when present, are always four in number on each side. The newly hatched young has the full complement of appendages.

This order is divided into four families:—*Scolopendridae* (*Scolopendra*, *Rhysida*), *Cryptopidae* (*Cryptops*, *Theatops*), *Scolopocryptopidae* (*Scolopocryptops*, *Otocryptops*) and *Newportiidae* (*Newportia*). Apart from the frigid zones it is cosmopolitan in distribution, though only one genus (*Cryptops*) extends into north temperate latitudes. In the tropics and warmer countries of the southern hemisphere the genera and species are particularly abundant, and individuals reach the greatest dimensions, some specimens of the tropical American species *Scolopendra gigantea* exceeding 12 in. in length. They are strictly carnivorous, their diet consisting of any animal, vertebrate or invertebrate, small enough to be overcome. They live in damp obscure places, under logs of wood or stones, and are nocturnal, shunning, like the *Geophilidae*, exposure to light; and as in the *Geophilidae*, the females guard their eggs and young until the latter disperse to lead an independent life.

Order 3. *Craterostigmomorpha*.—Chilopods with twenty-one tergal plates as in the typical genera of Scolopendromorpha, but with only fifteen pairs of legs as in the Lithobiomorpha. As in some members of the latter order there is a single ocellus on each side of the head, the penultimate and antepenultimate segments of the toxicognaths are complete on the postaxial side of the appendage, and spiracles are present upon the 3rd, 5th, 8th, 10th, 12th and 14th leg-bearing somites. In the size and shape of the head, of the toxicognaths, of the tergal plate of this somite, and of the first leg-bearing somite, great similarity to some genera of Geophilomorpha (*e.g. Mecistocephalus*) is presented; but in the structure of the posterior end of the body this order differs from all the other orders of Chilopoda. The skeletal elements of the last leg-bearing segment are welded together to form a subcylindrical tube, and the genital and anal somites are represented by a pair of chitinous valves capable of opening below for the escape of the genital and intestinal products.

This order, containing the family *Craterostigmidae*, is based upon a remarkable genus and species *Craterostigmus tasmanianus*, of which only two specimens are known. These were collected under stones upon the summit of Mount Rumney in Tasmania. They are about 1½ in. in length; but nothing has been recorded of their habits. The chief morphological interest attaching to *Craterostigmus* is that, apart from certain structural peculiarities of its own, it presents features previously believed to be found exclusively either in the Scolopendromorpha, or the Geophilomorpha, or the Lithobiomorpha; and it shows how the Lithobiomorpha may be derived from a Scolopendromorphous type most nearly resembling *Plutonium* by the excalation of the third, sixth, ninth, eleventh, fourteenth and seventeenth leg-bearing somites.



After Pocock. *Q.J.M.S.* vol. 45, pl. 23, 1902.

FIG. 8.
A, Anterior end of *Craterostigmus* from above.
a, Basal segments of antennae.
c, Cephalic plate with eyes (*o*).
t.tox, Tergal plate of somite bearing toxicognaths (*tox*).
*t.lg.*1, Tergal plate of somite bearing legs of first pair.
B, Maxillae.
C, Palpognath.
D, Toxicognath.
E, Last segment with genital capsule (*g.c*), and basal segments of legs of 14th and 15th pairs (*lg.* 14, *lg.* 15).

Order 4. *Lithobiomorpha*. Chilopoda with fifteen pairs of leg-bearing somites differentiated into larger and smaller, the 1st, 3rd, 5th, 7th, 8th, 10th, 12th and 14th being large, the others small. Spiracles present upon all the larger with the exception sometimes of the 1st. The toxicognaths are relatively weaker than in the orders hitherto considered, and have their basal segments less firmly fused mesially. In correlation with their weaker muscularity the first leg-bearing segment is relatively small. The gonopods, present and usually jointed in both sexes, are especially well developed and forcipate in the female, and arise from a large ventral plate resulting from the fusion of their coxae with the sternum of the genital somite. The antennae are many-jointed, and there is a single ocellus or a cluster of ocelli on each side of the head. The coxae of the legs are large, and those of the last four or five pairs usually contain glands opening by large orifices. The newly-hatched young has only seven pairs of legs, the remaining pairs being successively added as growth proceeds.

The genera of this order are divisible into three families, the *Lithobiidae* (*Lithobius*, *Bothropolys*), *Henicopidae* (*Henicops*, *Haasiella*), the *Cermatobiidae* (*Cermatobius*). *Cermatobius*, based upon a single species, *martensii*, from the island of Adenara, is of peculiar interest, since in the absence of coxal pores, and the length and multi-articulation of the antennae and tarsal segments, it approaches more nearly to *Scutigera* than does any other pleurostigmous Chilopod. It is also stated that the spiracles have assumed a more dorsal position, thus foreshadowing the completely dorsal situation they have taken up in the Notostigma. The *Henicopidae*, containing centipedes of small size, attains its maximum of development in the southern continents and islands, more particularly Australia, New Zealand, South Africa and South America. One genus (*Lamyctes*) however, occurs in Europe. The *Lithobiidae*, on the contrary, are almost exclusively northern in range, being particularly abundant and of large size individually in Europe, extra-tropical Asia, and North and Central America. In habits the *Lithobiidae* closely resemble the *Scolopendridae*. They are, however, comparatively far more agile with their shorter, more compact bodies and stronger legs. They are mostly of small size, the largest species, *Lithobius fusciatus*, of south Europe measuring only 2 in. in length of body. The females do not guard their eggs, but coat them with soil and leave them to their fate.

SUBCLASS 2, NOTOSTIGMA.—Chilopods with a series of median

dorsal tracheal sacs furnished with tubes dipping into the pericardial blood space, and opening each by an unpaired spiracle upon the 1st, 3rd, 5th, 8th, 10th, 12th and 14th leg-

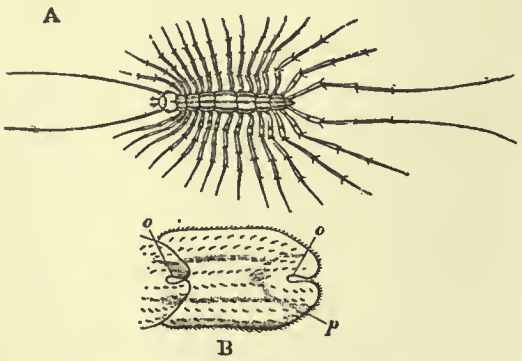


FIG. 9.—A, *Scutigera rubrolineata* (after Buffon). B, Tergum and part of a second of the same enlarged to show the position of the stigmata *o*, *o*; *p*, hinder margin of tergum.

bearing somites. This characteristic is accompanied by the complete disappearance of the tergum of the 7th, either by fusion with that of the 8th or by excalation, and by the evanescence of the terga of the 2nd, 4th, 6th, 9th, 11th and 13th pedigerous somites. The preantennal area of the head is not strongly reflexed inferiorly, and the eyes are large and compound. The maxillae are long and have a sensory organ; the palpognaths are long, spiny and composed of five segments, like the primitive Chilopod leg, and the toxicognaths have their basal segments disunited and independently movable. Gonopods duplicated in the male.

This subclass contains the single order Scutigeromorpha and the family *Scutigeridae*. As in the Lithobiomorpha there are fifteen pairs of legs, the gonopods are well developed in both sexes and the young is hatched with only seven pairs of legs. The legs and antennae in the adult are extremely long and many jointed. In habits as well as in structure the *Scutigeridae*, of which *Scutigera* is the best-known genus, differ greatly from other centipedes. Although they hide under stones and logs of wood like *Lithobius*, they are not lucifugous but diurnal, and may be seen chasing their foes in the blazing sun. They run with astonishing speed and have the power of dropping their legs when seized. South of about the 40th parallel of north latitude they are universally distributed in suitable localities. In most species the body only reaches a length of about 1 in.; but twice that size or more is reached by examples of the Indian species *Scutigera longicornis*.

After Latzel, *Die Myr. öst.-ung. Mon.* vol. i. "Chilopoda," Vienna, 1880.

FIG. 10.—Gnathites of *Scutigera*.
I. Mandibles. II. Maxillae.
III. Palpognaths. IV. Toxicognaths.

Some fossils of Carboniferous age have been described as Chilopoda by Scudder, who refers them to two families, *Gerascutigeridae* and *Eoscolopendridae*. But until the specimens have been examined by zoologists the genera they are alleged to represent cannot be taken seriously into consideration. Remains of centipedes closely related to existing forms have been recorded from Oligocene beds. (R. I. P.)

CENTLIVRE, SUSANNA (*c.* 1667–1723), English dramatic writer and actress, was born about 1667, probably in Ireland, whither her father, a Lincolnshire gentleman named Freeman, had been forced to flee at the Restoration on account of his political sympathies. When sixteen she married the nephew of Sir Stephen Fox, and on his death within a year she married an officer named Carroll, who was killed in a duel. Left in poverty, she began to support herself, writing for the stage, and some of her early plays are signed S. Carroll. In 1706 she married Joseph Centlivre, chief cook to Queen Anne, who survived her. Her first play was a tragedy, *The Perjured Husband* (1700), and she herself appeared for the first time at Bath in her comedy *Love at a Venture* (1706). Among her most successful comedies are—*The Gamester* (1705); *The Busy Body* (1709); *A Bold Stroke for a Wife* (1718); *The Basset-table* (1706); and *The Wonder! a Woman keeps a Secret* (1714), in which, as the jealous husband, Garrick found one of his best parts. Her plots, verging on the farcical, were always ingenious and amusing, though coarse after the fashion of the time, and the dialogue fluent. She never seems to have acted in London, but she was a friend of Rowe, Farquhar and Steele. Mrs Centlivre died on the 1st of December 1723. Her dramatic works were published, with a biography, in 1761 (reprinted 1872).

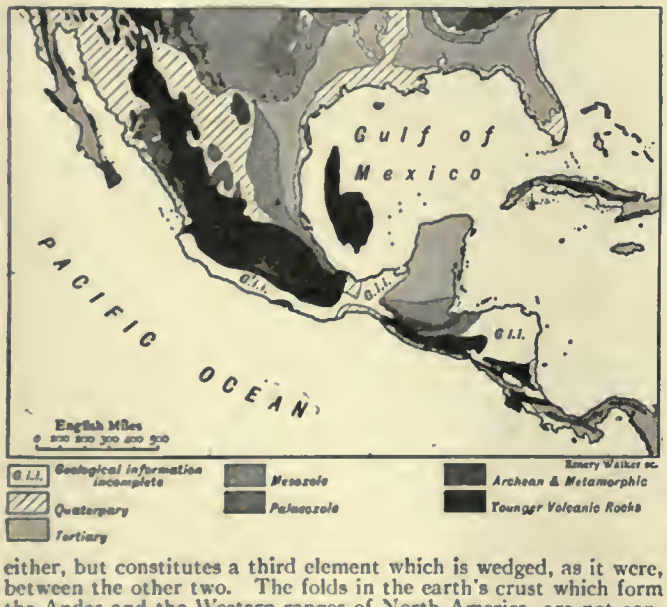
CENTO, a town of Emilia, Italy, in the province of Ferrara, 18 m. S.E. direct from the town of Ferrara; 50 ft. above sea-level; it is reached by road (6 m. to the W.) from the station of S. Pietro in Casale, 15 m. S.W. by W. of Ferrara, and also by a steam tramway (18 m. N.) from Bologna to Pieve di Cento, on the opposite bank of the Reno. Pop. (1901) 4307 (town), 19,078 (commune). It is connected by a navigable canal with Ferrara. It was the birthplace of the painter Giovanni Francesco Barbieri (Guercino). The communal picture-gallery and several churches contain works by him, but none of first-rate importance. A statue of him stands in front of the 16th century Palazzo Governativo. The town was surrounded by walls, the gates of which are preserved. The origin of the name is uncertain.

CENTO (Gr. *κέντρων*, Lat. *cento*, patchwork), a composition made up by collecting passages from various works. The Byzantine Greeks manufactured several out of the poems of Homer, among which may be mentioned the life of Christ by the famous empress Eudoxia, and a version of the Biblical history of Eden and the Fall. The Romans of the later empire and the monks of the middle ages were fond of constructing poems out of the verse of Virgil. Such were the *Cento Nuptialis* of Ausonius, the sketch of Biblical history which was compiled in the 4th century by Proba Falconia, wife of a Roman proconsul, and the hymns in honour of St Quirinus taken from Virgil and Horace by Metellus, a monk of Tegernsee, in the latter half of the 12th century. Specimens may be found in the work of Aldus Manutius (Venice, 1504; Frankfort, 1541, 1544). In 1535 Laelius Capitulus produced from Virgil an attack upon the dissolute lives of the monks; in 1536 there appeared at Venice a *Petrarca Spirituale*; and in 1634 Alexander Ross (a Scotsman, and one of the chaplains of Charles I.) published a *Virgilius Evangelizans, seu Historia Domini nostri Jesu Christi Virgilianis verbis et versibus descripta.*

CENTRAL AMERICA, that portion of the American continent which lies between Mexico and Colombia, comprising the British crown colony of British Honduras, and the six independent republics of Guatemala, Salvador, Honduras, Nicaragua, Costa Rica and Panama. These seven divisions are described in separate articles. Central America is bounded towards the N. by the Caribbean Sea, and towards the S. by the Pacific Ocean, and extends between 7° 12′ and 18° 3′ N. and between 77° 12′ and 92° 17′ W. It has an area of about 208,500 sq. m., and stretches for some 1300 m. from N.W. to S.E., in a succession of three serpentine curves, reaching its greatest breadth, 450 m., between the Peninsula of Nicoya and the north coast of Honduras, and diminishing to 35 m. in the Isthmus of Panama. The eastern boundary of Central America was usually regarded as identical with that of Costa Rica until 1903, when the republic of Panama was formed out of the northern territories of Colombia; and the more modern definition given above does not command the universal assent of geographers, because it fails to include the whole region up to the natural frontier on the north-west, *i.e.* the Isthmus of Tehuantepec in Mexico. It has, however, the support of political and historical considerations, as well as of common usage; and it may therefore be regarded as adequate, although, in respect of climate and natural products, it would be more accurate to define Central America as lying between Tehuantepec and Darien.

Physical Features.—The *Cordilleras*, or mountain chains of Central America do not form a complete link between the western ranges in the north and south of the continent, for their continuity is interrupted by various depressions, of which the chief is the lacustrine basin of Nicaragua. With these exceptions, they traverse Central America from end to end, their main axis trending from north-west to south-east. They do not, as a rule, rise in sharply serrated ridges or series of volcanic crests, like the Andes, but the central Cordilleras are disposed in a succession of mountain masses, with many lesser chains radiating from them. The principal summits have an altitude of 12,000 and even, in a few cases, of 13,000 ft., and the general character of the ranges is volcanic, many craters being still active. Large tracts of land remained imperfectly surveyed at the beginning of the 20th century, owing to the unhealthiness of the tropical climate, and the dense underwoods which impede exploration. In the northern part of Guatemala, on the Pacific coast of the same country, in British Honduras, along the Segovia river, on the Mosquito Coast, and in the basin of Lake Nicaragua and the San Juan river, there are broad stretches of comparatively flat country. The main line of watershed is everywhere nearer to the Pacific than to the Atlantic, except in southern Costa Rica and Panama, where it is almost equidistant from the two oceans. In consequence, the rivers of the Pacific seaboard are mostly short and swift,—mere mountain torrents, in many instances, until they reach the sands and swamps which border the sea. The rivers of the Atlantic littoral descend more gradually, and by longer channels. The largest of them is the Segovia, in Nicaragua and Honduras, which has a course of 450 m. Lake Nicaragua, the largest inland sheet of water, has an area exceeding 3500 sq. m. There are also several mountain lakes of exceptional interest and beauty, such as Atitlán and Amatitlán, in Guatemala, besides two great land-locked salt-water lakes—the Pearl Lagoon of the Mosquito Coast, and the Caratasku Lagoon in Honduras.

Geology.—The neck of land which unites the continents of North and South America is not, geologically, the direct continuation of



either, but constitutes a third element which is wedged, as it were, between the other two. The folds in the earth's crust which form the Andes and the Western ranges of North America, are not continued along the connecting isthmus, where, on the contrary, the strata are folded from west to east, obliquely across the trend of the continent. It should, however, be noticed that the Andes, as they approach the Caribbean sea, bend round towards the east; and it is probable that the folds of the North American Cordillera similarly bend eastward beneath the volcanic rocks of Mexico. The folds of Central America are tangential to the two arcs thus formed.

By far the greater part of Central America and Mexico is covered by Cretaceous and Tertiary deposits, both sedimentary and volcanic; but the foundation on which they rest is exposed at intervals. From the Rio Grande to the southern declivity of the Mexican plateau the existence of ancient crystalline rocks at the surface is yet unproved, but they probably occur in the Sierra Madre del Pacifico. South of the plateau, in the state of Oaxaca, low mountain ridges composed of granites and gneisses, supposed to be of Archaean age, begin to appear. They strike from west to east, and mark the front of the series of east and west folds which stand *en échelon* across the Central American region. Between the 15th and 17th parallels of latitude, in the state of Chiapas and in the republic of Guatemala, there is a second group of ridges composed of granites and schists with an eastward trend. In this case the evidence of age is clear, for the rocks are covered by a limestone which is proved to be Pre-Carboniferous. Similar rocks, supposed to be of Archaean or at least of early Palaeozoic age, occupy considerable areas in British Honduras, Honduras and northern Nicaragua, and occur also in Costa Rica and perhaps in Panama; and wherever the strike has been observed, it is approximately from west to east. The presence of Palaeozoic rocks has been proved in Guatemala and the adjacent state of Chiapas, where limestones have been found containing many unmistakable Carboniferous fossils, and below these is a considerable thickness of beds supposed to be Silurian. Nowhere else in the Central American region is there any palaeontological evidence of Palaeozoic rocks.

The Mesozoic series begins with sands and red or yellow clays containing plant remains and possibly of Triassic age; but the occurrence of these deposits is limited to a few small isolated outcrops. Jurassic beds have been found in Mexico but not in Central America. The Cretaceous system, consisting of a lower series of clays, sandstones and conglomerates, followed conformably by an upper series of limestones, covers a considerable area in Chiapas, Guatemala and Honduras, and is found also in Costa Rica. The upper series contains hippurites. The greater part of the eastern half of the Mexican plateau is also formed of Cretaceous beds.

The Tertiary system may be conveniently divided into two divisions. The lower, of Eocene and Oligocene age, consists generally of sand and clays which were evidently laid down near a shore line. The upper division also, including the Pliocene and Pleistocene (which have not yet been clearly distinguished from each other), is usually of shallow water origin; but in the northern part of Yucatan it includes beds of chalky limestone, like those of the Antilles, which may have been deposited in a deeper sea.

It is probable that folding took place at more than one geological epoch, and the whole series of beds up to the Oligocene is involved in the folds. The Pliocene, on the other hand, is usually undisturbed, and the final effort must, therefore, have occurred during the Miocene period, which appears to have been a period of great earth movement throughout the Caribbean region. From the southern extremity of the Mexican plateau to the Colombian border, the strike of the folds—of the Mesozoic and early Tertiary deposits, as well as of the older rocks—is in general from east to west; but there is one considerable exception. On both sides of the deep depression which crosses Honduras from Puerto Cortez to the Gulf of Fonseca, the strike is commonly from north to south. The depression is probably a "Graben" or trough formed by faulting.

The great volcanoes of Mexico and Central America stand upon the Pacific side of the continent, and it is only where the land contracts to a narrow neck that their products spread over to the Caribbean shore. The extent of the volcanic deposits is very great, and over a wide area they entirely conceal the original structural features of the country. The eruptions began towards the close of the Cretaceous period and continue to the present day. The rocks are lavas and ashes, chiefly of andesitic or basaltic composition, but rhyolites and trachytes also occur, and phonolite has been met with in one or two places.

According to R. T. Hill, there is but little geological evidence of any Tertiary or later connexion between the Caribbean Sea and the Pacific, excepting, perhaps, a shallow opening during the Eocene period. It should, however, be stated that all authorities are not agreed upon this point, and K. Sapper found marls and sandstones which he believes to belong to the Upper Tertiary, lying horizontally at a height of about 7500 ft. in the Mexican state of Chiapas. Unfortunately the fossils obtained from these beds were lost.

Climate.—The climate of Central America is subject to the most marked local differences of heat and cold, owing partly to the proximity of two oceans, partly to the variations of altitude which render such territories as the swamps of the coast, or the lowlands of British Honduras and northern Guatemala, totally unlike the alpine regions of Salvador and Costa Rica. The whole area may, however, be roughly divided into a tropical zone (*tierra caliente*), from sea-level to about 1500 ft.; a temperate zone (*tierra templada*), from 1500 to 5000 ft.; and a cold zone (*tierra fria*), above 5000 ft. These figures are, of course, only approximately correct; and it often happens that, at the same elevation, the heat is greater on the Pacific than on the Atlantic versant. The rainy season on the Pacific slope varies in duration from four to six months, between April and December. It lengthens as the altitude increases. On the coast, it corresponds with the prevalence of the south-west monsoon, the tempestuous *Cordonazo de San Francisco*, or "Flagellation of St Francis," as it is called in Mexico, and it is often interrupted by an interval of two or three weeks of fine weather, known as the *Veranillo de San Juan*, or "Little summer of St John." In the rainy season, the morning has usually a clear sky; about two or three o'clock in the afternoon the clouds begin to gather in great cumulus masses; suddenly the lightning flashes out and the rain crashes down; and by evening the sky is clear and starry. North winds are most usual during the dry season. On the Atlantic coast the trade-winds may bring rain in any month, and, owing to the moist atmosphere, the heat is more oppressive. The rainfall may vary in successive years from less than 50 in. to nearly 200 in., owing to the occurrence of cloud-bursts. Frosts are not rare above 7000 ft., but snow seldom falls.

Fauna.—The fauna of Central America is more closely connected with the fauna of South than with that of North America. As the

region is comparatively small, and its limits conventional, there are comparatively few species that it can claim as peculiarly its own. It is almost entirely free from the presence of animals dangerous to man. Of felines it possesses the jaguar (*Felis onza*), popularly called the tiger; the cuguar (*Felis concolor*), popularly called the lion; the tigrillo (*Felis tigrina*), which is sometimes kept tame; and other species. Several species of monkeys (*Mycetes* and *Ateles*) are numerous in the warm coast region. The Mexican deer (*Cervus mexicanus*) has a wide range both in the lowlands and highlands. Besides the tapir there are several varieties of wild pig, such as the marrano de monte (*Sus torquatus*) and the jabali or javali (*Sus labiatus javali*). The *Edentata* are represented by a species of armadillo, the honey-bear (*Myrmecophaga tomandua*), and the *Myrmecophaga didactyla*; and among the rodents may be mentioned, besides rats, hares and rabbits, the fruit-eating cotorra and tepescuinte (*Dasyprocta aguti* and *Coelogenys paca*), and the troublesome *Geomys mexicana*. The manatee is common in all the larger streams. Much annoyance is caused to the agriculturist by the little marsupial called the tacuacine, or the *Didelphys carcinora*, its allied species. The bats are so numerous that villages have sometimes had to be left to their undisputed occupancy. In the south-east of Costa Rica the inhabitants are at times compelled to withdraw, with all their live-stock, before the swarms of large migratory vampires which in a single night can bleed the strongest animal to death. Most of the domestic animals—the horse, ox, goat, sheep, pig, dog, rabbit, common fowl, peacock and pigeon—are of European origin, and are popularly grouped together as *animales de Castilla*. For the bird collector there is a rich harvest. The catalogue of the National Museum at Washington shows that Costa Rica alone possesses more than twice as many species of birds as the whole of Europe. Among birds of prey it is sufficient to mention *Corogyps atratus*, the commonest of the vultures, which acts as a universal scavenger, the *Cathartes aura*, the beautiful *Polyborus vulgaris*, and the king of the vultures (*Sarcorhamphus papa*). Neither the condor of the southern continent nor the great eagles of the northern are known. The parrot, macaw and toucan are found in all parts; the crow, blackbird, Mexican jay, ricebird, swallow, rainbird, wood-pecker, humming-bird and trogon are also widely distributed. A bird of the last-named genus, the quetzal, quijal or quesal (*Trogon resplendens*) is of special note, not only from the fact that its yellow tail-feathers, 2 or 3 ft. long, were formerly worn as insignia by the Indian princes, but because it has been adopted as the emblematical figure on the national arms of Guatemala. The gallinaceous order is well represented, and comprises several peculiar species, as the pavo de cacho, and the Peten turkey (*Meleagris ocellata*), which has a bronze sheen on its plumage; and aquatic birds, it is almost needless to add, are unusually numerous in a region so richly furnished with lagoons, rivers and lakes.

Besides the alligator, which swarms in many rivers, the almost endless varieties of Central American reptiles include the harmless boba or chicken-snake, python and black snake; the venomous corali, taboba, culebra de sangre and rattlesnake; iguanas of great size, scorpions, edible lizards and other lizards said to be poisonous. In the rivers and lakes, as in both seas, fish of many kinds abound; turtles and tortoises are exported; and there are valuable pearl and oyster fisheries. Insect life is even richer and more varied. Of the *Coleoptera*, the Camelicorns, the Longicorns, the Curculionids, and the Chrysomelines are said to be best represented, and of the *Lepidoptera* the prevalent genera are—*Ageronia*, *Papilio*, *Heliconia*, *Sphinx* and *Bombyx*. There are five species of bees, and the European honey-bee, known as *aveja de Castilla* or "bee of Castile," has been naturalized. Ants are common, and may sometimes be seen marching in a column 3 or 4 m. long. The mosquito, wood-tick, flea and locust are unfortunately no less plentiful in certain districts, but their distribution varies greatly, the mosquito being almost unknown in parts of Honduras. A curious species of butterfly is the *Timetes Chiron*, which migrates in countless multitudes from the forests of Honduras to the Mosquito Coast, but is never known to return.

Flora.—The flora of Central America ranges from the alpine to the tropical, with the transition from one climatic zone to another. Although its forest growths are, on the whole, inferior in size to those of corresponding latitudes in the eastern hemisphere, it is unsurpassed for beauty, luxuriance and variety. In the volcanic districts, the soil is extremely fertile, yielding, where cultivated and irrigated, magnificent crops of sugar, cotton, rice, tobacco, coffee, cocoa and maize. Indigo is produced in small quantities; sugar yields two or three crops, and maize as many as four, this cereal supplying a chief staple of food. Plantains, bananas, beans, tomatoes, yams, arrowroot, pine-apples, guavas, citrons and many other tropical fruits are also cultivated, while the extensive primeval forests abound in mahogany, cedars, rosewood, ironwood, rubber, gum copal, vanilla, sarsaparilla, logwood and many other dye-woods, medicinal plants, and valuable timbers. Conspicuous amongst the forest trees are the giant ceiba, or pyramidal bombax, and the splendid Coyal palm (*Cocos butyracea*, L.), with feathery leaves 15 to 20 ft. long, golden flowers 3 ft. high, and a sap which when fermented produces the intoxicating *chicha* or *vino de Coyol*. In Guatemala occurs the remarkable *Herrania purpurea*, a "Chocolate tree," whose seeds yield a finer flavoured chocolate than the cocoa itself. The same country is famous for its magnificent orchids, huge arborescent thistles, and a remarkable plant called by the Spaniards *Flor de la Calentura*, "fever flower," from the heat which it is said to emit at the moment of fertilization. Salvador produces an abundance of medicinal plants, notably the so-called Peruvian balsam (*Myrospermum salvatorense*); in Honduras there are immense forests of conifers, resembling those of the Landes in France; in Nicaragua a characteristic tree is the cortes (*Tecoma sideroxylon*) yielding timber as hard as ebony, and noteworthy for the golden blossom with which it is entirely covered after the leaves have fallen.

Inhabitants—In 1905 the population of Central America numbered about 4,750,000, and this total tends to increase, despite the unhealthy climate of many districts, the terribly high average of infant mortality, and the slow progress of immigration. Some authorities estimate it at 5,500,000. The vast majority of the inhabitants are of mixed Indian and Spanish blood, but the Indian element predominates everywhere except in Costa Rica, where the whites are exceptionally numerous. The Indian races have not shown the same power to adapt themselves to modern civilization as the Mexicans; in some regions there are tribes remaining in a state of complete savagery although before the Spanish conquest their ancestors attained a high level of culture (see below under *Archaeology*). The density of population throughout Central America is little more than 25 per sq. m.; and it is clear that several large areas now thinly peopled once maintained a far greater number of inhabitants. Such are parts of the Nicaraguan lake district, where the flora consists in great measure of plants that were formerly cultivated by the Indians. The depopulation of these areas was effected partly by tribal wars, partly by the harsh rule of the Spaniards. Apart from the German agricultural settlements in Guatemala and elsewhere, the foreign population is chiefly confined to the seaports and other centres of commerce, Great Britain, Germany and the United States being largely represented among the wealthier classes of residents; while the foreign labourers are mostly Italians or negroes, with a few Chinese on the Pacific coast.

History.—Central America was discovered by Columbus in August 1502; and part of the territory which is now Costa Rica was conquered by the Spaniards under Pedro Arias de Avila after 1513. Between 1522 and 1525, the authority of Avila was superseded, and his work of conquest completed by Hernando Cortes, who had already subjugated Mexico. Panama formed part of a distinct Spanish government, "New Granada"; British Honduras was colonized, though not formally annexed, in the 18th century; and over the Mosquito Coast the British government exercised a nominal protectorate after 1665. Otherwise the rest of Central America remained a Spanish dependency bearing the general name of "Guatemala," until 1821. It ranked as a captaincy-general under the rule of a military governor, and was organized in five departments, corresponding in area with the modern republics of Guatemala, Honduras, Salvador, Nicaragua and Costa Rica. For three centuries it was administered by Spanish officials, who almost invariably devoted their whole energy to enriching themselves and the home authorities. The old Indian civilization was swept away; the native races were enslaved, maltreated and, for a time, demoralized. But their history offers no parallel to that of the West Indian Caribs, who failed to survive, and were replaced by hordes of African slaves. In Central America the Indians not only survived, thus leaving no room for any large negro population, but quickly acquired the language, religion and habits of their masters, with whom they intermarried. By the close of the 18th century, the majority had attained something like uniformity of life and thought. Racial distinctions had been obscured by intermarriage; even the term *Ladino*, or "Latin," came to mean an educated man, whether of Spanish or Indian blood. Nowhere, except in Mexico, has a mixed or coloured race more completely absorbed the civilization of its white rulers; but so gradual and silent was the process that it passed almost unnoticed. Its result, the successful revolt of the Spanish colonies—colonies mainly peopled by Indians or half-castes—was no more a conflict of rival races or civilizations than the rebellion of the British colonies in North America.

"New Granada" attained its independence in 1819; and in 1821 "Guatemala" declared itself free. That the subsequent

history of the Central American republics has been largely a record of civil war, maladministration and financial dishonesty, is perhaps due in part to racial inferiority. In part, however, it may be explained by the absence of any tradition of good government; perhaps also by the brevity and artificiality of the evolution which converted a debased slave-population into the citizens of modern democratic states. The five divisions of "Guatemala" were temporarily incorporated in the Mexican empire during 1822, but regained their autonomy (as Guatemala, Honduras, Salvador, Nicaragua and Costa Rica) on the declaration of a Mexican republic, and in July 1823 combined to form the Republic of the United States of Central America. The Liberal or Federalist party, which was supreme in Honduras, found itself opposed by the Conservatives, including the clergy and former Spanish officials, who were very influential in Guatemala. A bitter and protracted struggle ensued. In 1837–1839 a Conservative rising, under Rafael Carrera, president of Guatemala, resulted in the overthrow of the Liberals, under General Francisco Morazan of Honduras; and in 1842, after a vain attempt to restore the Federal republic, Morazan was captured and shot. A fresh union of the republics (except Costa Rica) was concluded in 1842, and dissolved in 1845. The year 1850 was signalized by the conclusion, on the 19th of April, of the Clayton-Bulwer treaty (*q.v.*) between Great Britain and the United States, which was designed to facilitate the construction of an interoceanic canal. The history of this project is given in detail under PANAMA CANAL. One important result of the treaty was the abandonment, in 1860, of the British protectorate over the Mosquito Coast. This event had been preceded by a decade of political disturbances. In 1850 Honduras, Salvador and Nicaragua had combined to restore federal unity; but their allied armies were defeated by the Guatemalans under Carrera. In 1856 the American adventurer, William Walker, endeavoured to usurp the government of Nicaragua; in 1860 he invaded Honduras and was captured and shot. His object was to assist the slave-holders of the United States by adding new slave-states to the Union. A further attempt to restore federal unity failed in 1885, and its promoter, Justo Rufino Barrios, president of Guatemala, lost his life. In 1895 the Greater Republic of Central America was formed by the union of Nicaragua, Salvador and Honduras; and a constitution was framed providing for the admission of Guatemala and Costa Rica; in December 1898 it was dissolved, as unsatisfactory to Salvador. On the 4th of November 1903 Panama, which had since 1863 formed part of Colombia, declared itself an autonomous republic. Its independence was immediately recognized by the United States, and shortly afterwards by the European powers. The United States also forbade the landing of any Colombian force on the territories of Panama, and thus guaranteed the security of the new state.

BIBLIOGRAPHY.—For a general description of Central America, and especially of its physical features, the following monographs by K. Sapper are of prime importance:—*In den Vulcangebieten Mittelamerikas und Westindiens* (Stuttgart, 1905); *Mittelamerikanische Reisen und Studien aus den Jahren 1888 bis 1900* (Brunswick, 1902), and *Das nördliche Mittelamerika nebst einem Ausflug nach dem Hochland von Anahuac* (Brunswick, 1897); these all contain many useful illustrations and maps. See also *Central America and the West Indies*, by A. H. Keane, edited by Sir C. Markham (London, 1901, 2 vols., with maps and illustrations); *Central and South America*, by H. W. Bates (London, 1882); *The Spanish American Republics*, by T. Child (London, 1892); and *Expedition nach Zentral und Südamerika*, by P. Preuss (Berlin, 1901). For geology, see "The Geological History of the Isthmus of Panama and Portions of Costa Rica," by R. T. Hill, in *Bull. Mus. Comp. Zool. Harvard*, vol. xxviii., No. 5 (1898); and the following by K. Sapper:—"Grundzüge der physikalischen Geographie von Guatemala," in *Petermann's Mitt.* Ergänzungsheft, No. 113 (1894), "Über Gebirgsbau und Boden des nördlichen Mittelamerika," *ibid.*, No. 127 (1899), and "Über Gebirgsbau und Boden des südlichen Mittelamerika," *ibid.*, No. 151 (1905). *The States of Central America*, by E. G. Squier (New York, 1858), is still valuable, as are others of the numerous essays, pamphlets, &c., on Central American affairs left by this author; see the bibliography of his writings published in New York in 1876. The *Bulletins of the Bureau of American Republics* (Washington, from 1893) give ample information on commerce and industry. See also *History of Central America*, by H. Bancroft (San Francisco, 1881–1887, 3 vols.).

ARCHAEOLOGY OF CENTRAL AMERICA

Discoveries and investigations carried on during the 19th century have thrown much light on the splendid past of Central America. The still extant ruins of great buildings, unlike anything which is known in the old world, testify to the high culture attained in pre-Columbian days by several native peoples differing greatly from one another in speech and racial affinities. As a science the archaeology of Central America has scarcely yet emerged from its infancy. Entire branches are still wholly uninvestigated. Amongst the numerous problems which await solution must still be reckoned the decipherment of the inscriptions, which hitherto has not progressed beyond the discovery of calendar systems and the relative datings involved in such systems.

For a complete survey of this ancient civilization, so far as it has been investigated, it is necessary to include with Central America, properly so called, a considerable portion of the Mexican territories south and east of the isthmus of Tehuantepec. The peoples inhabiting Yucatan, Campeche, Guatemala, Chiapas and Oaxaca present at the first view striking ethnical differences. On a linguistic basis, however, they may be united into several large groups. Thus, Yucatan and the greater part of Guatamala are inhabited by the Mayas, with whom may be included the still savage Lacantun or Lacandones. Related to these linguistically are the Tzendals in Chiapas and the Quichés and Cackchiquels in Guatemala, as well as the less important tribes of the Mam, Pokoman, Pokonchi, Tzotzil, Tzutuhil and Ixil. Between these there are patches of country in which dialects of the Mexican are spoken. In Oaxaca there is an extraordinary mixture of languages, some of which, like that of the Huave of Tehuantepec, are of quite unknown affinities; the bulk of the population, however, is composed of Mixtecs and Zapotecs with which the Mixe and Zoque on the east are connected. Mexican dialects also occur in isolated parts of Oaxaca.

Mayan Culture.—The civilization of the Mayas may well have been reared upon one more ancient, but the life of that culture of which the ruins are now visible certainly lasted no more than 500 years. The date of its extinction is unknown, but in certain places, notably Mayapan and Chichenitza, the highest development seems to be synchronous with the appearance of foreign, viz. Mexican or Nahua elements (see below). This quite distinctive local character suggests that the cities in question played a certain preponderating rôle, a hypothesis with which the scanty documentary evidence is in agreement. On the other hand the Mayan culture evinces an evident tendency to assimilate heterogeneous elements, obliterating racial distinctions and imposing its own dominant character over a wide area. Oaxaca, the country of the Mixtecs and Zapotecs, became, as was natural from its geographical position midway between Yucatan and Mexico, the meeting-ground where two archaeological traditions which are sharply contrasted in their original homes united.

Architecture.

Central American architecture is characterized by a fine feeling for construction, and the execution is at once bold and aesthetically effective. Amongst the various ruins, some of which represent the remains of entire cities, while others are no more than groups of buildings or single buildings, certain types persistently recur. The commonest of such types are pyramids and galleries. The pyramids are occasionally built of brick, but most usually of hewn stone with a covering of finely-carved slabs. Staircases lead up to the top from one or more sides. Some pyramids are built in steps. Usually the platform on the top of a pyramid is occupied by buildings, the typical distribution of which is into two parts, viz. vestibule and sanctuary. In connexion with the pyramid there are various subsidiary structures, such as altars, pillars, and sacrificial stones, to meet the requirements of ritual and worship, besides habitations for officials and "tennis-courts" for the famous ball-game like that played by the Mexicans. The tennis-courts always run north and south, and all the buildings, almost without exception, have a definite orientation to particular points of the compass. Frequently the pyramids

constitute one of the four sides of a quadrangular enclosure, within which are contained other pyramids, altars or other buildings of various dimensions.

The normal type of gallery is an oblong building, of which the front facing inwards to the enclosure is pierced by doors. These divide it into a series of rooms, behind which again there may be a second series. Occasionally the rooms are distributed round a central apartment, but this is ordinarily done only when a second storey has to be placed above them. The gallery-buildings may rise to as much as three storeys, the height, size and shape of the rooms being determined by the exigencies of vaulting. The principle of the true arch is unknown, so that the vaults are often of the corbelled kind, the slabs of the side-walls being made to overlap in succession until there remains only so narrow a space as may be spanned by a single flat stone. At Mitla, where the material used in the construction of the buildings was timber instead of stone, the larger rooms were furnished with stone pillars on which the beams could rest. The same principle recurs in certain ruins at Chichenitza. The tops and sides of the doors are often decorated with carved reliefs and hieroglyphs, and the entrances are sometimes supported by plain or carved columns and pilasters, of which style the serpent columns of Chichenitza afford the most striking example. On its external front one of these galleries may have a cornice and half-pillars. Above this is a plain surface of wall, then a rich frieze which generally exhibits the most elaborate ornamentation in the whole building. The subjects are geometrical designs in mosaic, serpents' heads and human masks. The corners of the wall terminate in three-quarter pillars, above which the angles of the frieze frequently show grotesque heads with noses exaggerated into trunks. The roof of the gallery is flat and occasionally gabled.

Principal Sites.—Such are the general characteristics of Central American buildings, but it must be understood that almost every site exhibits peculiarities of its own, and the number of the ruined settlements even as at present known is very large. The most considerable are enumerated below.

Yucatan.—Of the very numerous ruins which are distributed over Yucatan and the islands of the east coast the majority still await exploration. A few words of special notice may be devoted to one or two sites in the centre of the peninsula which have already become famous. At Uxmal the buildings consist of five considerable groups, viz.—the Casa del Adivino, which is a step-pyramid 240 ft. long by 160 ft. wide and 80 ft. high, crowned by a temple 75 ft. long by 12 ft. wide; the Casa de Monjas, a striking erection of four oblong buildings on an extensive terrace; the Casa de Tortugas, Casa del Gobernador, and Casa de Palomas, the last of which is a group of six galleries surrounding a court. At Izamal there is a very imposing group of ruins, as yet quite insufficiently explored. At Chichenitza, a city of first-rate importance, situated 22 m. west of Valladolid, the ruins consist of eight principal groups, the chief of which are as follows. The Casa de Monjas, a three-storeyed building, attributable to several distinct periods; the Caracol, a round structure with dome in imitation of a snail-shell, showing evident traces of Mexican influence; El Castillo, a large temple standing on a base 200 ft. long and 75 ft. high, approached by staircases on all four sides, and furnished with serpent-pillars of a kind unknown anywhere else except at Uxmal and Tula near Mexico; an unnamed temple-pyramid, which is remarkable for a group of caryatid figures; a tennis-court; and finally the Tiger Temple, which contains marvellous coloured reliefs representing figures of warriors and place-hieroglyphs, all executed in a distinctively Mexican style. Yet another evidence of Mexican influence at Chichenitza is to be noted in five figures of the so-called Chac-mol type, that is to say, horizontal figures in which the arms are extended to the navel which is indicated by a cup-like depression. This Chac-mol type is characteristic of such sites as Tlascala and Cempoallan.

Other important sites in Yucatan are Chacmaltun, with fine wall-paintings; Tantah, with remarkable pillared façades; the ruins of Labna, Chunhuhub, and the caves of Loltun; and Xlabpak de Santa Rosa, where there is a three-storeyed temple palace. Two sculptured reliefs are of great interest; they represent a person holding a staff on which is a figure of the god Ah-bolon-tzacab.

Guatemala.—The Guatemalan ruins are distributed over a wide area. The most numerous and extensive are on the Usumacinta river. The most important sites in that district are Piedras Negras, and Yaxchilan or Menche Tinamit, where there are temples covered with sculptured reliefs and hieroglyphic inscriptions, and stelae and slabs carved with human figures placed in niches. In the Peten district, Tikal is famous for its splendid sculptures representing Kukulkan and other divinities. Near the modern city of Guatemala are the vast ruins of Guatemala-Mixco. Chacujál, which Cortes visited on his expedition of 1524–1525 is very possibly to be identified with the modern Pueblo Viejo on the river Tinaja. Chaculá and Quen-Santo between the headwaters of the Rio de Chiapas and the Rio Lacantun are two sites of a strongly marked local character. Series of three pyramids are peculiar to these two settlements, as also are pyramids with human figures on their platforms. Stelae discovered at Quen Santo have a calendar character, which proves that Mayan science had penetrated into what was probably the home of an old Lacantun culture.

Santa Lucia Cozumalhuapa, on the Pacific slope of the Cordilleras, is a very peculiar site. The ruins are those of a settlement which had already been deserted before Alvarado's expedition of 1522. The sculptures of gods, goddesses and other figures, executed on enormous blocks of stone, show a distinctively Mexican character, with which, however, various Mayan features are blended. They may perhaps be attributed to some offshoot of the Nahua stock, probably the Pipil Indians, which developed on lines of its own in this remote corner.

Near the frontier of Honduras are the remarkable ruins of Quirigua, which rival Copan in importance and have suffered less from the ravages of the climate. The ruins of temples and palaces contain gigantic stone stelae of very fine workmanship, on which are sculptured human and animal figures representing hieroglyphs of the calendar dates.

Honduras.—Copan, one of the most important seats of Mayan civilization, lies close to the borders of Guatemala. The ruins comprise great buildings, temples, pyramids, &c. and contain sculptures of the highest interest. Especially noteworthy are altars in the form of a turtle and stelae covered with hieroglyphs. The hieroglyphs are of the kind usually found in such ruins, the meaning of which is so far clear that it is known that the commencement of an inscription records certain dates in the complicated calendar system of the Mayas. A collation of these dates demonstrates that the most ancient on record are separated from the most recent by an interval of only a few centuries. From this it may be concluded that the Mayan civilization, whether or not it was preceded by anything older, flourished for only a comparatively short period, the beginning of which cannot be placed many centuries before A.D. 1000.

According to Squier (*Honduras*, London, 1870, p. 75) the other principal ruins of Honduras are to be found in plains of the department of Comayagua, near Yarumela, near Lajamini, and in the ruined town of Cururu. They are "large, pyramidal, terraced structures, often faced with stones, conical mounds of earth and walls of stone." Further ruins, such as those of Calamulla, Jamalteca, Maniana, Guasistagua, Chapuluca and Chapulistagua, are found in the department of Comayagua in the side valleys and adjoining tablelands. The most interesting and most extensive are the ruins of Tenampua (Pueblo Viejo), about 20 m. south-east of Comayagua. Here ramparts, defence works, terraced stone mounds and numerous large pyramids are to be found. Squier found further ruins in the west of Honduras, which have also been described in part by Stephens, and were probably first mentioned in 1576 by Diego Garcia de Palacio (*Carta dirigida al Rei de España*, published by Squier, New York, 1860).

At Rio Ulloa are remains which testify to the existence of a large population in past days. Possibly they may be identified

CENTRAL AMERICA
Scale, 1:5,700,000
English Miles
0 50 100 150
State Capitals
Railways
Canals
MEXICO
Yucatan Peninsula
Plain of Peten
BRITISH HONDURAS
GUATEMALA
HONDURAS
NICARAGUA
Gulf of Honduras
CARIBBEAN SEA
Bay Islands
Tegucigalpa
Managua
Lake Nicaragua
Nicoya Peninsula
Coronada Bay
Matina Bay
Mosquito Coast
Pearl Lagoon
Bay of Fonseca
PACIFIC OCEAN
PANAMA
Continuation east on Same Scale
CARIBBEAN SEA
Isthmus of Panama
Panama Bay
Gulf of Panama
PACIFIC OCEAN
COLOMBIA
Longitude West 88° of Greenwich
Emery Walker sc.

with a site of the name of Naco mentioned by Las Casas and by Bernal Diaz (*Histoire véridique de la conquête de la Nouvelle Espagne*, translated by D. Fourdanet, 2nd ed., Paris, 1877, ch. 178, p. 690).

Chiapas (Mexico).—The principal site is Palenque, the ruins of which were amongst the earliest of all to attract attention. The style of architecture, with the gigantic vaults and singular comb-shaped gables, distinguishes Palenque from Copan and Quirigua, which it surpasses also in the unequalled magnificence of its sculptures. Five out of the remarkably uniform series of buildings may be specially mentioned. They are the Great Palace, a complex structure of galleries and courts commanded by a three-storeyed tower, the Temples of the Cross, which are galleries constructed on terraces and containing the well-known reliefs, the Temple of Inscriptions, the Sun Temple and the Temple of the Relief. The sculptured figures of Palenque are familiar from many reproductions. The most characteristic groups represent a deity standing between worshippers who hold a staff surmounted by the water-god Ah-bolon-tzacab, the "god of the nine medicines." The inscriptions on the famous Cross and in the Sun Temple contain calendar-datings which are remarkable as showing a particular combination of numbers and hieroglyphs, which does not occur elsewhere.

A whole series of sites is included within the geographical limits of Chiapas, which from the archaeologist's standpoint must be considered as belonging properly to Guatemala. The country has been quite insufficiently explored.

Oaxaca (Mexico).—The bulk of the population of the province of Oaxaca is composed of a distinct racial group, best represented by the Zapotecs, who have been for an unknown length of time the intermediaries between the Nahua civilization of Mexico on the west and the Mayan on the east. The influence of the two separate currents may be detected in the bastard calendar system no less than in the still undeciphered inscriptions. The principal ruins are those of Mitla, the burial city of the priests and kings of the ancient Zapotecs, which bear a quite distinct character, though presenting certain analogies with the Mexican. One of the chief structures is a step-pyramid, rising in three steps to a height of 130 ft., another is a pyramid of brick. Besides these there are courts, surrounded by palaces which represented necropolises, the dwellings of the priests, of the chief priest, and of the king (with an audience-hall). The wall paintings of the "palaces" are especially admirable, and it is to be noted that the deities represented in them are those of the Mexican pantheon.

Monte Alban is interesting for the definitely Zapotec character of its sculptures. Quiengola near Tehuantepec is a site with extensive ruins including a fine tennis court.

British Honduras.—The antiquities of British Honduras have been but little investigated. In the scanty literature relating to them a few accounts of ruined places are to be found. In style these buildings closely resemble those of the neighbouring Yucatan. The ruins in the colony New Boston, mentioned by Froebel (*Central America*, p. 167), are of this kind. F. de P. Castells (see *American Antiquarian*, Chicago, 1904, vol. xxvi. pp. 32-37) describes the ruins, in the north of the colony, of "Ixim cheeh," supposed to be the Indian form of the English name "Indian Church." They are on the road to the Lake of Yaxha (green water), where further ruins are to be found. Thomas Gann gives detailed accounts of numerous mounds also in the northern part of British Honduras (see *19th Annual Report of the Bureau of American Ethnology*, Washington, 1900, part i. pp. 661-692, with plates). The most interesting ruins are those which have been discovered in Santa Rita, at the mouth of the New River, near the town of Corosal. Here wonderful wall paintings in stucco came to light, which unfortunately Gann could only save in part. The remainder were destroyed by Indians. It should be remarked that a number of the mounds in Santa Rita were erected over ruins of buildings which must therefore be of older date than the mounds.

Salvador.—Pedro de Alvarado in his expedition of 1524 calls this whole district *Cuscatan* (Mex. *Cozcatlan*), that is, "Land of precious stones, of treasures, of abundance." A further description of the land is given by Palacio (*l.c.*) in 1576. Although there are numerous relics of Mayan civilization buried in the earth, few ruins are to be seen on the surface. Karl Sapper has described three large ruins: Cuzcatlan near the capital, Tehuacan near S. Vicente, and Zacualpa on the Lake of Güija in the extreme north-west of the country. The ruins show a distinct affinity in style to those of the Mayan buildings in Guatemala, but they are less fine and artistically perfect. Probably the central and western districts of San Salvador were originally peopled by the same race of Mayas, and these tracts of country were later settled by the Mexican-speaking Pipiles.

A characteristic feature of the extensive ruins of Zacualpa is that the pyramids and ramparts have perpendicular steps which are higher than they are broad, and this peculiarity may be attributed to the influence of the Maya tribes, who are related to the Mams of Guatemala.

Decipherment of the Mayan Hieroglyphs.—The key to the decipherment, so far as this has progressed at present, was furnished by the *Historia de las Cosas de Yucatan*, a work written by Diego de Landa, the first bishop of the country. This professed to give, with much other more or less doubtful information, the full account of a calendar system analogous to that of the Mexicans, which was said to have been used by the Mayas (see MEXICO). The signs for each of the 20 days and for the 18 weeks of 20 days are figured by Landa. The first step was to compare these with the hieroglyphic characters contained in the few Mayan picture manuscripts (Codex Troano, Cortesianus, Peresianus, Dresden Codex) which have survived the destructive fanaticism of the Spanish missionaries. Förstemann's acute analysis detected that the bars and dots which occur along the margin and in the body of the pictorial scenes represented numerals, dots standing for each integer up to five, while for five a bar was used. Next, it was found that the order in which these numeral-signs are placed is regular, and that there are never more than five in a group. It was established that the first sign in such a group is that for the numeral 1 (*Kin*), the next that for 20 (*Uinal*), the third for 18×20 (*Tun*), the fourth for 18×20×20 (*Katun*), and the fifth for 18×20×20×20, that is to say, a cycle.

Had the available material for study been confined to the manuscripts, little more progress would have been made beyond establishing subsidiary details in the actual calendar. But when a similar analysis was applied to the numerous monuments discovered and figured by Maudslay and others, some important results of a general bearing were obtained. It was found that many of the hieroglyphs of various forms upon the stones were also of numeral value, and, what was of great importance, that they all referred back to a single starting-point. This starting-point or zero is no doubt the mythological date at which, according to Mayan cosmology, the world was created. It is placed at nine or ten cycles before the time when Copan and Quirigua were erected and the picture manuscripts made. And it is by reference to it in the inscriptions that such students as Seler, Goodman and others have been enabled, as already stated, to obtain a record of the relative chronology of the most famous monuments, to confine the period of their erection within the space of a few centuries, and approximately to fix even their absolute antiquity. Though much yet remains to be done, these are substantial results which have already been won from the study of the hieroglyphs.

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London, 1889, &c.), a pioneer work containing the admirably presented results of scientific exploration. Maler, in *Memoirs of the Peabody Museum*, vol. ii. 1, 2 (Cambridge, U.S.A., 1901 and 1903); Holmes, *Archaeological Studies among the Ancient Mexicans* (Field Columbian Museum, Chicago, 1895); E. Seler, *Die alten Ansiedelungen von Chacula* (Berlin, 1901), *Wandmalereien von Mitla* (Berlin, 1895), *Ges. Abhandlungen*, vol. i. (Berlin, 1902) and vol. ii. (1904), *Führer von Mitla* (Berlin, 1906). E. Förstemann has contributed many valuable essays to *Globus* and the *Zeitschrift für Ethnologie* (Berlin); especially important are his commentaries to the *Dresden Codex* (Dresden, 1901), to the *Codex Tro-Cortesianus Madrilensis* (Danzig, 1902), and to the *Codex Peresianus* (Danzig, 1903). See also "The Archaic Maya Inscriptions," by F. T. Goodman (in *Biologia Centrali-Americana*, section *Archaeology*, viii., 1897), and *Report of an Archaeological Tour in Mexico in 1881*, by A. F. Bandelier (Boston, 1884). Valuable bibliographies have been made by Bandelier (*Notes on the Bibliography of Yucatan and Central America*, Worcester, U. S. A., 1881) and by K. Häbler ("Die Maya Literatur und der Maya Apparat zu Dresden," in the *Zentralblatt für Bibliothekwesen*, xii., 1895). The Mayan picture MSS. have been published in facsimile as follows:—the *Dresden Codex* by Förstemann (Leipzig, 1880, and Dresden, 1892), and the *Codex Tro* by Brasseur de Bourbourg—*Manuscrit Troano, étude sur le système graphique et la langue des Mayas* (Paris, 1869–1870), the *Codex Cortesianus* by Léon de Rosny (Paris, 1883) and by F. de Dios de la Rada y Delgado and F. L. de Ayala y del Hierro (Madrid, 1893), the *Codex Peresianus* by Duruy and Brasseur de Bourbourg (Paris, 1864) and by L. de Rosny (Paris, 1887). The following relate especially to the ruins in Salvador:—*La Universidad*, by D. Gonzalez, vol. iii. ser. 3, No. 6, p. 283 (San Salvador, 1892–1893); *Le Salvador pré-Colombien, études archéologiques*, by F. de Montcasus de Ballore (Paris, 1891), 25 plates; Karl Sapper in *Arch. für Ethnologie*, 9, p. 3 ff. (1896). (W. L.*)

CENTRAL FALLS, a city of Providence county, Rhode Island, U.S.A., on the Blackstone river, about 5 m. N. of Providence. Pop. (1900) 18,167; (1905, state census) 19,446, of whom 8792 were foreign-born, 4164 being French-Canadian, 1587 being English, and 1292 being Irish; (1910) 22,754. It is served by the New York, New Haven & Hartford railway. The Blackstone furnishes good water-power, and the chief industry of the city is the manufacture of cotton goods; other important industries are the refining of copper and the manufacture of woollens, silks and hair-cloth. The total value of the factory product in 1905 was $5,090,984, being 12·9% more than in 1900. A settlement was established here about 1763 and was first a part of Smithfield, and then, after 1871, of Lincoln. About 1780 a chocolate mill was erected, and from then until 1827 the settlement was known as Chocolateville. It was incorporated as the Central Falls Fire District of Smithfield in 1847, and in 1895 was chartered as a city.

CENTRALIA, a city of Marion county, Illinois, U.S.A., in the S. part of the state, about 62 m. E. of St Louis. Pop. (1890) 4763; (1900) 6721, of whom 571 were foreign-born. The city is served by the Chicago, Burlington & Quincy, the Illinois Central, the Illinois Southern, and the Southern railways; the first two have repair shops here. Centralia is situated in the central part of southern Illinois, popularly known as "Egypt." Among its manufactures are window glass, envelopes, cigars, concrete blocks and flour. In and near the city coal is mined, and apples, strawberries and other fruits are raised, and the city is a shipping point for coal and fruit. Centralia was first settled in 1853, and was first chartered as a city in 1859.

CENTRAL INDIA, a collection of native states in India forming a separate agency, which must not be confounded with the Central Provinces. The Central India agency was formed in 1854, when Sir R. Hamilton was appointed agent to the governor-general. It lies between 21° 24′ and 26° 52′ N. and between 74° 0′ and 83° 0′ E., and may be said to consist of two large detached tracts of country which, with Jhansi as a pivot, spread outwards east and west into the peninsula, reaching northward to within some 30 m. of Agra, and southward to the valley of the Nerbudda and the Vindhya and Satpura ranges. The total area is 78,772 sq. m. It is bounded on the N. and N.E. by the United Provinces, on the W. and S.W. by Rajputana, some native states of the Bombay presidency, and Khandesh. The Central Provinces and the Bengal district of Chota Nagpur enclose it on the S. and E., while the Jhansi district of the United Provinces separates the two tracts.

Central India may be divided into three great natural divisions: the highlands of the Malwa plateau, with a mean elevation of some 1500 ft. above sea-level; the low-lying country some 600 ft. above sea-level, comprising the greater part of the eastern section of the agency; and the hilly tracts, which lie mostly to the south. The Malwa plateau consists of great undulating plains, separated by flat-topped hills, whose sides are boldly terraced, with here and there a scarp rising above the general level; it is covered with long grass, stunted trees and scrub, which owing to the presence of deciduous plants is of a uniform straw colour, except in the rains. The foundation of this plateau is a bed of sandstone and shales belonging to the Vindhyan series. This bed, which stretches east and west from Sasseram to Neemuch, and north and south from Agra to Hoshangabad, comprises the whole of the agency except the northern part of Bundelkhand. On the plateau itself the sandstone is generally overlaid by the Deccan trap, a blackish-coloured basaltic rock of volcanic origin, the high level tableland having been formed by a succession of lava flows, the valleys of Central India being merely "denudation hollows" carved out by the action of rain and rivers. It is apparently the northern limit of what was once a vast basaltic plain stretching from Goona to Belgaum, "one of the most gigantic outpourings of volcanic matter in the world." The sandstone bed on which it rests is visible at a point just north of Goona, and in a small area round Bhilsa and Bhopal, as it is in those places freed from the layer of trap. The low-lying land includes roughly that part of the agency which lies to the east of the plateau and comprises the greater part of the political divisions of Bundelkhand and Baghelkhand and the country round Gwalior. The formation save in north Bundelkhand is sandstone of the Vindhyan series, free as a rule from "trap." In the north of Bundelkhand the prevailing rock is gneiss and quartz. The quartz takes the shape of long serrated ridges, which are in many places a characteristic feature of the landscape. Trap appears here and there in intrusive dykes. The hilly tracts lie chiefly to the south of the agency, where the Vindhya, Satpura and Kaimur ranges are met with. The country is rough forest and jungle land little used for cultivation. The greater part of Central India is covered with the well-known "black cotton soil," produced by the disintegration of the trap rock. It is a very rich loamy earth, possessing great fertility and an unusual power of retaining moisture, which makes artificial irrigation little needed. Opium and millet are the principal crops grown upon it. The ordinary "red soil" covers a large part of northern Bundelkhand, and as it requires much irrigation, tanks are a special feature in this country. Ethnologically as well as climatically the differences between the plateau and the eastern part of the agency are distinct and the languages markedly so. The plateau is inhabited by pure-blooded Rajput races, whose ancestry can be traced back for centuries, with all their numerous offshoots. The inhabitants of the low-lying country are also Rajputs, but their descent is mixed and as a rule the families of the plateau will have no marriage connexion with them. The races of the hilly tracts are semi-civilized tribes, who often flee at the mere sight of a white man, and have as yet been but little affected by the Hindu religion of their Rajput rulers. Of the climate of the plateau, Abul Fazl, the author of the *Ain-i-Akbari*, says: "The climate is so temperate that in the winter there is no occasion for warm clothing, nor is it necessary in summer to cool the water with saltpetre. But in the four rainy months the night here is cold enough to render a quilt necessary." The rains of the south-east monsoon reach Central India as a rule about the 12th of July, and last until the end of September.

Administrative Divisions.—The Central India agency is divided for administrative purposes into eight units, two classed as residencies and six as agencies. These are the residencies of Gwalior and Indore, and the agencies of Baghelkhand, Bhopal, Bhopawar, Bundelkhand, Indore and Malwa. But these divisions are purely an artificial grouping for the purposes of the British government, the original native divisions consisting of 16 states and 98 minor states and estates. The 15 large states are Gwalior, Indore, Rewa, Bhopal, Dhar, Barwani, Datia, Orchha, Charkhari, Chhattarpur, Panna, Dewas (senior branch), Dewas (junior branch), Jaora and Ratlam. At the close of the

Pindari War in 1818 the whole country that is now under the Central India agency was in great confusion and disorder, having suffered heavily from the extortions of the Mahratta armies and from predatory bands. It had been the policy of the great Mahratta chiefs, Holkar and Sindhia, to trample down into complete subjection all the petty Rajput princes, whose lands they seized and from whom they levied heavy contributions of money. Many of these minor chiefs had been expelled from their possessions, had taken refuge in the hills and forest, and retaliated upon the Mahratta usurpers by wasting the lands which they had lost, until the Mahrattas compounded for peace by payment of blackmail. In this state of affairs all parties agreed to accept the interposition of the British government for the restoration of order, and under Lord Hastings the work of pacification was effected. The policy pursued was to declare the permanency of the rights existing at the time of the British interposition, conditionally upon the maintenance of order; to adjust and guarantee the relations of subordinate and tributary chiefs to their superiors so as to prevent all further disputes or encroachments; and to settle the claims of the ousted landholders, who had resorted to pillage or blackmail, by fixing grants of land to be made to them, or settling the money allowances to be paid to them. The general result was to place all the privileges, rights and possessions of these inferior chiefs under the guarantee or protection of the British government, to whom all disputes between the superior and inferior states must be referred, and whose decision is final upon all questions of succession to hereditary rights or rulership. The states have no general ethnological affinity, such as exists in Rajputana. Their territories are in many cases neither compact nor continuous, consisting of a number of villages here and there, with a nucleus of more or less importance round the chief town. Their relations to the government of India and to each other present many variations. Ten of them are under direct treaty with the government of India; others are held under *sanads* and deeds of fealty and obedience; while a third class, known as the mediatized states, are held under agreements mediated by the British government between them and their superior chiefs.

Population.—The total population of the Central India agency in 1901 was 8,628,781, showing a decrease during the decade of 16·4%. Considerable losses were caused by the famines of 1897–1898 and 1899–1900, which were severely felt, especially in Bhopal and Malwa. The greater part of the population of Central India is of the Hindu religion, but a few Mahommedan groups still exist, either traces of the days when the Mogul emperors extended their sway from the Punjab to the Deccan, or else the descendants of those northern adventurers who hired out their services to the great Mahratta generals. Of the first Bhopal is the only example, while Jaora is the only notable instance of the other. Roughly there are four great sections of the population: the Mahratta section, who belong to the ruling circles; the Rajputs, who are also hereditary noblemen; the trading classes, consisting chiefly of Marwaris and Gujaratis; and lastly, the jungle tribes of Dravidian stock. The Mahrattas are foreigners, and, though rulers of the greater part of Central India, have no true connexion with the soil and are little met with outside cities, the vicinity of courts, and administrative centres. The Rajputs with all their endless ramifications form a large portion of the population. Originally invaders, they have so long held a stake in the soil that they have become almost part of the indigenous population. The Marwaris hold practically all the trade of Central India, with the exception of the Bora class of Mahommedans. They are either Vaishnavite Hindus or else Jains. Their advent into Central India dates, except in the case of one or two families, from the time of the Mahratta invasion only. The Jain portion of this community is very wealthy. The last section, that of the jungle tribes, is mostly of Dravidian or mixed Aryo-Dravidian origin, these tribes being the modern representatives of the former rulers and inhabitants of this country.

The British agent to the governor-general resides at Indore, and there are British cantonments at Mhow, Neemuch and Nowgong. The whole country is fairly provided with railways, largely at the expense of Sindhia.

CENTRAL PROVINCES AND BERAR, a province of British India, which was formed in October 1903 by the amalgamation of the Central Provinces and the Hyderabad Assigned Districts. The total area of the provinces is 113,281 sq. m., and the population on that area in 1901 was 10,847,325. As is shown by its name the province is situated in the centre of the Indian peninsula, comprising a large proportion of the broad belt of hill and plateau country which separates the plains of Hindustan from the Deccan. It is bounded on the N. and N.E. by the Central India states, and along a small strip of the Saugor district by the United Provinces; on the W. by Bhopal, Indore and the Khandesh district of Bombay; on the S. by Hyderabad and the large *zamindari* estates of the Madras presidency; and on the E. by these latter estates and the tributary states of Bengal. In October 1905 most of Sambalpur and five Oriya-speaking hill-states were transferred from the Central Provinces to Bengal, while the Hindi-speaking states of Chota Nagpur were transferred from Bengal to the Central Provinces. The province, therefore, now consists of the five British divisions of Jubbulpore, Nerbudda, Nagpur, Chhattisgarh and Berar, which are divided into the twenty-two districts of Saugor, Damoh, Jubbulpore, Mandla, Seoni, Narsinghpur, Hoshangabad, Nimar, Betul, Chhindwara, Wardha, Nagpur, Chanda, Bhandara, Balaghat, Raipur, Bilaspur, Amraoti, Akola, Ellichpur, Buldana and Wun; and the fifteen tributary states of Makrai, Bastar, Kanker, Nandgaon, Kairagarh, Chhuikhadan, Kawardha, Sakti, Raigarh, Sarangarh, Chang Bhakar, Korea, Sirguja, Udaipur and Jashpur.

Central Provinces.

The Central Provinces are divided into two parts by the Satpura range of hills (*q.v.*), which runs south of the Nerbudda river from east to west; so that, speaking generally, it consists of districts north of the Satpuras, districts on the Satpura plateau, and districts south of the Satpuras. North of the Satpuras is the rich valley of the Nerbudda, which may be said to begin towards the north of the Jubbulpore district and to extend westward through the district of Narsinghpur as far as the western limit of Hoshangabad, a distance of nearly 300 m. The elevation of the valley above the sea varies from 1400 ft. at Jubbulpore to 1120 at Hoshangabad. In breadth it is about 30 m., extending between the Satpuras and the southern scarp of the Vindhyas. This great plain, 10,613 sq. m. in extent, contains for the most part land of extreme fertility. The continuation of the valley west of Hoshangabad forms the northern portion of the district of Nimar, the farther limit of which touches the Khandesh district of the Bombay presidency. Towards the river, though rich in parts, this tract of country is generally wild and desolate, but nearer the base of the hill range there is a large natural basin of fertile land which is highly cultivated. South of the Satpuras lies the great plain of Chhattisgarh at a mean elevation above the sea of 1000 ft.; it has an area of 23,000 sq. m., and forms the upper basin of the Mahanadi. Farther to the west and again divided off by hills is the great plain of Nagpur, extending over 24,000 sq. m. Its general surface inclines towards the south from 1000 ft. above the sea at Nagpur to 750 ft. at Chanda. To the south the province is shut in by the wide mountainous tract which stretches from the Bay of Bengal through Bastar to the Godavari, and west of that river is continued onward to the rocky ridges and plateaus of Khandesh by a succession of ranges that enclose the plain of Berar along its southern border.

Berar.

Berar consists mainly of the valley lying between the Satpura range of mountains in the north and the Ajanta range in the south. The Gawilgarh hills, a range belonging to the Satpura mountains, form the northern border. On the east the frontier is marked by the Wardha river down to its confluence with the Penganga, and on the south by the Penganga for about two-thirds of the frontier's length. The tract is half surrounded on the east, north and north-west by the Central Provinces, with which it is amalgamated. In addition to the Melghat mountain tract which walls it in on the north, Berar is divided into two sections, the Payanghat or lowland country, bounded on the north by the Gawilgarh hills, and on the south by the outer scarps of the Ajanta range, and the Balaghat or upland country above the Ajanta ridge, sloping down southwards beyond the ghats or passes which lead up to it. The Payanghat is a wide valley running up eastward between this ridge and the Gawilgarh hills, varying in breadth from 40 to 50 m., and broader towards the end than at its mouth. It contains all the best land in Berar; it is full of deep, rich, black alluvial soil, of almost inexhaustible fertility, and it undulates sufficiently to maintain a natural system of drainage, but there is nothing picturesque about this broad strip of champaign country. The upland tract, on the contrary, is diversified with low-lying

plains, high plateaus, fertile bottoms and rocky wastes, and is rendered picturesque by rivers and groves.

Natural Features.—The provinces may be divided into two tracts of upland and three of plain, consisting of the Vindhya and Satpura plateaus, and the Berar, Nagpur and Chhattisgarh plains. To the north the districts of Saugor and Damoh form the southern boundary of the Vindhyan escarpment. In this region the sandstone rocks are generally overlaid with heavy black soil formed from the decaying trap, which is principally devoted to the cultivation of the spring crops, wheat and grain, while rice and hill millets are sown in the lighter and more sandy soils. Next, the long and narrow valley of the Nerbudda from Jubbulpore to Hoshangabad is formed of deep alluvial deposits of extreme richness and excellently suited to the growth of wheat. To the south of the Nerbudda the Satpura range stretches across the province, containing the greater part of five districts, its crystalline and sandstone rocks rising in places through the superficial stratum of trap, and with large areas of shallow stony land still covered to a great extent with forest interspersed by black-soil valleys of great fertility. In the latter are grown wheat and other spring crops, while the lighter kinds of rice and the hill millets are all that the poorer land can bear. To the south of the Satpuras and extending along its base from west to east lie successively the Berar, Nagpur and Chhattisgarh plains. The surface soil of Berar is to a great extent a rich black vegetable mould; and where this surface soil does not exist, there are muram and trap with a shallow upper crust of inferior light soil. The Nagpur country, drained by the Wardha and Wainganga rivers, contains towards the west the shallow black soil in which autumn crops like cotton and the large millet, *juar*, which do not require excessive moisture, can be successfully cultivated. The eastern part of the Nagpur country and the Chhattisgarh plain, comprising the Mahanadi basin, form the great rice tract of the province, its heavy rainfall and hard yellowish soil rendering it excellently adapted for the growth of this crop.

Climate.—As regards climate the districts of the Central Provinces are generally divided into hot and cool ones. In the latter division are comprised the two Vindhyan districts of Saugor and Damoh, Jubbulpore at the head of the Nerbudda valley, and the four Satpura districts of Mandla, Seoni, Betul and Chhindwara, which enjoy, owing to their greater elevation, a distinctly lower average temperature than the rest of the province. The ordinary variation is from 3 to 4 degrees, the mean maximum reading in the shade in a cooler district being about 105° as against 108° in the hotter ones for the month of May, and 79° as against 83° for the month of December. In the cold weather the temperature in Nagpur and the other hot districts is about the same as in Calcutta and substantially higher than that of northern India. The climate of Berar differs very little from that of the Deccan generally, except that in the Payanghat valley the hot weather may be exceptionally severe. The rainfall of the province is considerably heavier than in northern India, and the result of this is a cooler and more pleasant atmosphere during the monsoon season. The average rainfall, before it was affected by the abnormal seasons which followed 1892, was 51 in., varying from 33 in. in Nimar to 65 in Balaghat. In the autumn months malarial fever is prevalent in all thickly forested tracts and also in the rice country; but on the whole the province is considered to be healthy, and as the rains break fairly regularly in June and produce an immediate fall in the temperature, severe heat is only experienced for a period of from two to three months.

Agriculture.—Broadly speaking, the northern districts of the province produce principally cold weather crops, such as wheat and grain, and the eastern ones principally rice. At the beginning of the decade 1891–1901 wheat was the staple product of the Vindhyan and Nerbudda valley districts, and was also grown extensively in all the Satpura districts except Nimar and in Wardha and Nagpur. Cotton and juar were produced principally in Nimar, Nagpur, Wardha and the southern portion of Chhindwara, and the latter also in Chanda. In the Satpura districts the inferior soil was and is principally devoted to hill millets. Rice is an important crop in Damoh, Jubbulpore, Mandla, Seoni and Chanda, and is the chief staple of Bhandara, Balaghat, and the two eastern districts of Raipur and Bilaspur. The staple crops of Berar are cotton and juar. The succession of bad seasons which marked the end of the decade affected the distribution of the principal crops, but with the advent of more prosperous seasons things tend to return to their old level.

Industries.—The only important industries are connected with cotton and coal. In 1904 the total number of factories was 391, almost entirely cotton presses and ginning factories, which received an immense impetus from the rise in cotton prices. In 1896 a brewery was established at Jubbulpore. Two coal-mines are worked in the Central Provinces, at Warora and Mopani, to each of which there is a branch line of railway. In 1903–1904 there was a total yield of 160,000 tons, valued at about £45,000. In connexion with the Warora colliery there is a fire-clay business. The Mopani colliery, which dates back to 1860, is worked by a joint-stock company.

Trade.—The trade of the Central Provinces is conducted mainly by rail with Bombay and with Calcutta. The chief imports are cotton piece goods, cotton twist, salt, sugar, provisions, railway materials, raw cotton, metals, coal, tobacco, spices and kerosene oil. The chief exports are raw cotton, rice, wheat, oil-seeds, hides and lac. The exports of wheat are liable to extreme fluctuations, especially during famine periods.

Railways.—Until recently, the only railway in the Central Provinces was the Great Indian Peninsula, with two branches, one terminating at Nagpur, the other at Jubbulpore, whence it was continued by the East Indian system to Allahabad. The Bengal-Nagpur line has now opened up the eastern portion of the country, bringing it into direct connexion with Calcutta; and a new branch of the Indian Midland, from Saugor through Damoh, has been partly constructed as a famine work. Large portions, however, in the hilly centre and in the south-east, are still remote from railways.

Administration.—The administration of the province is conducted by a chief commissioner on behalf of the governor-general of India in council, assisted by members of the Indian civil service, provincial civil service, subordinate civil service, district and assistant superintendents of police, and officers specially recruited for various departments. The form of the administration of Berar was in 1903 entirely reorganized. Under the original settlement concluded by the treaties of 1853 and 1860 the revenues of the province were assigned primarily for the maintenance of the Hyderabad contingent, such surplus as accrued from year to year being made over to the nizam, while the province itself was administered in trust by the government of India through the resident at Hyderabad. In November 1902 a fresh settlement was arranged and Berar was leased in perpetuity to the British government in return for an annual rental of 25 lakhs. It remained under the administration of the resident until the 1st of October 1903, from which date it was amalgamated with the Central Provinces for administrative purposes. As the immediate result of this change the offices of heads of departments in Berar, except the judicial commissionership and the conservatorship of forests, were amalgamated with the corresponding appointments in the Central Provinces, and Berar is now treated as one of the divisions of that province for purposes of revenue administration, with a divisional commissioner as its immediate head.

Population.—The population of the Central Provinces and Berar as now defined according to the census of 1901 was 10,847,325, and is of very diverse ethical construction, having been recruited by immigration from the countries surrounding it on all sides. There are six main divisions of the people: the Dravidian tribes, who formerly held the country; Hindi-speaking immigrants from the north and north-west into Saugor, Damoh, the Nerbudda valley and the open country of Mandla and Seoni; Rajasthani-speaking immigrants from Central India into Nimar, Betul and parts of Hoshangabad, Narsinghpur and Chhindwara; Marathi-speaking immigrants from Bombay into Berar, the Mahratta districts and the southern tahsil of Betul; the Telugu castes in the Sironcha and Chanda tahsil of Chanda and the south of Bastar; and the Hindu immigrants into Chhattisgarh, who are supposed to have arrived many centuries ago when the Haihaya dynasty of Ratanpur rose into power.

Language.—Owing to the diversity of race, the diversity of language is equally great. Thirty languages and a hundred and six dialects are found in the Central Provinces alone, and twenty-eight languages and sixty-eight dialects in Berar. The chief of these languages are Western Hindi, Eastern Hindi, Rajasthani, Marathi, Oriya, Telugu and Dravidian dialects. Of these last the chief dialects are Gondi, Oraon or Kurukh, Kandhi and Kanarese, of which Gondi is by far the most important. There are also the Munda languages, of which the chief are Korku, Kharia and Munda or Kol. The chief languages of Berar are Marathi, Urdu, Gondi, Banjari, Hindi, Marwari, Telugu, Korku and Gujarati.

History.—The authentic history of the greater part of the country embraced in the Central Provinces does not begin till the 16th century A.D. By the people of northern India the country was known as Gondwana, after the savage tribes of Gonds by whom it was inhabited. The Mussulman invaders of the Deccan passed it by, not caring to enter its mountain fastnesses and impenetrable forests; though occasional inscriptions show that parts of it had fallen from time to time under the dominion of one or other of the great kingdoms of the north, *e.g.* of Asoka, of the Guptas of Maghada, or of the ancient Hindu kingdom of Vidarbha (Berar); and inscriptions and numerous discoveries of coins prove that, during the middle ages, the open spaces were occupied by a series o Rajput dynasties. Of these the most important was that of the Haihayas of Ratanpur, a family which, settled from time immemorial in the Nerbudda valley, had towards the close of the 10th century succeeded the Pandava dynasty of Maha Kosala (Chhattisgarh) and ruled, though from the 16th century onwards over greatly diminished territories, until its overthrow by the Mahrattas in 1745. The second ruler of this dynasty, Ratnaraja, was the founder of Ratanpur.

The inscriptional records cease abruptly in the 12th century, and no more is known of the country until the rise of the Gond

dynasties from the 14th to the 16th centuries. The first of these is mentioned in 1398, when Narsingh Rai, raja of Kherla, is said by Ferishta to have ruled all the hills of Gondwana. He was finally overthrown and killed by Hoshang Shah, king of Malwa. The 16th century saw the establishment of a powerful Gond kingdom by Sangram Sah, who succeeded in 1480 as the 47th of the petty Gond rajas of Garha-Mandla, and extended his dominions so as to include Saugor and Damoh on the Vindhyan plateau, Jubbulpore and Narsinghpur in the Nerbudda valley, and Seoni on the Satpura highlands. Sangram Sah died in 1530; and the break up of his dominion began with the enforced cession to the Mogul emperor by Chandra Sah (1563–1575) of Saugor and Damoh and of that portion of his territories which afterwards formed the state of Bhopal.

About 200 years after Sangram Sah's time, Bakht Buland, the Gond chieftain of a principality seated at Deogarh in Chhindwara, having visited Delhi, set about introducing the civilization he had there admired. He founded the city of Nagpur, which his successor made his capital. The Deogarh kingdom, at its widest extent, embraced the modern districts of Betul, Chhindwara, Nagpur, with parts of Seoni, Bhandara and Balaghat. In the south of the province Chanda was the seat of another Gond dynasty, which first came into prominence in the 16th century. The three Gond principalities of Garha-Mandla, Deogarh and Chanda were nominally subject to the Mogul emperors. In addition to the acquisitions made in the north at the expense of Garha-Mandla, the Moguls, after the annexation of Berar, established governors at Paunar in Wardha and Kherla in Betul. Having thus hemmed in the Gond states, however, they made no efforts to assert any effective sovereignty over them; the Gond rajas for their part were content with practical independence within their own dominions. Under their peaceful rule their territories flourished, until the weakening of the Mogul empire and the rise of the predatory Bundela and Mahratta powers, with the organized forces of which their semi-barbarous feudal levies were unable to cope, brought misfortune upon them.

In the 17th century Chhatarsal, the Bundela chieftain, deprived the Mandla principality of part of the Vindhyan plateau and the Nerbudda valley. In 1733 the peshwa of Poona invaded Bundelkhand; and in 1735 the Mahrattas had established their power in Saugor. In 1742 the peshwa advanced to Mandla and exacted the payment of *chauth* (tributary blackmail), and from this time until 1781, when the successors of Sangram Sah were finally overthrown, Garha-Mandla remained practically a Mahratta dependency. Meanwhile the other independent principalities of Gondwana had in turn succumbed. In 1743 Raghoji Bhonsla of Berar established himself at Nagpur, and by 1751 had conquered the territories of Deogarh, Chanda and Chhattisgarh. In 1741 Ratanpur had surrendered to the Mahratta leader Bhaskar Pant without a blow, and the ancient Rajput dynasty came to an end. In Chanda and Deogarh the Gond rajas were suffered by Raghoji Bhonsla and his successor to carry on a shadowy existence for a while, in order to give them an excuse for avoiding the claims of the peshwa as their overlord; though actually decisions in important matters were sought at Poona. Raghoji died in 1755, and in 1769 his son and successor, Janoji, was forced to acknowledge the peshwa's effective supremacy. The Nagpur state, however, continued to grow. In 1785 Mudhoji (d. 1788), Janoji's successor, bought from the Poona court the cession of Mandla and the upper Nerbudda valley, and between 1796 and 1798 this was followed by the acquisition of Hoshangabad and the larger part of Saugor and Damoh by Raghoji II. (d. 1816). Under this latter raja the Nagpur state covered practically the whole of the present Central Provinces and Berar, as well as Orissa and some of the Chota Nagpur states.

In 1803 Raghoji joined Sindhia against the British; the result was the defeat of the allies at Assaye and Argaon, and the treaty of Deogaon, by which Raghoji had to cede Cuttack, Sambalpur and part of Berar. Up to this time the rule of the Bhonsla rajas, rough warriors of peasant extraction, had been on the whole beneficent; but, soured by his defeat, Raghoji now set to work to recover some of his losses by a ruthless exploitation of the peasantry, and until the effective intervention of the British in 1818 the country was subjected to every kind of oppression. After Raghoji II.'s death in 1816 his imbecile son Parsaji was deposed and murdered by Mudhoji, known as Appa Sahib. In spite of a treaty signed with the British in this year, Mudhoji in 1817 joined the peshwa, but was defeated at Sitabaldi and forced to cede the rest of Berar to the nizam, and parts of Saugor and Damoh, with Mandla, Betul, Seoni and the Nerbudda valley, to the British. After a temporary restoration to the throne he was deposed, and Raghoji III., a grandchild of Raghoji II., was placed on the throne. During his minority, which lasted till 1840, the country was well administered by a British resident. In 1853, on the death of Raghoji III. without heirs, Nagpur lapsed to the British paramount power. Until the formation of the Central Provinces in 1861, Nagpur province, which consists of the present Nagpur division, Chhindwara and Chhatisgarh, was administered by a commissioner under the central government.

The territories in the north ceded in 1817 by the peshwa (parts of Saugor and Damoh) and in 1818 by Appa Sahib were in 1820 formed into the Saugor and Nerbudda Territories under an agent to the governor-general, and in 1835 were included in the newly formed North-West Provinces. In 1842, in consequence of a rising, they were again placed under the jurisdiction of an agent to the governor-general. Restored to the North-West Provinces in 1853, they were finally joined with the Nagpur province to constitute the new Central Provinces in 1861. On the 1st of October 1903 Berar also was placed under the administration of the commissioner of the Central Provinces (for history see BERAR). In 1905 the greater part of Sambalpur district, with the feudatory states of Bamra, Rairakhol, Sonpur, Patna and Kalahandi, were transferred to Bengal, while the feudatory states of Chang Bhakar, Korea, Surguja, Udaipur and Jashpur were transferred from Bengal to the Central Provinces.

During the decade 1891–1901 the Central Provinces suffered from famine more severely than any other part of India. The complete failure of the rain in the autumn of 1896 caused scarcity to develop suddenly into famine, which lasted until the end of 1897. The total number of persons in receipt of relief reached its maximum of nearly 700,000 in May 1897. The expenditure on relief alone was about a million sterling; and the total cost of the famine, including loss of revenue, amounted to nearly twice that amount. During 1897 the death-rate for the whole province rose to sixty-nine per thousand, or double the average, while the birth-rate fell to twenty-seven per thousand. The Central Provinces were stricken by another famine, yet more severe and widespread, caused by the complete failure of the rains in 1899. The maximum of persons relieved for the whole province was 1,971,000 in June 1900. In addition, about 68,000 persons were in receipt of relief in the native states. During the three years 1899–1902 the total expenditure on famine relief amounted to about four millions sterling. Berar also suffered from the famines of 1897 and 1900.

See *The Imperial Gazetteer of India* (Oxford, 1908), x. 99, for list of authorities.

CENTUMVIRI (*centum*, hundred; *vir*, man), an ancient court of civil jurisdiction at Rome, probably instituted by Servius Tullius.[1] Its antiquity is attested by the symbol and formula used in its procedure, the lance (*hasta*) as the sign of true ownership, the oath or wager (*sacramentum*), the ancient formula for recovery of property or assertion of liberty. It is probably alluded to in Livy's account of the Valerio-Horatian laws of 449 B.C. (Livy iii. 55, *Consules . . . fecerunt sanciendo ut qui tribunis plebis, aedilibus, judicibus, decemviris nocuisset, ejus caput Jovi sacrum esset*). If the *judices* here mentioned are the *centumviri*, it is clear that they formed a tribunal which represented the interests of the *plebs*. This is in accordance with Cicero's account (*de Orat.* i. 38. 173) of the sphere of their jurisdiction. He says this was mainly concerned with the property of which account was taken at the census; it was therefore in

[1] Mommsen (*Staatsrecht*, i³. 275, n. 4, ii³. 231, n. 1, 590 f.) believed that the *Centumviri* were instituted about 150 B.C.

their power to make or unmake a citizen. They also decided questions concerning debt. Hence the *plebs* had an interest in securing their decisions against undue influence. They were never regarded as magistrates, but merely as *judices*, and as such would be appointed for a fixed term of service by the magistrate, probably by the *praetor urbanus*. But in Cicero's time they were elected by the *Comitia Tributa*. They then numbered 105. Their original number is uncertain. It was probably increased by Augustus and in Pliny's time had reached 180. The office was probably open in quite early times to both patricians and plebeians. The term is also applied in the inscriptions of Veii to the municipal senates and Cures, which numbered 100 members.

AUTHORITIES.—Tigerström, *De Judicibus apud Romanos* (Berlin, 1826); Greenidge, *Legal Procedure of Cicero's Time*, pp. 40 ff., 58 ff., 182 ff., 264 (Oxford, 1901); Bethmann-Hollweg, *Der römische Civilprozess*, ii. 53 ff. (Bonn, 1864); Pauly-Wissowa, *Realencyclopädie*, iii. 1935 ff. (Wlassak). (A. M. CL.)

CENTURION (Lat. *centurio*), in the ancient Roman army, an officer in command of a *centuria*, originally a body of a hundred infantry, later the sixtieth part of the normal legion. There were therefore in the legion sixty centurions, who, though theoretically subordinate to the six military tribunes, were the actual working officers of the legion. For the most part the centurions were promoted from the ranks: they were arranged in a complicated order of seniority; the senior centurion of the legion (*primus pilus*) was an officer of very high importance. Besides commanding the centuries of the legion, centurions were "seconded" for various kinds of special service, *e.g.* for staff employment, the command of auxiliaries. See further ROMAN ARMY.

CENTURIPE (formerly CENTORBI, anc. Κεντόριπα or *Centuripae*), a town of Sicily, in the province of Catania, situated 2380 ft. above sea-level in a commanding situation, 7 m. N. of the railway station of Catenanuova-Centuripe, which is 28 m. W. from Catania. Pop. (1901) 11,311. Thucydides mentions it as a city of the Sicels. It became an ally of the Athenians at the time of their expedition against Syracuse, and maintained its independence almost uninterruptedly (though it fell under the power of Agathocles) until the First Punic War. Cicero describes it, perhaps with some exaggeration, as being far the largest and richest city of Sicily, and as having a population of 10,000, engaged in the cultivation of an extensive territory. It was granted Latin rights before the rest of Sicily. It appears to have suffered much in the war against Sextus Pompeius, and not to have regained its former prosperity under the empire. Frederick II. entirely destroyed it in 1233, but it was soon rebuilt. Considerable remains of the ancient city walls and of buildings, mostly of the Roman period, still exist, and numerous antiquities, including some fine Hellenistic *terra-cottas*, have been discovered in casual excavations.

See F. Ansaldi, *I Monumenti dell' antica Centuripi* (Catania, 1851); P. Orsi in *Atti del Congresso Internazionale di Scienze Storiche* (Rome, 1904), v. 177. (T. As.)

CENTURY (from Lat. *centuria*, a division of a hundred men), the name for a unit in the Roman army, originally amounting to one hundred men, and for one of the divisions into which the Roman people was separated for voting purposes (see COMITIA). The word is applied to any group of one hundred, and more particularly to a period of a hundred years, and to the successive periods of a hundred years, dating before or after the birth of Christ. The "Century-plant" is a name given to the Agave (*q.v.*), or American aloe, from the supposition that it flowered once only in every hundred years.

CEOS (Gr. Κέως, mod. *Zea* or *Tzia*), an island in the Aegean Sea, belonging to the group of the Cyclades and the eparchy of Syra, 14 m. off the coast of Attica. Its greatest length is about 15 m. and its breadth about 8 m. It rises gradually towards the centre, where it culminates in Mount Elias, 1864 ft. high. Among its natural productions are lemons, citrons, olives, wine and honey; it also exports a considerable quantity of valonia. There were formerly four towns of some importance in the island:—Iulis, about 3 m. from the north-west shore; Coressia, the harbour of Iulis, with a temple of Apollo Smintheus in the neighbourhood; Carthaea, in the south-east, with a temple of Apollo; and Poieëssa, in the south-west. Of these Iulis is represented by the town of Zea, and Carthaea by the village of 'S tais Polais; traces of the other two can still be made out. Iulis was the birthplace of the lyric poets Simonides and Bacchylides, the philosophers Prodicus and Ariston, and the physician Erasistratus; the excellence of its laws was so generally recognized that the title of Cean Laws passed into a proverb. One of them forbade a citizen to protract his life beyond sixty years. The people of Ceos fought on the Greek side at Artemisium and Salamis; they joined the Delian League and also the later Athenian alliance in 377 B.C. They revolted in 363–362, but were reduced again, and the Athenians established a monopoly of the ruddle, or red earth, which was one of the most valuable products of the island. In A.D. 1207 it was divided between four Italian adventurers; after forming part of the duchy of Naxos in 1537, it passed under Turkish rule in 1566. Silver coins of Carthaea and Coressia have been found dating from the 6th century B.C. (see NUMISMATICS: *Greek*, "Cyclades and Sporades"). The present population of the island is about 4000, of which the capital has about 2000.

See Pridik, *De Cei Insulae rebus* (1892). (E. GR.)

CEPHALIC INDEX, the term in use by anthropologists to express the percentage of breadth to length in any skull. The principle employed by Retzius is to take the longer diameter of a skull, the antero-posterior diameter, as 100; if the shorter or transverse diameter falls below 80 the skull may be classed as long (dolichocephalic), while if it exceeds 80 the skull is broad (brachycephalic) (see CRANIOMETRY).

CEPHALONIA (Ital. *Cefalonia*, ancient and modern official Greek *Cephallenia*, Κεφαλληνία), an island belonging to the kingdom of Greece, and the largest of those known as the Ionian Islands, situated on the west side of the mainland, almost directly opposite the Gulf of Corinth. The name was traditionally derived from Cephalus, the Attic hero who was regarded as having colonized the island. The tradition, which is repeated by Aristotle, is probably due solely to the similarity of the names (see J. G. Frazer, *Pausanias*, i. 37, 6 note). Pop. (1907) 71,235. Its extreme length is 31 m., and its breadth varies from about 20 m. in the southern portion to 3 m. or less in the projecting part, which runs parallel with the island of Ithaca, at a distance of about 4 m. across the strait of Guiscardo or Viscaro. The whole island, with its area of 348 English sq. m., is covered with rocky hills of varying elevation, the main range running from north-west to south-east. The ancient Mount Aenos, now Elato, Monte Negro, or the Black Mountain (5315 ft.), frequently retains the snow for several months. It is not only the loftiest part of the sierra, but also the highest land in the whole Ionian group. The name "Black" was given from the darkness of the pine woods which still constitute the most striking feature in Cephalonian scenery, although their extent has been greatly curtailed by fire. The summit is called Megálo Sorós. The island is ill supplied with fresh water; there are few permanent streams except the Rakli, and springs are apt to fail in dry summers. In the western part of the island a gulf runs up from the south, a distance of about 7 m.; on its east side stands the chief town Argostoli, with about 10,000 inhabitants, and on its west side the rival city of Lixouri, with 6000. About a mile west of the town are the curious sea mills; a stream of sea water running down a chasm in the shore is made to turn the wheels. About 5 m. from Argostoli is the castle of St George, a building of Venetian origin, and the strongest fortification in the island. On an eminence east-south-east of Argostoli are the ruins of the ancient Cranii, and Lixouri is close to or upon those of Pale; while on the other side of the island are the remains of Samos on the bay of the same name, of Proni or Pronni, farther south above the vale of Rakli and its blossoming oleanders, and of an unknown city near the village of Scala. The ruins of this city include Roman baths, a brick-built temple, rock-cut tombs, and tessellated pavements; and Cranii, Proni and Samos are remarkable for stretches of Cyclopean and Hellenic walls, partly of the most irregular construction, and partly preserving almost unimpaired the results of the most perfect skill. The inhabitants

of Cephalonia have all along been extremely active; and no slight amount of toil has been expended in the construction of terraces on the steep sides of the hills. Owing to the thinness of the population, however, but a small proportion of the soil is under cultivation, and the quantity of grain grown in the island is comparatively meagre. The staple is the currant, in the production of which the island surpasses Zante. The fruit is smaller than that of the Morea, and has a peculiar flavour; it finds a market mainly in Holland, Belgium and Germany. The grape vine also is grown, and the manufacture of wine is a rising industry. The olive crop is of considerable importance, and the culture of cotton in the low grounds has been successfully attempted. Manufactures are few and undeveloped, but lace from the aloe fibre, Turkey carpets and basket-work are produced by the villagers, and boats are built at both the principal towns. Of all the seven Ionian islands Cephalonia and Zante are most purely Greek, and the inhabitants display great mental activity.

In the Homeric poems Cephalonia is generally supposed to be mentioned under the name of Same, and its inhabitants, among the subjects of Ulysses, to be designated Cephallenes (see, however, under ITHACA). In the Persian War they took but little part; in the Peloponnesian they sided with the Athenians. The town of Pale was vainly besieged by Philip of Macedon in 218 B.C., because it had supported the Aetolian cause. In 189 B.C. all the cities surrendered to the Romans, but Same afterwards revolted, and was only reduced after a siege of four months. The island was presented by Hadrian to Athens, but it appears again at a later date as "free and autonomous." After the division of the Roman empire, it continued attached to Byzantium till 1082, when it was captured by Robert Guiscard, who died, however, before he could repress the revolt of 1085. In 1204 it was assigned to Gaius, prince of Tarentum, who accepted the protection of Venice in 1215; and after 1225 it was held along with Santa Maura and Zante by a succession of five counts of the Tocco family at Naples. Formally made over to Venice in 1350 by the prince of Tarentum, it was afterwards captured by the Turks in 1479; but the Hispanico-Venetian fleet under Benedetto Pessaro and Gonsalvo of Cordova effected their expulsion in 1500, and the island continued in Venetian possession till the fall of the republic. For some time it was administered for the French government, but in 1809 it was taken by the British under Cuthbert, Lord Collingwood. Till 1813 it was in the hands of Major de Bosset, a Swiss in the British service, who displayed an industry and energy in the repression of injustice and development of civilization only outdone by the despotic vigour of Sir Charles Napier, who held the same office for the nine years from 1818 to 1827. During the British protectorate the island made undoubted advances in material prosperity, but was several times the scene of political disturbances. It retained longer than the sister islands traces of feudal influence exerted by the landed proprietors, but has been gradually becoming more democratic. Under the Venetians it was divided into eight districts, and an elaborate system of police was in force; since its annexation to Greece it has been broken up into twenty demarchies, each with its separate jurisdiction and revenues, and the police system has been abolished.

AUTHORITIES.—A special treatise on the antiquities of Cephalonia was written by Petrus Maurocenus. See Holland's *Travels* (1815); Ansted's *Ionian Islands* (1863); Viscount Kirkwall's *Four Years in Ionian Islands* (1864); Wiebel's *Die Insel Kephalonia*; parliamentary papers. Riemann, *Recherches archéologiques sur les Îles Ioniennes* (Paris, 1879–1880); Partsch, *Kephallenia und Ithaka* (1890); see also CORFU; IONIAN ISLANDS. (E. GR.)

CEPHALOPODA, the fifth of the classes into which the zoological phylum Mollusca is divided (see MOLLUSCA). The Cephalopoda are mainly characterized by the concrescence of the foot and head. The foot grows forward on each side so as to surround the mouth, the two upgrowths meeting on the dorsal side of the head—whence the name Cephalopoda. The perioral portion of the foot is drawn out into paired arm-like processes; these may be beset with sheathed tentacles or with suckers or hooks, or both. The epipodia are expanded into a pair of muscular lobes right and left, which are bent round towards one another so that their free margins meet and constitute a short tube—the siphon or funnel. The hind-foot is either very small or absent. A distinctive feature of the Cephalopoda is their bilateral symmetry and the absence of anything like the torsion of the visceral mass seen in the Anisopleurous Gastropoda.

The anus, although it may be a little displaced from the median line, is approximately median and posterior. The mantle-skirt is deeply produced posteriorly, forming a large sub-pallial chamber around the anus. By the side of the anus are placed the single or paired apertures of the nephridia, the genital apertures (paired only in *Nautilus*, in female Octopoda, female *Ommatostrephes* and male *Eledone*), and the paired ctenidia. The visceral hump or dome is elevated, and may be very much elongated in a direction almost at right angles to the primary horizontal axis of the foot.

A shell is frequently, but not invariably, secreted on the visceral hump and mantle-skirt. The shell is usually light in substance or lightened by air-chambers in correlation with the free-swimming habits of the Cephalopoda. It may be external or internal, that is, enclosed in folds of the mantle. Very numerous minute pigmented sacs, capable of expansion and contraction, and known as chromatophores, are usually present in the integument. The sexes are separate.

The ctenidia are well developed as paired gill-plumes, serving as the efficient branchial organs (figs. 4, 24).

The vascular system is very highly developed; the heart consists of a pair of auricles and a ventricle (figs. 12, 28). Branchial hearts are formed on the afferent vessels of the branchiae. It is not known to what extent the minute subdivision of the arteries extends, or whether there is a true capillary system.

The pericardium is extended so as to form a very large sac, passing among the viscera dorsalwards and sometimes containing the ovary or testis—the viscero-pericardial sac—which opens to the exterior either directly or through the renal organs. It has no connexion with the vascular system. The renal organs are always paired sacs, the walls of which invest the branchial afferent vessels (figs. 28, 29). They open each by a pore into the viscero-pericardial sac, except in *Nautilus*. The anal aperture is median and raised on a papilla. Jaws (fig. 6, *e*) and a radula (fig. 9) are well developed. The jaws have the form of powerful beaks, either horny or calcified (*Nautilus*), and are capable of inflicting severe wounds.

Cerebral, pleural and pedal ganglia are present, but the connectives are shortened and the ganglia concentrated and fused in the cephalic region. Large special ganglia (optic, stellate and supra-buccal) are developed. Sense-organs are highly developed; the eye exhibits a very special elaboration of structure in the Dibranchiata, and a remarkable archaic form in the nautilus. Otocysts are present in all. The typical osphradium is not present, except in *Nautilus*, but other organs are present in the cephalic region, to which an olfactory function is ascribed both in *Nautilus* and in the other Cephalopoda.

Hermaphroditism is unknown in Cephalopoda, male and female individuals always being differentiated. The genital aperture and duct is sometimes single, when it is the left; sometimes the typical pair is developed right and left of the anus. The males of nearly all Cephalopoda have been shown to be characterized by a peculiar modification of the arm-like processes or lobes of the fore-foot, connected with the copulative function. The term hectocotylization is applied to this modification (see figs. 6, 24). Elaborate spermatophores or sperm-ropes are formed by all Cephalopoda, and very usually the female possesses special capsule-forming and nidamental glands for providing envelopes to the eggs (fig. 4, *g.n*). The egg is large, and the development is much modified by the presence of an excessive amount of food-material diffused in the protoplasm of the egg-cell. Trochosphere and veliger stages of development are consequently not recognizable.

The Cephalopoda are divisible into two orders, Tetrabranchiata and Dibranchiata, the names of which (due to Sir R. Owen) describe the number of gill-plumes present; but in fact there are several characters, of as great importance as those derived from the gills, by which the members of these two orders are separated from one another.

ORDER 1. TETRABRANCHIATA (= Schizosiphona, Tentaculifera).

Characters.—The inrolled lateral margins of the epipodia are not fused, but form a siphon by apposition (fig. 4). The circumoral lobes of the fore-foot carry numerous retractile tentacles, not suckers (fig. 6). There are two pairs of ctenidial gills (hence Tetrabranchiata), and two pairs of renal organs, consequently four renal apertures (fig. 4). The viscero-pericardial chamber opens by two independent apertures to the exterior, and not into the renal sacs. There are two oviducts (right and left) in the female, and two sperm-ducts in the male, the left duct in both sexes being rudimentary. A large external shell, either coiled or straight, is present, and is not enclosed by reflections of the

mantle-skirt. The shell consists of a series of chambers, the last-formed of which is occupied by the body of the animal, the hinder ones (successively deserted) containing gas (fig. 1). The pair of cephalic eyes are hollow chambers (fig. 14, A), opening to the exterior by minute orifices (pinhole camera), and devoid of refractive structures. A pair of ospbradia are present at the base of the gills (fig. 4, *olf*). Salivary glands are wanting. An ink-sac is *not* present. Branchial hearts are *not* developed on the branchial afferent vessels.

Visceral Hump and Shell.—The visceral hump of *Nautilus* (if we exclude from consideration the fine siphuncular pedicle which it trails, as it were, behind it) is very little, if at all, affected by the coiled form of the shell which it carries, since the animal always slips forward in the shell as it grows, and inhabits a chamber which is practically cylindrical (fig. 1). Were the deserted chambers thrown off instead of being accumulated behind the inhabited chamber as a coiled series of air-chambers, we should have a more correct indication in the shell of the extent and form of the animal's body. Amongst Gastropods it is not very unusual to find the animal slipping forward in its shell as growth advances and leaving an unoccupied chamber in the apex of the shell. This may indeed become shut off from the occupied cavity by a transverse septum, and a series of such septa may be formed, but in no Gastropod are these apical chambers known to contain a gas during the life of the animal in whose shell they occur. A further peculiarity of the nautilus shell and of that of the allied extinct *Ammonites*, *Scaphites*, *Orthoceras*, &c., and of the living *Spirula*, is that the series of deserted air-chambers is traversed by a cord-like pedicle extending from the centro-dorsal area of the visceral hump to the smallest and first-formed chamber of the series. No structure comparable to this siphuncular pedicle is known in any other Mollusca. The siphuncle does not communicate with the coelomic cavity; it is a simple vascular process of the mantle, whose cavity consists of a venous sinus, and whose wall contains a ramification of the pallial artery. There appears to be no doubt that the deserted chambers of the nautilus shell contain in the healthy living animal a gas which serves to lessen the specific gravity of the whole organism. This gas is said to be of the same composition as the atmosphere, with a larger proportion of nitrogen. With regard to its origin we have only conjectures. Each septum shutting off an air-containing chamber is formed during a period of quiescence, probably after the reproductive act, when the visceral mass of the nautilus may be slightly shrunk, and gas is secreted from the dorsal integument so as to fill up the space previously occupied by the animal. A certain stage is reached in the growth of the animal when no new chambers are formed. The whole process of the loosening of the animal in its chamber and of its slipping forward when a new septum is formed, as well as the mode in which the air-chambers may be used as a hydrostatic apparatus, and the relation to this use, if any, of the siphuncular pedicle, is involved in obscurity, and is the subject of much ingenious speculation. In connexion with the secretion of gas by the animal, besides the parallel cases ranging from the protozoon *Arcella* to the physoclistic fishes, from the hydroid *Siphonophora* to the insect-larva *Corethra*, we have the identical phenomenon observed in the closely allied *Sepia* when recently hatched. Here, in the pores of the internal rudimentary shell, gas is observable, which has necessarily been liberated by the tissues which secrete the shell, and not derived from any external source (Huxley).

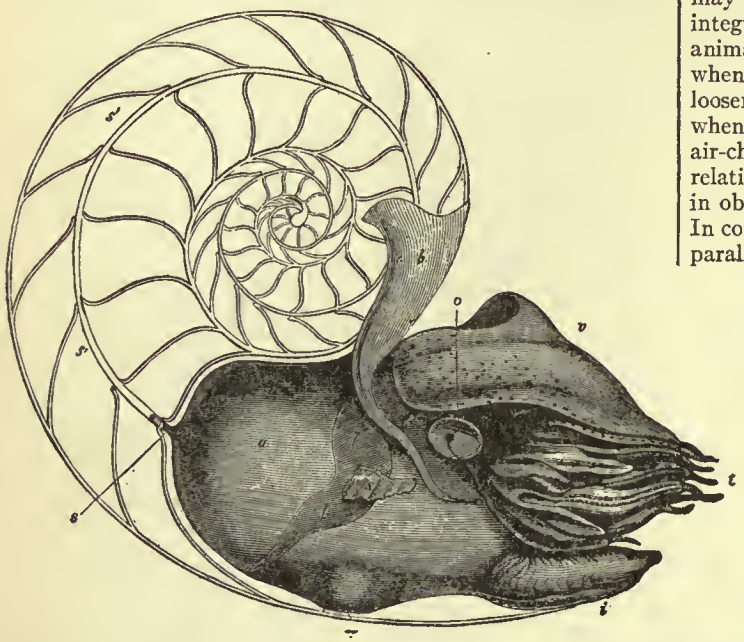


FIG. 1.—Lateral view of the female Pearly Nautilus, contracted by spirit and lying in its shell, the right half of which is cut away (from Gegenbaur, after Owen).

a, Visceral hump.
b, Portion of the free edge of the mantle-skirt reflected on to the shell,—the edge of the mantle-skirt can be traced downwards and forwards around the base of the mid-foot or siphon *i*.
l, *l*, Superficial origin of the retractor muscle of the mid-foot(siphon), more or less firmly attached to the shell, of which a small piece (*s*) is seen between the letters *l*, *l*.
s, (farther back) points to the siphuncular pedicle, which is broken off short and not continued, as in the perfect state, through the whole length of the siphuncle of the shell, also marked *s* and *s'*.
o, points to the right eye.
t, is placed near the extremities of the contracted tentacles of the outer or annular lobe of the fore-foot—the jointed tentacles are seen protruding a little from their long cylindrical sheaths.
v, The dorsal "hood" formed by an enlargement in this region of the annular lobe of the fore-foot (*m* in figs. 2, 3).
V, A swelling of the mantle-skirt, indicating the position on its inner face of the nidamental gland (see fig. 4, *g.n.*).

The coiled shell of *Nautilus*, and of the majority of extinct Tetrabranchiata, is peculiar in its relation to the body of the animal, inasmuch as the curvature of the coil proceeding from the centro-dorsal area is towards the head or forwards, instead of away from the head and backwards as in other discoid coiled shells such as *Planorbis*; the coil is in fact absolutely reversed in the two cases. Such a shell is said to be exogastric. But in some extinct forms, *e.g. Phragmoceras*, *Cyrtoceras*, *Ptenoceras*, the shell is coiled towards the ventral side, when it is termed endogastric. Amongst the extinct allies of the nautilus (Tetrabranchiata) we find shells of a variety of shapes, open coils such as *Scaphites*, leading on to perfectly cylindrical shells with chamber succeeding chamber in a straight line (*Orthoceras*), whence again we may pass to the corkscrew spires formed by the shell of *Turrilites*. In some extinct genera, *e.g. Gomphoceras*, among the Nautiloidea the aperture of the shell is contracted and the edge of the aperture is lobed. In these cases the animal was probably able only to protrude its appendages and not its whole head. The ventral part of the aperture corresponding to the funnel is separated from the dorsal part by a constriction. Hence it is possible to distinguish the ventral and dorsal sides of the shell and to decide whether it was exogastric or endogastric. The direction of the coil of the shell cannot be determined by the position of the siphuncle, which traverses the septa centrally, ventrally or dorsally. Contracted shell apertures occur also in Ammonitoidea, the condition reaching an extreme in *Morphoceras*, where the original aperture is subdivided by the ingrowth of the sides, so that only five small separate apertures remain. Of these the central probably corresponded to the mouth, two lateral to the eyes, and the remaining two to the pedal appendages.

Head, Foot, Mantle-skirt and Sub-pallial Chamber.—In the pearly nautilus the ovoid visceral hump is completely encircled by the free flap of integument known as mantle-skirt (figs. 2, 3, *d*, *e*). In the antero-dorsal region this flap is enlarged so as to be reflected a little over the coil of the shell which rests on it. In the postero-ventral region the flap is deepest, forming an extensive sub-pallial chamber, at the entrance of which *e* is placed in fig. 3. A view of the interior

of the sub-pallial chamber, as seen when the mantle-skirt is retroverted and the observer faces in the direction indicated by the reference line passing from *e* in fig. 3, is given in fig. 4. With this should be compared the similar view of the sub-pallial chamber of the Dibranchiate *Sepia*. It should be noted as a difference between *Nautilus* and the Dibranchiates that in the former the nidamental gland (in the female) lies on that surface of the pallial chamber

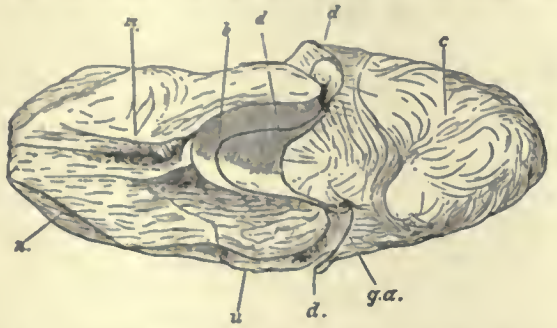


FIG. 2.—Spirit specimen of female Pearly Nautilus, removed from its shell, and seen from the antero-dorsal aspect (drawn from nature by A. G. Bourne).

m, The dorsal "hood" formed by the enlargement of the outer or annular lobe of the fore-foot, and corresponding to the sheaths of two tentacles (*g*, *g* in fig. 6).
n, Tentacular sheaths of lateral portion of the annular lobe.
u, The left eye.
b, The nuchal plate, continuous at its right and left posterior angles with the root of the mid-foot, and corresponding to the nuchal cartilage of Sepia.
c, Visceral hump.
d, The free margin of the mantle-skirt, the middle letter *d* points to that portion of the mantle-skirt which is reflected over a part of the shell as seen in fig. 1, *b*; the cup-like fossa to which *b* and *d* point in the present figure is occupied by the coil of the shell.
g.a. points to the lateral continuation of the nuchal plate *b* to join the root of the mid-foot or siphon.

formed by the dependent mantle-flap (fig. 4, *g.n.*; fig. 1, *V*), whilst in the latter it lies on the surface formed by the body-wall; in fact in the former the base of the fold forming the mantle-skirt comprises in its area a part of what is unreflected visceral hump in the latter.

The apertures of the two pairs of renal sacs, of the viscero-pericardial sac, of the genital ducts, and of the anus, are shown in position on the body-wall of the pallial chamber of *Nautilus* in figs. 4, 5. There are nine apertures in all, one median (the anus)

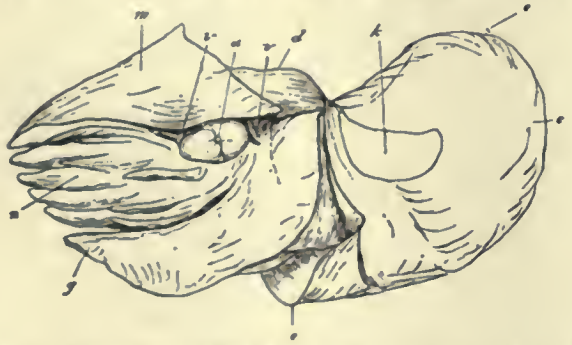


FIG. 3.—Lateral view of the same specimen as that drawn in fig. 2. Letters as in that figure with the following additions—

e points to the concave margin of the mantle-skirt leading into the sub-pallial chamber.
g, The mid-foot or siphon.
k, The superficial origin of its retractor muscles closely applied to the shell and serving to hold the animal in its place.
l, The siphuncular pedicle of the visceral hump broken off short.
v,v, The superior and inferior ophthalmic tentacles.

and four paired. Besides these apertures we notice *two* pairs of gill-plumes which are undoubtedly typical ctenidia, and a short papilla (the osphradium) between each anterior and posterior gill-plume (see figs. 4, 5, and explanation). As compared with this in a Dibranchiate, we find (fig. 25) only four apertures, viz. the median anus with adjacent orifice of the ink-sac, the single pair of renal apertures, and one asymmetrical genital aperture (on the left side) except in female Octopoda and a few others, where the genital ducts and their apertures are paired. No viscero-pericardial pores are present on the surface of the pallial chamber, since in the Dibranchiata the viscero-pericardial sac opens by a pore into each nephridium instead of directly to the surface. A single pair of ctenidia (gill-plumes) is present instead of the two pairs in *Nautilus*. The existence of two pairs of ctenidia and of two pairs of renal sacs in *Nautilus*, placed one behind the other, is highly remarkable. The interest of this arrangement is in relation to the general morphology of the Mollusca, for it is impossible to view this repetition of organs in a linear series as anything else than an instance of metameric segmentation, comparable to the segmentation of the ringed worms and Arthropods. The only other example which we have of this metamerism in the Mollusca is presented by the Chitons. There we find not two pairs of ctenidia merely, but sixteen pairs (in some species more) accompanied by a similar metamerism of the dorsal integument, which carries eight shells. In *Chiton* the renal organs are not affected by the metamerism as they are in *Nautilus*. It is impossible on the present occasion to discuss in the way which their importance demands the significance of these two instances among Mollusca of incomplete or partial metamerism; but it would be

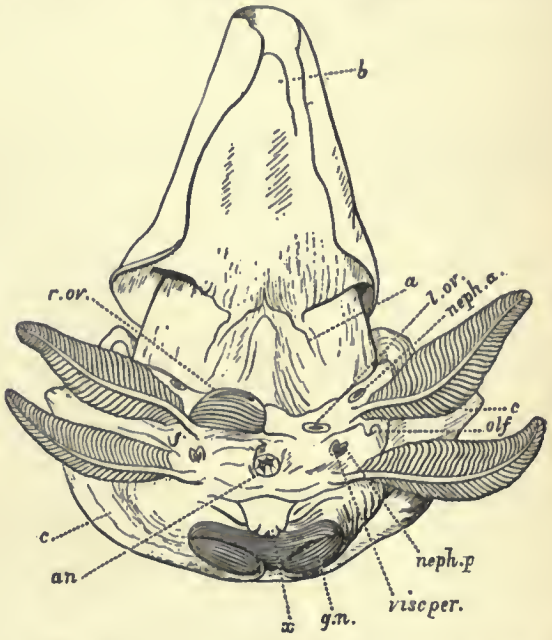


FIG. 4.—View of the postero-ventral surface of a female Pearly Nautilus, the mantle-skirt (*c*) being completely reflected so as to show the inner wall of the sub-pallial chamber (drawn from nature by A. G. Bourne).

a, Muscular band passing from the mid-foot to the integument.
b, The valve on the surface of the funnel, partially concealed by the inrolled lateral margin of the latter.
c, The mantle-skirt retroverted.
an, The median anus.
x, Post-anal papilla of unknown significance.
g.n., Nidamental gland.
r.ov, Aperture of the right oviduct.
l.ov, Aperture of the rudimentary left oviduct (pyriform sac of Owen).
neph.a, Aperture of the left anterior renal sac.
neph.p, Aperture of the left posterior renal sac.
viscper, Left aperture of the viscero-pericardial sac.
olf, The left osphradium placed near the base of the anterior gill-plume.

The four gill-plumes (ctenidia) are not lettered.

wrong to pass them by without insisting upon the great importance which the occurrence of these isolated instances of metameric segmentation in a group of otherwise unsegmented organisms possesses, and the light which they may be made to throw upon the nature of metameric segmentation in general.

The foot and head of *Nautilus* are in the adult inextricably grown together, the eye being the only part belonging primarily to the head which projects from the all-embracing foot. The fore-foot or front portion of the foot has the form of a number of lobes carrying tentacles and completely surrounding the mouth (figs. 2, 3). The epipodia incline towards each other posteriorly so as to form an incomplete siphon (fig. 4), a condition which is completed and rendered permanent in the tubular funnel of Dibranchiata. The epipodial nature of the funnel is well seen in young embryos, in which this organ is situated laterally and posteriorly between the mantle and the foot.

The lobes of the fore-foot of *Nautilus* and of the other Cephalopoda require further description. It has been doubted whether these lobes were rightly referred (by T. H. Huxley) to the fore-foot, and it has been maintained by some zoologists (H. Grenacher, H. von

Jhering) that they are truly processes of the head. It appears to be impossible to doubt that the lobes in question are the fore-portion of the foot, when their development is examined (see fig. 35), further, when the fact is considered that they are innervated by the pedal ganglion. The fore-foot of *Nautilus* completely surrounds the buccal cone (fig. 6, *e*), so as to present an appearance with its expanded tentacles similar to that of the disk of a sea-anemone (*Actinia*). A. G. Bourne, of University College, prepared from actual specimens the drawings of this part in the male and female *Nautilus* reproduced in fig. 6, and restored the parts to their natural form when expanded. The drawings show very strikingly the difference between male and female. In the females (lower figure), we observe in the centre of the disk the buccal cone *e* carrying the beak-like pair of jaws which project from the finely papillate buccal membrane. Three tentaculiferous lobes of the fore-foot are in immediate contact with this buccal cone; they are the right and left (*c*, *c*) inner lobes, and the inferior inner lobe (*d*) — called inferior because it really lies ventralwards of the mouth. This inner inferior lobe is clearly a double one, representing a right and left inner inferior lobe fused into one. A lamellated organ on its surface, known as Owen's organ, probably olfactory in function (*n*), marks the separation of the constituent halves of this double lobe. Each half carries a group of fourteen tentacles. The right and the left inner lobes (*c*, *c*) each carry twelve tentacles. External to these three lobes the muscular substance of the mouth-embracing foot is raised into a wide ring, which becomes especially thick and large in the dorsal region where it is notably modified in form, offering a concavity into which the coil of the shell is received, and furnishing a protective roof to the retracted mass of tentacles. This part of the external annular lobe of the fore-foot is called the "hood" (figs. 2, 3, *m*). The median antero-posterior line traversing this hood exactly corresponds to the line of concrescence of the two halves of the fore-foot, which primitively grew forward one on each side of the head, and finally fused together along this line in front of the mouth. The tentacles carried by the great annular lobe are nineteen on each side, thirty-eight in all. They are called "digital," and are somewhat larger than the "labial" tentacles carried on the three inner lobes. The dorsalmost pair of tentacles (marked *g* in fig. 6) are the only ones which actually belong to that part of the disk which forms the great dorsal hood *m*. The hood is, in fact, to a large extent formed by the enlarged sheaths of these two tentacles. All the tentacles of the circumoral disk are set in remarkable tubular sheaths, into which they can be drawn. The sheaths of some of those belonging to the external or annular lobe are seen in fig. 3, marked *n*. The sheaths are muscular as well as the tentacles, and are simply tubes from the base of which the solid tentacle grows. The functional significance of this sheathing arrangement is as obscure as its morphological origin. With reference to the latter, it appears highly probable that the tubular sheath represents the cup of a sucker such as is found on the fore-foot of the Dibranchiata. In any case, it seems to the writer impossible to doubt that each tentacle, and its sheath on a lobe of the circumoral disk of Nautilus, corresponds to a sucker on such a lobe of a Dibranchiate. W. Keferstein follows Sir R. Owen in strongly opposing this identification, and in regarding such tentacle as the equivalent of a whole lobe or arm of a Decapod or Octopod Dibranch. The details of these structures, especially in the facts concerning the hectocotylus and spadix, afford the most conclusive reasons for dissenting from Owen's view. On the ventral side an extensive part of the internal surface of the muscular ring is laminated, forming the so-called "organ of Valenciennes," peculiar to the female and serving for the attachment of the spermatophores. We have so far enumerated in the female nautilus ninety tentacles. Four more remain which have a very peculiar position, and almost lead to the suggestion that the eye itself is a modified tentacle. These remaining tentacles

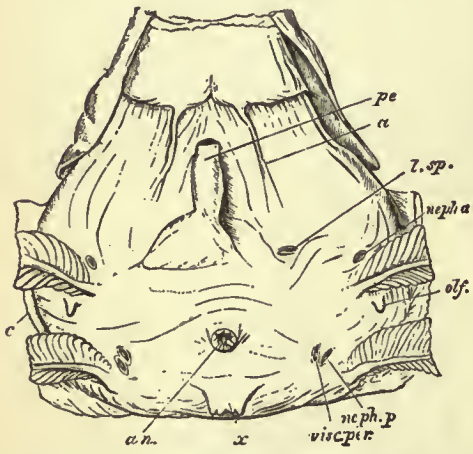


FIG. 5.—View of the postero-ventral surface of a male Pearly Nautilus, the mantle-skirt (*c*) being completely reflected so as to show the inner wall of the sub-pallial chamber, and the four ctenidia and the foot cut short (drawn from nature by A. G. Bourne). *pe*, Penis, being the enlarged termination of the right spermatic duct; *l.sp*, aperture of the rudimentary left spermatic duct (pyriform sac of Owen). Other letters as in fig. 4.

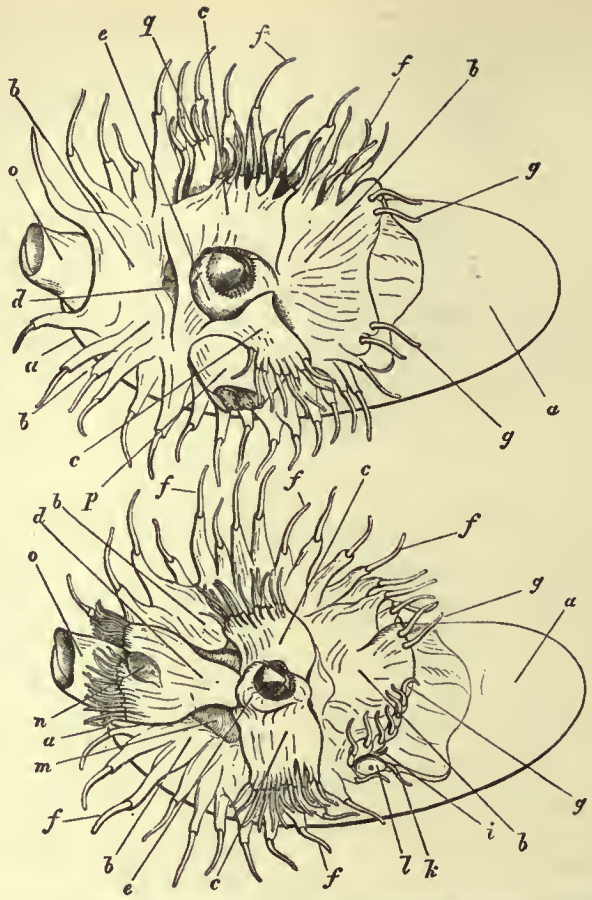


FIG. 6.—Male (upper) and female (lower) specimens of *Nautilus pompilius* as seen in the expanded condition, the observer looking down on to the buccal cone *e*; one-third the natural size linear. The drawings have been made from actual specimens by A. G. Bourne, B.Sc., University College, London.

a, The shell.

b, The *outer* ring-like expansion (annular lobe) of the circumoral muscular mass of the fore-foot, carrying nineteen tentacles on each side—posteriorly this is enlarged to form the "hood" (marked *v* in fig. 1 and *m* in figs. 2 and 3), giving off the pair of tentacles marked *g* in the present figure.

c, The right and left inner lobes of the fore-foot, each carrying twelve tentacles in the female, in the male subdivided into *p*, the "spadix" or hectocotylus on the left side, and *q*, the "anti-spadix," a group of four tentacles on the right side—it is thus seen that the subdivided right and left inner lobes of the male correspond to the undivided right and left inner lobes of the female.

d, The inner inferior lobe of the fore-foot, a bilateral structure in the female carrying two groups, each of fourteen tentacles, separated from one another by a lamellated organ *n*, supposed to be olfactory in function—in the male the inner inferior lobe of the fore-foot is very much reduced, and has the form of a paired group of lamellae (*d* in the upper figure).

e, The buccal cone, rising from the centre of the three inner lobes, and fringing the protruded calcareous beaks or jaws with a series of minute papillae.

f, The tentacles of the outer circumoral lobe or annular lobe of the fore-foot projecting from their sheaths.

g, The two most posterior tentacles of this series belonging to that part of the annular lobe which forms the hood (*m* in figs. 2 and 3).

i, Superior ophthalmic tentacle.

k, Inferior ophthalmic tentacle.

l, Eye.

m, Paired laminated organ on each side of the base of the inner inferior lobe (*d*) of the female.

n, Olfactory lamellae upon the inner inferior lobe (in the female).

o, The siphon (mid-foot).

p, The spadix (in the male), the hectocotylized portion of the left inner lobe of the fore-foot representing four modified tentacles, eight being left unmodified.

q, The anti-spadix (in the male), being four of the twelve tentacles of the right inner lobe of the fore-foot isolated from the remaining eight, and representing on the right side the differentiated spadix of the left side. The four tentacles of the anti-spadix are set, three on one base and one on a separate base.

are placed one above (before) and one below (behind) each eye, and bring up the total to ninety-four (fig. 3 *v*, *v*).

In the adult male nautilus we find the following important differences in the tentaculiferous disk as compared with the female (see upper drawing in fig. 6). The inner inferior lobe is rudimentary, and carries no tentacles. It is represented by three groups of lamellae (*d*), which are not fully exposed in the drawing. The right and left inner lobes are subdivided each into two portions. The right shows a larger portion carrying eight tentacles, and smaller detached groups (*q*) of four tentacles, of which three have their sheaths united whilst one stands alone. These four tentacles may be called the "anti-spadix." The left inner lobe shows a similar larger portion carrying eight tentacles, and a curious conical body behind it corresponding to the anti-spadix. This is the "spadix." It carries no tentacles, but is terminated by imbricated lamellae. These lamellae appear to represent the four tentacles of the anti-spadix of the right internal lobe, and are generally regarded as corresponding to that modification of the sucker-bearing arms of male Dibranchiate Siphonopods to which the name "hectocotylus" is applied. The spadix is in fact the hectocotylized portion of the fore-foot of the male nautilus. The hectocotylized arm or lobe of male Dibranchiata is connected with the process of copulation, and in the male nautilus the spadix has probably a similar significance, though it is not possible to suggest how it acts in this relation. It is important to observe that the modification of the fore-foot in the male as compared with the female nautilus is not confined to the existence of the spadix. The anti-spadix and the reduction of the inner inferior lobe are also male peculiarities. The external annular lobe in the male does not differ from that of the female; it carries nineteen tentacles on each side. The four ophthalmic tentacles are also present. Thus in the male nautilus we find altogether sixty-two tentacles, the thirty-two additional tentacles of the female being represented by lamelliform structures.

Musculature, Fins and Cartilaginous Skeleton.—Without entering into a detailed account of the musculature of *Nautilus*, we may point out that the great muscular masses of the fore-foot and of the mid-foot (siphon) are ultimately traceable to a large transverse mass of muscular tissue, the ends of which are visible through the integument on the right and left surfaces of the body dorsal of the free flap of the mantle-skirt (fig. 1, *l*, *l*, and fig. 3, *k*). These muscular areae have a certain adhesion to the shell, and serve both to hold the animal in its shell and as the fixed supports for the various movements of the tentaculiferous lobes and the siphon. They are to be identified with the ring-like area of adhesion by which the foot-muscle of the limpet is attached to the shell of that animal. In the Dibranchs a similar origin of the muscular masses of the fore-foot and mid-foot from the sides of the shell—modified, as this is, in position and relations—can be traced.

In *Nautilus* there are no fin-like expansions of the integument, whereas such occur in the Decapod Dibranchs along the sides of the visceral hump (figs. 15, 16). As an exception among Octopoda lateral fins occur in *Pinnoctopus* (fig. 38, A), and in *Cirrhoteuthis* (fig. 38, D).

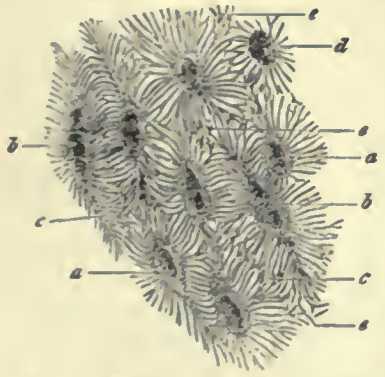


FIG. 7.—Minute structure of the cartilage of *Loligo* (from Gegenbaur, after Fürbringer).

a, Simple cells.
b, Dividing cells.
c, Canaliculi.
d, An empty cartilage capsule with its pores.
e, Canaliculi in section.

In *Nautilus* there is a curious plate-like expansion of integument in the mid-dorsal region just behind the hood, lying between that structure and the portion of mantle-skirt which is reflected over the shell. This is shown in fig. 2, *b*. If we trace out the margin of this plate we find that it becomes continuous on each side with the sides of the funnel. In *Sepia* and other Decapods (not in Octopods) a closely similar plate exists in an exactly corresponding position (see *b* in figs. 10, 26). In *Sepia* a cartilaginous development occurs here immediately below the integument forming the so-called "nuchal plate," drawn in fig. 8, D. The morphological significance of this nuchal lamella, as seen both in *Nautilus* and in *Sepia*, is not obvious. Cartilage having the structure shown in fig. 7 occurs in various regions of the body of Cephalopoda. In all Glossophorous Mollusca the lingual apparatus is supported by internal skeletal pieces, having the character of cartilage; but in the Cephalopoda such cartilage has a wider range.

In *Nautilus* a large H-shaped piece of cartilage is found, forming the axis of the funnel (fig. 8, A, B). Its hinder part extends up into the head and supports the peri-oesophageal nerve-mass (*a*), whilst its two anterior rami extend into the tongue-like siphon. In *Sepia*, and Dibranchs generally, the cartilage takes a different form, as shown in fig. 8, C. The processes of this cartilage cannot be identified in any way with those of the capito-pedal cartilage of *Nautilus*. The lower larger portion of this cartilage in *Sepia* is called the cephalic cartilage, and forms a complete ring round the oesophagus; it completely invests also the ganglionic nerve-collar, so that all the nerves from the latter have to pass through foramina in the cartilage. The outer angles of this cartilage spread out on each side so as to form a cup-like receptacle for the eyes. The two processes springing right and left from this large cartilage in the median line (fig. 8, C) are the "pre-orbital cartilages"; in front of these, again, there is seen a piece like an inverted T, which forms a support to the base of the "arms" of the fore-foot, and is the "basi-brachial" cartilage. The Decapod Dibranchs have, further, the "nuchal cartilage" already mentioned, and in *Sepia*, a thin plate-like "sub-ostracal" or (so-called) dorsal cartilage, the anterior end of which rests on and fits into the concave nuchal cartilage. In Octopoda there is no nuchal cartilage, but two band-like "dorsal cartilages." In Decapods there are also two cartilaginous sockets on the sides of the funnel —"siphon-hinge cartilages"—into which fleshy knobs of the mantle-

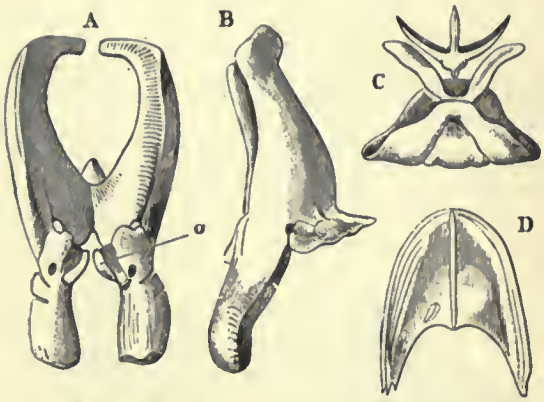


FIG. 8.—Cartilaginous skeleton of Cephalopoda (after Keferstein.)

A, Capito-pedal cartilage of *Nautilus pompilius*.
a points to the ridge which supports the pedal portion of the nerve-centre.
B, Lateral view of the same—the large anterior processes are sunk in the muscular substance of the siphon.
C, Cephalic cartilages of *Sepia officinalis*.
D, Nuchal cartilage of *Sepia officinalis*.

skirt are loosely fitted. In *Sepia*, along the whole base-line of each lateral fin of the mantle (fig. 15), is a "basi-pterygial cartilage." It is worthy of remark that we have, thus developed, in Dibranch Cephalopods a more complete internal cartilaginous skeleton than is to be found in some of the lower vertebrates. There are other instances of cartilaginous endo-skeleton in groups other than the Vertebrata. Thus in some capito-branchiate Chaetopods cartilage forms a skeletal support for the gill-plumes, whilst in the Arachnids (*Mygale*, *Scorpio*) and in *Limulus* a large internal cartilaginous plate —the ento-sternite—is developed as a support for a large series of muscles.

Alimentary Tract.—The buccal cone of *Nautilus* is terminated by a villous margin (buccal membrane), surrounding the pair of beak-like jaws, of which the ventral projects over the dorsal. These are very strong and dense in *Nautilus*, being calcified. Fossilized beaks of Tetrabranchiata are known under the name of rhyncholites. In Dibranchs the beaks are horny, but similar in shape to those of *Nautilus*. They resemble in general those of a parrot, the lower beak being the larger and overlapping the upper or dorsal beak. The lingual ribbon and odontophoral apparatus have the structure which is typical for Glossophorous Mollusca. In fig. 9, A is represented a single row of teeth from the lingual ribbon of *Nautilus*, and in fig. 9, B, C, of other Cephalopoda.

In *Nautilus* a long and wide crop or dilated oesophagus (fig. 10, *cr*) passes from the muscular buccal mass, and at the apex of the visceral hump passes into a highly muscular stomach, resembling the gizzard of a bird (fig 10, *gizz*). A nearly straight intestine passes from the muscular stomach to the anus, near which it develops a small caecum. In other Cephalopods the oesophagus is usually narrower and the muscular stomach more capacious, whilst a very important feature in the alimentary tract is formed by the caecum. In all but *Nautilus* the caecum lies near the stomach, and may be very capacious—much larger than the stomach in *Loligo vulgaris*—or elongated into a spiral coil. The simple U-shaped flexure of the alimentary tract, as seen in fig. 10, is the only important one which it exhibits in the Cephalopoda. The acini of the large liver of *Nautilus* are compacted into a solid reddish-brown mass by a firm

membrane, as also is the case in the Dibranchiata. The liver has four paired lobes in *Nautilus*, which open by two bile-ducts into the

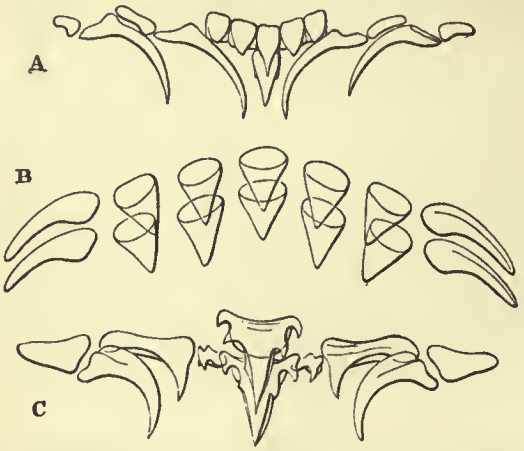


FIG. 9.—Lingual dentition of Cephalopoda. A, A single row of lingual teeth of *Nautilus pompilius* (after Keferstein). B, Two rows of lingual teeth of *Sepia officinalis* (after Troschel). C, Lingual teeth of *Eledone cirrhosa* (after Loven).

alimentary canal at the commencement of the intestine. The bile-ducts unite before entering the intestine. In Dibranchiata the two large lobes of the liver are placed antero-dorsally (beneath the shell

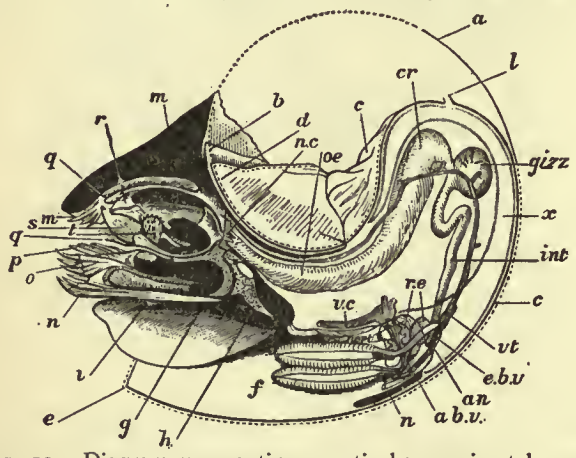


FIG. 10.—Diagram representing a vertical approximately median antero-posterior section of *Nautilus pompilius* (from a drawing by A. G. Bourne). The parts which are quite black are the cut muscular surfaces of the foot and buccal mass.

a, The shell.
b, The nuchal plate, identical with the nuchal cartilage of *Sepia* (see fig. 2, *b*).
c, The integument covering the visceral hump.
d, The mantle flap or skirt in the dorsal region where it rests against the coil of the shell.
e, The inferior margin of the mantle-skirt resting on the lip of the shell represented by the dotted line.
f, The pallial chamber with two of the four gills.
g, The vertically cut median portion of the mid-foot (siphon).
h, The capito-pedal cartilage (see fig. 8).
i, The valve of the siphon.
l, The siphuncular pedicle (cut short).
m, The hood or dorsal enlargement of the annular lobe of the fore-foot.
n, Tentacles of the annular lobe.
p, Tentacles of the inner inferior lobe.
q, Buccal membrane.
r, Upper jaw or beak.
s, Lower jaw or beak.
t, Lingual ribbon.
x, The viscero-pericardial sac.
n.c, Nerve-collar.
oe, Oesophagus.
cr, Crop.
gizz, Gizzard.
int, Intestine.
an, Anus.
nept, Aperture of a nephridial sac.
r.e, Renal glandular masses on the walls of the afferent branchial veins (see fig. 11).
a.b.v, Afferent branchial vessel.
e.b.v, Efferent branchial vessel.
vt, Ventricle of the heart.

in Decapoda), and the bile-ducts open into the caecum. Upon the bile-ducts in Dibranchiata are developed yellowish glandular diverticula, which are known as "pancreas," though neither physiologically nor morphologically is there any ground for considering either the so-called liver or the so-called pancreas as strictly equivalent to the glands so denominated in the Vertebrata. In *Nautilus* the equivalents of the pancreatic diverticula of the Dibranchs can be traced upon the relatively shorter bile-ducts.

Posterior salivary glands are not developed in *Nautilus*, but on each side in the wall of the buccal mass is a gland corresponding to the anterior salivary gland of the Dibranchiata. No ink-sac is present in *Nautilus*.

Coelom, Blood-vascular System and Excretory Organs.—*Nautilus* and the other Cephalopoda conform to the general Molluscan characters in regard to these organs. Whilst the general visceral cavity forms a lacunar blood-system or series of narrow spaces, connected with the trunks of a well-developed vascular system, that part of the original coelom surrounding the heart and known as the Molluscan pericardium is shut off from this general blood-lymph system, and communicates, directly in *Nautilus*, in the rest through the renal sacs, with the exterior. In the Cephalopoda this specialized pericardial cavity is particularly large, and has been recognized as distinct from the blood-carrying spaces, even by anatomists who have not considered the pericardial space of other Mollusca to be thus isolated. The enlarged pericardium, which may even take the form of a pair of sacs, has been variously named, but is best known as the viscero-pericardial sac or chamber. In *Nautilus* this sac

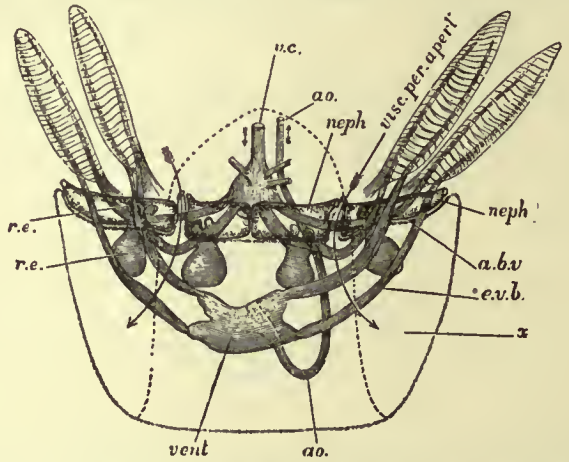


FIG. 11.—Diagram to show the relations of the four nephridial sacs, the viscero-pericardial sac, and the heart and large vessels in *Nautilus* (drawn by A. G. Bourne).

neph, *neph*, on the right side point to the two nephridia of that side (the two of the opposite side are not lettered)—each is seen to have an independent aperture.
x is the viscero-pericardial sac, the dotted line indicating its backward extension.
visc.per.apert, marks an arrow introduced into the right aperture of the viscero-pericardial sac.
r.e, *r.e*. point to the glandular enlarged walls of the afferent branchial vessels—two small glandular bodies of the kind are seen to project into each nephridial sac, whilst a larger body of the same kind depends from each of the four branchial afferent vessels into the viscero-pericardial sac.
v.c, Vena-cava.
vent, Ventricle of the heart.
ao, Cephalic aorta (the small abdominal aorta not drawn).
a.b.v, Branchial vessel.
e.v.b, Efferent branchial vessel.

occupies the whole of the postero-dorsal surface and a part of the antero-dorsal (see fig. 10, *x*), investing the genital and other viscera which lie below it, and having the ventricle of the heart suspended in it. Certain membranes forming incomplete septa, and a curious muscular band—the pallio-cardiac band—traverse the sac. The four branchial afferent veins, which in traversing the walls of the four renal sacs give off, as it were, glandular diverticula into those sacs, also give off at the same points four much larger glandular masses, which hang freely into the viscero-pericardial chamber (fig. 11, *r.e*). In *Nautilus* the viscero-pericardial sac opens to the exterior directly by a pair of apertures, one placed close to the right and one close to the left posterior renal aperture (fig. 5, *visc. per*). This direct opening of the pericardial sac to the exterior is an exception to what occurs in all other Mollusca. In all other Molluscs the pericardial sac opens into the renal organs, and through them or the one renal organ to the exterior. In *Nautilus* there is no opening from the viscero-pericardial sac into the renal sacs. Therefore the external pore of the viscero-pericardial sac may possibly be regarded as a shifting of the reno-pericardial orifice from the actual wall of the renal sac to a position alongside of its orifice. Parallel cases of such shifting are seen in the varying position of the orifice of the ink-bag in Dibranchiata, and in the orifice of the genital ducts of Mollusca, which in some few cases (*e.g. Spondylus*) open into the renal organs, whilst in other cases they open close by the side of the renal organs on the surface of the body. The viscero-pericardial sac of the Dibranchs is very large also, and extends into the dorsal region. It varies in

shape—that is to say, in the extensions of its area right and left between the various viscera—in different genera, but in the Decapods is largest. In an extension of this chamber is placed the ovary of *Sepia*, whilst the ventricle of the heart and the branchial hearts and their appendages also lie in it. It is probable that water is drawn into this chamber through the renal sacs, since sand and other foreign matters are found in it. In all it opens into the pair of renal sacs by an orifice on the wall of each, not far from the external orifice (fig. 29, *y*, *y'*). There does not seem any room for doubting that each orifice corresponds to the reno-pericardial orifice which we have seen in the Gastropoda, and shall find again in the Lamellibranchia.

The circulatory organs, blood-vessels and blood of *Nautilus* do not differ greatly from those of Gastropoda. The ventricle of the heart is a four-cornered body, receiving a dilated branchial efferent vessel (auricle) at each corner (fig. 11). It gives off a cephalic aorta anteriorly, and a smaller abdominal aorta posteriorly. The diagram, fig. 12, serves to show how this simple form of heart is related to the dorsal vessel of a worm or of an Arthropod, and how by a simple flexure of the ventricle (D) and a subsequent suppression of one auricle, following on the suppression of one branchia, one may obtain the form of heart characteristic of the anisopleurous Gastropoda (excepting the Aspidobranchia). The flexed condition of the heart is seen in *Octopus*, and is to some extent approached by *Nautilus*, the median vessels not presenting that perfect parallelism which is shown in the figure (B). The most remarkable feature presented by the heart of *Nautilus* is the possession of four instead of two auricles, a feature which is simply related to the metamerism of the branchiae. By the left side of the heart of *Nautilus*, attached

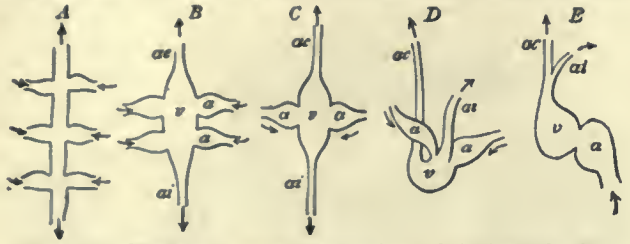


FIG. 12.—Diagram to show the relations of the heart in the Mollusca. (From Gegenbaur.)

A, Part of the dorsal vascular trunk and transverse trunks of a worm. [*Nautilus*.
B, Ventricle and auricles of
C, Of a Lamellibranch, of *Chiton*, or of *Loligo*.
D, Of *Octopus*.
E, Of a Gastropod.
a, Auricle.
v, Ventricle.
ac, Arteria = cephalica = (aorta).
ai, Arteria abdominalis. The arrows show the direction of the blood-current.

to it by a membrane, and hanging loosely in the viscero-pericardial chamber, is the pyriform sac of Owen. This has been shown to be the rudimentary left oviduct or sperm-duct, as the case may be (E. R. Lankester and A. G. Bourne), the functional right ovi-sac and its duct being attached by a membrane to the opposite side of the heart.

The cephalic and abdominal aortae of *Nautilus* appear, after running to the anterior and posterior extremes of the animal respectively, to open into sinus-like spaces surrounding the viscera, muscular masses, &c. These spaces are not large, but confined and shallow. Capillaries are stated to occur in the integument. In the Dibranchs the arterial system is very much more complete; it appears in some cases to end in irregular lacunae or sinuses, in other cases in true capillaries which lead on into veins. An investigation of these capillaries in the light of modern histological knowledge is much needed. From the sinuses and capillaries the veins take origin, collecting into a large median trunk (the vena cava), which in the Dibranchs as well as in *Nautilus* has a ventral (postero-ventral) position, and runs parallel to the long axis of the animal. In *Nautilus* this vena cava gives off at the level of the gills four branchial afferent veins (fig. 11, *v.c.*), which pass into the four gills without dilating. In the Dibranchs at a similar position the vena cava gives off a right and a left branchial afferent vein, each of which, traversing the wall of the corresponding renal sac and receiving additional factors, dilates at the base of the corresponding branchial plume, forming there a pulsating sac—the branchial heart. Attached to each branchial heart is a curious glandular body, which may possibly be related to the larger masses (fig. 11, *r.c*) which depend into the viscero-pericardial cavity from the branchial afferent veins of *Nautilus*. From the dilated branchial heart the branchial afferent vessel proceeds, running up the adpallial face of the gill-plume. From each gill-plume the blood passes by the branchial efferent vessels to the heart, the two auricles being formed by the dilatation of these vessels.

The blood contains the usual amoeboid corpuscles, and a diffused colouring matter—the haemocyanin of Fredericque—which has been found also in the blood of *Helix*, and in that of the Arthropods *Homarus* and *Limulus*. It is colourless in the oxidized, blue in the deoxidized state, and contains copper as a chemical constituent.

The renal sacs and renal glandular tissue are closely connected with the branchial advehent vessels in *Nautilus* and in the other Cephalopoda. The arrangement is such as to render the typical relations and form of a renal tube difficult to trace. In accordance with the metamerism of *Nautilus* already noticed, there are two pairs of renal organs. Each assumes the form of a sac opening by a pore to the exterior. As is usual in renal tubes a glandular and a non-glandular portion are distinguished in each sac; these portions, however, are not successive parts of a tube, as happens in other cases, but they are localized areae of the wall of the sac. The glandular renal tissue is, in fact, confined to a tract extending along that part of the sac's wall which immediately invests the great branchial afferent vein. The vein in this region gives off directly from its wall a complete herbage of little venules, which branch and anastomose with one another, and are clothed by the glandular epithelium of the renal sac. The secretion is accumulated in the sac and passed by its aperture to the exterior. Probably the nitrogenous excretory product is very rapidly discharged; in *Nautilus* a pink-coloured powder is found accumulated in the renal sacs, consisting of calcium phosphate. The presence of this phosphatic calculus by no means proves that such was the sole excretion of the renal glandular tissue. In *Nautilus* a glandular growth like that rising from the wall of the branchial vessel into its corresponding renal sac, but larger in size, depends from each branchial afferent vessel into the viscero-pericardial sac and forms the pericardial gland—probably identical with the "appendage" of the branchial hearts of Dibranchs.

The chief difference, other than that of number, between the renal organs of the Dibranchs and those of *Nautilus*, is the absence of the accessory growths depending into the viscero-pericardial space just mentioned, and, of more importance, the presence in the former of a pore leading from the renal sac into the viscero-pericardial sac (*y*, *y'* in fig. 29). The external orifices of the renal organs are also more prominent in Dibranchs than in *Nautilus*, being raised on papillae (*np* in fig. 29; *r* in fig. 25). In *Sepia* the two renal sacs give off each a diverticulum dorsalwards, which unites with its fellow and forms a great median renal chamber, lying between the ventral portions of the renal organs and the viscero-pericardial chamber. In *Loligo* the fusion of the two renal organs to form one sac is still more obvious, since the ventral portions are united. In *Octopus* the renal sacs are quite separate.

Gonads and Genital Ducts.—In *Nautilus* it has been shown by E. Ray Lankester and A. G. Bourne that the genital ducts of both sexes are paired right and left, the left duct being rudimentary and forming the "pyriform appendage," described by Sir R. Owen as adhering by membranous attachment to the ventricle of the heart, and shown by W. Keferstein to communicate by a pore with the exterior. The ovary (female gonad) or the testis (male gonad) lies in *Nautilus*, as in the Dibranchs, in a distinct cavity walled off from the other viscera, near the centro-dorsal region. This chamber is formed by the coelomic or peritoneal wall; the space enclosed is originally part of the coelom, and in *Sepia* and *Loligo* is, in the adult, part of the viscero-pericardial chamber. In *Octopus* it is this genital chamber which communicates by a right and a left canal with the renal sac, and is the only representative of pericardium. The ovary or testis is itself a growth from the inner wall of this chamber, which it only partly fills. In *Nautilus* the right genital duct, which is functional, is a simple continuation to the pore on the postero-dorsal surface of the membranous walls of the capsule in which lies the ovary or the testis, as the case may be. The gonad itself appears to represent a single median or bilateral organ.

The ovary forms a large projection into the genital coelom, and the coelomic epithelium is deeply invaginated into the mass of the gonad, so as to constitute an ovarian cavity communicating with the coelom by a narrow aperture. The ova originate in the epithelium, migrate below it and then, as they enlarge, project into the ovarian cavity, pushing the epithelium before them. Each ovum is surrounded by a follicular epithelium which is nourished by numerous blood-vessels, and which penetrates into the surface of the ovum in numerous folds. When mature, the ovum is contained in a membrane or chorion with a micropyle, and escapes by dehiscence of the follicle into the genital coelom and duct. In its passage to the exterior the ovum passes a glandular structure on the wall of the genital capsule, which probably secretes the gelatinous substance enclosing the eggs. In addition to this internal gland there are other accessory glands, which are not related to the genital duct or sac but are differentiations of the wall of the pallial cavity, and occur on the inner wall of the pallium in *Nautilus*, on the somatic wall in Dibranchiata. In *Nautilus* they form a continuous mass. These produce the external envelopes of the eggs.

In the male the testis is a specialized portion of the wall of the genital coelom, and has a structure comparable to that of the ovary. The spermatozoa pass through an orifice from the cavity of the testis to the genital capsule, and thence to the spermiduct. The spermiduct is provided with a glandular pouch, and opens into a terminal reservoir known as Needham's sac or the spermatophore sac. The function of this pouch is to form the spermatophore, which is an elastic tube formed of structureless secretion and invaginated into itself. The deeper part contains the spermatozoa, the external part is called the connective, and is usually much contracted and spirally

coiled. When the spermatophore is expelled into the water the connective is extended and evaginated, and the sac containing the sperms bursts. In *Nautilus* the spermatophore when uncoiled is a little over 30 mm. in length. These spermatophores are somewhat similar to those formed in certain pulmonate Gastropods.

The eggs are laid shortly after copulation. In *Nautilus* they are laid separately, each being about 4 cm. long and contained in two thick shells, the outer of which is partly open.

Nervous System.—*Nautilus*, like the other Cephalopoda, exhibits a great concentration of the typical Molluscan ganglia, as shown in fig. 13. The ganglia take on a band-like form, and are but little differentiated from their commissures and connectives—an archaic condition reminding us of *Chiton*. The special optic outgrowth of the cerebral ganglion, the optical ganglion (fig. 13, *o*), is characteristic. The cerebral ganglion-pair (*a*) lying above the oesophagus is connected with two sub-oesophageal ganglion-pairs, of band-like form. The anterior of these is the pedal *b*, *b*, and supplies the circumoral lobes and tentacles, and the funnel, a fact which proves the pedal origin of these organs. The hinder band is the visceral and pleural pair fused; from its pleural portion nerves pass to the mantle, from its visceral portion nerves to the branchiae and genital ganglion (fig. 13, *d*), and in immediate connexion with the latter is a nerve to the osphradium or olfactory papilla. A labial commissure arises by a double root from the cerebral ganglia and gives off a stomatogastric commissure, which passes under the pharynx immediately behind the radula and bears a buccal ganglion on either side.

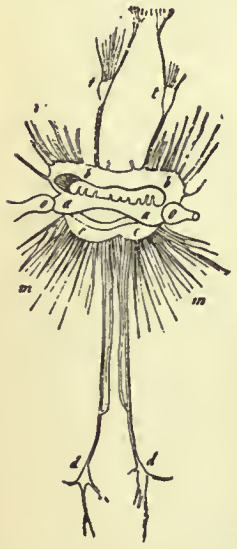


FIG. 13.—Nervous system of *Nautilus pompilius* (from Gegenbaur, after Owen).

t, *t*, Ganglion-like enlargements on nerves passing from the pedal ganglion to the inner series of tentacles.
t', Nerves to the tentacles of the outer or annular lobe.
b, Pedal ganglion-pair.
a, Cerebral ganglion-pair.
c, Pleuro-visceral ganglionic band (fused pleural and visceral ganglion-pairs).
d, Genital ganglion placed on the course of the large visceral nerve, just before it gives off its branchial and its osphradial branches.
m, Nerves from the pleural ganglion to the mantle-skirt.

Special Sense-Organs.—*Nautilus* possesses a pair of osphradial papillae (fig. 4, *olf*) corresponding in position and innervation to Spengel's organ placed at the base of the ctenidia (branchiae) in all classes of Mollusca. This organ has not been detected in other Cephalopoda. *Nautilus* possesses other olfactory organs in the region of the head. Just below the eye is a small triangular process (not seen in our figures), having the structure of a shortened and highly-modified tentacle and sheath. By A. Valenciennes, who is followed by W. Keferstein, this is regarded as an olfactory organ. The large nerve which runs to this organ originates from the point of juncture of the pedal with the optic ganglion. The lamelliform organ upon the inner inferior tentacular lobe of *Nautilus* is possibly also olfactory in function. In Dibranchs behind the eye is a pit or open canal supplied by a nerve corresponding in origin to the olfactory nerve of *Nautilus* above mentioned. Possibly the sense of taste resides in certain processes within the mouth of *Nautilus* and other Cephalopoda.

The otocysts of *Nautilus* were discovered by J. D. Macdonald. Each lies at the side of the head, ventral to the eye, resting on the capito-pedal cartilage, and supported by the large auditory nerve which apparently arises from the pedal ganglion but originates in the cerebral. It has the form of a small sac, 1 to 2 mm. in diameter, and contains whetstone-shaped crystals, such as are known to form the otoliths of other Mollusca.

The eye of *Nautilus* is among the most interesting structures of that remarkable animal. No other animal which has the same bulk and general elaboration of organization has so simple an eye as that of *Nautilus*. When looked at from the surface no metallic lustre, no transparent coverings, are presented by it. It is simply a slightly projecting hemispherical box like a kettle-drum, half an inch in diameter, its surface looking like that of the surrounding integument, whilst in the middle of the drum-membrane is a minute hole (fig. 3, *u*). Sir R. Owen very naturally thought that some membrane had covered this hole in life, and had been ruptured in the specimen studied by him. It, however, appears from the researches of V. Hensen that the hole is a normal aperture leading into the globe of the eye, which is accordingly filled by sea-water during life. There is no dioptric apparatus in *Nautilus*, and in place of refracting lens and cornea we have actually here an arrangement for forming an image on the principle of "the pin-hole camera." There is no other eye known in the whole animal kingdom which is so constructed. The wall of the eye-globe is tough, and the cavity is lined solely by the naked retina, which is bathed by sea-water on one surface and receives the fibres of the optic nerve on the other (see fig. 14, A). As in other Cephalopods (*e.g.* fig. 33, *Ri*, *Re*, *p*), the retina consists of two layers of cells, separated by a layer of dark pigment. The most interesting consideration connected with this eye of *Nautilus* is found when the further facts are noted—(1) that the elaborate lens-bearing eyes of Dibranchiata pass through a stage of development in which they have the same structure as the eye of *Nautilus*—namely, are open sacs (fig. 34); and (2) that amongst other Mollusca examples of cephalic eyes can be found which in the adult condition are, like the eye of *Nautilus* and the developing eye of Dibranchs, simple pits of the integument, the cells of which are surrounded by pigment and connected with the filaments of an optic nerve. Such is the structure of the eye of the limpet (*Patella*), and in such a simple eye we obtain the clearest demonstration of the fact that the retina of the Molluscan cephalic eye, like that of the Arthropod cephalic eye and unlike that of the vertebrate myelonic eye, is essentially a modified area of the general epiderm, and that the sensitiveness of its cells to the action of light and their relation to nerve-filaments is only a specialization and intensifying of a property common to the whole epiderm of the surface of the body. What, however, strikes us as especially remarkable is that the simple form of a pit, which in *Patella* serves to accumulate a secretion which acts as a refractive body, should in *Nautilus* be glorified and raised to the dignity of an efficient optical apparatus. In all other Mollusca, starting as we may suppose from the follicular or pit-like condition, the eye has proceeded to acquire the form of a *closed* sac, the cavity of the closed vesicle being then filled partially or completely by a refractive body (lens) secreted by its walls (fig. 14, B). This is the condition attained in most Gastropoda. It presents a striking contrast to the simple Arthropod eye, where, in consequence of the existence of a dense exterior cuticle, the eye does not form a vesicle, and the lens is always part of that cuticle.

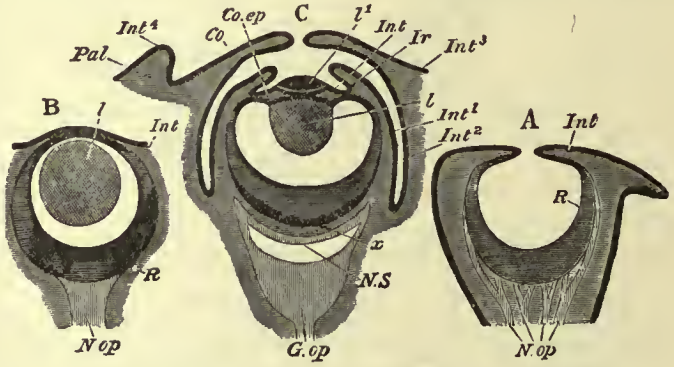


FIG. 14.—Diagrams of Sections of the Eyes of Mollusca.

A, *Nautilus* (and *Patella*).
B, Gastropod (*Limax* or *Helix*).
C, Dibranchiate Cephalopod (Oigopsid).
Pal, Eyelid (outermost fold).
Co, Cornea (second fold).
Ir, Iris (third fold).
*Int*¹,²,³,⁴, Different parts of the integument.
l, Deep portion of the lens.
*l*¹, Outer portion of the lens.
Co.ep, Ciliary body.
R, Retina.
N.op, Optic nerve.
G.op, Optic ganglion.
x, Inner layer of the retina.
N.S., Nervous stratum of the retina. (From Balfour, after Grenacher.)

The development of *Nautilus* is still entirely unknown. Dr Arthur Willey, during his sojourn in the East Indies, made special efforts to obtain fertilized eggs, both by offering rewards to the native fishermen and collectors and by keeping the living adults in captivity, but without success.

Phylogeny and Classification.—As *Nautilus* is the only living genus of the Tetrabranchiata, our knowledge of all the rest is based upon the study of their fossil shells. A vast number of species of shell similar in structure to that of *Nautilus* are known, chiefly from Primary and Secondary formations. These are divided into two sub-orders by differences in the form and structure of the initial chamber. In the Nautiloidea this chamber has the form of an obtuse cone, on the apex of which is a slit-like mark or cicatrix, elongated dorso-ventrally and placed opposite to the blind end of the siphuncle, which indents the front wall of the initial chamber but does not enter its cavity. In the Ammonoidea, on the other hand, the initial chamber is inflated, and is spheroidal, oval or pyriform in shape, with no cicatrix, and separated from the first air-chamber by a constriction. The siphuncle also commences with a dilatation which deeply indents the front wall of the initial chamber, called the protoconch, but does not penetrate into its cavity. Munier-Chalmas has shown that the cavity of the protoconch is traversed by a tubular organ, the "prosiphon," which does not communicate with the true siphuncle, the place of which it is supposed to take in the early life of the animal. It is generally held, as suggested by

Alpheus Hyatt, that the initial chamber of the Nautiloidea corresponds not to the protoconch of the Ammonoids, but to the second chamber of the latter, and that there existed in the young Nautiloids a true initial chamber, a protoconch which was either uncalcified or deciduous. The shell of the living nautilus does not decide this question, as its early stages are unknown, and there is a little vacuity in the centre of the spirally coiled shell which may have been originally occupied by the true protoconch.

The septa in the Nautiloidea are generally concave towards the aperture of the shell, their curvature therefore directed backwards (fig. 1); in the Ammonoidea, on the other hand, the convexity is usually towards the aperture, the curvature therefore directed forwards. The lines along which the edges of the septa are united to the shell are known as "sutures," and these in the Nautiloidea are simply curved or slightly lobed, whereas in the Ammonoidea they are folded in various degrees of complexity; the projections of the suture towards the mouth of the shell are called saddles, those in the opposite direction lobes. The siphuncle in the *Nautilus* pierces the centres of the septa, and in fossil Nautiloids it is usually central or sub-central. In a few cases it is marginal, and in that case may be external, *i.e.* ventral, or internal, *i.e.* dorsal. In Ammonoids the siphuncle is always marginal, and usually external. Its walls in the living *Nautilus* are strengthened by the deposit of calcareous granules, and in some fossil forms the wall is completely calcified. But this proper calcified wall is quite distinct from calcareous tubes surrounding the siphuncle, which are developed from the septa. In the pearly nautilus each septum is prolonged backwards at the point where it is pierced by the siphuncle, forming a shelly tube somewhat like the neck of a bottle. In many fossil forms these septal necks are continued from the septum from which they arise to the next, so that the siphuncle is enclosed in a complete secondary calcareous tube. In the majority of Nautiloids the septal necks are directed backwards, and they are said to be retrosiphonate. In the majority of the Ammonoids the septal necks are continued forwards from the septa to which they belong, and such forms are termed prosiphonate.

The Tetrabranchiata were most abundant in the Palaeozoic and Mesozoic periods. The Nautiloidea are the most ancient, appearing first in the Upper Cambrian, the genera being most numerous in the Palaeozoic period, and comparatively few surviving into the Secondary. On the other hand, the Ammonoidea are scarce in Palaeozoic formations, being represented in deposits earlier than the Carboniferous only by comparatively simple types, such as *Clymenia* and *Goniatites*. In the Secondary period Ammonoids were very abundant, both in genera and species and in individuals, and with few local exceptions none are known to have survived even to the commencement of the Tertiary. In the widest sense the genus *Nautilus* has existed since the Ordovician (Silurian) period, but the oldest types are not properly to be placed in the same genus as the existing form. Even with this qualification the genus is very ancient, shells very similar to those of the living *Nautilus* being found in the Upper Cretaceous.

It has been maintained by some zoologists that the Ammonoidea were Dibranchiate, though it would not follow from this that the shell was, therefore, internal. They are, however, generally classed with the Tetrabranchiata, and the absence of all evidence of the possession of an ink-sac is in favour of this view. There can be little doubt that they gave rise to the Dibranchiata.

About 2500 fossil species are included in the Nautiloidea, but only a few species of the genus *Nautilus* survive. Some of the fossil forms are very large, the shell reaching a length of 2 metres, or 6 ft. 6 in. Of the Ammonoidea more than 5000 species have been described, and some of the coiled forms are 70 cm., or nearly 2 ft. 6 in. in diameter.

Associated with various forms of Ammonoids there have been found peculiar horny or calcified plates, sometimes contained within the body-chamber of the shell, sometimes wholly detached. The most typical form of these structures has been named *aptychus*. It consists of two bilaterally symmetrical halves, of somewhat semicircular shape, and attached to one another by their straight inner margins, like a pair of doors. In some cases the aptychus is thin and horny, but more often it is thick and calcified, in which case the principal layer has a peculiar cellular structure. The surface may be smooth or sculptured, and one side is usually marked by concentric lines of growth. Another type is similar, except that the two halves are united in the middle line; bodies of this character are called *synaptychus*; they occur in the body-chamber of species of *Scaphites*. Another form called *anaptychus* consists of a thin horny undivided plate which is concentrically striated. This is associated with species of *Ammonites* and *Goniatites*.

Many theories have been proposed in explanation of these structures. According to Sir Richard Owen, the aptychus is an operculum developed in a part of the body corresponding to the hood of *Nautilus*. E. Ray Lankester suggested that the double plate was borne on the surface of the nidamental gland, with the form and sculpturing of which in *Nautilus* it closely agrees. On this view the aptychus would occur only in females. The most recent view is that these structures could not have been opercula because of their constant position inside the body-chamber, and that they were not external secretions at all, but a calcified internal cartilage situated at the base of the funnel.

Classification of Tetrabranchiata.—Cephalopoda in which the mantle is entirely enclosed by a multilocular siphunculated shell, which may or may not be coiled. Only the last compartment of the shell occupied by the body of the animal. Numerous pedal tentacles around the mouth, which are retractile within sheaths. Halves of the funnel not united. Two pairs of ctenidia, and two pairs of renal tubes without reno-pericardial apertures. Pericardium opens directly to exterior. Cephalic cartilage wholly ventral. Optic vesicles with apertures, without crystalline lens.

Sub-order 1. *Nautiloidea.*—Initial chamber not inflated, with dorso-ventral cicatrix at extremity.

Fam. 1. *Orthoceratidae.* Shell straight or slightly curved, with a simple aperture, large terminal chamber and cylindrical siphuncle. *Orthoceras*, Silurian to Trias. *Baltoceras*, Silurian.

Fam. 2. *Actinoceratidae.* Shell straight or slightly curved, with wide siphuncle contracted at level of septa. *Actinoceras*, Silurian to Carboniferous. *Discosorus*, Silurian. *Huronia*, Silurian. *Loxoceras*, Silurian to Carboniferous.

Fam. 3. *Endoceratidae.* Shell straight, with wide marginal siphuncle, necks produced into tubes fitting into one another. *Endoceras*, Silurian.

Fam. 4. *Gomphoceratidae.* Shell globular, straight or arcuate, aperture contracted. *Gomphoceras*, Silurian. *Phragmoceras*, Silurian.

Fam. 5. *Ascoceratidae.* Shell straight, ampulliform, summit truncate, terminal chamber extending nearly whole length of shell ventrally. *Ascoceras*, Silurian. *Glossoceras*, Silurian.

Fam. 6. *Poterioceratidae.* Shell straight or curved, fusiform, aperture simple, siphuncle contracted at septa. *Poterioceras*, Silurian to Carboniferous. *Streptoceras*, Silurian.

Fam. 7. *Cyrtoceratidae.* Shell slightly curved, aperture simple, siphuncle wide, septa approximated. *Cyrtoceras*, Devonian.

Fam. 8. *Lituitidae.* Shell coiled in one plane with the terminal part uncoiled, aperture contracted. *Lituites*, Silurian. *Ophidioceras*, Silurian.

Fam. 9. *Trochoceratidae.* Shell helicoidally coiled, dextral or sinistral, the last whorl generally uncoiled. *Trochoceras*, Devonian. *Adelphoceras*, Devonian.

Fam. 10. *Nautilidae.* Shell coiled in one plane, aperture wide and simple, siphuncle central. *Nautilus*, recent. *Trocholites*, Silurian. *Gyroceras*, Silurian to Carboniferous. *Hercoceras*, Silurian. *Pienoceras*, Devonian. *Discites*, Carboniferous.

Fam. 11. *Bactritidae.* Shell straight, conical, siphuncle narrow and marginal, necks long, infundibuliform, sutures undulating. *Bactrites*, Silurian and Devonian.

Sub-order 2. *Ammonitoidea.*—Initial chamber spheroidal; siphuncle narrow and simple; septa convex towards aperture; sutures complex.

Tribe 1. *Retrosiphonata.*—Siphuncular necks projecting behind the septa as in Nautiloidea. Sutures form simple undulations. Occur exclusively in Palaeozoic strata from Devonian upwards.

Fam. 1. *Goniatitidae.* Shell nautiloid, with simple sutures and ventral siphuncle. *Goniatites*, Devonian and Carboniferous. *Anarcestes*, Devonian.

Fam. 2. *Clymeniidae.* Shell nautiloid, with simple sutures, siphuncle dorsal, that is, internal. *Clymenia*, Upper Devonian.

Tribe 2. *Prosiphonata.*—Siphuncular necks projecting in front of the septa. Sutures form deeply indented lobes and saddles.

Fam. 1. *Arcestidae.* Globular and smooth or nearly smooth, with reduced umbilicus, terminal chamber very deep, an aptychus present. *Popanoceras*, Permian. *Cyclolobus*, Permian, *Arcestes*, Trias. *Lobites*, Trias.

Fam. 2. *Tropitidae.* Shells globular, but having radiating and tuberculated costae. *Thalassoceras*, Permian. *Tropites*, Trias. *Sibirites*, Trias.

Fam. 3. *Ceratitidae.* Shells coiled, with a large umbilicus, terminal chamber short, sutures with simple saddles. *Trachyceras*, Upper Trias. *Ceratites*, Trias. *Dinarites*, Trias.

Some genera with helicoidal shells are related to these coiled forms, viz. *Cochloceras*, Trias; also some straight forms, *e.g. Rhabdoceras*, Trias.

Fam. 4. *Pinacoceratidae.* Shell compressed, smooth, terminal chamber short, sutures very complicated, convex. *Pinacoceras*, Trias.

Fam. 5. *Phylloceratidae.* Shell coiled, the whorls overlapping each other, sutures formed of numerous lobes and saddles. *Phylloceras*, Jurassic.

Fam. 6. *Lytoceratidae.* Shell discoid, whorls loosely united or uncoiled, sutures deeply indented, but with only three saddles and lobes. *Lytoceras*, Jurassic and Cretaceous. *Macroscaphites*, Cretaceous. *Hamites*, Cretaceous. *Ptychoceras*, Cretaceous. *Turrilites*, Cretaceous. *Baculites*, Cretaceous.

Fam. 7. *Ammonitidae.* Shell coiled, with narrow whorls which do not embrace one another, aperture simple, a horny anaptychus present. *Ammonites*, Jurassic. *Arietites*, Jurassic. *Aegoceras*, Lias.

Fam. 8. *Harpoceratidae.* Shell discoid and flattened, with a carinated border, aperture provided with lateral projections,

a calcareous aptychus, formed of two pieces. *Harpoceras*, Jurassic. *Oppelia*, Jurassic. *Lissoceras*, Jurassic and Cretaceous.

Fam. 9. *Amaltheidae*. Shell flattened, with a prominent carina continued anteriorly into a rostrum. *Amaltheus*, Lias. *Cardioceras*, Jurassic. *Schloenbachia*, Cretaceous.

Fam. 10. *Stephanoceratidae*. Shell not carinated, but with radiating costae, which are often bifurcated, aperture often with lateral projections which contract it, aptychus formed of two pieces. *Stephanoceras*, *Morphoceras*, *Perisphinctes*, *Peltoceras*, Jurassic. *Hoplites*, Cretaceous. *Acanthoceras*, Cretaceous. *Cosmoceras*, Jurassic. Various more or less uncoiled forms are related to this family, viz. *Scaphites*, *Crioceras*, Cretaceous.

Order 2. Dibranchiata (=Holosiphona, Acetabulifera)

Characters.—Cephalopods in which the inflected margins of the epipodia are fused so as to form a complete tubular siphon (fig. 24, *i*). The circumoral lobes of the forefoot carry suckers

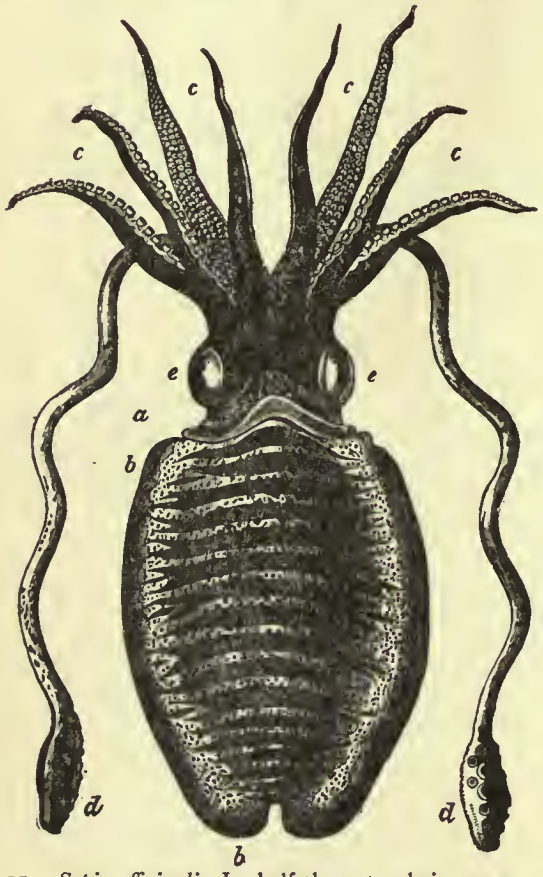


Fig. 15.—*Sepia officinalis*, L., half the natural size, as seen when dead, the long prehensile arms being withdrawn from the pouches at the side of the head, in which they are carried during life when not actually in use. *a*, Neck; *b*, lateral fin of the mantle-sac; *c*, the eight shorter arms of the fore-foot; *d*, the two long prehensile arms; *e*, the eyes.

disposed upon them in rows, *not* tentacles (see figs. 15, 24). There is a single pair of typical ctenidia (fig. 25) acting as gills (hence Dibranchiata), and a single pair of renal organs, opening by apertures right and left of the median anus (fig. 25, *r*) and by similar internal pores into the pericardial chamber, which consequently does not open directly to the surface as in *Nautilus*. The oviducts are sometimes paired right and left (Octopoda, Oigopsida), sometimes that of one side only is developed (Myopsida). The sperm-duct is always single except, according to W. Keferstein, in *Eledone moschata*.

A plate-like shell is developed in a closed sac formed by the mantle (figs. 20, 21), except in the Octopoda, which have none, and in *Spirula* (fig. 17, D) and the extinct *Belemnitidae*, &c., which have a small chambered shell resembling that of *Nautilus* with or without the addition of plate-like and cylindrical accessory developments (fig. 17, A, C, fig. 19).

The pair of cephalic eyes are highly-developed vesicles with a refractive lens (fig. 33), cornea and lid-folds,—the vesicle being in the embryo, an open sac like that of *Nautilus* (fig. 34). Osphradia are not present, but cephalic olfactory organs are recog-

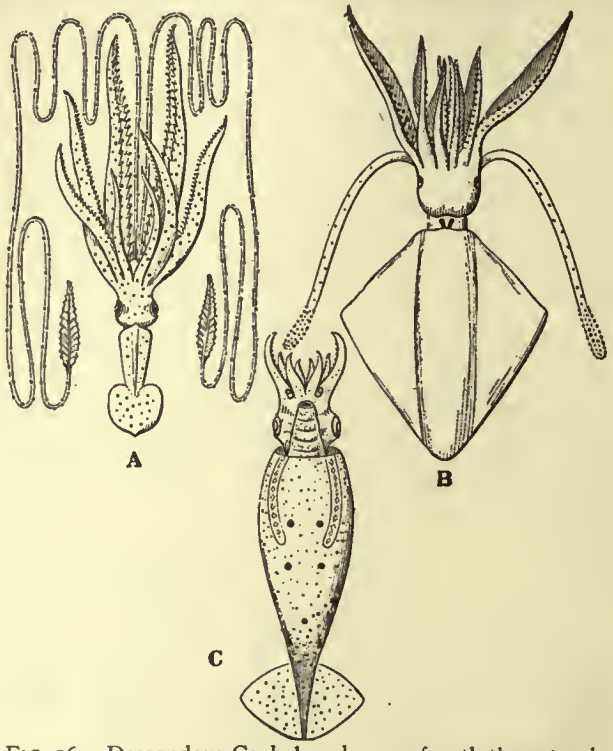


Fig. 16.—Decapodous Cephalopods; one-fourth the natural size linear.

A, *Cheiroteuthis Veranyi*, d'Orb. (from the Mediterranean).
B, *Thysanoteuthis rhombus*, Troschel (from Messina).
C, *Loligopsis cyclura*, Fér. and d'Orb. (from the Atlantic Ocean).

nized. One or two pairs of large salivary glands with long ducts are present. An ink-sac formed as a diverticulum of the rectum and opening near the anus is present in all Dibranchiata (fig. 25, *t*), and has been detected even in the fossil *Belemnitidae*. Branchial hearts are developed on the two branchial afferent blood-vessels (fig. 28, *vc'*, *vi*).

In the Dibranchiata the shell shows various stages of degeneration, culminating in its complete disappearance in *Octopus*. As in other Mollusca, there is a tendency in Cephalopods for the mantle to extend over the outside of the shell from its edges, and when these secondary mantle-folds entirely cover the shell and meet or fuse together the shell is surrounded by the mantle both externally and internally, and is said to be internal, though it remains always a cuticular structure external to the epidermis. This process is generally accompanied by a reduction of the size of the shell in comparison with that of the body, so that the relations of the two are gradually reversed, the body outgrows its house and instead of the

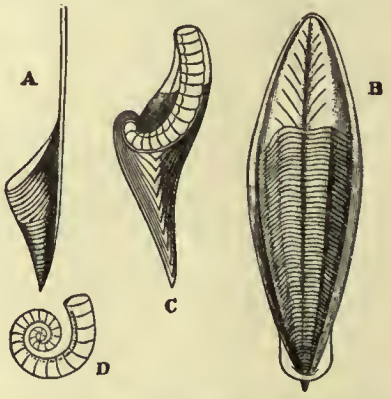
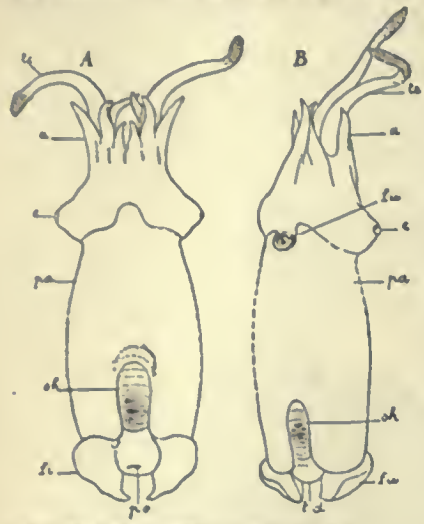


Fig. 17.—Internal Shells of Cephalopoda.

A, *Conoteuthis dupiniana*, d'Orb. (from the Neocomian of France).
B, Shell *Sepia orbigniana*. Fér. (Mediterranean).
C, Shell of *Spirulirostra Bellardii*, d'Orb. (from the Miocene of Turin). The specimen is cut so as to show in section the chambered shell and the laminated "guard" deposited upon its surface.
D, Shell of *Spirula laevis*, Gray (New Zealand).

mantle being enclosed by the shell, the the mantle. The earliest stage of this shell is enclosed by process is shown in the recent *Spirula*, though it is perhaps not impossible that in some of the later fossil Ammonoids the shell was becoming more and more internal. The shell of *Spirula* (fig. 18) is coiled somewhat like that of *Nautilus*, but the coils are not in contact, the direction of the coil is endogastric or ventral instead of exogastric, and the shell is very much smaller than the body. Like that of *Nautilus* it is divided by septa and traversed by a siphuncle. The relation of the animal to the terminal chamber is as in *Nautilus*, but the body extends far beyond the aperture, and folds of the mantle grow up over the shell and cover it everywhere except part of the dorsal and ventral surfaces.



After Chun, from Lankester's *Treatise on Zoology*.

FIG. 18.—*Spirula*.

A, Dorsal aspect. *pa*, Mantle.
B, Ventral aspect. *po*, Posterior fossa.
a, Arms. *sh*, Shell.
e, Eyes. *te*, Tentacular arms.
fi, Fins. *td*, Terminal pallial disk.
fu, Funnel.

The next modification in the enclosed shell is the addition to it of secondary deposits of calcareous matter, by the inner surface of the shell-sac. Successive layers are deposited on the posterior part of the original shell, whether coiled or straight, and these layers form a conical mass, which may attain great thickness. A somewhat coiled shell with such a deposit is seen in *Spirulirostra* (fig. 17, C) of the Miocene. In the next stage of modification secondary secretion forms a long and broad projection of the dorsal lip of the aperture; this is well developed in the belemnites (fig. 19). Thus in these modified shells three parts are to be distinguished: the original septate shell, which has been called the phragmacone; the posterior conical deposit, called the rostrum or guard; and the anterior somewhat flat projection, called the proöstracum. In the living Dibranchiata other than *Spirula* the phragmacone and rostrum have become very rudimentary. The shell of *Sepia* (fig. 20) consists almost entirely of the proöstracum, the little ventral hollow posteriorly representing the phragmacone, and the posterior pointed projection, the rostrum. In the *Oigopsida* the shell is represented by a prostracum which is no longer calcified but forms a chitinous plume or gladius, and a similar rudiment occurs in *Loliginidae* (fig. 21) and *Sepiolidae*. Lastly, in the Octopoda the shell is represented only by small chitinous rudiments to which the retractor muscles of the head and funnel are attached; these are paired in *Octopus*, unpaired in other cases as in *Cirrhoteuthis*.

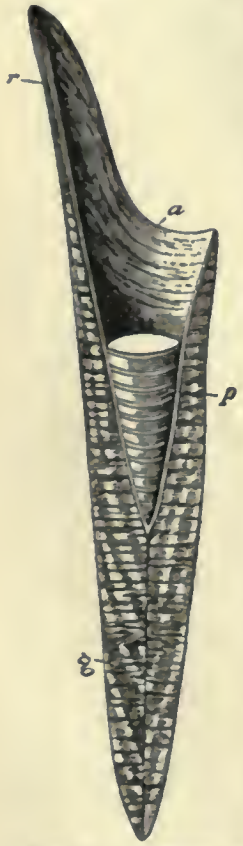


FIG. 19.—Diagram of Belemnite (after Phillips). *r*. Horny pen or "prostracum"; *a*, conical cavity or "alveolus," in which the chambered "phragmacone" (*p*) is contained; *g*, "guard," or "rostrum."

FIG. 20.

FIG. 21.

FIG. 20.—The calcareous internal shell of *Sepia officinalis*, the so-called cuttle-bone. *a*, Lateral expansion; *b*, anterior cancellated region; *c*, laminated region, the laminae enclosing air.

FIG. 21.—The horny internal shell or gladius or pen of *Loligo*.

The early appearance of the sac of the mantle in which the shell is enclosed has led to an erroneous identification of this sac with the primitive shell-sac or shell-gland of the Molluscan embryo. The first appearance of the shell-sac in Dibranchiata is shown in figs. 35, 36. Its formation as an open upgrowth of the centro-dorsal area, and the fact that it appears and disappears without closing in *Argonauta* and *Octopus*, was demonstrated by E. Ray Lankester.

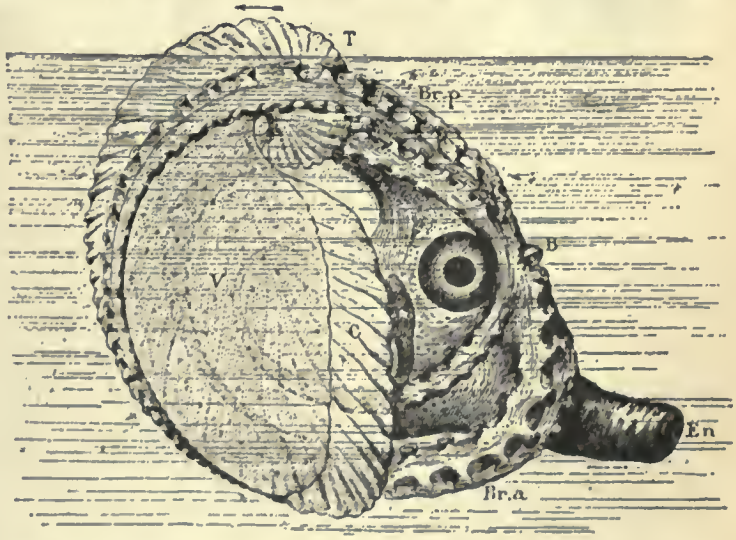


FIG. 22.—The Argonaut in life. (After Lacaze-Duthiers.) *Tr*. Float; *Br.a*, anterior arms; *Br.p*, posterior arms; *V*, the expanded portion of them, once called the sails; *B*, the beak; *C*, the shell; *En*, the funnel.

In *Argonauta* (the paper nautilus) the female only possesses a shell, in which the body is contained; but this is not

homologous with the true shell in other cases; it is a structure *sui generis* secreted by the expanded arms of the dorsal pair which are closely applied to it on either side (fig. 22).

Head, Foot, Mantle and Mantle-cavity.—If we now compare the fore-foot of the Dibranchiata with that of *Nautilus*, we find in the first place a more simple arrangement of its lobes, which are either four or five pairs of tapering processes (called "arms"), arranged in a series around the buccal cone, and a substitution of suckers for tentacles on the surface of these lobes (figs. 15 and 24). The most dorsally placed pair of arms, corresponding to the two sides of the hood of *Nautilus*, are in reality the most anterior, and are termed the first pair. In the Octopoda there are four pairs of these arms (fig. 38), in the Decapoda five pairs, of which the fourth is greatly elongated (figs. 15, 16). In *Sepia*, *Sepiola* and *Rossia*, each of these long arms is withdrawn into a pouch beside the head, and is only ejected for the purpose of prehension. In *Loligo* they are completely retractile, very slightly

FIG. 23.—Head and circumoral processes of the fore-foot of *Onychoteuthis* (from Owen).

a, Neck. *b*, Eye.
c, The eight short arms.
d, Long prehensile arms, the clavate extremities of which are provided with suckers at *e*, and with a double row of hooks beyond at *f*. The temporary conjunction of the arms by means of the suckers enables them to act in combination.

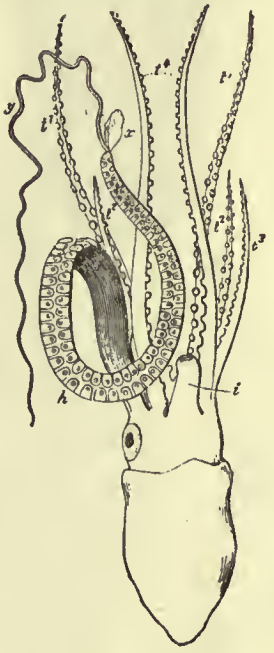


FIG. 24.—Male of *Ocythoë catenulata*, Steenstrup (*Octopus carena*, Ver.), showing the hectocotylized arm. (From Gegenbaur.)

t^1, t^2, t^3, t^4, The first, second, third and fourth arms or processes of the fore-foot.
h, The third arm of the right side hectocotylized.
x, The apical sac of the hectocotylized arm.
y, The filament which issues from the sac when development is complete.
i, The siphon.

so in the majority of the Oigopsida, and in *Rhynchoteuthis* they are united to form a beak-like appendage. A gradual reduction of the tentacular arms can be seen in the Decapoda, leading to their total absence in Octopoda; thus in *Leachia*, *Chaunoteuthis* and others these arms are reduced to mere stumps. In some *Cheiroteuthidae* and *Cranchiidae* the ordinary or sessile arms, especially the dorsal pairs, are reduced. In the Octopoda they are not unfrequently connected by a web, and form an efficient swimming-bell, *e.g.* in *Cirrhoteuthidae* and *Amphiiretidae*. The suckers are placed on the adoral surface of the arms, and may be in one, two or four rows, and very numerous. In place of suckers in some genera, *e.g.* *Veranya*, we find on certain arms or parts of the arms horny hooks; in other cases a hook rises from the centre of each sucker. The hooks on the long arms of *Onychoteuthis* are drawn in fig. 23. In various species of *Cheiroteuthis* the suckers on the tentacular arms are very feeble, but the bottom of the cup is covered by a number of anastomosed epithelial filaments which are used as a fishing-net. The fore-foot, with its apparatus of suckers and hooks, is in the Dibranchiata essentially a prehensile apparatus, though the whole series of arms in the Octopoda serve as swimming organs, and in many (*e.g.* the common octopus or poulp) the sucker-bearing surface is used as a crawling organ.

In the males of the Dibranchiata one of the arms is more or less

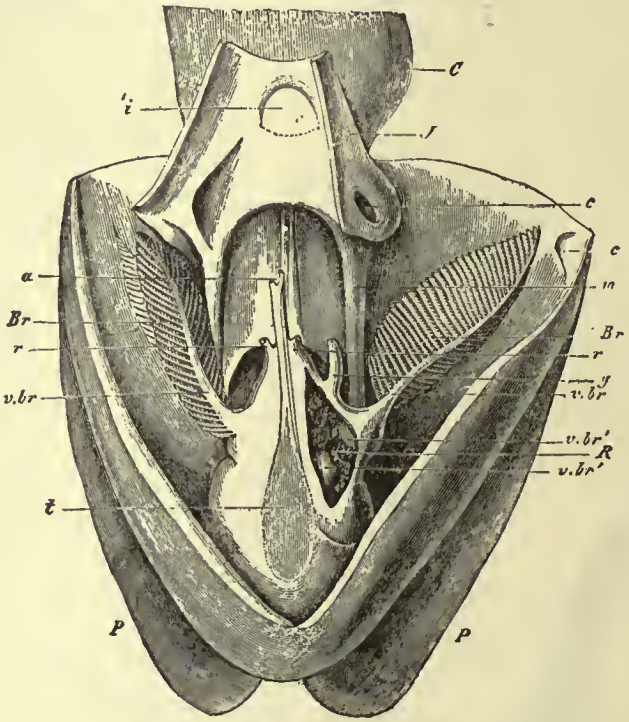


FIG. 25.—View of the postero-ventral surface of a male *Sepia*, obtained by cutting longitudinally the firm mantle-skirt and drawing the divided halves apart. This figure is strictly comparable with fig. 4. (From Gegenbaur.)

C, The head.
J, The mid-foot or siphon, which has been cut open so as to display the valve *i*.
R, The glandular tissue of the left nephridium or renal-sac, which has been cut open (see fig. 29).
P, *P*, The lateral fins of the mantle-skirt.
Br, The single pair of branchiae (ctenidia).
a, The anus—immediately below it is the opening of the ink-bag.
c, Cartilaginous socket in the siphon to receive *c'*, the cartilaginous knob of the mantle-skirt—the two constituting the "pallial hinge apparatus" characteristic of Decapoda, not found in Octopoda.
g, The azygos genital papilla and aperture.
'i, Valve of the siphon (possibly the rudimentary hind-foot).
m, Muscular band connected with the fore-foot and mid-foot (siphon) and identical with the muscular mass *k* in fig. 3.
r, Renal papillae, carrying the apertures of the nephridia.
v.br, Branchial efferent blood-vessel.
v.br', Bulbous enlargements of the branchial blood-vessels (see figs. 28, 29).
t, Ink-bag.

modified in connexion with the reproductive function, and is called the "hectocotylized arm." This name is derived from the condition assumed by the arm in those cases in which its modification is carried out to the greatest extent. These cases are those of the Octopods *Argonauta argo* and *Ocythoë catenulata* (fig. 24). In the males of these the third arm (on the left side in *Argonauta*, on the right side in *Ocythoë*) is found before the breeding season to be represented by a globular sac of integument. This sac bursts, and from it issues an arm larger than its neighbours, having a small sac at its extremity in *Ocythoë* (fig. 24. *x*), from which subsequently a long filament issues. Before copulation the male charges this arm with the spermatophores or packets of spermatozoa removed from its generative orifice beneath the mantle-skirt, and during coitus the arm becomes detached and is left adhering to the female by means of its suckers. A new arm is formed at the cicatrix before the next breeding season. The female, being much larger than the male, swims away with the detached arm lodged beneath her mantle-skirt. There, in a way which is not understood, the fertilization of the eggs

is effected. Specimens of the female *Ocythoë* with the detached arm adherent were examined by Cuvier, who mistook the arm for a parasitic worm and gave to it the name *Hectocotylus*. Accordingly, the correspondingly modified arms of other Cephalopoda are said to be hectocotylized. J. J. S. Steenstrup has determined the hectocotylized condition of one or other of the arms in a number of male Dibranchs as follows:—in all, excepting *Argonauta* and *Ocythoë* and *Tremoctopus*, the modification of the arm is slight, consisting in a small enlargement of part or the whole of the arm, and the obliteration of some of its suckers; in *Octopus* and *Eledone* the third right arm is hectocotylized; in *Rossia* and *Sepiola* the fourth left arm is hectocotylized along its whole length, and the fourth right arm also in the middle only; in *Sepia* the fourth left arm is modified at its base only; in *Sepioteuthis*, the same at its apex; in *Loligo*, the same also at its apex; in *Loliolus*, the same along its whole length; in *Ommatostrephes*, *Onychoteuthis* and *Loligopsis* no hectocotylized arm has hitherto been observed. Thus, speaking generally, it is one or both of the fourth pair of short arms which are modified in the Decapoda, of the third pair in the Octopoda. In the pallial cavity are situated one pair of gills in the Dibranchiata (fig. 25), attached

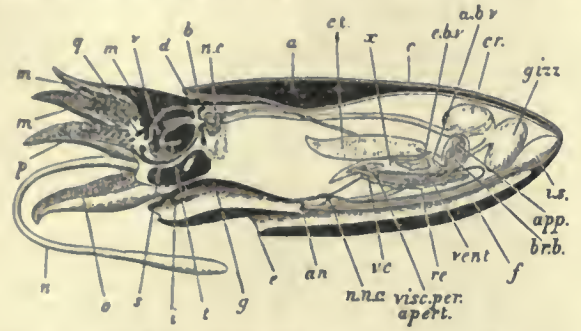


FIG. 26.—Diagram representing a vertical approximately median antero-posterior section of *Sepia officinalis* (from a drawing by A. G. Bourne). The lettering corresponds with that of fig. 10, with which this drawing is intended to be compared.

a,	Shell (here enclosed by a growth of the mantle).	*o*,	The fifth or lowermost lobe of the fore-foot. [foot.
b,	The nuchal plate (here a cartilage).	*p*,	The third lobe of the fore-
c,	(The reference line should be continued through the black area representing the shell to the outline below it), the integument covering the visceral hump.	*q*,	The buccal membrane.
		v,	The upper beak or jaw.
		s,	The lower beak or jaw.
		t,	The lingual ribbon.
		x,	The viscero-pericardial sac.
		n.c,	The nerve-collar.
		cr,	The crop.
d,	The reflected portion of the mantle-skirt forming the sac which encloses the shell.	*gizz*,	The gizzard.
		an,	The anus.
		c.t,	The left ctenidium or gill-plume.
e,	The inferior margin of the mantle-skirt (mouth of the pallial chamber).	*vent*,	Ventricle of the heart.
		a.b.v,	Afferent branchial vessel.
		e.b.v,	Efferent branchial vessel.
f,	The pallial chamber.	*re*,	Renal glandular mass.
g,	The vertically cut median portion of the siphon.	*n.n.a*,	Left nephridial aperture.
		visc.per.apert,	Viscero-pericardial aperture (see fig. 29).
i,	The valve of the siphon.	*br.b*,	Branchial heart.
m,	The two upper lobes of the fore-foot. [the same.	*app*,	Appendage of the same.
n,	The long prehensile arms of	*i.s*,	Ink-bag.

dorsally along the whole of their afferent borders. On each side of the branchia is a series of lamellae, least in number in the Octopoda. Each lamella is transversely folded, and the folds are in turn folded, so that the respiratory surface is increased. On the somatic wall of the pallial cavity, between and ventral to the gills, are the following apertures: the anus and opening of the ink-sac, close together in the median line; a pair of apertures of the renal sacs, on either side of the median line; external to the renal orifice, on the left side, the genital aperture in *Cirrhoteuthidae* and Myopsida. In other Octopoda, and in nearly all the Oigopsida among the Decapoda, the genital ducts are paired in the female, but only the left is developed in the male. The funnel forms a complete tube in the Dibranchiata, and in the majority of the Decapoda, as in *Nautilus*, it is provided with an internal valve projecting from its somatic surface, which allows water to pass outwards but prevents it passing inwards. The mantle performs rhythmical respiratory movements of expansion and contraction, the water entering between funnel and mantle and passing out through the funnel. In Decapoda the edge of the mantle bears internally on each side a cartilaginous projection which fits into a corresponding depression on the external surface of the funnel; this is called the "resisting apparatus," and serves to make the union of mantle and funnel firmer during expiration. More powerful expiratory movements are used for sudden retrograde locomotion through the water.

Luminous Organs.—In certain Oigopsida living in deep water, *e.g. Histioteuthis*, *Calliteuthis*, *Histiopsis*, *Pterygioteuthis*, the surface of the skin bears photogenous organs directed towards the oral extremity. Anatomically these consist of a deeper photogenous layer and a more superficial refracting layer. In some cases, *e.g. Pterygioteuthis*, they occur even within the mantle-cavity.

Fins.—In the majority of the Decapoda and in the *Cirrhoteuthidae*, the mantle is produced into lateral symmetrical expansions which have the function of fins. They originate at the aboral extremity where they remain in *Spirula* (fig. 18). In most other Oigopsida they are terminal, but more dorsal than ventral, *e.g. Loligopsis* (fig. 16), and there may be two on each side, as in *Grimalditeuthis*. In other cases they extend laterally along a greater length of the body, as in *Sepia* (fig. 15). In *Ctenopteryx* they have a superficial resemblance to the fins of fishes, consisting of a thin membrane supported by a series of muscular rods.

Chromatophores.—These are characteristic of the Dibranchiata, apparently absent in *Nautilus*. They are originally single cells of ectodermic origin which sink below the epidermis and become connected with radiating muscular fibres. The cells are single but multinuclear. Different cells contain pigments of different colours, yellow, brown, red or blue. Each cell in life is in constant tremulous movement; under the influence of nervous excitement the cells are suddenly expanded or contracted, producing blushes of colour and pallor. By reflex action of which the afferent stimulus acts upon the eyes as in fishes, the chromatophores assume a condition which approximates the colour of the animal to that of surrounding objects. In the Decapoda there are also reflecting elements which produce iridescent hues.

Aquiferous Cavities.—In addition to the pockets into which the tentacular arms of Decapoda are retracted, there are in several Dibranchiata cavities in the integument which open to the exterior by special pores but have no communication with the vascular system or other internal cavities of the body. In *Ocythoë* there are such pores on the back of the head and at the base of the funnel; buccal pouches on the ventral side of the mouth, internal to the arms, occur in some genera, one in *Loligo*, two in *Sepia*. In some species of *Sepia* there are pouches in the mantle.

Alimentary Tube.—The principal differences from *Nautilus* are the following:—the mandibles are similar in shape, but are chitinous, not calcified. In the radula there are three teeth on each side of the median tooth in each row, except in *Gonatus*, in which there are only two lateral teeth, and the *Cirrhoteuthidae*, in which the radula has entirely disappeared. In front of the radula is the so-called tongue, a fleshy projection corresponding to the sub-radular organ of other Mollusca.

In most of the Dibranchiata there are two pairs of salivary glands. In the Decapoda the ducts of the posterior pair unite into a median duct which opens on the surface of the sub-radular organ. The anterior pair is but slightly developed except in the Oigopsida. In the Octopoda there are also two pairs, but the posterior pair, except in *Cirrhoteuthis* where they are absent, are large and displaced backwards, being situated near the oesophageal proventriculus.

Fig. 27.—Alimentary canal of *Loligo sagittata* (from Gegenbaur). The buccal mass is omitted.

oe,	Oesophagus.
v,	The stomach opened longitudinally.
x,	Probe passed through the pylorus.
c,	Commencement of the caecum.
e,	Its spiral portion.
i,	Intestine.
a,	Ink-bag.
b,	Its opening into the rectum.

Connected with the intestine immediately beyond the pylorus is a thin-walled caecum, spherical in *Rossia* and *Leachia*, elongated in *Loligo*, but usually coiled into a spiral (fig. 27). The hepatic ducts open into the caecum. The liver is developed as a paired gland, more or less fused into one in the adult, but the ducts are always paired. The ducts are covered by a number of glandular follicles forming what is called the pancreas.

The ink-sac, absent in *Nautilus*, is a rectal caecum developed from its dorsal wall. It is present in all Dibranchiata except *Octopus arcticus*, *O. piscatorum* and *Cirrhoteuthis*. It consists of a deeper part or gland proper and a reservoir. It extends to the posterior extremity of the body in *Sepia*, but in *Octopoda* is usually embedded in the surface of the liver. The pigment of the secretion is melanin, and its function is to produce a dense opacity in the water, which conceals the animal.

Vascular System (fig. 28).—The ventricle lies in the pericardial cavity, except in Octopoda where this cavity is much reduced. The auricles, one pair, are contractile expansions of the efferent branchial vessels. The heart gives off an anterior or cephalic and a posterior or abdominal aorta. The vascular system is almost perfect, arteries and veins being united by capillaries. The principal vein is a vena

cava passing backwards ventrally from the cephalic region and dividing into two afferent branchial veins, each of which receives a

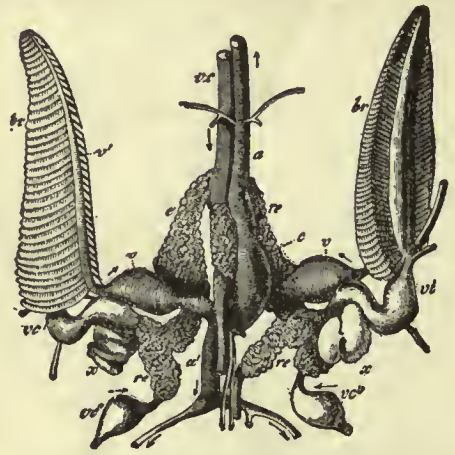


FIG. 28.—Circulatory and excretory organs of *Sepia* (from Gegenbaur, after John Hunter).

br, Branchiae (ctenidia).
c, Ventricle of the heart.
a, Anterior artery (aorta).
a', Posterior artery.
v, The right and left auricles (enlargements of the efferent branchial veins).
v', Efferent branchial vein on the free face of the gill-plume.
v.c, Vena cava.
vi, *vc'*, Afferent branchial vessels (branches of the vena cava, see fig. 29).
vc'', Abdominal veins.
x, Branchial hearts and appendages.
re, *e*, Glandular substance of the nephridia developed on the wall of the great veins on their way to the gills. The arrows indicate the direction of the blood-current.

pallial and an abdominal vein. Each of these afferent branchial vessels is enclosed in the cavity of a renal organ and is covered externally by the glandular tissue which forms the excretory part of the "kidney" (fig. 29). Each afferent vessel is expanded into a

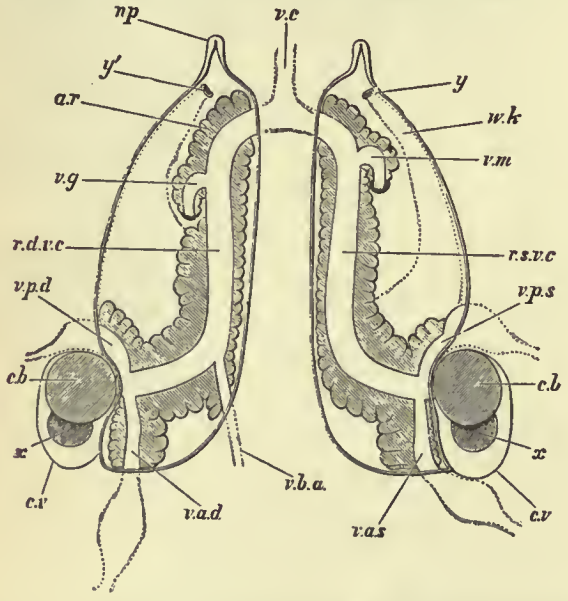


FIG. 29.—Diagram of the nephridial sacs, and the veins which run through them, in *Sepia officinalis* (after Vigelius). The nephridial sacs are supposed to have their upper walls removed.

v.c, Vena cava. [of the same.
r.d.v.c, Right descending branch
r.s.v.c, Left descending branch of the same.
v.b.a, Vein from the ink-bag.
v.m, Mesenteric vein.
v.g, Genital vein.
v.a.d, Right abdominal vein.
v.a.s, Left abdominal vein.
v.p.d, Right pallial vein.
v.p.s, Left pallial vein.
c.b, Branchial heart.
x, Appendage of the same.
c.v, Capsule of the branchial heart.
np, External aperture of the right nephridial sac.
y, Reno-pericardial orifice placing the left renal sac or nephridium in communicaton with the viscero-pericardial sac, the course of which below the nephridial sac is indicated by dotted lines.
y', The similar orifice of the right side.
a.r, Glandular renal outgrowths.
w.k, Viscero-pericardial sac (dotted outline).

contractile branchial heart, which is provided with a glandular appendage. The latter corresponds to the glandular masses which are attached to the afferent branchial veins in *Nautilus*, and to the pericardial glands of other Molluscs.

Coelom.—The coelom forms a large sac with a constriction between

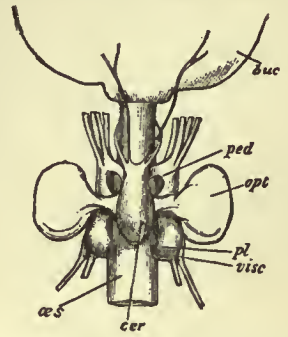


FIG. 30.

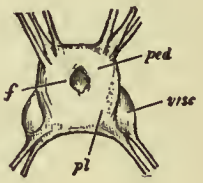


FIG. 31.

FIGS. 30, 31.—Nerve-centres of *Octopus*. Figure 30 gives a view from the dorsal aspect, figure 31 one from the ventral aspect.

buc, The buccal mass.
ped, Pedal ganglion.
opt, Optic ganglion.
cer, Cerebral ganglion.
pl, Pleural ganglion.
visc, Visceral ganglion.
oes, Oesophagus.
f, Foramen in the nerve-mass formed by pedal, pleural and visceral ganglion-pairs, traversed by a blood-vessel.

the anterior or pericardial division and the posterior or genital division, and it is produced into lateral diverticula which contain the branchial hearts; but in the Octopoda the pericardial division is suppressed and the genital division communicates by long ducts with sacs containing the appendages of the branchial hearts. The renal sacs communicate with the pericardium by pores near the external renal apertures; in the Octopoda the reno-pericardial openings are in the capsules of the branchial hearts. The genital ducts pass from the genital coelom to the exterior. They are paired in female Oigopsida and Octopoda except *Cirrhoteuthidae*, but only the left persists in the males of all Dibranchiata, and in the female Myopsida.

In the oviduct is a glandular enlargement, and in addition to this the females are provided with the so-called nidamental glands which are developed on the somatic wall of the pallial cavity, one on each side of the rectum, except in certain Oigopsida (*Enoploteuthis*, *Cranchia*, *Leachia*) and in the Octopoda, in which these organs are absent. The latter fact is related to the habit of the majority of the Octopoda of guarding or "incubating" their eggs, which have little protective covering. In the other cases the eggs are surrounded by a tough gelatinous elastic material secreted by the nidamental glands.

The vas deferens is at first narrow and convoluted, then dilates into a vesicula seminalis at the end of which is a glandular diverticulum called the prostate. By the vesicula and the prostate the spermatophores are formed. These have a structure similar to those of *Nautilus*, and in the Octopoda may be as much as 50 mm. in length. Beyond the prostate the duct opens into a large terminal reservoir which has been called Needham's sac, and in which the spermatophores are stored.

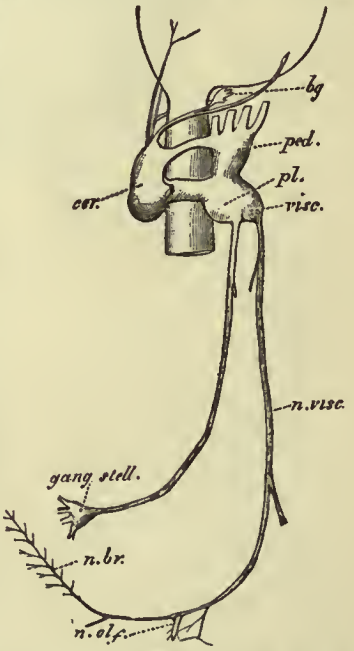


FIG. 32.—Lateral view of the nervous centres and nerves of the right side of *Octopus vulgaris* (from a drawing by A. G. Bourne).

bg, Buccal ganglion.
cer, Cerebral ganglion.
ped, Pedal ganglion.
pl, Pleural, and *visc.*, visceral region of the pleuro-visceral ganglion.
gang. stell, The right stellate ganglion of the mantle connected by a nerve to the pleural portion.
n.visc, The right visceral nerve.
n.olf, Its (probably) olfactory branches.
n.br, Its branchial branches.

Nervous System and Sense-Organs.—The figures (30, 31, 32) representing the nerve-centres of *Octopus* serve to exhibit the disposition

of these parts in the Dibranchiata. The ganglia are more distinctly swollen than in *Nautilus*. In *Octopus* an infra-buccal ganglion-pair are present, corresponding to the buccal ganglion-pair of Gastropoda. In Decapoda a supra-buccal ganglion-pair connected with these are also developed. Instead of the numerous radiating pallial nerves of *Nautilus*, we have in the Dibranchiata on each side (right and left) a large pleural nerve passing from the pleural portion of the pleuro-visceral ganglion to the mantle, where it enlarges to form the stellate ganglion. From each stellate ganglion nerves radiate to supply the powerful muscles of the mantle-skirt. The two stellate ganglia are connected, except in *Sepiola*, by a transverse supra-oesophageal commissure, which represents the pallial cords united by a commissure above the intestine in Amphineura. The nerves from the visceral portion of the pleuro-visceral ganglion have the same course as in *Nautilus*, but no osphradial papilla is present. An enteric nervous system is richly developed in the Dibranchiata, connected with the somatic nervous centres through the buccal ganglia, as in the Arthropoda through the stomato-gastric ganglia, and anastomozing with deep branches of the visceral nerves of the viscero-pleural ganglion-pair. It has been especially described by A. Hancock in *Ommatostrephes*. Upon the stomach it forms a single large and readily detected gastric ganglion.

In the Dibranchiate division of the Cephalopoda the greatest elaboration of the dioptric apparatus of the eye is attained, so that

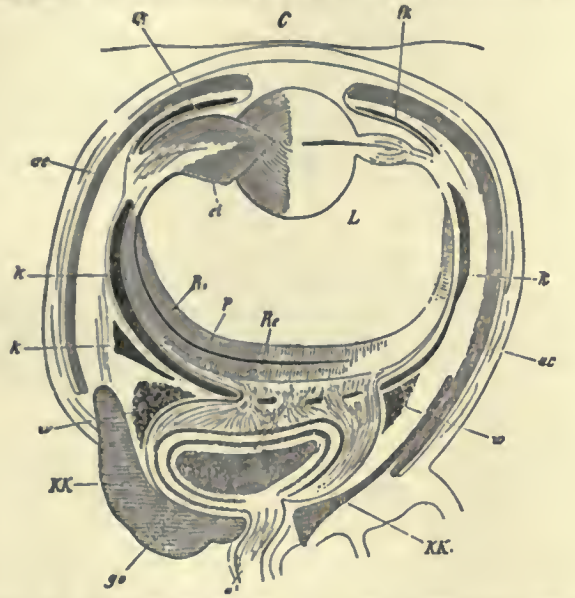


FIG. 33.—Horizontal section of the eye of *Sepia* (Myopsid). (From Gegenbaur, after Hensen.)

KK, Cephalic cartilages (see fig. 8).
C, Cornea (closed).
L, Lens.
ci, Ciliary body.
Ri, Internal layer of the retina.
Re, External layer of the retina.
p, Pigment between these.
o, Optic nerve.
go, Optic ganglion.
k and *k'*, Capsular cartilage.
ik, Cartilage of the iris.
w, White body.
ae, Argentine integument.

we have in this class the extremes of the two lines of development of the Molluscan eye, those two lines being the punctigerous and the lentigerous. The structure of the Dibranchiate's eye is shown in section in fig. 14, C, and in fig. 33, and its development in figs. 34 and 37. The open sac which forms the retina of the young Dibranchiate closes up, and constitutes the posterior chamber of the eye, or primitive optic vesicle (fig. 37, A, *poc*). The lens forms as a structureless growth, secreted by both the internal and external surfaces of the front wall of the optic vesicle (fig. 37, B, *l*). The integument around the primitive optic vesicle which has sunk below the surface now rises up and forms firstly nearest the axis of the eye the iridian folds (*if* in B, fig. 37; *ik* in fig. 33; *Ir* in fig. 14), and then secondly an outer circular fold grows up like a wall and completely closes over the iridian folds and the axis of the primitive vesicle (fig. 33, C). This covering is transparent, and is the cornea. In the oceanic Decapoda the cornea does not completely close, but leaves a central aperture traversed by the optic axis. These forms are termed Oigopsidae by C. d'Orbigny, whilst the Decapoda with closed cornea are termed Myopsidae. In the Octopoda the cornea is closed, and there is yet another fold thrown over the eye. The skin surrounding the cornea presents a free circular margin, and can be drawn over the surface of the cornea by a sphincter muscle. It thus acts as an adjustable diaphragm, exactly similar in movement to the iris of Vertebrates. *Sepia* and allied Decapods have a horizontal lower eyelid, that is to say, only one-half of the sphincter-like fold of integument is movable. The statocysts are situated ventrally between the pedal and visceral ganglia, and are entirely enclosed in the cranial cartilage. The cavity of each is continued into a small blind process which is the remnant of the embryonic connexion of the vesicle with the external surface. The sensory epithelium is at the anterior end of the vesicle forming a macula acustica, and in the cavity is a single otolith, partly calcareous and partly organic except in *Eledone*, in which it is entirely organic. The nerve arises from the cerebral ganglion on each side and passes through the pedal ganglion.

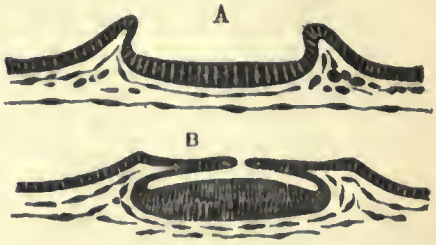


FIG. 34.—Diagrams of sections showing the early stage of development of the eye of *Loligo* when it is, like the permanent eye of *Nautilus* and of *Patella*, an open sac. (From Lankester.)

A, First appearance of the eye as a ring-like upgrowth.

B, Ingrowth of the ring-like wall so as to form a sac, the primitive optic vesicle of *Loligo*.

There is no branchial osphradium in the Dibranchiata corresponding to that of *Nautilus*, but the olfactory organ or rhinophore near the eye is present. In *Sepia* and the majority of the Dibranchiata it is a simple pit, in some of the Oigopsida it is a projection which may be stalked.

Reproduction and Development.—The modification of one or a pair of the arms in the male for purposes of copulation has already been described. In many genera the sexes differ from one another in other characters also. As a rule the males are more slender or smaller than the females. The maximum degree of sexual dimorphism occurs in *Argonauta* among the Octopods; in this genus the female may be fifteen times as large as the male, and the peculiar modification of the dorsal arms for the secretion of the shell occurs in the female only, no shell being formed in the male. In most cases the females are much more numerous than the males, but the opposite relation appears to exist in those Octopoda in which the hectocotylus is autotomous, for as many as four hectocotyli have been found in the pallial cavity of a single female. When the hectocotylus is not detached it is usually inserted into the pallial cavity of the female so as to deposit the spermatophores in or near the aperture of the oviduct, but in *Sepia* and *Loligo* they are merely deposited on the ventral lobes of the buccal membrane.

The eggs are laid shortly after copulation. In the Octopoda and in *Sepia*, *Sepiola* and *Rossia*, each egg has a separate envelope continued into a long stalk by which it is attached with several others in a cluster. In *Argonauta* the eggs are carried by the female in the cavity of the shell. In *Loligo* the eggs are very numerous, and are enclosed in cylindrical transparent gelatinous strings united at one end into a cluster.

The Cephalopoda appear to be the only Invertebrates in which the egg is mesoblastic and telolecithal like that of Vertebrata. This is the result of the large quantity of the yolk, and the position the latter assumes in relation to the blastoderm. In all other Mollusca the segmentation is complete though in some cases very unequal. In the egg of *Loligo*, which has been chiefly studied (fig. 35), the protoplasmic pole is at the narrower end of the egg, and segmentation is restricted to this end, forming a layer of ectoderm cells. From one part of the periphery of the ectoderm proliferation of cells takes place and gives rise to a layer of scattered nuclei over the whole surface of the yolk. The region of proliferation marks the anal side of the ectoderm, and the layer of nuclei forms the perivitelline membrane. This process must be regarded as equivalent to the first stage of invagination, the yolk being surrounded by hypoblast cells or their nuclei. Later on the same anal edge of the ectoderm forms another cellular layer, the endoderm proper, which forms a continuous sheet below the ectoderm.

The mesoderm also originates at the anal side of the ectoderm and extends in two bands right and left between ectoderm and endoderm. After the mesoderm is thus established, a little vesicle lying upon and open to the yolk is formed from the endoderm, and this vesicle ultimately gives rise to the stomach, the two lobes of the liver and the intestine. The buccal mass and oesophagus arise from a stomodaeal invagination, and the anus is formed later from a short proctodaeal invagination.

The external changes of form are as follows:—The mantle is the middle of the embryonic area, and in its centre is the shell-gland, which, however, behaves in a different way from that seen in other Molluscs. Its borders grow inwards and approach each other to form the shell-sac. E. Ray Lankester showed that in *Argonauta* and other Octopods the shell-sac disappears before it is closed up, but in other forms except *Spirula* it closes completely and the shell develops within it. The lateral and posterior borders of the embryo form the foot, and these borders grow out into ten or eight lobes which become the arms, and which at first, as seen in fig. 35 (8), are entirely posterior to the mouth. Development actually shows the anterior arms gradually growing round the mouth and uniting in front of it.

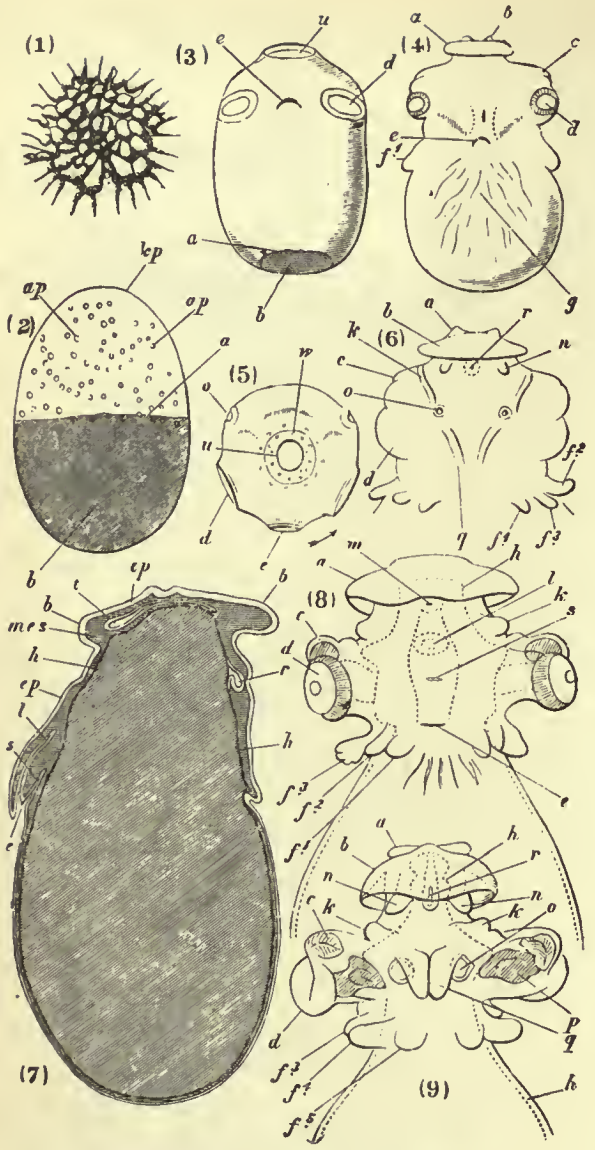


FIG. 35.—Development of *Loligo*.

1. View of the cleavage of the egg during the first formation of embryonic cells.
2. Lateral view of the egg at a little later stage. *a*, Limit to which the layer of cleavage-cells has spread over the egg; *b*, portion of the egg (shaded) as yet uncovered by cleavage-cells; *ap*, the autoplasts; *kp*, cleavage-pole where first cells were formed.
3. Later stage, the limit *a* now extended so as to leave but little of the egg-surface (*b*) unenclosed. The eyes (*d*), mouth (*e*) and mantle-sac (*u*) have appeared.
4. Later stage, anterior surface, the embryo is becoming nipped off from the yolk-sac (*g*).
5. View of an embryo similar to (3) from the cleavage-pole or centro-dorsal area.
6. Later stage, posterior surface.
7. Section in a median dorso-ventral and antero-posterior plane of an embryo of the same age as (4).
8. View of the anterior face of an older embryo.
9. View of the posterior face of an embryo of the same age as (8).

Letters in (3) to (9):—*a*, lateral fins of the mantle; *b*, mantle-skirt; *c*, supra-ocular invagination to form the "white body"; *d*, the eye; *e*, the mouth; f^1, ^{2}, ^{3}, ^{4}, ^{5}, the five paired processes of the fore-foot; *g*, rhythmically contractile area of the yolk-sac, which is itself a hernia-like protrusion of the median portion of the fore-foot; *h*, dotted line showing internal area occupied by yolk (food-material of the egg); *k*, first rudiment of the epipodia (paired ridges which unite to form the siphon or funnel); *l*, sac of the radula or lingual ribbon; *m*, stomach; *n*, rudiments of the gills (paired ctenidia); *o*, the otocysts—a pair of invaginations of the surface of the epipodia; *p*, the optic ganglion; *q*, the distal portion of the ridges which form the siphon, *k* being the basal portion of the same structure; *r*, the vesicle-like rudiment of the intestine formed independently of the parts connected with the mouth, *s*, *k*, *m*, and without invagination; *s*, rudiment of the salivary glands; *t* in (7), the shell-sac at an earlier stage open (see fig. 36), now closed up; *u*, the open shell-sac formed by an uprising ring-like growth of the centro-dorsal area; *w* in (5), the mantle-skirt commencing to be raised up around the area of the shell-sac. In (7) *mes* points to the middle cell-layer of the embryo, *ep* to the outer layer, and *h* to the deep layer of fusiform cells which separates everywhere the embryo from the yolk or food-material lying within it.

Between the mantle and the foot are two ridges which form the funnel, and their position shows them to be the epipodia. The otocysts and eyes are formed as invaginations of ectoderm, the former behind the eyes, at the sides of the funnel. All the nerve-centres, cerebral, visceral, pedal and optic, are formed as proliferations of the ectoderm. At the sides of the optic ganglia a pair of ectodermic invaginations are formed, which in the adult become the white bodies of the eyes, surrounding the optic ganglion. These are vestiges of lateral cerebral lobes which degenerate in the course of development.

The coelomic cavity appears as a symmetrical pair of spaces in the mesoderm, right and left of the intestine, and from it grow out the genital ducts and the renal organs. The gonad develops from the wall of the coelom.

Phylogeny and Classification.—The order is divided into two sub-orders, Decapoda and Octopoda, by the presence or absence of the tentacular arms. The Decapoda are more adapted for swimming than the Octopoda, the body being usually provided with fins. In the former also there is generally an internal shell of considerable size, often calcified, while in the Octopoda only the merest vestiges of a shell remain. There can be no doubt that the Octopoda were derived from the Decapoda, although from the absence of skeletal structures fossil remains of Octopods are almost entirely unknown. *Palaeoctopus*, however, occurs in the Cretaceous, while shells of *Argonauta* do not appear before the Pliocene. The Decapoda are abundantly represented in the Secondary formations by the *Belemnitidae*, whose shell (fig. 19) consists of a straight conical phragmacone covered posteriorly by a very thick rostrum, and produced anteriorly into a thin long proöstracum which is only occasionally preserved. In certain cases remains of the arms provided with hooks, and of the ink-sac, have been recognized. The *Belemnitidae* appear first in the Upper Trias, attain their maximum development in the Jurassic rocks, and are not continued into the Tertiary period, though represented in the Eocene by a few allied forms.

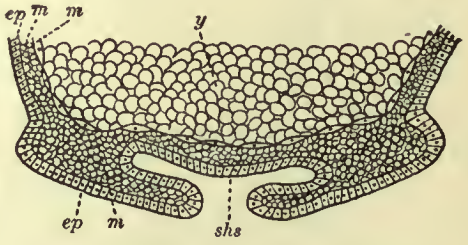


FIG. 36.—Section through aboral end of embryo of *Loligo* showing shell-sac still open. *ep*, ectoderm; *m*, mesoderm; *m'*, endoderm; *shs*, shell-sac; *y*, yolk.

There is no difficulty in deriving the typical existing Decapoda from *Belemnitidae*, and many of the extinct forms may have been directly ancestral. Chitinous "pens" like that of *Loligo*, however, begin to appear in the Jurassic and Cretaceous rocks, so that in this case as in many others the parent form and the modified form existed contemporaneously, and the latter alone has survived. The oldest shells of the *Sepia* type are from the Eocene, and it is perhaps possible that the *Sepiidae* arose separately from the Belemnites.

It is a curious fact that no fossil specimens of the genus *Spirula* have been found, but this may be due to the fact that it occurs only in deep water. At any rate there is no evidence that the shell of *Spirula* has lost a rostrum and a proöstracum; its characters must be regarded as primitive, not secondary. In the characters of the protoconch and of the commencement of the siphuncle, the shell of *Spirula* agrees with that of the Ammonoids, and in both its position is ventral, although in most Ammonoids the shell being exogastric the ventral side is the convex or external, while in *Spirula* the shell is endogastric and the siphuncle internal. The fact that the shell is not completely enclosed by the mantle is also a primitive character.

With regard to the general morphology of the Cephalopoda, it is difficult to reconcile the existence of two pairs of renal tubes as well as a pair of genital ducts in *Nautilus* with the view that the original Mollusc was unsegmented and had only one pair of coelomoducts. Considering the great specialization, however, and high degree of organization of the Cephalopods, it is evident that the earliest Nautiloid whose remains are known to us must have had a long evolutionary history behind it, and such metamerism as exists may have been developed in the course of its own history. In the other direction the evidence seems to prove that the Dibranchiata with only two renal ducts have been derived from the Tetrabranchiata.

Suborder 1. Decapoda.—Four pairs of ordinary non-retractile arms which are shorter than the body, and one pair of tentacular arms, situated between the third and fourth normal arms on each side and retractile within special pouches. Suckers pedunculated and provided with horny rings, on the tentacular arms confined usually to the distal extremities. Usually a well-developed internal shell, and lateral fins on the edges of the body. Heart in a coelomic cavity; nidamentary glands usually present.

Tribe 1. *Oigopsida.*—A wide aperture in the cornea. Two oviducts in the female. In fossil genera and *Spirula*, shell has a multilocular phragmacone with a siphuncle; initial chamber globular and larger than the second chamber. The most ancient forms characterized by the small size of the rostrum and proöstracum, and large

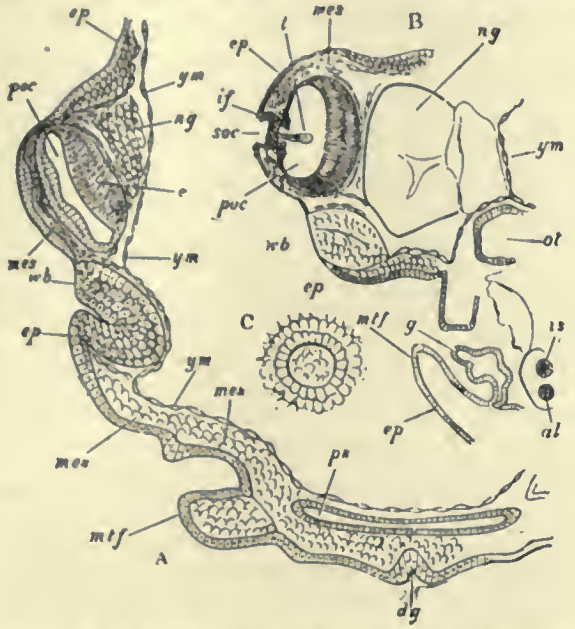


Fig. 37.—Right and left sections through embryos of *Loligo*. (After Lankester.)

A, Same stage as fig. 35 (4).
B, Same stage as fig. 35 (8); only the left side of the sections is drawn, and the food-material which occupies the space internal to the membrane *ym* is omitted.
al, Rectum.
is, Ink-sac.
ep, Outer cell-layer.
mes, Middle cell-layer.
ym, Deep cell-layer of fusiform cells (yolk-membrane).
ng, Optic nerve-ganglion.
ot, Otocyst.
wb, The "white body" of the adult ocular capsule forming as an invagination of the outer cell-layer.
mtf, Mantle-skirt.
g, Gill.
ps, Pen-sac or shell-sac, now closed.
dg, Dorsal groove.
poc. Primitive optic vesicle, now closed (see fig. 34).
l, Lens.
r, Retina.
soc, Second or anterior optic chamber still open.
if, Iridean folds.
C, The primitive invagination to form one of the otocysts, as seen in fig. 35 (5) and (6).

size of the phragmacone. In the living genera, except *Spirula*, the shell is a chitinous gladius.

Fam. 1. *Belemnoteuthidae.* Extinct; shell with well-developed phragmacone, and rostrum merely a calcareous envelope; siphuncular necks directed backwards as in Nautiloidea; ten equal arms provided with hooks. *Phragmoteuthis*, Trias. *Belemnoteuthis*, Jurassic and Cretaceous. *Acanthoteuthis*, Jurassic.

Fam. 2. *Aulacoceratidae.* Extinct; phragmacone with widely separated septa; rostrum well developed and claviform. *Aulacoceras*, Trias. *Atractites*, Trias and Jurassic. *Xipho-teuthis*, Lias.

Fam. 3. *Belemnitidae.* Extinct; phragmacone short with ventral siphuncle, prolonged dorsally into long proöstracum; rostrum large and cylindrical. *Belemnites*, 350 species from Jurassic and Cretaceous. *Diploconus*, Upper Jurassic.

Fam. 4. *Belopteridae.* Extinct; rostrum and phragmacone well developed, phragmacone often curved; initial chamber small. *Belopteva*, Eocene. *Bayanoteuthis*, Eocene. *Spirulirostra*, Miocene.

Fam. 5. *Spirulidae.* Dorsal and ventral sides of posterior extremity of shell uncovered by mantle; no rostrum or proöstracum; shell calcareous, coiled endogastrically and siphunculated; fins posterior. *Spirula*, three living species known, abyssal.

Fam. 6. *Ommatostrephidae.* Shell internal and chitinous, ending aborally in a little narrow cone; tentacular arms short and thick; suckers with denticulate rings. *Ommatostrephes*, fins aboral, simple and rhomboidal, British. *Ctenopteryx*, fins pectinate, as long as the body; *Bathyteuthis*, fins terminal, rudimentary; tentacular arms, filiform; abyssal. *Rhynchoteuthis*, tentacular arms united to form a beak-shaped appendage. *Symplectoteuthis. Tracheloteuthis. Doridicus. Architeuthis*; this is the largest of Cephalopoda, reaching 60 ft. in length including arms.

Fam. 7. *Thysanoteuthidae.* Arms enlarged, bearing two rows of suckers and filaments; fins triangular, extending whole length of body. *Thysanoteuthis*, Mediterranean.

Fam. 8. *Onychoteuthidae.* Fins terminal; tentacular arms long; suckers with hooks. *Onychoteuthis*, hook-bearing suckers on tentacular arms only. *Enoploteuthis*, hook-bearing suckers on all the arms. *Veranya*, body very short, tentacular arms atrophied in the adult, Mediterranean. *Chaunoteuthis*, body elongated, tentacular arms atrophied. *Pterygioteuthis. Ancistroteuthis. Abralia. Teleoteuthis. Lepidoteuthis.*

Fam. 9. *Gonatidae.* Body elongated; fins terminal; radula with only two lateral teeth. *Gonatus.*

Fam. 10. *Cheiroteuthidae.* Tentacular arms long, not retractile; resisting apparatus well developed. *Cheiroteuthis*, suckers along the whole length of the tentacular arms. *Doratopsis*, body very long and slender with aboral spine, dorsal arms very short. *Histioteuthis*, six dorsal arms united by membrane, photogenous organs present. *Histiopsis*, membrane of dorsal

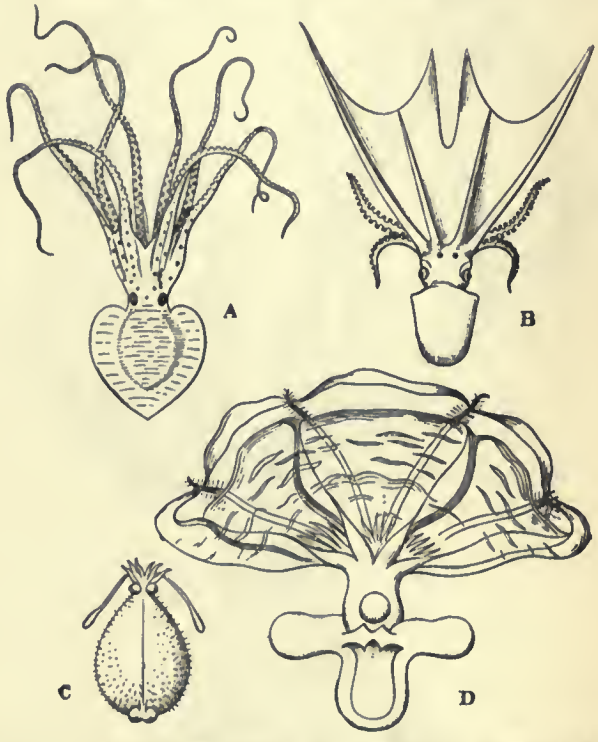


Fig. 38.—Octopodous Cephalopods; one-fourth the natural size linear.

A, *Pinnoctopus cordiformis*, Quoy and Gain (from New Zealand).
B, *Tremoctopus violaceus*, Ver. (from the Mediterranean).
C, *Cranchia scabra*, Owen (from the Atlantic Ocean; one of the Decapoda).
D, *Cirrhoteuthis Mülleri*, Esch. (from the Greenland coast).

arms only half-way up the arms, photogenous organs present. *Calliteuthis*, no brachial membrane, photogenous organs present. *Grimalditeuthis*, two fins on each side, no tentacular arms.

Fam. 11. *Cranchiidae.* Eight normal arms, very short; eyes prominent; fins small and terminal. *Cranchia*, body short, purse-shaped, normal arms short, fins entirely aboral. *Loligopsis*, body elongated, conical, tentacular arms slender. *Leachia*, tentacular arms absent, funnel without a valve. *Taonius*, body elongated, normal arms, rather short, eyes pedunculated.

Tribe 2. *Myopsida.*—No aperture in the cornea. Left oviduct only developed in female. Internal shell without a distinct phragmacone, calcified or simply chitinous.

Fam. 1. *Sepiidae.* Body wide and flat; fins narrow, extending the whole length of the body; shell calcareous and laminated. *Belosepia*, a rudiment of rostrum and phragmacone present in shell, Eocene. *Sepia*, shell with a rostrum, British. *Sepiella*, shell without a rostrum.

Fam. 2. *Sepiolidae.* Body short, rounded at the aboral end; fins rounded, inserted in middle of body-length; shell chitinous, small or absent. *Sepiola*, head united to mantle dorsally, British. *Rossia*, head not united to mantle, British. *Stoloteuthis* and *Inioteuthis*, without shell. *Heteroteuthis*. *Euprymna*.

Fam. 3. *Idiosepiidae.* Body elongated, with rudimentary terminal fins; internal shell almost lost. *Idiosepius*, 1·5 cm. long, Indian Ocean.

Fam. 4. *Sepiadariidae.* Body short; mantle united to head dorsally; no shell. *Sepiadarium*, Pacific Ocean. *Sepioloidea*, Australian.

Fam. 5. *Loliginidae.* Body elongated and conical; fins extending forward beyond the middle of body-length; shell chitinous, well developed. *Loligo*, fins triangular, aboral, British. *Sepioteuthis*, fins rounded, extending along whole of body-length. *Loliolus*. *Loliguncula*. The following fossil genera, known only by their gladius and ink-sac, have been placed near *Loligo*:—*Teuthopsis*, *Beloteuthis* and *Geoteuthis*, Lias; *Phylloteuthis*, Cretaceous; *Plesioteuthis*, Jurassic and Cretaceous.

SUBORDER 2. OCTOPODA.—Only four pairs of arms, all similar and longer than the body. Body short and rounded aborally.

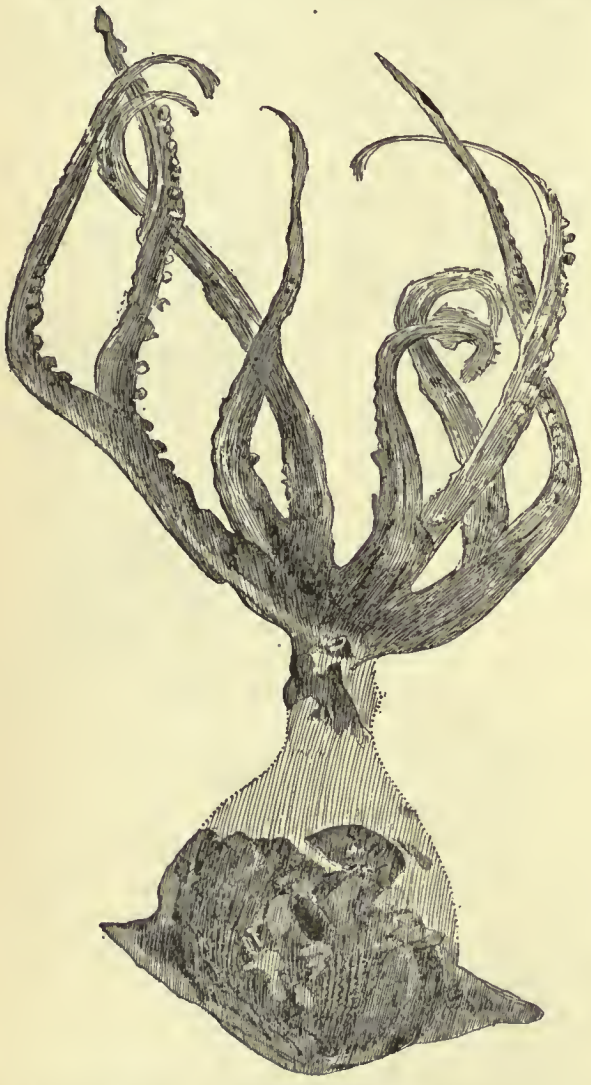


FIG. 39.—*Palaeoctopus Newboldi*, the oldest Octopod known. From the Cretaceous rocks of Lebanon. (After H. Woodward.)

Suckers sessile. Heart not contained in coelom. No nidamentary glands.

Tribe 1. *Leioglossa.*—No radula. Arms united by a complete membrane. Fins on sides of body.

Fam. *Cirrhoteuthidae.* Tentacular filaments on either side of the suckers. *Cirrhoteuthis*, pallial sac prominent, fins large, pelagic. *Opisthoteuthis*, body flattened, with small fins, deep-sea. *Vampyroteuthis*, four fins. *Palaeoctopus*, fossil, Cretaceous.

Tribe 2. *Trachyglossa.*—Radula present. No fins.

Fam. 1. *Amphitretidae.* Arms united by membrane; funnel attached to mantle, dividing the pallial aperture into two. *Amphitretus*, pelagic.

Fam. 2. *Alloposidae.* All arms united by membrane; mantle joined to head by dorsal band and two lateral commissures. *Alloposus*, pelagic.

Fam. 3. *Octopodidae.* Arms long and equal, without membrane; hectocotylus not autotomous. No cephalic aquiferous pores. *Octopus*, two rows of suckers on each arm, British. *Eledone*, single row of suckers on each arm. *Scaeurgus*. *Pinnoctopus*. *Cistopus*. *Japetella*.

Fam. 4. *Philonexidae.* Hectocotylus autotomous; arms unequal in size; aquiferous pores on head and funnel. *Tremoctopus*, two dorsal pairs of arms united by membrane. *Ocythoë*, without interbrachial membrane.

Fam. 5. *Argonautidae.* Hectocotylus autotomous; no interbrachial membrane; extremities of dorsal arms in female expanded and secreting a shell; males very small, without shell. *Argonauta*.

LITERATURE.—Use has been freely above made of the article by E. Ray Lankester, on *Mollusca*, in the 9th edition of this Encyclopedia. For the chief modern works, see Bashford Dean, "Notes on Living Nautilus," *Amer. Nat.* xxxv., 1901; Arthur Willey, "Contribution to the Natural History of the Pearly Nautilus," A. Willey's *Zoological Results*, pt. vi. (1902); Foord, *Cat. Fossil Cephalopoda in British Museum*; Alpheus Hyatt, "Fossil Cephalopods of the Museum of Comp. Zoology," *Bull. Mus. Comp. Zool.* (Cambridge, U.S., 1868); Jalta, "I Cefalopodi viventi nel golfo di Napoli," *Fauna und Flora des Golfes von Neapel*, xxiii. (1896); Joubin, "Céphalopodes de l'atlantique nord," "Céph. de la Princesse Alice," *Camp. sci. Albert Ier de Monaco*, ix. (1895), xxii. (1900); Paul Pelseneer, "Mollusca," in the *Treatise on Zoology*, edited by E. Ray Lankester. (J. T. C.)

CEPHEUS, in Greek mythology, the father of Andromeda (*q.v.*); in astronomy, a constellation of the northern hemisphere, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.). Ptolemy catalogued 13 stars in this constellation, Tycho 11, and Hevelius 51. The most interesting star in it is *δ Cephei*, a remarkable double star, the brighter component of which is a short period variable (5·37 days), with a range in magnitude of 3·7 to 4·9; it is also a spectroscopic binary.

CEPHISODOTUS, the name of the father and of the son of Praxiteles, both sculptors like himself. The former must have flourished about 400 B.C. A noted work of his was Peace bearing the infant Wealth, of which a copy exists at Munich. Peace is a Madonna-like figure of a somewhat conservative type; the child Wealth is less successful. Cephisodotus also made, like his son, a figure of Hermes carrying the child Dionysus, unless indeed ancient critics have made two works of one. He made certain statues for the city of Megalopolis, founded in 370 B.C. Of the work of the younger Cephisodotus, his grandson, we have no remains; he was a prolific sculptor of the latter part of the 4th century B.C., especially noted for portraits, of Menander, of the orator Lycurgus, and others (see J. Overbeck, *Anlike Schriftquellen*, p. 255).

CERAM (*Sirang*), an island of the Dutch East Indies, in the Molucca group, lying about 3° S., and between 127° 45′ and 131° E. Its length is a little over 200 m., its greatest breadth about 50 m., and its area, including neighbouring islets, 6621 sq. m. It consists of two parts, Great Ceram and Little Ceram or Huvamohel, united by the isthmus of Taruno; and, for administrative purposes, is assigned to the residency of Amboyna, being divided into Kairatu or West Ceram, Wahai and Amahai, the northern and the southern parts of Middle Ceram, and Waru or Eastern Ceram. No central chain of mountains stretches west and east through the island, but near the north coast hills, rising 2300 to 2600 ft., slope steeply to the shore. Near the south coast, west of the Bay of Elpaputeh, a complex mass of mountains forms a colossal pyramid, with peaks rising to nearly 5000 ft. The isthmus connecting the two parts of the island is very narrow, and has a height of only 460 to 490 ft. The chief rivers flow north and south into bays, but are navigable only for a few miles during the rainy season. The rainfall is very heavy, amounting to 121 in. (mean annual) on the south coast. On the north coast the bays of Savai and Waru are accessible for small vessels. The geological structure, consisting chiefly of eruptive rocks and crystalline limestone, is similar to that of northern Amboyna. In the eastern section the prevailing rock is crystalline chalk, similar to that of Buru. Several hot springs occur, and earthquakes are not infrequent. About 4000 persons

perished in the earthquake of 1899. A large part of the interior is covered with dense forests, and except along the coast the population is scanty. For the naturalist Ceram is without much interest, lacking characteristic species or abundance of specimens. The Bandanese pay occasional visits to shoot bears and deer; there are numbers of wild goats and cattle; and among birds are mentioned cassowaries, cockatoos, birds of paradise, and the swallows that furnish edible nests. A large number of fish are to be found in the various rivers; and as early as 1860 no fewer than 213 species were described. The most valuable timber tree is the iron-wood. Rice, maize, cocoa-nuts, sugar-cane and a variety of fruits are grown; and some tobacco is exported to Europe; but by far the most important production is the sago palm, which grows abundantly in the swampy districts, especially of Eastern Ceram, and furnishes a vast supply of food, not only to Ceram itself, but to other islands to the east. The Dutch have established cocoa and coffee plantations at various points. The coast-villages are inhabited by a mixed Malay population, Buginese, Macassars, Balinese and other races of the archipelago. The interior is occupied by the aborigines, a people of Papuan stock. They are savages and head-hunters. The introduction of Christianity was hampered by the baneful influence of a secret society called the Kakian Union, to which pagans, Mahommedans and Christians indiscriminately attached themselves; and it has several times cost the Dutch authorities considerable efforts to frustrate their machinations (see *Tijdschrift van Ned. Ind.*, fifth year). The total population is estimated at 100,000, including 12,000 Christians and 16,000 Mahommedans. The chief settlements are Savai at the north and Elpaputeh at the south end of the isthmus of Taruno. There was a Dutch fort at Kambello, on the west side of Little Ceram, as early as 1646.

CERAMICS, or KERAMICS (Gr. *κέραμος*, earthenware), a general term for the study of the art of pottery. It is adopted for this purpose both in French (*céramique*) and in German (*Keramik*), and thus has its convenience in English as representing an international form of description for a study which owes much to the art experts of all nations, though "ceramic" and "ceramics" do not appear in English as technical terms till the middle of the 19th century.

The word "pottery" (Fr. *poterie*) in its widest sense includes all objects fashioned from clay and then hardened by fire, though there is a growing tendency to restrict the word to the commoner articles of this great class and to apply the word "porcelain" to all the finer varieties. This tendency is to be deprecated, as it is founded on a misconception; the word "porcelain" should only be applied to certain well-marked varieties of pottery. The very existence of pottery is dependent on two important natural properties of that great and widespread group of rocky or earthy substances known as clays, viz. the property of plasticity (the power of being readily kneaded or moulded while moist), and the property of being converted when fired into one of the most indestructible of ordinary things.

The clays form such an important group of mineral substances that the reader must refer to the article CLAY for an account of their occurrence, composition and properties. In this article we shall only deal with the various clays as they have affected the problems of the potter throughout the ages. The clays found on or close to the earth's surface are so varied in composition and properties that we may see in them one of the vital factors that has determined the nature of the pottery of different countries and different peoples. They vary in plasticity, and in the hardness, colour and texture of the fired product, through an astonishingly wide range. To-day the fine, plastic, white-burning clays of the south of England are carried all over Europe and America for the fabrication of modern wares, but that is a state of affairs which has only been attained in recent times. Even down to the 18th century, the potters of every country could only use on an extensive scale the clays of their own immediate district, and the influence of this controlling factor on the pottery of bygone centuries has never yet received the attention it deserves.[1]

[1] The archaeologist is frequently puzzled as to the place of origin of some example of ancient pottery—was it made in the district where it was found, or had it been imported from some other centre? When we possess a sufficient body of analytical data obtained by the use of one general chemical method, an analysis of a fragment will frequently enable such a question to be answered, where now all is doubt and speculation. But the analytical results published hitherto are often not worth the paper they are printed on for such a purpose, the older methods of silicate analysis being only approximate.

General Evolution of Pottery.—The primitive races of mankind, whether of remote ages or of to-day, took perforce such clay as they found on the surface of the ground, or by some river-bed, and with the rudimentary preparation of spreading it out on a stone slab if necessary and picking out any rocky fragments of appreciable size, then beating it with the hands, with stones or boards, or treading it with the feet to render it fairly uniform in consistency, proceeded to fashion it into such shapes as need or fancy dictated. Fired in an open fire, or in the most rudimentary form of potter's kiln, such pottery may be buff, drab, brown or red—and these from imperfect firing become smoked, grey or black. How many generations of men, of any race, handed on their painfully acquired bits of knowledge before this earliest stage was passed, we can never know; but here and there, where the circumstances were favourable or the race was quick of observation, we can trace in the work of prehistoric man in many countries a gradually advancing skill based on increased technical knowledge. For ages tools and methods remained of the simplest—the fingers for shaping or building up vessels, a piece of mat or basket-work for giving initial support to a more ambitious vase,—until some original genius of the tribe finds that by starting to build up his pot on the flattened side of a boulder he can turn his support so as to bring every part in succession under his hand, and lo! the potter's wheel is invented—not brought down from heaven by one of the gods to a favoured race, as the myths of all the older civilizations or barbarisms, Egyptian, Chaldean, Greek, Scythian, and Chinese have fabled, but born from the brain and hand of man struggling to fulfil his allotted task.

Formerly every writer on the history of pottery seemed to imagine that the very rudest pottery must have been the invention of Egyptian, Chinese or some other distinct race from which the knowledge radiated to all the other races of the prehistoric world. No conception could be more erroneous. Since the middle of the 19th century research has established beyond doubt that wherever clay was found men became potters of a sort, just as they became hunters, carpenters, smiths, &c., by sheer force of need and slowly-gathered tradition. The not yet exploded view that Egypt or Assyria was the special cradle of this art, and that the pottery of the Greeks and Romans directly descended from such a parent stock, cannot survive in view of the incontestable evidence that pottery was made by the prehistoric peoples of what we now call Greece, Italy, Spain and other countries, long before they were aware that any other peoples lived on the earth than themselves.

For centuries this simple hand-made pottery was hardened by drying in the sun, so that it would serve for the storage of dried grain, &c., but the increasing use of fire would soon bring out the amazing fact that a baked clay vessel became as hard as stone. Then, too, came the knowledge that even in one district all the clays did not fire to the same colour, and colour decoration arose, in a rude daubing or smearing of some clay or earth (a ruddle or bole perhaps), which was found to give a bright red or buff colour on vessels shaped in a duller-coloured clay—most precious of all were little deposits of white clay which kept their purity unsullied through the fire,—and by these primitive means the races of the dawn made their wares. On this substructure all the pottery of the last four thousand years has been built, for behind all Egyptian, Greek or Chinese pottery we find the same primitive foundations.

We now reach the beginnings of recorded history, and as the great nations of the past emerge from the shadows they each develop the potter's art in an individual way. The Egyptians evolve schemes of glowing colour—brilliant glazes fired on objects, shaped in sand held together with a little clay, or actually carved from rocks or stones; the Greeks produce their marvels

of plastic form, and then, excited by their growing skill in metal work, turn the plastic clay into imitations of metal forms. These nations are overthrown, and the Romans spread some knowledge —only a tincture, it must be confessed—over all the lands they hold in fee; and from the Euphrates to the Atlantic, from Egypt to the Wall of Hadrian, they set alight potters' fires that have never since been extinguished. The Roman empire falls, and over Europe its pottery is forgotten along with its greater achievements; yet still pottery-making goes on in a very simple way, to be slowly revived and modified once more by the communities of monks, who, in later centuries, replace the Roman legions as the great civilizing influence in Europe. Meantime Egypt and the nearer East continued, in a debased form, the splendours of their glorious past, and glazed and painted pottery was still made by traditional methods. What part the Byzantine civilization and the Persians played during this obscure time, we are only just beginning to realize; but we now know that many interesting kinds of decorated pottery were made at Old Cairo, at Alexandria, at Damascus, in Syria, Anatolia and elsewhere (on which the later Moslem potters founded their glorious works), at a time when all over Europe crocks of simple red or drab clay, covered only with green and yellow lead-glazes, were the sole evidence of the potter's skill. What the Arab conquests destroyed, and what their breath quickened into life, we can only guess; but the fact is indisputable that with the Mahommedan conquests there came a time when the potter's art of the Occident reached its highest expression, and when methods and knowledge hitherto confined to Egypt, Syria and Persia were spread from Spain and the south of France to India—even, it may be, into China.

Meantime, in the farther East, the Chinese—the greatest race of potters the world has ever seen—were quietly gathering strength, until from their glazed, hard-fired pottery there emerged the marvellous, white translucent porcelain, one of the wonders of the medieval world.

With the dawn of the 15th century of our era, the state of affairs was practically this:—In European countries proper we find rudely fashioned and decorated wares in which we can trace the slow development of a native craft from the superposition of Roman methods on the primitive work of the peoples. The vessels were mostly intended for use and not for show; were clumsily fashioned of any local clay, and if glazed at all then only with coarse lead-glazes, coloured yellow or green; in no case above the level of workmanship of the travelling brick- or tile-maker. The finest expression of this native style is to be found in the Gothic tile pavements of France, Germany and England, where all the colours are due to the clays and there is no approach to painting. In the Moslem countries—including the greater part of Spain and Sicily, Egypt and the nearer East, probably even to the very centre of Asia—pottery was being made either of whitish clay and sand, or of a light reddish clay coated with a white facing of fine clay or of tin-enamel, on which splendid decorative patterns in vivid pigments or brilliant iridescent lustres were painted.

As early as the 12th century of our era this superior artistic pottery of the Moslem nations had already attracted the notice of Europeans as an article of luxury for the wealthy; and we may well believe the traditional accounts that Saracen potters were brought into Italy, France and Burgundy to introduce the practice of their art, while Italian potters certainly penetrated into the workshops of eastern Spain and elsewhere, and gathered new ideas. In Italy certainly, and in the south of France probably, efforts were continuously in progress to improve the native wares by coating the vessels with a white "slip" and drawing on them rude, painted patterns in green, yellow and purplish black. The increasing intercourse with Spain, in war and peace, also introduced the use of tin-enamel after the fashion of the famous Hispano-Moresque wares, and by the end of the 14th century a knowledge of tin-enamel was widespread in Italy and paved the way to the glorious painted majolica of the 15th and 16th centuries. From Italy and Spain, France and Holland, Germany, and finally, though much later, England learnt this art, and the tin-enamelled pottery of middle and northern Europe, so largely made during the 17th and 18th centuries, was the direct offshoot of this movement of the Italian Renaissance.[1]

During the 15th and 16th centuries Chinese porcelain also began to find its way into Europe, and by the whiteness of its substance and its marvellous translucence excited the attention of the Italian majolists and alchemists. The first European imitation of this famous oriental porcelain of which we have indubitable record was made at Florence (1575–1585) by alchemists or potters working under the patronage, and, it is said, with the active collaboration of Francesco de' Medici. This Florentine porcelain was the first of those distinctively European wares, made in avowed imitation of the Chinese, which form a connecting link between pottery and glass, for they may be considered either as pottery rendered translucent or as glass rendered opaque by shaping and firing a mixture containing a large percentage of glass with a very little clay. After the cessation of the Florentine experiments we know of no European porcelain for nearly a century, though the importation of Chinese porcelain had largely increased owing to the activity of the various "India" companies. The next European porcelain, made like the Florentine of glass and clay, was that of Rouen (1673) and St Cloud (1696); and during the 18th century artificial glassy porcelain was made in France and England largely, and in other countries experimentally. German experimenters worked in another direction, and the first porcelain made in Europe from materials similar to the Chinese was produced at Meissen by Böttger (1710–1712). During the 18th century not only was there a very large trade in imported Chinese and Japanese porcelain, but there was a great development of porcelain manufacture in Europe; and in every country factories were established, generally under royal or princely patronage, for the manufacture of artificial porcelain like the French, or genuine porcelain like the German. The English made a departure in the introduction of a porcelain distinct from either, though adding calcined ox-bones to the other ingredients; and this English bone-porcelain—a well-marked species—is now largely made in America, France, Germany and Sweden as well as in England.

By the end of the 18th century the risks and losses attendant on the manufacture of the French glassy porcelain had caused its abandonment, and a porcelain made from natural materials like the Chinese has since been generally made on the continent of Europe.

The older tin-enamelled wares—derived from the Hispano-Moresque and the Italian majolica—so largely made in France, Holland, Germany and elsewhere during the 17th and 18th centuries, met with a fate analogous to that of the French porcelain. Tin-enamelled earthenware is always a brittle substance, soon damaged in regular use; so that, when, in the middle of the 18th century, the English potter first appeared as a serious competitor with a fine white earthenware of superior durability and precision of manufacture, the old painted faience gradually disappeared between the upper millstone of European porcelain and the nether millstone of English earthenware.

The 19th century witnessed a great and steady growth in the output of porcelain and pottery of all kinds in Europe and the United States. Mechanical methods were largely called in to supplement or replace what had hitherto remained almost pure handicraft. The English methods of preparing and mixing the materials of the body and glaze, and the English device of replacing painted decoration by machine printing, to a large extent carried the day, with a great gain to the mechanical aspects of the

[1] It must always be borne in mind that, side by side with the production of artistic wares in all countries, the traditional craft of the village pot-maker continued, and has probably been less interfered with than is generally imagined, except in the British Isles. Any country market-place in Spain, Italy, Greece, France, Germany, or Holland is provided to-day with a simple peasant pottery little removed in its forms, its decorations, or its technical skill from the country work of the middle ages. In England the cheapness of machine-made pottery has largely destroyed such village industries.

work and in many cases with an entire extinction of its artistic spirit. Even the hand-work that still remained was largely affected by the growing dominance of machinery; and the painting, gilding and decoration of pottery and porcelain, in the first half of the 19th century, became everywhere mechanical and hackneyed. During the latter half of the 19th century another influence was fortunately at work. Side by side with the increasing mechanical perfection of the great bulk of modern pottery there grew up a school of innovators and experimentalists, who revived many of the older decorative methods that had fallen into oblivion and produced fresh and original work, in certain directions even beyond the achievements of the past. The 20th century opened with a wider outlook among the potters of Europe and America. In every country men were striving once again to bring back to their world-old craft something of artistic taste and skill.

Technical Methods.— All primitive pottery, whether of ancient or of modern times, has been made by the simplest methods. The clay, dug from the earth's surface, was or is prepared by beating and kneading with the hands, feet or simple mallets of stone or wood; stones and hard particles were picked out; and the mass, well tempered with water, was used without any addition. From this clay, vessels were shaped by scooping out or cutting a solid lump or ball, by building up piece by piece and smoothing down one layer upon another or by squeezing cakes of clay on to some natural object or prepared mould or form. The potter's wheel, though very ancient, was a comparatively late invention, arrived at independently by many races of men. In its simplest form it was a heavy

FIG. 1.—Potter moulding a vessel on the wheel (from a painting in a tomb at Thebes about 1800 B.C.). Compare the wheel on the left in fig. 5.

FIG. 2.—Potter's wheel of the time of the Ptolemies, moved by the foot (from a wall-relief at Philae). Compare fig. 5, the wheel on the right.

disk pivoted on a central point to be set going by the hand, as the workman squatted on the ground; and it may be seen to-day in India, Ceylon, China or Japan, in all its primitive simplicity (see fig. 1). This form of potter's wheel was the only one known until about the Christian era, and then, in Egypt apparently, the improvement was introduced of lengthening the spindle which carries the throwing-wheel and mounting on it near the base a much larger disk which the potter could rotate with his foot, and so have both hands free for the manipulation of the clay (fig. 2). No further advance seems to have been made before the 17th century, when the wheel was spun by means of a cord working over a pulley; and though a steam-driven wheel was introduced in the middle of the 19th century, this form remains the best for the production of fine pottery.

A prevalent misconception with regard to the potter's wheel needs correction. For anything beyond very simple shapes it is impossible to carry the work to completion on the wheel at one operation as is generally imagined. All that the potter can do while the clay is soft enough to "throw" on the wheel is to get a rough shape of even thickness. This operation completed, the piece is removed from the wheel and set aside to dry. When it is about leather-hard, it may be re-centred carefully on the wheel (the old practice), or placed in a horizontal lathe (since 16th century) and turned down to the exact shape and polished to an even, smooth surface. The Greek vase-makers were already adepts in what is often reckoned a modern, detestable practice. Many Greek vases have obviously been "thrown" in separate sections, and when these had contracted and hardened sufficiently they were luted together with slip, and the final vase-shape was smoothed and turned down on the wheel, and even polished to as fine a degree of mechanical finish as the modern potter ever attains. So too with the Chinese; many of their forms have been made in two or three portions, subsequently joined together and finished on the outside as one piece. Indeed, it is remarkable how the Greeks and Chinese had discovered for themselves many devices of this kind which are generally held up to opprobrium as the debased methods of a mechanical age. Always it should be borne in mind that the shaping of pottery by "pressing" cakes of clay into moulds is much older than the potter's wheel, and has always been the method of making shapes other than those in the round. The modern method of "casting" pottery by pouring slip, a fluid mixture of clay and water, into absorbent moulds seems to have originated in England about the middle of the 18th century; and this too is a genuine potter's method which does not merit the disapproval with which it has been generally regarded by writers on the potter's art.

In all ages the work of the "thrower" or "presser" has been largely supplemented by the modeller, who alters the shape, and applies to it handles, spouts or modelled accessories at will.

Firing.—The firing of pottery has become in modern times such a specialized branch of the manufacture that the student can only be referred here to the technological works mentioned in the bibliography at the end of this article. It is, however, necessary that we should briefly describe the earlier forms of potters' kilns used by the nations whose pottery counts among the treasures of the collector and the antiquary. Here again we now know that the primitive types of kiln used by the potters of ancient Egypt or Greece have not vanished from the earth; it is only in the civilized countries of the modern world that they have been replaced by improved and perfected devices. The potters of the North-West Provinces of India use to-day a kiln practically identical with that depicted in severest silhouette on the rock-tombs of Thebes; and the skilful Japanese remain content with a kiln very similar to the one shown in fig. 3. This Greek type of kiln was improved and enlarged by the Romans, and its use seems to have been introduced wherever pottery was made under their sway, for remains of Roman kilns have been found in many countries (see fig. 4). With the end of Roman dominance we have ample evidence that their technical methods fell into disuse, and the northern European potter of the period from the 6th to the 12th century had to build up his methods

FIG. 3.—Early Greek pottery-kiln, about 700–600 B.C. (from a painted votive tablet found at Corinth, now in the Louvre). The section shows the probable construction of the kiln.

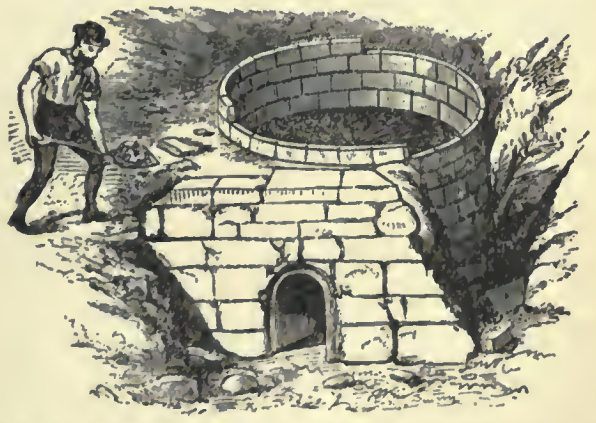


FIG. 4.—Roman kiln found at Castor. The low arch is for the insertion of the fuel; the pots rested on the perforated floor, made of clay slabs; the top of the kiln is missing,—it was probably a dome.

afresh, and improved kilns were invented. The general type of medieval potter's kiln is illustrated for us in the manuscript of an Italian potter of the 16th century, now in the library of the Victoria and Albert Museum [1] (fig. 5). Kilns of a different type, horizontal reverberatory kilns, were used for making the hard-fired pottery of

[1] *I tre libri dell' Arte del Vasajo*, by Cipriano Piccolpasso of Castel Durante, A.D. 1548.

Europe (Rhenish stoneware, &c.), as well as for Chinese porcelain and the earliest German porcelains. With the organization of pottery as a factory industry in the 18th century, improved kilns were introduced, and the type of kiln now so largely used in civilized countries is practically a vertical reverberatory furnace of circular section, from 10 to 22 ft. in diameter and of similar height, capable, therefore, of containing at one firing a quantity of pottery that would have formed the output of a medieval potter for a year. Every device that can be thought of for the better utilization of heat and

FIG. 5.—Two forms of Italian potter's wheels, about 1540.

its even distribution throughout the kiln or oven has been experimented with; and, though the results have been most successful from the point of view of the potter, even the most recent coal-fired ovens remain very wasteful types of apparatus, the amount of available heat being relatively small to the fuel consumption. Gas-fired kilns and ovens are now being used or experimented with in every country, and their perfection, which cannot be far distant, will improve the most vital of the potter's processes both in certainty and economy.

Glazes.—We are never likely to known when glaze (*i.e.* a coating of fired glass) was first applied to pottery, though the present state of knowledge would incline us to the opinion that the earliest glazed objects we possess are those of ancient Egypt,[1] but the practice may have been originated independently wherever a knowledge of the elements of glass-making had spread, as all the early glazes were of the alkaline type, which must first be fused into a glass before they can be applied to pottery.

Many primitive races seem to have burnished their pottery after it was fired, in order to get a glossy surface; and in other cases the surface was rendered shining and waterproof by coating it with waxy or resinous substances which were often coloured. It is possible that the black varnish of Greek vases was obtained by such a method, and though that point is not settled, we have many types of primitive pottery, both modern and ancient, which are coated in this way. Such a coating is only a substitute for glaze in the work of peoples who do not know or have not mastered the technical secrets of true glazes. We can only consider as glazes those definite superficial layers of molten material which have been fired on the clay substance. Glazes are as varied as the various kinds of pottery, and it must never be forgotten that each kind of pottery is at its best with its appropriate glaze. The earliest known glazes (Egyptian and Assyrian) were silicates of soda and lime containing very little alumina and no lead. Such glazes are very uncertain in use, and can only be applied to pottery unusually rich in silica (*i.e.* deficient in clay). Consequently these alkaline glazes cannot be used on ordinary clay wares, and when they have been used successfully, the clay has always been coated with a surface layer of highly siliceous substance (*e.g.* the so-called Persian, Rhodian, Syrian and Egyptian pottery of the early middle ages). The fact that glazes containing lead-oxide would adhere to ordinary pottery when alkaline glazes would not was discovered at a very early period; for lead glazes were extensively used in Egypt and the nearer East in Ptolemaic times, and it is significant that, though the Romans made singularly little use of glazes of any kind, the pottery that succeeded theirs, either in western Europe or in the Byzantine empire, was generally covered with glazes rich in lead. Throughout Europe, and over the greater part of the world, leaded glazes have been continuously used and improved for all ordinary pottery, and it is only with certain special hard-fired types of ware that they have yet been successfully replaced. Chinese porcelain and all the European porcelains made by analogous methods are fired at so high a temperature that a glaze by felspar softened by lime and silica is found most suitable for them, and the hard-fired stonewares, rich in silica, are often glazed with a salt glaze, or a melted earth rich in oxide of iron.

Every kind of potter's clay (the mixture of clay, sand, flint, &c., from which the potter shapes his wares) has its own type of glaze, and from the earliest time down to our own what the potter could produce in form or glaze or colour has been largely decided for him by the clay material at his command. With any good plastic clay which cannot be fired at the highest temperature, lead glazes have always proved the most practicable. A similar clay, to which large quantities of sand are added, may be glazed by the vapours of common salt; and mixtures rich in felspar, like Chinese or European porcelain, can be glazed by melting felspathic materials upon them. Naturally those species of pottery which are the hardest fired are the most durable—the glazes of hard porcelain are more unchangeable than lead glazes, and these in their turn than alkaline glazes.

The most important types of glaze are (1) alkaline glazes (*e.g.* Egyptian, Syrian, Persian, &c.), the oldest and most uncertain; (2) lead glazes, the most widespread in use and the best for all ordinary purposes; (3) felspathic glazes, the glazes of hard-fired porcelains, generally unsuited to any other material; (4) salt glaze, produced by vapours of common salt, the special glaze of stonewares. Many intermediate glazes have been devised to meet special needs, but these remain the only important groups. Fuller details on this important subject must be sought in the technical works.

Colours.—The primitive potters of ancient and modern times have all striven to decorate their wares with colour. The simplest, and therefore the earliest, colour decoration was carried out in natural earths and clays. The clays are so varied in composition that they fire to every shade of colour from white to grey, cream, buff, red, brown, or even to a bronze which is almost black. One clay daubed or painted upon another formed the primitive palette of the potter, especially before the invention of glaze. When glaze was used these natural clays were changed in tint, and native earths, other than clays, containing iron, manganese and cobalt, were gradually discovered and used. It is also surprising to note that some of the very earliest glazes were coloured glasses containing copper or iron (the green, turquoise and yellow glazes of the ancient Egyptians and Assyrians). Marvellous work was wrought in these few materials, but the era of the finest pottery-colour dawns with the Persian, Syrian and Egyptian work that preceded the Crusades. By this time the art of glazing pottery with a clear soda-lime glaze had been thoroughly learnt. Vases, tiles, &c., shaped in good plastic clay, were covered with a white, highly siliceous coating fit to receive glazes of this type, and giving the best possible ground for the painted colours then known. With this rudimentary technique the potters of the countries south and east of the Mediterranean produced, between the 9th and 16th centuries of our era, a type of pottery that remains ideal from the point of view of colour: for, with nothing more than the greens given by oxide of copper and iron, the turquoise of pure copper, the deep yet vivid blue of cobalt, the beautiful uncertain purple of manganese, and in certain districts the rich red of Armenian bole, they achieved colour schemes that have never been surpassed in their brilliant yet harmonious richness.

When the coating of white siliceous clay was replaced by an opaque tin-enamel as in Spain, Italy, France, Holland, &c., a necessary change in the colour schemes resulted. At first only the copper-greens and cobalt-blues could be used on such a ground; the fine manganese purple turned to brown or black and the rich iron-reds to filthy shades of yellow. We cannot wonder that the Spanish-Arab potters paid more attention to their lustre decoration, for that was the natural thing to do. How strong and fine a palette could be evolved for use on a tin-enamel ground was shown by the Italian majolists of the 15th and 16th centuries; and when the later developments of tin-enamelled pottery took place in France, Holland, Germany, &c., their colour schemes are only echoes of Italian majolica crossed with Chinese porcelain. Delft, Nevers, Moustiers and Rouen may each charm us with its individuality; Nuremberg and other south German towns may show us that they too had mastered the use of tin-enamel; yet our minds always go back to the colour schemes of Italian majolica and of the Persian and Syrian pottery that lie behind and beyond them.

The colours already spoken of were either clay colours or what are known as "under glaze" colours, because they were painted on the pottery before the glaze was fired.

The earliest glazes of the Egyptians appear not to have been white, but were coloured throughout their substance, and this use of coloured glazes as apart from painted colour was developed along with the painted decoration by the later Egyptian, Syrian and Persian potters. Green, yellow and brown glazes were almost the only artistic productions of the medieval European potters' kilns, and their use everywhere preceded the introduction of painted pottery. The most extensive application of coloured glazes was, however, that made by the Chinese, who developed this type of colour decoration before they used painted patterns in underglaze colour. The earliest Chinese porcelains, and the hard-fired stonewares out of which their porcelain arose, were decorated in this way, and the beauty of many of the early Sung coloured glazes has never been surpassed.

With the exceedingly refractory felspathic glazes of Chinese porcelain very few underglaze colours could be used; and the prevalence of blue and white among the early specimens of Chinese porcelains is due to the fact that cobalt was almost the only substance known to the potters of the Ming dynasty which would endure the high temperature needed to melt their glazes. Consequently the Chinese were driven to invent the method of painting in coloured fusible glasses on the already fired glaze. They adopted for this purpose [illegible] coloured enamels used on metal; hence the common

[1] The earliest glazed objects found in Egyptian tombs (once dignified by the name of Egyptian porcelain) are hardly to be called pottery at all, though we have no other name for them. The material is largely sand held together by a little clay and glass.

term "enamel decoration," which is so generally applied to painting in those colours which are attached to the already fired glaze by refiring at a lower temperature. With the introduction of this many-coloured Chinese porcelain into Europe the same practice was eagerly followed by our European potters, and a new palette of colours and fresh styles of decoration soon arose amongst us. Painting in on-glaze colours, being executed on the fired glaze, resembles glass painting, and it generally offers a striking contrast both in technique and colour-quality to the painting executed in colours under the glaze. In the former the work can be highly finished and the most mechanical execution is possible, but the colours are neither so rich nor so brilliant as under-glaze colours, nor have they the same softness as is given by the slight spread of the under-glaze colour when the glaze is melted over it.

It must be pointed out that the colour possibilities in any method of pottery decoration are largely dependent on the temperature at which the colour needs to be fired. The clay colours are naturally more limited in range than the under-glaze colours, and these in their turn than the on-glaze colours.

When, about the middle of the 18th century, European pottery took on its modern form, of earthenware made after the English fashion, and porcelain like the French and German, the lead or felspathic glazes used brought about another revolution in the potter's palette. The growing ideal of mechanical perfection discounted the freedom of the earlier brushwork, and printed patterns, or painting that might almost have been printed, removed the mind still farther from the richness of painted faience or majolica. It is useless to look for the glorious colour of Persian faience, Italian majolica, or Chinese porcelain, in modern wares produced by manufacturing processes where mechanical perfection is demanded to a degree undreamt of before the 19th century. The finest modern pottery colour is only to be sought in the work of those enthusiasts and experimenters who are striving to produce work as rich and free as the best of past times.

Metals.—The noble metals, such as gold, platinum and silver, have, since the early years of the 18th century, been largely used as adjuncts to pottery decoration, especially on the fine white earthenwares and porcelains of the last two centuries. At first the gold was applied with a kind of japanner's size and was not fired to the glaze, but for the last 150 years or so the metals have generally been fired to the surface of the glaze like enamel colours, by mixing the metal with a small proportion of flux or fusible ground glass. There can scarcely be a doubt that the ancient lustres of Persia, Syria and Spain were believed to be a form of gilding, though their decorative effect was much more beautiful than gilding has ever been. The early Chinese and Japanese gilding appears, like the European, to have been "sized" or water-gilt, not fired; and it seems probable that the use of "fired" gold was taught to the Oriental by the European in the 18th century. To-day "liquid" gold is exported to China and Japan from Europe for the use of the potter.

Primitive Pottery

We can group together that great and widely-spread class of vessels made by the primitive races of mankind, whether before the dawn of civilization or at the present day, for it is interesting to note that many modern races still make pottery by the same rude method as the Neolithic races of Europe and Asia, and with striking similarity of result. In fact, the knowledge of the methods and practices of the primitive potters of our own time furnishes the best possible guide to the methods of fabrication and ornamentation of the ancient specimens that are dug up from barrows, grave mounds, and tumuli. It is only natural that the materials and methods of such pottery are always of the simplest. The clay is used with very little preparation, and it is no unusual thing to find bits of stone, gravel, &c., embedded in the paste of such wares, though at a later stage of development they would have been removed. It must be remarked, however, that no race of potters practised the art for long without discovering that their vessels were not so liable to crack in drying, or lose their shape in firing, if fine sand or pounded "potsherds" were mixed with the clay; and when we are dealing with the work of races that have passed beyond the Stone Age and have learned the use of metals we find this custom universal.

There are three methods of shaping which seem to be common to almost every primitive race:—

1. The scooping out of a vessel from a ball of clay.
2. The building up of a form, often on a piece of basket-work or matting, gradually raising the walls higher by applying and smoothing down successive layers of clay.
3. Coiling; in which the clay is rolled out into thin ropes, and these are coiled round and round upon each other and smoothed down with the hands and with simple tools of bone, wood or metal.

The use of the potter's wheel is unknown, while it is remarkable how beautifully true and finely-fashioned much primitive pottery is. The primitive red and black vases discovered by Flinders Petrie in Egypt, and the somewhat similar vessels of prehistoric date from Spain, are remarkable instances of this. Some primitive races leave their pottery without decoration, especially when they have a fine red-burning clay to work in, but, generally speaking, primitive pottery of every race and time is elaborately decorated, but only with the simplest patterns. Such decorations consist of lines, dots or lunette-shaped depressions arranged in crosses, chevrons, zigzags or all-over repeated pattern. All this ornament is scratched or impressed into the clay before it is fired. Simplest of all is, perhaps, the pattern which has so obviously been produced by pressing a twisted thong round the neck or bowl of a vase; though the thong may have been used in the first instance merely to serve as a support while the vessel was dried. At a later stage the ornament is generally obtained by scratching with a tool, by pressing the end of a hollow stick into the clay to form rows of circles, by using a stick cut at the end into the shape of a half-moon, or other equally simple decorative device. In certain tropical countries this rudimentary pottery becomes hard enough for a certain amount of use when merely dried in the sun, but in all northern and temperate countries it must have been fired, probably in the most imperfect way, in an open fire or in such a kiln as could be formed by sinking a hole into the ground and erecting round it a screen of stones. How imperfect the firing was is shown by the ashen-grey colour due to smoke. In those countries where the ware has been more perfectly fired the pieces naturally become buff, drab, brown or red.

The primitive vessels that have been found in the grave-mounds of England and the northern countries generally have received a number of fanciful names for which there is very little warrant except in the case of the cinerary urns. These are generally the largest vessels of this class, and as they were used to contain burnt bones there seems sufficient warrant for the supposition that they were made for this and for no other purpose.

Our knowledge of primitive pottery has been greatly improved during recent years by the labours of a number of American students connected with the United States Geological Survey, who have carefully recorded the present-day practices of those native tribes who make and use pottery in various parts of North America and Mexico; while, in the same way, Peruvian, Brazilian and other South American pottery has been as closely investigated by European observers. It should be noted that no primitive pottery reveals any trace of a knowledge of glaze, though much of it has been highly polished after firing, and in some cases a varnish has been applied which may perhaps be regarded as the earliest kind of "glazing" ever applied to pottery vessels.

Literature.—On primitive pottery the following works may be specially mentioned. W. Greenwell, *British Barrows* (1877); Boyd-Dawkins, *Early Man in Britain* (1880); Mortimer, *Forty Years' Researches in British and Saxon Burial-mounds of East Yorkshire* (1905); Abercromby, "The Oldest Bronze-age Ceramic Type in Britain," *J. Anth. Inst.* vol. xxxii. (1902), 373; *Guide to Antiquities of the Bronze Age* (British Museum, 1904); Koenen, *Gefässkunde der vorrömischen, römischen und fränkischen Zeit in den Rheinländern* (1895); Wosinsky, *Der inkrustierte Keramik der Stein- und Bronzezeit* (1904); Walters, *History of Ancient Pottery* (Greek and Roman) (1905); Holmes, *Aboriginal Pottery of the Eastern United States* (Bureau of Ethnology, Washington, 1899); also Holmes and Cushing in *Report* of Bureau of Ethnology for 1882; Wiener, *Pérou et Bolivie* (1880); Von der Steinen, *Natur-Völkerei Central Brasiliens* (1894); Hartman, *Archaeological Researches in Costa Rica* (1905); Strebel, on "Mexican Pottery" in *Publications* of Museum für Völkerkunde (Berlin, vol. 6, 1899); Werner, *British Central Africa* (1907); Füllborn, *Deutsche Ost-Afrika*, vol. ix. (1907); Maclver, "Kabyle Pottery," *Journ. Anth. Inst.* vol. xxxii. p. 245, and "Upper Egypt," *ibid.* xxxv. p. 20; Myres, "Early Pottery Fabrics of Asia Minor," *Journ. Anth. Inst.* xxxiii. p. 367; Turveren Museum, *Notes analytiques sur les collections ethnographiques du Congo*, tome ii. (1907); Cupart, *Débuts de l'art de l'ancienne Égypte* (1903). (W. B.*)

Egypt and Western Asia

Egyptian Pottery.—Egypt affords us the most striking instance of the development of the potter's art. As in other countries

pottery was made even in Neolithic times, for the Nile mud forms a fine plastic clay and sand is of course abundant. With these materials various kinds of pottery, often extremely well made and of good form, have been continuously produced for common domestic requirements, but such pottery was never glazed.

The wonderful glazes of the Egyptians were applied to a special preparation which can hardly be called pottery at all, it contained so little clay. Yet as early as the Ist Dynasty the Egyptians had learnt to shape little objects in this tender material and cover them with their wonderful turquoise glazes. We have therefore to study the development of two independent things: (1) the ordinary pottery of common clay left without glaze; (2) the brilliant glazed faience which appears to be special to Egypt, though it may have been the groundwork for the technique of the slip-faced painted and glazed pottery of the nearer East.

We probably do not possess any specimens of the most primitive Neolithic pottery; the oldest type known to us, the black and red ware of Ballas and Nagada (1), dates from the later Neolithic age, when copper was just beginning to be used. This ware is very hard and compact and the face is highly burnished. The red colour was produced by a wash of fine red clay; the black is an oxide of iron obtained by limiting the access of air in the process of baking, which was done, Professor Petrie suggests, by placing the pot's mouth down in the kiln, and leaving the ashes over the part which was to be burnt black. Both red and black colour go right through in every case. All-red and all-black vases are occasionally found, the red with geometrical decorations in white colour, and the black with incised decoration. The forms are usually very simple, but at the same time graceful, and the grace of form is more remarkable when it is remembered that none of this early pottery was made on the wheel. Pottery of almost similar technique was found in Crete in 1905 during the American excavations at Vasiliki near Hierapetra. The general appearance of the Cretan pottery is much the same as that of the Egyptian, and the duller red and black decoration (which here has a spotted or mottled appearance) was probably obtained in the same way, the black spots being due to the action of separate fragments of the baking material. This discovery is important in view of the probable early connexion of the Cretan and Egyptian culture-centres.

A very similar red and black ware, usually of thinner and harder make, and often with a brighter surface, was introduced into Egypt at a later date (XIIth Dynasty), probably by Nubian tribes who were descended from relatives of the Neolithic Egyptians. From their characteristic graves these people are called the Pan-Grave people, and their pottery is known by the same name.

Perhaps rather later in date than the early red and black wares, but by no means certainly so, the second characteristic type of primeval Egyptian pottery is a ware of buff colour with surface decorations in red. These decorations are varied in character, including ships, birds and human figures; wavy lines and geometrical designs commonly occur. The whole *facies* of this ware seems very un-Egyptian, and it has been compared with the decorated " Kabyle pottery " of modern times. To call the people who made this ware " Libyans " on the strength of this resemblance of their pottery to that of the modern Kabyles, six thousand years later, seems, however, rash. The prehistoric Egyptians were not Kabyles or Libyans, but Nilotes, and the peculiar decoration of their pottery, which seems so strangely barbaric, is in reality merely the most ancient handiwork of the Egyptian painter, and marks the first stage in the development of pictorial art on the banks of the Nile (2). Other types of pottery (3), in colour chiefly buff or brown, were also in use at this period; the most noticeable form is a cylindrical vase with a wavy or rope band round it just below the lip, which developed out of a necked vase with a wavy handle on either side. This cylindrical type outlived the red and black and the red and buff decorated styles (which are purely Neolithic and predynastic) and continued in use in the early dynastic period, well into the Copper age. The other unglazed pottery of the first three dynasties is not very remarkable for beauty of form or colour, and is indeed of the roughest description (4), but under the IVth Dynasty we find beautiful wheel-made bowls, vases and vase-stands of a fine red polished ware (4). This fine ware continued in use at least as late as the XVIIIth Dynasty, though the forms of course differed from age to age. Under the XIIth Dynasty, and during the Middle Kingdom generally, either this or a coarser unpolished red ware was in use. The forms of this period are very characteristic (5); the vases are usually footless, and have a peculiar globular or drop-like shape—some small ones seem almost spherical. At this period the foreign " Pan-Grave " black and red pottery was also in use (see above).

The art of making a pottery consisting of a siliceous sandy body coated with a vitreous copper glaze seems to have been known unexpectedly early, possibly even as early as the period immediately preceding the Ist Dynasty (4000 B.C.). Under the XIIth Dynasty pottery made of this characteristic Egyptian faience seems to have come into general use, and it continued in use down to the days of the Romans, and is the ancestor of the glazed wares of the Arabs and their modern successors (6). The oldest Egyptian glazed ware is found usually in the shape of beads, plaques, &c.—rarely in the form of pottery vessels. The colour is usually a light blue, which may turn either white or green; but beads of the grey-black manganese colour are found, and on the light blue vases of King Aha (who is probably one of the historical originals of the legendary " Mena " or Menes) in the British Museum (No. 38,010) we have the king's name traced in the manganese glaze on (or rather in) the blue-white glaze of the vase itself, for the second glaze is inlaid. This style of decoration in manganese black or purple on copper-blue continued till the end of the " New Empire " shortly before the XXVIth (Saite) Dynasty. It was not usual actually to inlay the decoration before the time of the XVIIIth Dynasty. The light blue glaze was used well into the time of the XIIth Dynasty (British Museum, No. 36,346), but was then displaced by a new tint, a brilliant turquoise blue, on which the black decoration shows up in sharper contrast than before. This blue, and a somewhat duller, greyer or greener tint was used at the time for small figures, beads and vases, as well as for the glaze of scarabs, which, however, were usually of stone-schist or steatite —not faience. The characteristically Egyptian technique of glazed stone begins about this period, and not only steatite or schist was employed (on account of its softness), but a remarkably brilliant effect was obtained by glazing hard shining white quartzite with the wonderfully delicate XIIth Dynasty blue. A fragment of a statuette plinth of this beautiful material was obtained during the excavation of the XIth Dynasty temple at Deir el-Bahri in 1904 (British Museum, No. 40,948). Vessels of diorite and other hard stones are also found coated with the blue glaze. A good specimen of the finest XIIth Dynasty blue-glazed faience is the small vase of King Senwosri I. (2400 B.C.) in the Cairo Museum (No. 3666) (6). The blue-glazed hippopotami of this period, with the reeds and water-plants in purplish black upon their bodies to indicate their habitat, are well known. Fine specimens of these are in the collection of the Rev. Wm. MacGregor at Tamworth (8).

The blue glaze of the XIIth Dynasty deepened in colour under the XIIIth, to which the fine blue bowls with designs (in the manganese black) of fish and lotus plants belong (8) (British Museum, Nos. 4790, &c.). The finest specimens of XVIIIth Dynasty blue ware have come from Deir el-Bahri, in the neighbourhood of which place there may have been a factory for the manufacture of votive bowls, cups, beads, &c., of this fine faience, for dedication by pilgrims in the temple of Hathor (good collection in British Museum). Towards the end of this dynasty polychrome glazes came into fashion; white, light and dark blue, violet, purple, red, bright yellow, apple-green and other tints were used, not only for smaller objects of faience, such as rings, scarabs, kohl-pots, &c., but also for vases, *e.g.* No. 3965 of the Cairo Museum (Amenophis III. wine-bottle), the ground colour of which is white with a decoration of flower wreaths in blue, yellow and red, with an inscription in delicate blue (6). This

polychrome faience was also now used for the *ushabti* figures which were placed in the tombs; hitherto they had been made exclusively of stone or wood, never of glazed stone or pottery; henceforward they were made exclusively of faience, but the polychrome glazes (*e.g.* British Museum, Nos. 34,180, 34,185) were soon abandoned, and the plain blue and black of the ordinary vases was adopted. The *ushabtis* of King Seti I. (British Museum, No. 22,818, &c.) (9) are fine specimens of this type. Under the XXth Dynasty the blue paled and became weak in quality, but the priest-king family of the XXIst used for their *ushabtis* a most brilliant blue glaze, an extraordinary colour which at once distinguishes the faience of this period from that of all others (9). The same brilliant glaze was used for vases of various kinds as well. The polychrome ware had developed into a style of inlaying with glazed faience, which we see at Tel el-Amarna under the XVIIIth Dynasty (1400 B.C.) (10), and at Tel el-Yahūdīya under the XXth (1200 B.C.), used for wall decoration. After this time polychrome ceramic decoration seems to have died out in Egypt, but was retained in Asia (see below).

The technical skill of the New Empire potters is shown by such a remarkable object as the gigantic *Uas*-sceptre of blue glazed faience, now in the Victoria and Albert Museum (12, 8). This is the largest known piece of Egyptian glazed faience; really large vases of faience are not found. Faience vases were very commonly built up or carved out of a ball of the dried material, perhaps held together by some mucilaginous substance —it seems impossible that such a substance could ever have been fashioned on the wheel. Sometimes even small vases were made of separately moulded pieces united by a glassy material (6). Under the XXIInd Dynasty small glazed vases with figures of deities or animals in relief became common; these were made in moulds (6). In the matter of form the faience pottery of the New Empire follows the lead of the new earthenware types. Forms had altered considerably from those of the XIIth Dynasty. In place of the simple flowing lines of that period, we now find egg-shaped bodies with cylindrical necks, with or without handles; great *amphorae* with almost pointed bases, sometimes with the handles perched upon the shoulders of the vase; flat-tipped, squat jugs; little handleless vases somewhat resembling the modern *kulla*, "*mit mehrfach eingezogenem Bauch*" (V.B.), and the common flat flask-like type known as the "pilgrim bottle" (6, 13, 14, 15).

Owing to the extended foreign relations of Egypt at this time, imported vases from Greece and Asia, including Mycenaean *Bügelkannen* and Cypriote black "base ring" jugs, have been found in the tombs and deposits of this age (14). Imitations of foreign forms, especially the *Bügelkannen*, are found[1] chiefly in faience (British Museum, 22,731, is an imitation of a Minoan jug from Crete). The faience forms of the XVIIIth and XXIInd Dynasties include also the *kulla* shape, the pilgrim bottle, miniature *amphorae*, &c. (see fig. 6), and miscellaneous forms not found in common pottery, imitating metal and stone vases, *e.g.* the blue-green ribbed pots of the XXIInd Dynasty, imitating bronze originals, and the *alabastron* of the XVIIIth; these last go back to the XIIth Dynasty. Very pretty cups in the shape of lotus flowers (see fig. 7) are to be seen in most museums; they are of the XIXth Dynasty, and mostly came from Tuna (6, 8).

FIG. 6.—Egyptian pottery made of fine blue paste.

The continuance of the old red polished ware of the IVth Dynasty during the Middle Kingdom to the time of the XVIIIth Dynasty has already been mentioned. Characteristic of the latter period of this ware are long jugs with attenuated body and single handle, which, because they have been found with Mycenaean objects in Cyprus, have been considered to be of foreign, probably of Syrian origin. They may, however, be Egyptian. Vases of the same ware in the shape of men and animals are not uncommon (17). Another ware of this period has a highly polished yellow face, sometimes becoming ruddy, and passing off into a pinkish red; in this ware the pilgrim bottles are common. An unpolished, brittle, and thin yellow ware was also used largely for wine-vases. The rougher, commoner red and brown ware at this period became decorated with designs, chiefly of lily wreaths, &c., in paint of various colours (13). This new development hid the ugly colour of the common pottery and was a cheaply obtained imitation of the expensive, polychrome glazed ware of the period (see fig. 8). This painted pottery continued in use until about the time of the XXIInd Dynasty. From this time onwards, till the Ptolemaic period, the commonest pottery was a red ware, usually covered with a white slip. Under the XXVIth Dynasty a finer homogeneous white ware occurs, usually for vases with a rude representation of the face of the god Bes on their bodies.

FIG. 7.—Egyptian blue-glazed pottery.

The XXVIth Dynasty marks a new period of development in the history of Egyptian faience. The old deep blue colour had gradually deteriorated into an ugly green (British Museum, No. 8962), which was replaced by the Saite potters with a new light blue of very delicate tint, imitated, in accordance with the archaistic spirit of the time, from the old light blue of the earliest Dynasties. The glaze itself is very thin and "sugary" in texture. The old decoration of the blue with designs and inscriptions in manganese-black is abandoned; on the *ushabtis* the inscriptions are now incised. Side by side with this light blue glaze was used an unglazed faience, a sort of composition paste with the colour going right through.[2] It has more variety of colour than the glazed faience, light green and a dark indigo blue being found as well as the Saite light blue. Sometimes it is of a very soft, almost chalky consistency. It was used for vases, but more generally for small figures and scarabs (6). The commonest vase-form of this period is the pilgrim bottle, now made with the neck in the form of a lily flower, and with inscriptions on the sides wishing good luck in the New Year to the possessor. These flasks appear to have been common New Year's gifts.

FIG. 8.—Egyptian pottery with painted ornament and sham marbling.

Under the Sebennyte kings of the XXXth Dynasty a further new development of glaze began, of a more radical character than ever before. The colour deepened, and the glaze itself became much more glassy, and was thickly laid on. The new glaze was partly translucent, and differed very greatly from the old opaque glaze. It first appeared on *ushabtis* at the end of the Saite period. A curious effect was obtained by glazing the head-dress, the inscription &c., of the *ushabtis* in dark blue, and then covering the whole with translucent light blue glaze. This method was regularly used during the succeeding Ptolemaic and Roman periods, when the new style of glaze came into general use. A yellowish green effect was obtained by glazing parts of the body of the vases in yellow and covering this with the translucent blue glaze. This method was used to touch up the salient portions of

[1] Foreign pottery had been imported into Egypt at least as early as the XIIth Dynasty, *e.g.* the Cretan polychrome ware of the Middle Minoan period (Kamares style) found at Medinet Ghuraib ("Kahun") and the Cypriote (?) "punctuated" black ware from the same site, and from Khata'anah (17). The date between the XIIth and XIIIth Dynasties is certain (14), but the Middle Kingdom Egyptians do not seem to have imitated these earlier foreign forms. British Museum, No. 17,046, is, however, probably an instance of an Egyptian idea imitated by the foreign potter (17).

[2] Some of these figures appear to have been made with a mixture of sand, clay and coloured glass which produced a real glassy porcelain—the earliest porcelain of which we have any record.

the designs in relief, imitated from foreign originals, a style which now became usual on vases. The usual decoration is mixed Egyptian and classical, the latter generally predominating. A large range of colours was employed; purple, dark blue, blue-green, grass-green, and yellow glazes all being found. The glaze is very thickly laid on, and is often " crazed " (**6, 8**). A remarkable instance of this Romano-Egyptian faience is the head of the god Bes in the British Museum (No. 35,028). A hard, light blue, opaque glaze like that of the XXVIth Dynasty is occasionally, but rarely, met with in the case of vases (British Muscum, Nos. 37,407, 37,408).

We know something of the common wares in use during this period from the study of the *ostraka*, fragments of pottery on which dated tax-receipts, notes, and so forth were written. From the *ostraka* we see that during the Ptolemaic period the commonest pottery was made of red ware covered with white slip, which has already been mentioned. At the beginning of the Roman period we find at Elephantine a peculiar light pink ware with a brownish pink face, and elsewhere a smooth dark brown ware. About the 3rd century A.D. horizontally ribbed or fluted pots, usually of a coarse brown ware, came into general use. These were often large-sized *amphorae*, with very attenuated necks and long handles (see fig. 9). During the Byzantine (Coptic) period most of the pottery in use was ribbed, and usually pitched inside to hold water, as the ware was loose in texture and porous.

FIG. 9.—Egyptian pottery under the Ptolemies, showing Greek influence in the shapes.

During the Coptic period, a lighter ware was also in use, decorated with designs of various kinds in white, brown or red paint on the dull red or buff body. In Nubia a peculiar development of this ware is characteristic of the later period (Brit. Mus. No. 30,712).

A polished red ware of Roman origin (imitation Arretine or " Samian ") was commonly used as well.

The heavily glazed blue faience continued in use until replaced in the early Arab period by the well-known yellow and brown lead-glazed pottery, of which fragments are found in the mounds of Fostat (Old Cairo).

Western Asia.—Palestine. The most ancient Palestinian pottery is the rough " Amorite " ware from Lachish (Tel el-Hesi) which sometimes has wavy handles like the prehistoric Egyptian (**18**). Later we find actual Mycenaean pottery in Philistia (**19**), an interesting testimony to the truth of the legend which brings the Philistines from Crete; the fourth and fifth cities of Lachish (1200–1000 B.C.) show us the first ordinary Phoenician or Israelite pottery—buff or red lamps and bowls, the latter with the handles sometimes painted in bistre, and vases showing strong Egyptian influence; while pottery from Cyprus and elsewhere is found as in Egypt.

The only remarkable later development of Palestinian pottery is the Phoenician imitation of Egyptian faience of the Saite period, of which the characteristics are well known. Some of this may actually have been made in Egypt.

The course of the potter's art in Mesopotamia and Persia appears to have run on lines of development parallel with the art in Egypt, for the country between the Tigris and the Euphrates is rich in good clays, and, wherever the invention of glass arose, its application to pottery decoration was certainly developed at an early period in Egypt and in Mesopotamia.

Two characteristic uses of clay wares must, however, be pointed out, though they have nothing to do with vase-making.

1. The Babylonian and Assyrian use of clay shaped into tablets, cylinders and prisms, to produce an imperishable record of the literature of the time. The cylinders and prisms were thrown on the potter's wheel and are consequently hollow; the circular form was then sliced down, and the surface was impressed with cuneiform inscriptions, the prism, tablet or cylinder being subsequently dried and fired.

2. The architectural use of glazed bricks and slabs. While the Egyptians remained content for the most part with the application of their brilliant alkaline glazes to small and delicately-finished objects, the Babylonians and Assyrians developed an architecture decorated with glazed and coloured brickwork. The bricks were of very open texture, and the ornamental pattern or figure subjects were obtained by a strong outline in dark-coloured clay which formed a kind of *cloison* or boundary, the shallow cells between being filled in with coloured clays—yellow, red or white—or with coloured glazes of turquoise, green or blue, yellow and purplish brown. These glazes are obviously like the Egyptian, but they are more coarsely prepared and are always full of bubbles and consequently more or less opaque. Yet the severe simplicity of the method, the splendid colour effect, strong yet sumptuous, entitles these productions to a very high rank among all the world's work in clay and glaze. The " Frieze of the Archers " now in the Louvre may be mentioned as one of the finest productions of its kind, and the Louvre and British Museum possess the finest collections of this early architectural use of glazed and coloured clay. (See also MURAL DECORATION.)

Coming to ordinary pottery we find that in early times well-formed vases made of good clay, unglazed and unpainted, were made. Small figures of deities made of the same clay are often found. It is practically the same terra-cotta as that of the inscribed tablets. None of the forms are particularly distinctive (see fig. 10). The excavations of the French in Persia have

FIG. 10.—Assyrian biscuit pottery.

brought to light at Moussian in Susiana an extremely interesting painted ware, which belongs to a very early period. The decoration is usually geometrical. The technique seems to be analogous to the Mycenaean-Greek (*Firnismalerei*), and the whole effect is very like that of the Greek, Late Mycenaean or Dipylon pottery. The ware is buff in colour and fine in texture, with a polished surface. The decoration is sometimes in polychrome, but usually in the grey-brown iron-glaze (?) alone. This pottery degenerates later and finally disappears (**20**).

During the Sargonide period in Assyria (7th century B.C.) we find a polychrome faience (colours usually white and brown) obviously of Egyptian origin. It was used, not for vases, but architectonically for friezes, ornamental bosses, &c. Its origin may be found in Egypt under the XVIIIth Dynasty, when Egyptian influence extended to the Tigris, and Babylonia had regular diplomatic relations with Egypt. In Asia this polychrome decoration in glazes continued to be used long after it had ceased

FIG. 11.—Assyrian glazed and enamelled pottery.

to be made in the country of its origin; the enamelled brick decoration of Persepolis is the descendant of the glazed inlay decorations of Tel el-Amarna, Tel el-Yahudiya and Kuyunjik. In the Sargonide period blue glazed vases occur (see fig. 11) which are probably of Egyptian origin or are Phoenician imitations of Egyptian faience.

Characteristic of the Parthian period is a coarse green glazed pottery of which the slipper-shaped coffins of the time were made

(British Museum, Nos. 1645-1647) (21). This glaze possibly contains a small amount of lead; in appearance it is not unlike the contemporary translucent blue glaze of Egypt. The Egyptian glaze certainly spread into western Asia, and we find the last specimens of it in the tiles from the destroyed city of Rhagae in Persia, which may be as late as the 13th century A.D. The lead glazes, unknown in Egypt till the late Roman period, may be of Asiatic origin, though this important point is by no means clear.

REFERENCES.—(1) Petrie-Quibell, *Ballas and Nagada* (date erroneous); (2) Jacques de Morgan, *L'Âge de la pierre et des métaux*; (3) Petrie, *Diospolis Parva*, frontispiece (also for "sequence-dates" of pottery); (4) Garstang, *Mahâsna and Bêt Khallâf*, pls. xxix.–xxxii.; (5) Petrie, *Illahûn*, pl. xii. (corr. by V. Bissing in (14)); (6) V. Bissing, *Catalogue générale du musée de Caire*, "Die Fayencegefässe"; (7) Petrie, *Abydos*, ii., frontispiece; (8) Henry Wallis, *Egyptian Ceramic Art* (Macgregor Collection); (9) *Guide to Third and Fourth Egyptian Rooms, British Museum*, p. 252 ff.; (10) Petrie, *Tel-el-Amarna*; (11) *Guide to Third and Fourth Egyptian Rooms*, p. 261; (12) Petrie, *Nagâda*, pl. xxviii.; (13) Petrie, *Illahûn*, pls. xx., xxi.; (14) V. Bissing, *Strena Helbigiana*, p. 20 ff.; (15) Garstang, *El Arâbah*, pls. xviii.-xxi., xxviii., xxix.; (16) Hall, *Oldest Civilization of Greece*, p. 143 ff. *ibid.* figs. 29, 30, 69; (17) *Guide to Third and Fourth Egyptian Rooms*, pl. viii.; (18) Petrie, *Tell-el-Hesy*, pl. v.; (19) Welch, *Ann. Brit. Sch. Ath.* vi.; (20) de Morgan, *Délégation en Perse*, viii. (1905); (21) *Brit. Mus.: Guide to Babylonian and Assyrian Room.* (H. R. H.)

GREEK, ETRUSCAN AND ROMAN

GREEK. *Study of Greek Vases.*—It is not so many years since an account of Greek pottery would naturally have followed chronologically the history of Egyptian pottery with little overlapping; but recent discoveries have reversed all such ideas, and, while up to the end of the 19th century the earliest remains to be traced on Greek soil could be assigned at the furthest to the period 2500–2000 B.C., it is now possible not only to show that at that period technical processes were highly developed, but even to trace a continuous development of Greek pottery from the Neolithic age. This result has been mainly brought about by Dr Arthur Evans's researches at Cnossus in Crete, but traces of similar phenomena are not wanting in other parts of Greece. Whether the race which produced this pottery can strictly be called Greek may be open to question, but at all events the ware is the independent product of a people inhabiting in prehistoric times the region afterwards known as Greece; its connexion with the pottery of the historic period can now be clearly traced, and in its advanced technical character and the genuinely artistic appearance of its decoration even this early ware proclaims itself as inspired by a similar genius.

The study of Greek vases has thus received an additional impetus from the light that it throws on the early civilization of the country, and its value for the student of ethnology. But it has always appealed strongly to the archaeologist and in some degree also to the artist or connoisseur, to the former from its importance as a contribution to the history of Greek art, mythology and antiquities, to the latter from its beauty of form and decoration. Attention was first redirected to the painted vases at the end of the 17th century, though for a long time they served as little more than an adjunct to the cabinet of the amateur or a pleasing souvenir for the traveller; but even during the 18th century it dawned on the minds of students that they were of more than merely artistic importance, and attention was devoted to the elucidation of their subjects, and attempts made to arrive at a chronological classification. Two facts must, however, be borne in mind: firstly, that down to the middle of the 19th century the great majority of painted vases had been found only in Italy; secondly, that these vases were mostly of the later and more florid styles, which, if artistically advanced, are now known to represent a decadent phase of Greek art.

From the former cause arose the notion that these vases were the product not of Greek but of Etruscan artists, and so the term "Etruscan vase" arose and passed into the languages of Europe, surviving even at this day in popular speech in spite of a century of refutation. Meanwhile, the study of the subjects depicted on the vases passed through the successive stages of allegorical, historical and mystical interpretation, until a century and more of painstaking study led to the more rational principles of modern archaeologists.

Sites and Discoveries.—The sites on which Greek vases have been found cover the whole area of the Mediterranean and beyond, from the Crimea to Spain, and from Marseilles to Egypt. By far the great majority, at all events of the finer specimens, have been extracted from the tombs of Vulci and other sites in Etruria; those of the later period or decadence have been found in large numbers on various sites in southern Italy, such as Capua, Cumae and Nola in Campania, Anzi in Lucania, and Ruvo in Apulia. In the western Mediterranean, Sicily has also been a fruitful field for this pottery, early varieties being found at Syracuse, later ones at Gela, Girgenti and elsewhere. Painted vases have also come to light in Sardinia and in North Africa, especially in the Cyrenaica, where the finds mostly belong to the 4th century B.C. In Greece proper the most prolific site has been Athens, where the finds extend from the Dipylon vases of the 8th century B.C. down to the decadent productions of the 4th century; one group, that of the white funeral *lekythoi*, is almost peculiar to Athens. Next to this city, Corinth has been most productive, especially in pottery of the archaic period and of local manufacture. Large quantities of pottery of all periods have been yielded by Thebes, Tanagra and other sites in Boeotia, and remains of the "Mycenaean" period at Mycenae, Argos and elsewhere. But on the whole painted pottery is rare in other parts of the mainland. Among the western islands of the archipelago, Aegina and Euboea have proved fruitful in vases of all periods; Thera, Melos and others of the Cyclades are remarkable for pottery of the prehistoric period with rudely painted designs; and above all Crete is now famous for the wondrous series of painted and ornamented pottery of pre-Mycenaean date, which can be traced back even to the Neolithic period, and the discovery of which has entirely revolutionized the preconceived theories on the appearance of painted pottery in Greece. This has been found in the recent excavations at Cnossus, Palaeokastro and elsewhere. In Asia Minor there have been some important finds on the mainland, but only along the coast; some of the islands, more especially Samos and Rhodes, have been more fruitful in this respect. At Kertch and elsewhere in the Crimea, large numbers of fine but somewhat florid vases of the 5th and 4th centuries B.C. have come to light. Cyprus has long been known as a rich field for pottery of all periods, from the Mycenaean onwards, the later varieties being marked by strong local quasi-oriental characteristics, with little development from the more primitive types (figs. 12 and 13). The principal sites are Salamis, Amathus, Marion (Poli) and Curium. Lastly, in the Egyptian delta two sites, Naucratis and Daphnae, have yielded results of considerable importance for the history of early Greek vase-painting.

FIG. 12.—Jug from Cyprus of Oriental style, 10 in. high.

FIG. 13.—Pottery from Cyprus with geometrical ornament.

The great majority of these vases have been found in tombs; but some important discoveries have been made on the sites of temples and sanctuaries, as on the Acropolis of Athens, or at Naucratis. In such cases the vases are seldom complete, having been broken up and cast away into rubbish-heaps, where the fragments have remained undisturbed. The tombs vary greatly in form, those of Greece being usually small rock-graves or shafts, those of Italy often fine and elaborate chambers with architectural details, and the manner in which the vases are found in these tombs varies greatly. Plain unornamented pottery is almost universal, and may be considered to have formed the "tomb-furniture" proper—the painted vases being as in daily life merely ornamental adjuncts.

Shapes and Uses of Greek Vases.—The enormous number of painted vases now collected in museums is in itself sufficient evidence of the important part they must have played in the daily life of the Greeks, and the care which was bestowed on their decoration shows the high estimation in which they were held. It is, however, remarkable that, with the exception of general allusions to pottery and its use in daily life, there are singularly few passages in classical literature which throw light on the purposes for which these vases were used. Where any are described at full length there is always evidence that metal vases are intended. Athenaeus and the lexicographers have indeed put on record a long list of names of shapes, but it is only in a few cases that we can be certain what forms they describe, or whether any of the typical forms of existing vases can be identified with the literary descriptions.

We have then two questions to consider in this section: firstly, the uses to which painted vases were put by the Greeks; secondly, the classical names of the various forms of plain and painted pottery which have come down to us.

As we have seen, the majority of painted vases have been discovered in tombs, which at first sight seems to suggest that they were made principally for sepulchral purposes; but that they also had their uses in daily life as much as plain pottery or earthenware cannot be doubted. They stand, in fact, in the same relation to the commoner wares of their day as china or porcelain does with us, being largely ornamental only, but used by wealthy people or on special occasions for the purposes of daily life, as for instance at banquets or in religious ceremonies.

Vases were used as measures, as in the case of a small one-handled cup in the British Museum (see fig. 15), found at Cerigo (*Cythera*) and inscribed with the word ἡμικοτύλιον or "half-kotyle," equivalent to about one-fourth of a pint. Another vase found at Athens is supposed to represent the official χοῖνιξ or quart, having a capacity of 0·96 litre; it is inscribed δημόσιον or "official measure," and bears the official stamp of the state. Conversely many names of vases, such as the *amphora* or the *kotyle*, were adopted to indicate measures of capacity for liquid or dry commodities. Earthenware vessels were used for storing both liquids and food, for the preparation of foods and liquids, and for the various uses of the table and the toilet. That the painted ware was used at banquets or on great occasions we learn from scenes depicted on the vases themselves, in which vases painted with subjects appear in use. In connexion with athletics, they were given as prizes, as in the case of the Panathenaic *amphorae*, a class of vases given for victories in the games held at Athens at the Panathenaic festivals, where, however, they do not represent prizes so much as marks of honour corresponding to modern racing cups. Vases were also used as toys for children, as is proved by the discovery of many diminutive specimens, chiefly jugs, in the tombs of children at Athens, on which are depicted children playing at various games. They also served a purely decorative use as domestic ornaments, being placed on columns or shelves; or, in the case of flat cups and plaques, suspended on the wall. Many of the later Greek and Italian painted vases are very carelessly decorated on the one side, which was obviously not intended to be seen.

We come now to the use of vases for religious purposes, dedicatory, sacrificial or funerary. Of all these uses, especially the last, there is ample evidence. That vases were often placed in temples or shrines as votive offerings is clear from the frequent mention in literature of the dedication of metal vases, and it can hardly be doubted that painted pottery served the same purpose for those who could only afford the humbler material. Of late years much light has been thrown upon this subject by excavations, notably on the Acropolis of Athens, at Corinth, and at Naucratis in the Egyptian delta, where numerous fragments have been found bearing inscriptions which attest their use for such purposes. It was a well-known Greek custom to clear out the temples from time to time and form rubbish-heaps (*favissae*) of the disused vases and statuettes, which were broken in pieces as useless, but it is to this very fact that we owe their preservation. At Naucratis many of the fragments bear incised inscriptions, such as Ἀπόλλωνός εἰμι, "I am Apollo's" (possibly a memorandum of the priest's, to mark consecrated property), or ὁ δεῖνά με ἀνέθηκε τῇ Ἀφροδίτῃ, "So-and-so dedicated me to Aphrodite." Fig. 14 gives another example with a dedication to Apollo. At Penteskouphia, near Corinth, a large series of painted tablets (πίνακες), dating from 600 to 550 B.C., with representations of Poseidon and dedicatory inscriptions to that deity, were found in 1879. Votive offerings in this latter form were common at all periods, and tablets painted with figures and hung on trees or walls are often depicted on the vases, usually in connexion with scenes representing sacrifices or offerings.

There is no doubt that vases (though not necessarily painted ones) must have played a considerable part in the religious ceremonies of the Greeks. We read of them in connexion with the Athenian festival of the Anthesteria, and that of the gardens of Adonis. They were also used in sacrifices, as shown on an early black-figured cup in the British Museum and on a vase at Naples with a sacrifice to Dionysus. In scenes of libation the use of the jug and bowl (*phiale*) is invariable.

But their most important use, and that to which their preservation is mainly due, was in connexion with funeral ceremonies. They were not only employed at the burial, but were placed both outside the tombs to receive offerings, and inside them either to hold the ashes of the dead or as "tomb-furniture," in accordance with Greek religious beliefs in regard to the future life. Several classes of vases are marked out by their subjects as exclusively devoted to this purpose, such as the large jars found in the Dipylon cemetery at Athens, which were placed outside the tombs, the white Athenian *lekythoi* of the 5th and 4th centuries B.C., and the large *krateres* and

FIG. 14.—Part of vase from Naucratis with dedication to Apollo.

other vases of the 4th century B.C. found in the tombs of Apulia and other parts of southern Italy. Their use as cinerary urns was perhaps more restricted, at all events as regards the painted vases, though the custom is well known and is referred to in literature from Homer downwards. In "Mycenaean" times coffers (λάρνακες) of clay were used for this purpose, especially in Crete, where fine painted examples have been found; but of Greek pottery of the best periods there are but isolated instances.

The diagrams in fig. 15 show the principal shapes characteristic of Greek pottery in all but the earliest periods, when the variety of form was as yet too great to permit of more than the vaguest nomenclature; each form has its conventional name appended. These shapes may be classified under the following heads: (1) Vases in which food or liquids were preserved; (2) vases in which liquids were mixed or food cooked; (3) those by means of which liquids were poured out or food distributed; (4) drinking-cups; (5) other vases for the use of the table or toilet. Thus we have the *pithos* and *amphora* for storing wine, the *krater* for mixing it, the *psykter* for cooling it, the *kyathos* for ladling it out, and the *oinochoe* or *prochoos* for pouring it out; the *hydria* was used for fetching water from the well. The names and forms of drinking-cups are innumerable, the principal being the *kylix*, *kotyle*, *kantharos*, *rhyton* (drinking-horn) and *phiale* (libation bowl). The *pyxis* was used by women at their toilet, and the *lekythos*, *alabastron* and *askos* for oil and unguents.

Technical Processes.—Though the Greeks succeeded in making pottery of a very high order from the point of view of form and decoration, the technical processes remained throughout of the most elementary—for glaze was not used at all, the colour was of the simplest, and the temperature at which the ware was fired was not high enough to introduce any serious difficulties. As we should expect, it is possible to trace a gradual improvement in the technical processes in the direction of greater precision and refinement, for no vase-painter of the best period could have achieved his decorative triumphs on wares so coarse in substance and so rough in finish as those that satisfied his predecessors. As in every other case technical and artistic refinement went hand in hand. In the earliest times the clay was used with very little preparation; at all events before the introduction of the potter's wheel the finish is not to be compared with that of the early races in Egypt. As the practice developed no doubt, specially good clays were found in certain districts, and these became centres of manufacture or the clays were carried to other established centres. The primitive wares usually exhibit the natural buff, yellow, grey or brownish colours of other elementary pottery, and the surface is somewhat rough and possesses no gloss. Thenceforward it becomes appreciably warmer in tone as it becomes finer in texture, until it reaches its perfection in the glowing orange, inclining to red, of the best Attic vases of the 5th century B.C. In the vases of the later Italian centres the colour again reverts to a paler hue.

The clay for the potter was doubtless prepared by a system of sedimentation, so as to get rid of all coarse particles. It was mixed with water and decanted into a series of vats so that ultimately fine clay of two or three grades was obtained. Both red and whitish clays were used, and the best potters gradually discovered that mixtures of different clays gave the best results. The clay for the Athenian vases was obtained from Cape Kolias in Attica; and as it did not burn to a very warm tone, ruddle or red ochre (*rubrica*) was added to it to produce the lovely deep orange glow that distinguishes the best vases. Corinth, Cnidus, Samos and other places were also famous for their clays, and at the first named tablets have

been found bearing representations of the digging of clay for pottery.

The improved manipulation of the clays, and the increasing knowledge that the colour of a clay could be modified by admixture of other substances such as ruddle and ochre, really paved the way for what is known as the glaze of the Greek painted vases. This delicate gloss, so thin as to defy analysis, has been commonly called glaze, but it cannot be a glaze in the sense of a separate coating of finely-ground glass superimposed upon the clay. In all probability, as the Greek potter used finer and finer clays and so was enabled to perfect his shapes, he found that after a vase had been "thrown" he could get a closer texture on it by dipping it in a slip of still finer clay material and then smoothing it down and polishing it on the wheel when sufficiently dry. But the mixtures he would use for such a purpose—of very siliceous clay and ochre—would, when they were burnt in the Greek kiln, not only fire to a beautifully bright colour, but also to a glossy surface, especially where the flames had freely played about them; and it is more in accordance with our knowledge to believe that the exquisitely thin gloss of the finest Greek red vases was produced in this way, for it seems impossible that it can have been a coating of any special glaze.

FIG. 15.—Shapes of Greek Vases.

In any case we may state broadly that the body of Greek vases is always fine in grain, fired hard enough to give forth a dull metallic sound when it is struck, but seldom fired above a temperature of about 900° C., which a modern potter would consider very low. When broken the inside is generally found to be duller in colour, and is often yellow or grey, even where the external surface is red. The material is exceedingly porous, and allows water to ooze through it (another proof that it was not glazed). Numerous analyses of the material of Greek vases have been published, but they tell us nothing of the secrets of the Greek potter. The results of a great number of these analyses may be summed up as follows: silica, 52-60 parts; alumina, 13-19 parts; lime, 5-10 parts; magnesia, 1-3 parts; oxide of iron, 12-19 parts. Analyses of a thousand ordinary simple red burning clays would give a similar result. It is to the glory of the Greek potter that with such ordinary materials, by the exercise of selection, patience and skill, he achieved the fine artistic results we see. He did as much as can be done with natural clay materials, but the glory of painted colour and glaze, like the later Persian or Chinese, was not for him.

Manufacture of Vases.—The earliest Greek pottery is, like all primitive pottery, hand-made. The introduction of the potter's wheel into Greece was the subject of various ancient traditions, but we now know that it can be easily traced by a study of the primitive pottery of Crete, Cyprus or Troy. In Cyprus, for instance, the Bronze age tombs of 2500–1500 B.C. contain only hand-made pottery, but in the next period (1500–1000 B.C.) we find hand-made and coarse vases side by side with a more developed kind of painted pottery—the "Mycenaean"—obviously made on the wheel. It seems probable, therefore, that the wheel was introduced into Greece about 1500 B.C.; it was certainly known to Homer, as a familiar allusion shows (*Il.* xviii. 600). It was still a low circular table turned with the hand, not the foot; representations of its use are seen on several vases of the archaic period (fig. 16), and they further prove that the vase was replaced on the wheel for the subsequent processes of painting, polishing and adding separately modelled parts, as well as for the original shaping or "throwing."

The method of shaping the vase on the wheel, which is the same as that still in use, need not be described in detail; the feet, necks, mouths and handles were modelled separately or shaped in moulds, and attached while the clay was moist, as is also indicated on a vase. Large and coarse vases, such as wine casks (*πίθοι*), were always modelled by hand on a kind of hooped mould (*κάνναβος*).

FIG. 16.—Votive tablet from Corinth, full size; a potter applying painted bands while the vessel revolves on the wheel.

Parts of vases were modelled by hand at all periods by way of decoration. Even in the geometrical period we find horses modelled in the round on the covers of vases and later on handles enriched with moulded figures of serpents twining round them. Such embellishments are frequently, if not always, deliberate imitations of metal forms, but the plastic principle is one which obtained in Greek pottery from the very first, as for instance in the primitive pottery of Troy, in which the vases are often modelled in human or animal forms; and the same principle is involved in the common practice of speaking of the "neck," "shoulder" or "foot" of a vessel. In the best period the practice of adding moulded ornaments or of modelling vases in natural forms took a subsidiary place, but

examples occur from time to time, as in the beautiful *rhyta* or drinking-horns of the red-figure period (Plate II., fig. 58), or in smaller details such as are seen in handles enriched with heads in relief, a favourite practice of the potter Nicosthenes. In the 4th-century vases of southern Italy the handles are often much ornamented in this fashion, as in the large *krateres*, where they are adorned with masks in relief.

The system of moulding whole vases or ornamenting them with designs in relief taken from moulds really belongs to the decadence of the art, when imitations of metal were superseding the painted pottery. Even then it is rare to find whole vases produced from a mould, except in the case of those in the form of human figures or animals (Plate II., figs. 57 and 58), which almost come under the heading of terra-cotta figures, except for the fact that they are usually painted in the manner of the vases. But in southern Italy the tendency to imitate metal led to the popularity of ornaments made separately from moulds and attached or let in to vases otherwise plain. Vases of this period, with reeded bodies, must also have been made from moulds, as were a series of *phialae* or libation-bowls associated with Cales in Campania (Plate II., fig. 56), which are known to be direct imitations of metal.

All or nearly all of these vases are covered with a plain black glaze or varnish, and painted decoration is rare except in the case of those moulded in special forms or of a certain class made in Apulia with opaque colouring laid on the varnish. Some of these plain black vases of the 4th century are ornamented with *stamped* patterns made with a metal punch impressed in the moist clay. This decoration is confined to simple patterns.

After the vases had been made on the wheel they were dried in the sun and lightly baked, after which they were ready for varnishing and painting; it is also probable that the gloss was brought out by a process of polishing, the surface of the clay being smoothed with a piece of wood or hard leather. On a vase in Berlin a boy is seen applying a tool of some kind to an unfinished cup, probably for this purpose; the cup, being shown in red on the vase, has evidently not been varnished. Many vases are varnished black all over the exterior (whether decorated with designs or not) with the exception of the foot and lip.

The process of baking was regarded as one of the most critical in the potter's art. It was not indeed universal, as we read of sun-dried vessels for utilitarian purposes, but all the vases that have come down to us have been baked. The amount of heat required was regulated by the character of the ware, but was not very high. Many examples exist of discoloured vases which have been subjected to too much or too little heat, the varnish having acquired a greenish or reddish hue. Or again the red gloss is sometimes turned to an ashen-grey colour, the black remaining unimpaired. Other accidents were liable to occur in the baking, such as cracking under too great heat, or the damaging of the shape by vases knocking against one another and so being dented in or crushed.

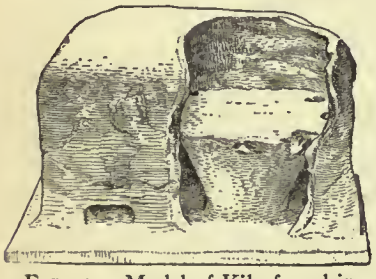


FIG. 17.—Model of Kiln found in Essex.

The form of the oven was of the simplest (fig. 17). No furnaces have been found in Greece, and only one or two in Italy, but we have a variety of evidence from vase-paintings. They were fed by fires from beneath, and the vases were inserted with a long shovel. They were heated with charcoal or wood fuel, and there are representations of men poking or raking the fires with long-handled implements. One vase-painting gives a bird's-eye view, in horizontal section, of the interior of an oven full of jugs of various forms. Others have more complete presentations of potteries, with men engaged in the different processes of vase manufacture, modelling, painting or supplying the kilns with newly-made wares.

The Painting of Vases.—We may distinguish three principal classes of painted pottery, of which two admit of subdivision.

1. Primitive Greek vases with simple painted ornaments, chiefly linear and geometrical, laid directly on the clay with the brush. The colour employed is usually a yellowish or brownish red passing into black. The execution varies, but is often extremely coarse.

2. Greek vases painted with figures. These may be subdivided as follows:—
   - (*a*) Vases with figures in shining black on a red glossy ground.
   - (*b*) Vases with figures left in the glossy red on a ground of shining black.

3. Vases with polychrome decoration.
   - (*a*) Vases of various dates with designs in outline or washes in various colours on white ground (these range from the 6th to the 4th century B.C.).
   - (*b*) Vases of various dates with designs in opaque colour laid over a ground of shining black (ranging from the primitive period to the 3rd century B.C.).

Of these the second group is by far the largest and most important, including the majority of the finest specimens of Greek vase-painting, and the following account will deal mainly with the technical processes by which the most successful results were obtained. In both the classes (*a*) and (*b*) the colouring is almost confined to a contrasting of the glossy red ground and shining black.

This black varnish (?) is particularly deep and lustrous, but varies under different circumstances according to differences of locality, of manufacture or accidents of production. It is seen in its greatest perfection in the "Nolan" *amphorae* of the earlier red-figure period, at its worst in the Etruscan and Italian imitations of Greek vases. The gradations of quality may be partly due to the action of heat, *i.e.* stoving at a higher or lower temperature. It also varies in thickness. At present no certainty has been attained as to its composition—Brongniart's oft-quoted analysis cannot be accepted—nor has any acid been found to have an effect upon it, though the chemical action of the earth sometimes causes it to disappear.

The method of its use forms the chief distinction between the black-figured and red-figured vases, but there is a class of the former which approaches near in treatment to the latter, the whole vase being covered with black except a framed panel which is left red to receive the figures. It is obvious that the transition to merely leaving the figures red is but a slight one. But in all black-figured vases the main principle is that the figures are painted in black silhouette on the red ground, the outlines being first roughly indicated by a pointed instrument making a faint line. The surface within these outlines being filled in with black, details of anatomy, dress, &c., were brought out by incising inner lines with a pointed tool. After a second baking or perhaps stoving had taken place, the designs were further enriched by the application of opaque purple and white pigments, which follow certain conventional principles in their respective use. After a third baking at a lower heat still to fix these colours the vase was complete.

In the red-figured vases the shining black is used as a background. But before it is applied the outlines of the figures are indicated not by incised lines, but by drawing a thick line of black round their contours. Recent researches have attempted to show that the instrument with which this was achieved may have been a feather brush or pen, by which the lines were drawn separately, not concurrently. The other tools used for painting would be an ordinary metal or reed pen and a camel's-hair brush, or at any rate something analogous. Thus the outlines of the figures were clearly marked, and the process is one of drawing rather than painting, but it was in draughtsmanship that the best vase-painters excelled. The next stage was to mark the inner details by very fine black lines or by masses of black for surfaces such as the hair; white and purple were also employed, but more sparingly than on the earlier vases. The main processes always remain the same down to the termination of vase-painting, though the tendency to polychromy, which came in about the end of the 5th century B.C., effected some modifications. The blacking of the whole exterior surface—a purely mechanical process—took place after the figures had been completed and protected from accidents by the thick black border of which we have spoken.

(From a photo supplied by the Director of the Sèvres Museum).

FIG. 18.—Fragment of unfinished red-figured vase.

A fragment of an unfinished vase preserved in the Sèvres Museum gives a very clear idea of the process just described, the figures being completed, but the background not yet applied (fig. 18). There is also another vase in existence which gives the interior of a vase-painter's studio, in which three artists are at work with their brushes, their paint-pots by their side.

In the class of vases (3 (*a*)), with polychrome figures on a white ground, the essential feature is the white slip or *engobe* with which the naturally pale clay is covered. In the archaic vases of the 7th and 6th centuries B.C., especially in the Ionian centres, as at Rhodes, Naucratis and Cyrene, this slip is frequently employed, but with this difference, that the figures are painted in the ordinary black-figure method, the only additional colour being purple laid on the black. We first find polychrome decoration, whether in wash or outline, in a small class of fragments from Naucratis, of the 6th century B.C., which technically are of a very advanced character. The colours used either for outline or wash include purple, brown, yellow, crimson and rose-colour, but some, if not all, of these colours were not fired.

In the 5th century this practice was revived at Athens, chiefly in the class of *lekythoi* or oil-flasks devoted exclusively to sepulchral uses. Here the vases, after leaving the wheel and being fitted with handles, &c., were covered with a coating of white clay. A second coating of black was applied to the parts not required for decoration, and the white was then finely polished, acquiring a dull gloss, and finally fired at a low temperature. The decoration was achieved as follows: a preliminary sketch was made with fine grey lines, ignoring draperies, &c., and not always followed when the colours were laid on. This was done when the first lines were dry, the colour

being applied with a fine brush in monochrome—black, yellow or red—following the lines of the sketch. For the drapery and other details polychrome washes were employed, laid on with a large brush. All varieties of red from rose to brown are found, also violet, yellow, blue, black and green. Hair is treated either in outline or by means of washes.

Finally, we have to deal with the class of vases (3 (*b*)) in which opaque pigments are laid over the surface of the shining black with which the whole vase is coated. This method is met with at three distinct periods in the history of vase-painting, separated by long distances of time.

We first find it in the earlier Cretan or Kamares ware, where it seems to have been introduced not long after the close of the Neolithic period, about 2500 B.C., and where it holds its own for about a thousand years against the contrasted method of "dark on light" painting, till it was finally ousted by the latter at the height of "Mycenaean" civilization in Crete. The colouring is very varied, orange, brown, pink and white being the principal tints employed.

The process appears again at the end of the 5th century in a small class of Attic vases, which have been regarded as a sort of transition between the black-figured and red-figured. White and orange-red are here employed, sometimes with accessory details in purple and black and incised lines, so that the technique is virtually black-figured, though the appearance of the vases is often red-figured. Lastly, it appears in southern Italy as a final effort of vase-painting to flicker into life again about the end of the 3rd century. Some of these vases were made in Campania, where the method resembles that of the Attic class just described, others in Apulia, probably at Gnathia. The latter have feeble conventional decoration in purple and white with details in yellow, confined to one side of the vases, and are also distinguished by the use of ornaments in relief. They were also occasionally made in Greece proper.

Remarkably few colours were used by the Greek vase painters, especially in the best periods. The deep purple used for accessory details was produced from iron oxide, but the red used for lines on the white *lekythoi* is an ochre (μίλτος, *rubrica*). The white also used for accessories is an earth or clay; in the slip coating of the white ground vases it assumes the consistency of pipe-clay. Yellow, where used for details on the later vases, is an ochre, and blue and green are produced from artificial compounds containing copper. A number of the colours, such as blue, rose and green, used by the polychrome painters, are obviously artificial pigments which have not been fired. When gilding was employed it was laid on over a raised ground of clay finely modelled with a small tool or brush, and was attached by varnish, not by fire.

Potters and Inscriptions.—The potters who made these vases were mostly—at least at Athens in the 6th and 5th centuries, B.C.—μέτοικοι, or resident aliens, as their names in many cases imply. We have an Amasis (an Egyptian name), a Brygus (a Scythian), a Lydus and a Scythes. The dialect of many of the inscriptions on Attic vases seems to show foreign influence, though in other cases peculiarities may be merely due to the use of a vernacular. They formed a gild or fraternity, and in each pottery there was probably more or less division of labour, the more simple processes being the work of slaves. This seems to be implied in the vase-paintings representing the interior of potteries. Others again "specialized" in different shapes, and were known as χυτροκλάδοι, ληκυθοποιοί, and so on.

Over a hundred names of artists are known, found on some five hundred vases. They go back to about 700 B.C., the earliest names being found on Corinthian and Boeotian vases; but the majority of the signatures are found on Attic black- and red-figured wares. Some, such as Andocides, made vases in which the two methods are combined. The best known is Nicosthenes, whose signature occurs eighty times. The ordinary forms of signature are four—(1) ὁ δεῖνα ἐποίησεν; (2) ὁ δεῖνα ἔγραψεν; (3) ὁ δεῖνα ἔγραψε καὶ ἐποίησεν; (4) Α ἔγραψε. Β ἐποίησεν. Where ἐποίησε alone occurs (as in a signature of Euxitheus), it probably refers to the master of the pottery who designed the vase and superintended its production; in other cases the share of the actual artist is clearly indicated. Some artists, such as Duris and Makron, sign ἔγραψε alone; in all cases, the form of signature affords us a useful guide to their style.

Space forbids the discussion of other inscriptions found on vases, which include those descriptive of subjects or persons, ejaculations uttered by the figures, convivial exclamations, or the καλός names discussed below; all these are painted on the designs themselves. There is also another class of *graffiti* inscriptions, which includes those incised by the owners with their names and memoranda scratched under the foot, probably made by the potter or his workmen relating to the number of vases in a batch or "set" and their price.

Vitreous and Lead-glazed Wares.—In Greek tombs a class of pottery is often found which approximates more in appearance to porcelain, but, though often spoken of by that name, it is not porcelain at all, but is analogous to the Egyptian glazed faience, of which it is in point of fact an imitation. It is distinguished by the white gritty material of which it is made, largely composed of sand, and forming what is sometimes known as "frit" from its semi-vitreous consistency. The surface is covered with a glaze, usually of a pale blue or cream colour, but other colours such as a manganese-purple or brown are sometimes found. Some of the earliest examples of this ware have been found in Mycenaean tombs at Enkomi in Cyprus, in the form of vases moulded in the shape of human or animal heads. These exhibit a remarkably advanced skill in modelling, and are more like Greek work of the 6th century B.C. Apart from the technique they have nothing in common with the Egyptian importations so often found in Mycenaean tombs.

In a subsequent period (8th–7th century B.C.) Egyptian objects in faience became a common import into Greek cities, such as those of Rhodes, and to a less degree in Sardinia and southern Italy, through the commercial medium of the Phoenicians. Flasks of faience occur in the Polledrara tomb at Vulci (610–600 B.C.) and similar vases with a pale green glaze at Tharros in Sardinia in tombs of the same date. In Rhodes, small flasks and jars are found ornamented with friezes of men and animals in relief, or imitating in colour and design the glass vessels of the Phoenicians. It also seems probable that the Greeks of Rhodes and other centres attempted the imitation of this ware (see fig. 19), for we find faience *aryballi* or globular oil-flasks modelled in the form of helmeted heads or animals, which are purely Greek in style.

FIG. 19.—Enamelled pottery from tombs in Rhodes, made under Egyptian influence.

In the Hellenistic period the fashion was revived at Alexandria, and under the Ptolemies large jugs of blue-enamelled faience with figures in relief and bearing the names of reigning sovereigns were made and exported to the Cyrenaica and to southern Italy. Two of these are in the British Museum (Egyptian department). The same collection includes a very beautiful glazed vase in the form of Eros riding on a duck, found in a tomb at Tanagra, but undoubtedly of Alexandrine make, and a head of a Ptolemaic queen, with a surface of bright blue glaze.

Subsequently in the 1st century B.C., this so-called porcelain ware was replaced by a variety of ware characterized by a brilliantly coloured glaze coating, in which the presence of lead is often indicated. This ware was principally made at three centres; at Tarsus in Asia Minor, at Alexandria and at Lezoux in central Gaul. But it was probably also made in western Asia Minor and in Italy. It is not confined to vases, being also employed for lamps and small figures; the vases are usually of small size, in shapes imitated from metal (Plate II., fig. 59). The colour of the glaze varies from a deep green to bright yellow, and the inside of a vessel is often of a different tint from the exterior. Many of these vases are decorated with figures or designs in relief, others are quite plain. The colours of these glazes are of course due to the addition of oxide of copper and oxide of iron to a lead glaze, and they are strictly analogous to the green and yellow glazes of medieval Europe.[1]

HISTORICAL ACCOUNT OF GREEK VASE-PAINTING.—It has been indicated in the section dealing with technical processes that Greek vases may be classified under four headings according to the character of the decoration, and this classification may with a slight modification be adopted as a chronological one, the history of the art falling under four main heads, under which it will be convenient to describe its development from the earliest specimens of painted pottery down to the period when it was finally replaced by other methods of decoration.

These four classes and their main characteristics may be summarized as follows:—

I. *Vases of the Primitive Period* from about 2500 or 2000 to 600 B.C., including both the Cretan-Mycenaean epoch and the early ages of historical Greece. In the former the pottery is either decorated in polychrome on a shining black ground or conversely in shining black on a buff ground; in the latter, the decoration is in brown or black (usually dull, not shiny) on an unglazed ground varying from white to pale red. In the former again the decoration is marked by its naturalistic treatment of plant and animal forms; in the latter the ornaments are chiefly linear, floral or figures of animals; human figures and mythological scenes being very rare.

II. *Black-figured Vases* from about 600–500 B.C.; figures painted in shining black on a glossy ground varying from cream colour to bright orange red, with engraved lines and white and purple for details; subjects mainly from mythology and legend.

III. *Red-figured Vases*, from 520 to 400 B.C.; figures drawn in outline on red clay and the background wholly filled in with shining black, inner details indicated by painted lines or dashes of purple and white, scenes from daily life or mythology. With these are included the vases with polychrome figures on white ground. In these, which are exclusively made at Athens, the perfection of vase-painting is reached between 480 and 450 B.C.

IV. *Vases of the Decadence*, from 400 to 200 B.C.; mostly from southern Italy, technique as in Class III., but the drawing is free

[1] On this subject see in particular Mazard, *De la connaissance par les anciens des glaçures plombifères*, a scientific and valuable monograph (1879); also Rayet and Collignon, *Hist. de la céramique grecque*, p. 365 (or *B.M. Cat. of Roman Pottery*, Introduction).

and often careless, and the general effect gaudy; subjects funereal, theatrical and fanciful. At the end of this period vases are largely replaced by plain shining black pottery modelled in various forms, or with decorations in relief, all these being imitations of the metal vases which began to take the place of painted wares in the estimation of the Hellenistic world.

I. *Vases of the Primitive Period.*—It has been noted in the introductory section that it is possible to trace the development of pottery in Greece as far back as the Neolithic period, owing chiefly to the light recently thrown on the subject by the excavations in Crete. These have yielded large quantities of painted pottery of high technical merit, usually with decoration in polychrome or white on a dark ground, in what is known as the Kamares ware, covering the period 2500–1500 B.C. (fig. 20). This was gradually superseded by painting in dark shining pigments on a light glossy ground during the later Minoan period (1500–1000 B.C.), forming what is known as the "Mycenaean" style. The subjects, though chiefly confined to floral ornaments or aquatic plants and creatures, are marvellously naturalistic yet decorative in their treatment, often rivalling in this respect the pottery of the Far East. In the latter part of this period this class of pottery was spread all over the Mediterranean, and large quantities have been found in Greece, especially at Mycenae, in Rhodes and other Greek islands, and in Cyprus, where a series of vases with animals, monsters, and even human figures shows what is probably the latest development of the pure Minoan or Mycenaean style.

From *Annual of the British School at Athens.*

FIG. 20.—Minoan or "Kamares" ware, from Crete.

FIG. 21.—Primitive black pottery from the Troad.

Outside Crete the earliest Greek pottery has been found in Cyprus and at Troy, with simple incised or painted patterns on a black polished ground, the vases being all hand-made, and often treated in a plastic fashion with rude modelling of human or animal forms (figs. 21, 22); these cover the period 2500–2000 B.C. Early painted pottery, parallel with the Kamares ware, has been found in Thera and in the important cemeteries of Phylakopi in Melos. But until the general spread of Mycenaean civilization and art in the latter half of the second millennium there is no site except Crete where a continuous and successful development can be studied.

FIG. 22.—Primitive red pottery from the Troad.

About the time which is represented in Greek tradition by the Dorian invasion (1100 B.C.) the then decadent Mycenaean civilization was replaced by a new one much more backward in development, making pottery of a far simpler and more conventional type, the decoration being largely confined to geometrical patterns to the exclusion of motives derived from plant forms. This is usually known as the geometrical style, and the pottery covers the period from about 1000 to 700 B.C. It is found all over the mainland and islands of Greece, and exhibits a certain development towards a more advanced stage. The patterns include the chevron, the triangle, the key or maeander, and the circle, in various combinations, painted in dull black on a brown ground. In most places the art advanced no further, but in Boeotia, and still more at Athens, we can trace the gradual growth of decorative skill, first in the introduction of animals, and then in the appearance of the human figure. In the Athenian cemetery outside the Dipylon gate a series of colossal vases has come to light, on which are painted such subjects as sea-fights and funeral processions. The human figures are exceedingly rude and conventional, painted almost entirely in silhouette, but there is a distinct striving after artistic effect in the composition and arrangement. In Boeotia the vases do not advance beyond the animal stage, and many exhibit a tendency to decadence in their carelessness, as contrasted with the painstaking helplessness of the Athenian artists.

FIG. 23.—Vase with bands of animals, Oriental in style. (British Museum.)

In Ionia and the islands of the Aegean such as Rhodes, the art of vase-painting from the first carried on the Mycenaean tradition, and was distinguished by its naturalism and originality, and by the bold and diverse effects produced by variety of colour or novelty of subject. The ornamentation is at first elementary, consisting of friezes of animals, especially lions, deer and goats (figs. 23 and 24). These figures stand out sharply in black against the creamy buff ground which is characteristic of nearly all Ionic pottery, and details are brought out by means of engraved lines, patches of purplish iron pigment, or by drawing parts of the figures, especially the heads, in outline on the clay ground. Another feature is the general use of small ornaments such as rosettes and crosses in great variety of form to cover

FIG. 24.—Ionic amphora, with contest between Heracles and Hera, and bands of birds and animals; black, with incised lines.

the background and avoid the vacant spaces which the Greek artist abhorred. The system of decoration has been thought to owe much to Assyrian textile fabrics.

One of the best though most advanced examples of early Ionic pottery is a *pinax* or plate from Rhodes in the British Museum, on which is represented the combat of Menelaus and Hector over the body of Euphorbus (fig. 25); their names are inscribed over the figures, and this is almost the earliest known instance of a mythological subject, the date of the painting being not later than 600 B.C. To a slightly later date belongs another remarkable group of cups with figures on a white ground, probably made at Cyrene in North Africa. Of these the most famous has a painting in the interior, of Arcesilaus II., king of Cyrene from 580 to 550 B.C., weighing goods for export in a ship. Others have mythological subjects, such as Zeus, Atlas and Prometheus, Cadmus and Pelops.

But these vases, though still retaining the older technique, really belong to the second class, that of black-figured vases, and they belong to a time when in all Ionian centres this method was being superseded by the new technique which Corinth had

FIG. 25.—Early inscribed pinax from Rhodes, with contest of Menelaus and Hector over the body of Euphorbus.

introduced and Athens perfected, to the consideration of which we must return.

For some 150 years Corinth almost monopolized the industry of pottery on the west of the Aegean. Large numbers of examples have been found in or near the city itself, many bearing inscriptions in the peculiar local alphabet. They show a continuous progress from the simplest ornamentation to fully-developed black-figured wares. In the earliest (Plate I. fig. 52) oriental influence is very marked, the surface being so covered with the figures and patterns that the background disappears and the designs are at times almost unintelligible. The general effect is thus that of a rich oriental tapestry, and the subjects are largely chosen from the fantastic and monstrous creations of Assyrian art, such as the sphinx and gryphon. The vases are mostly small, the ground varies from cream to yellow, and the figures are painted in black and purple.

Both in Ionia and at Corinth during the early part of the 6th century the same tendencies are seen to be at work, tending to a unification of styles under the growing influence of Athens. In Ionia (see above) figure subjects become more common, and the technique approaches gradually nearer to the black-figure method. Similarly at Corinth the ground ornaments diminish and disappear, the friezes of animals are restricted to the borders of the designs, and human figures are introduced, first singly, then in friezes or groups, and finally engaged in some definite action such as combats or hunting scenes. In the last stages Greek myths and legends are freely employed. A new development, traditionally associated with the painter Eumarus of Athens, was the distinguishing of female figures by the use of white for flesh tints. A somewhat similar development was in progress at Athens, though represented by comparatively few vases. Here the adoption of Corinthian and Ionian technical improvements evolved by the middle of the 6th century the fully developed black-figure style which by degrees supplanted or assimilated all other schools.

II. *Black-figured Vases.*—At the head of this new development stands the famous François vase at Florence, found at Chiusi in 1844 (Plate I. fig. 53). Its shape is that of a *krater* or mixing-bowl, and it bears the signatures of its maker and decorator in the form "Ergotimos made me, Klitias painted me." It might be described as a Greek mythology in miniature, with its numerous subjects and groups of figures all from legendary sources such as the stories of Peleus, Theseus and Meleager, or the return of Hephaestus to heaven. All the figures have their names inscribed.

The general technique of the black-figured vases has already been described. It may be noted as a chronological guide that the use of purple for details is much commoner in the earlier vases, white in the later, but towards the end of the century when the new fashion of red figures was gaining ground, both colours were almost entirely dropped. The drawing of the figures is, as might be expected, somewhat stiff and conventional, though it advanced considerably in freedom before the style went out of fashion. Many vases, otherwise carefully and delicately executed, are marred by an excess of mannerism and affectation, as in the works of the artists Amasis and Exekias (Plate I. fig. 54). The treatment of drapery is a good indication of date, ranging from flat masses of colour to oblique flowing lines of angular falling folds.

The shapes most commonly employed by the Athenian potters of this period are the *amphora*, *hydria*, *kylix*, *oinochoe* and *lekythos*, the first-named being the most popular. A special class of *amphorae* is formed by the Panathenaic vases, which were given as prizes in the Athenian games, and were adorned with a figure of the patron goddess Athena on one side and a representation of the contest in which they were won on the other (fig. 26). They usually bear the inscription *τῶν Ἀθηνῆθεν ἄθλων εἰμί*, "I am (a prize) from the games at Athens." Some of these can be dated by the names of Athenian archons which they bear, as late as the 4th century, the old method of painting in black figures with a stiff conventional pose for the goddess being retained for religious reasons.

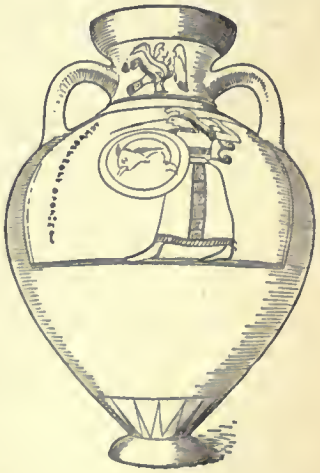


FIG. 26.—Panathenaic amphora.

The chief interest of the black-figured vases is really derived from their subjects, which range over every conceivable field, the proportion of myth and legend to scenes from daily life being much greater than in the succeeding period. They include groups of Olympian and other deities, and the various scenes in which they take part, such as the battle of the gods and giants, or the birth of Athena (treated in a very conventional manner, as on a fine *amphora* in the British Museum); Dionysus and his attendant satyrs and maenads, the labours and exploits of Heracles and other heroes, subjects taken from the tale of Troy and other less familiar legends; and scenes from daily life, battle scenes, athletics, the chase and so on. The same classification of course holds good for the later periods of vase-painting, with some exceptions. The proportion of genre-scenes subsequently becomes greater, and some myths disappear, others rise

into prominence, new deities such as Eros (Love), and Nikē (Victory) appear for the first time, and, generally speaking, the later subjects are characterized by a sentimentality or tendency to emotion which is entirely foreign to the conventional stereotyped compositions of the 6th century artist.

A remarkable feature of the subjects on black-figured vases is that a stereotyped form of composition is invariably adopted at least for the principal figures, but minor variations are generally to be found, as, for instance, in the number of bystanders; and it is almost an impossibility to find any two vase-paintings which are exact duplicates. The form of the composition was partly determined by the field available for the design; when this took the form of a long frieze the space was filled up with a series of spectators or the repetition of typical groups, but when the design is on a framed panel or confined by ornamental borders the method of treatment is adapted from that of a sculptured metope, and the figures limited to two or three. In many cases it is difficult to decide, in the absence of inscriptions, whether or no a scene has mythological signification; the mythological types are over and over again adopted for scenes of ordinary life, even to the divine attributes or poses of certain figures.

Among the artists of the period who have left their names on the vases, besides those already mentioned, the most conspicuous is Nicosthenes, a potter of some originality, from whose hand we have over seventy examples, a few being in the red-figure method. He is supposed to have introduced at Athens a revival of the Ionic fashion of painting on a cream-coloured ground instead of on red, of which some very effective examples have been preserved. He was always a potter rather than a painter, and most of his vases are remarkable for their forms—introducing plastic imitations of metal vases—rather than for their painted decoration. Most of the artists of this period, as in the succeeding one, have left their signatures on cups (*kylikes*), but this form did not receive so much attention from the painter as at a later period, and many of these examples bear only inscriptions and no painted decoration.

III. *Red-figured Vases.*—The sudden reversal of technical method involved in the change from black figures on a red ground to red figures on black is not at first sight easy of explanation. Some artists, like Nicosthenes and Andocides, used both methods, sometimes on the same vase, and there is no doubt that the two went on for some years concurrently. As, however, no intermediate stage is possible, there is no question of development or transition. The new style was in fact a bold and ingenious innovation. It may possibly have been suggested by a small class of vases in which the figures are painted in the black-figure *method*, but have the converse appearance, that is to say they are painted in a thick red pigment on a ground of shining black. It may therefore have occurred to the artist that he could obtain the same effect merely by leaving the figures unpainted on the red clay and surrounding them with the black. The change, must, however, be closely associated with the career of the artist Andocides, who not only produced vases in each method, but also several in which the two are combined (fig. 27). In two or three cases the subject is actually the same on each side, almost every detail being repeated, except that the colouring is reversed.

The date at which the change took place was formerly placed well on in the 5th century, on account of the great advance in drawing which most of the red-figured vases show, as compared with the black. They were thus regarded as contemporary with the painter Polygnotus, if not with Pheidias. But the excavations on the Acropolis of Athens yielded so many fragments in the advanced red-figured style which must be earlier than 480 B.C., that it has become necessary to find an earlier date for its appearance. This is now usually placed at about 520 B.C., overlapping with the preceding period.

The red-figure period is usually subdivided into four, marking the chief stages of development, and known respectively as the "severe," "strong," "fine," and "late fine" periods. Their principal characteristics and representative painters may be briefly enumerated.

In the *severe* period there is no marked advance on the black-figured vases as regards style. The figures are still more or less stiff and conventional, and some vases even show signs of an analogous decadence. The real development is partly technical, partly in the introduction of new subjects. Although the change of style probably had its actual origin in the *amphora*, as treated by Andocides, the new developments are best seen in the *kylix*, a form of vase which now sprang into popularity and called forth the chief efforts of the principal artists. Its curved surface gave ample scope for skilful effects of drawing and decorative arrangement, and the earlier painters devoted all their attention to perfecting it as a work of decorative art. For other shapes, such as the *hydria* and *lekythos*, the old method was for a time preferred.

Vase by Andocides. Black figures on obverse. FIG. 27. Vase by Andocides. Red figures on reverse.

The most typical artist of the period was Epictetus, and other famous cup-painters were Pamphaeus, Cachrylion and Phintias. The earliest cups are decorated in a quite simple fashion like those of the black-figure period, often with a single figure each side between two large "symbolical" eyes, and a single figure in a circle in the interior. To the latter the artist at first devoted his chief efforts, though even here his scope was at first limited. But although he had not yet attained to skill in composition, he did discover that the circular space was well adapted for exhibiting his newly-acquired abilities as a draughtsman and for disposing figures in ingeniously conceived attitudes. In all cases the object was to fill the space as far as possible, a characteristic of all the best Greek art. By degrees more attention was paid to the designs on the exterior, and the single figures were replaced by groups, but regular compositions in the form of friezes telling some story were not introduced until quite the end of this period. Epictetus was throughout his career a thoroughly "archaic" artist, but a considerable advance was

made by Cachrylion, who stands on the verge of the succeeding stage.

The *strong* period centres round the name of Euphronius, the author of a really great artistic movement. His capacity for inventing new subjects or new poses—or otherwise overcoming technical and artistic difficulties—marks a great advance on all previous achievements, and he seems to represent the stage of development traditionally associated with the painter Cimon of Cleonae, the inventor of foreshortening and other novelties. Thus figures were no longer represented exclusively in profile, as in the black-figured vases which had made no advance beyond the conventions of Egyptian art. Ten vases signed by him are in existence (though it is not certain that all were actually painted by him), most of them having mythological subjects (fig. 28).

FIG. 28.—Cup by Euphronius.

Of his contemporaries, Duris, Hieron and Brygus take foremost rank, all three being, like Euphronius, essentially cup-painters, though they use other forms at times. For decorative effect and beauty of composition their vases have never been surpassed. As an example we may quote a *kotyle* or beaker in the British Museum signed by Hieron, with a group of Eleusinian deities. The larger vases of this period are more rarely signed, but many of them rival the cups in execution, though the subjects are characterized by greater simplicity and largeness of style.

In the *fine* style (460–440 B.C.) breadth of effect and dignity are aimed at, and although cup-painting had passed its zenith, and signed specimens become rarer, yet, considering the red-figured vases as a whole, this period exhibits the perfection of technique and drawing. In many of the larger vases the scenes are of a pictorial character, landscape being introduced, with figures ranged at different levels, and herein we may see a reflection of the style of the painter Polygnotus. One of the finest cups in this style is in the Berlin Museum, it is signed by the artists Erginus and Aristophanes, and the subject is the battle of the gods and giants. To the end of the period belongs a beautiful *hydria* in the British Museum by the painter Meidias with subjects from Greek legend in two friezes (fig. 29). Generally speaking, there is a reaction in favour of mythological subjects.

In the *late fine* style, which begins about 440 B.C., the pictorial effect is preserved, but with perfected skill in drawing the compositions deteriorate greatly in merit, and become at once over-refined and careless. The figures are crowded together without meaning or interest. The fashion also arose of enhancing the designs by means of accessory colours—almost unknown in the previous stages—such as white laid on in masses, blue and green, and even with gilding. Athletic and mythological subjects yield place to scenes from the life of women and children or meaningless groups of figures (fig. 30).

A good example of this style is an *amphora* from Rhodes with the subject of Peleus wooing Thetis, in which polychrome colouring and gilding are introduced. There are also many imposing and elaborate specimens found (and perhaps made) in the colonies of the Crimea and the Cyrenaica; in particular one signed by Xenophantus with the Persian king hunting, and another representing the contest of Athena and Poseidon for the soil of Attica, both from the Crimea.

Contemporary with the red-figure method is one in which the figures are painted on a white slip or *engobe* resembling pipe-clay, with which the whole surface was covered; the figures are drawn in outline in red or black, and partly filled in with washes of colour, chiefly red, purplish red, or brown, but sometimes also with blue or green. This style seems to have been popular about the middle of the 5th century B.C. and was employed for the funeral *lekythoi* which came into fashion at Athens about that time. These vases, which form a class by themselves, were made specially for funeral ceremonies and were painted with subjects relating to the tomb, such as the laying-out of the corpse on the bier, the ferrying of the dead over the Styx by Charon, or (most frequently) mourners bringing offerings to the tomb (fig. 31). They continued to be made well on into the 4th century, but the later examples are very degenerate and careless.

FIG. 29.—Hydria by Meidias in the style of Polygnotus.

Of other forms, especially the *kylix* and the *pyxis* (toilet-box), some exceedingly beautiful specimens have come down to us, which show a delicacy of drawing and firmness of touch never surpassed, although the lines were probably only drawn with a brush. The technique of these vases may reflect the methods of the painter Polygnotus and his contemporaries, who used a

limited number of colours on a white ground. Among them no finer specimen exists than the cup in the British Museum with Aphrodite riding on a goose; the design is entirely in brown outlines, and the drawing, if slightly archaic, full of grace and refinement.

In the subjects on red-figured vases we do not find the same

FIG. 30.—Painting from a small toilet-box or pyxis, showing painted vases used to decorate a lady's room. On the left is a gilt pyxis with a tall lid, and an oenochoe on a low table; on the right two tall vases (lebes) on a plinth. All except the pyxis are decorated with painted figures, and contain flowers.

variety of choice as on the black-figured, but on the other hand there is infinitely greater freedom of treatment. The stereotyped form of composition is almost entirely discarded, and each painter forms his own conception of his subject. The class of slim *amphorae*, known as "Nolan" from the place where they were mostly found, are distinguished by having the design limited to one or at most two figures on each side, often on a large scale; these vases are also famous for the marvellous brilliance of their shining black (fig. 32).

FIG. 31.—Funeral lekythos showing vases placed inside tomb.

Towards the middle of the 5th century the patriotism of the Athenian artist finds expression in the growing importance which he attaches to local legends, especially those of Theseus, the typical Attic hero. He seems to have been regarded as the typical Athenian athlete or *ephebus*, and his contests as analogous to episodes of the gymnasium. Hence the grouping on some vases of scenes from his labours are like so many groups of athletes (fig. 33), and hence, too, a general tendency of the red-figured vases, especially the cups, to become a sort of glorification of the Attic *ephebus*, the representations of whom in all sorts of occupations are out of all proportion to other subjects.

We find evidence of this, too, in another form. Many vases, especially the cups of the "severe" and "strong" periods, bear names of persons inscribed on the designs with the word καλός, "fair" or "noble," attached; sometimes merely, "the boy is fair." The exact meaning of this practice has been much discussed, but evidence seems to show that the persons celebrated must have been quite young at the time, and were probably youths famous for their beauty or athletic prowess. Some of the names are those of historical characters, such as Hipparchus, Miltiades or Alcibiades, and, though they cannot always be identified with these celebrated personages, enough evidence has been obtained to be of great value for the chronology of the vases. Further, the practice of the vase-painter of adopting his own particular favourite name or set of names has enabled us to increase our knowledge of the characteristics of individual artists by identifying unsigned vases with the work of particular schools.

IV. *Vases of the Decadence.*—For all practical purposes the red-figure style at Athens came to an end with the fall of the city in 404 B.C. Painted vases did not then altogether cease to be made, as the Panathenaic prize vases and the funeral *lekythoi* testify, but at the same time a rapid decadence set in. The whole tendency of the 4th century B.C. in Greece was one of decentralization, and the art of vase-painting was no exception, for we find that there must have been a general migration of craftsmen from Athens, not only to the Crimea and to North Africa, but also to southern Italy, which now becomes the chief centre of vase production. Here there were many rich and flourishing Greek colonies or Grecianized towns, such as Tarentum, Paestum and Capua, ready to welcome the new art as an addition to their many luxuries. In the character of the vases of this period we see their tendencies reflected, especially in their splendid or showy aspect; the only aim being size and gaudy colouring.

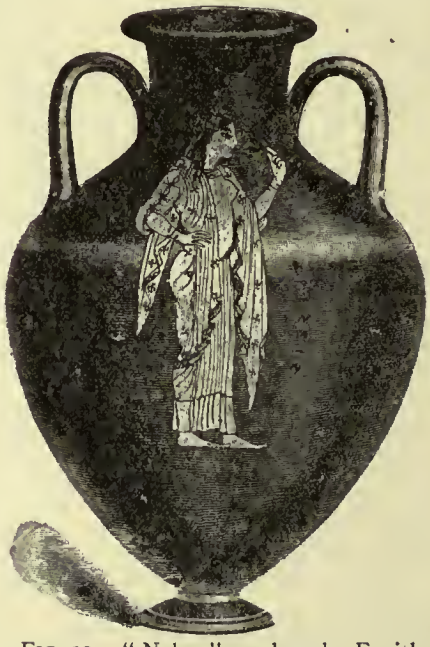


FIG. 32.—"Nolan" amphora by Euxitheus (*c.* 450 B.C.), figure of Briseis; the other side has Achilles.

The general method of painting remains that of the Athenian red-figure vases, but with entire loss of simplicity or refinement, either in the ornamentation, the choice of colours, or the drawing of the figures. Large masses of white are invariably employed, especially for the flesh of women or of Eros, the universally present god of Love, and for architectural details. Yellow is introduced for details of hair or features, and in attempts at shading, nor is a dull iron-purple uncommon. The reverses of the vases, when they have subjects, are devoid of all accessory colouring, and the figures are drawn with the greatest carelessness, as if not intended to be seen. There is throughout a lavish use of ornamental patterns such as palmettes, wreaths of leaves, or ornaments strewn over the field (a reversion to an old practice).

The drawing, having now become entirely free, errs in the opposite extreme; the forms are soft and the male figures often effeminate. The fanciful and richly-embroidered draperies of the figures and the frequent architectural settings seem to indicate that theatrical representations exercised much influence on the vase-painters. The great painters of the 4th century may also have contributed their share of inspiration, but rather perhaps in the subjects chosen than in regard to style; though the effect of many scenes on the larger vases is decidedly pictorial, they are chiefly remarkable for their emotional and dramatic themes.

The influence of the stage is twofold, for tragedy as well as comedy plays its part. Many subjects are taken directly, others indirectly, from the plays of Euripides, such as the *Medea*, *Hecuba* (Plate II. fig. 60), or *Hercules Furens*, and the arrangement of the scenes is essentially theatrical. The influence of

comedy is seen in subjects derived from the *phlyakes*, a kind of farce or burlesque popular in southern Italy, and here again the setting is adapted from the stage, some vases having parodies of myths, others comic scenes of daily life.

Many vases of this period, especially those of large size, were expressly designed for funeral purposes. Some of these bear representations of the underworld, with groups of figures undergoing punishment. On others shrines or tombs are depicted—sometimes containing effigies of the deceased, at which the relatives make offerings—as on the Athenian *lekythoi*. But by far the greater portion of the subjects are taken from daily life, many of these being of a purely fanciful and meaningless character like the designs on Sèvres or Meissen china; the commonest type is that of a young man and a woman exchanging presents, the presence of Eros implying that they are scenes of courtship.

The vases of this period are usually grouped in three or four different types, corresponding to the ancient districts of Lucania, Campania and Apulia, each with its special features of technique, drawing and subjects. In Lucanian vases the drawing is bold and restrained, more akin to that of the Attic vases; in Campania a fondness for polychromy is combined with careless execution. In Apulia a tendency to magnificence exemplified in the great funeral and theatrical vases is followed by a period of decadence characterized by small vases of fantastic form with purely decorative subjects. Besides these we have the school of Paestum, represented by two artists who have left their names on their vases, Assteas and Python. A well-known example of the work of the former is a *krater* in Madrid with Heracles destroying his children, a theatrical and quasi-grotesque composition, and there is a fine example of Python's work in a *krater* in the British Museum, with Alkmena, the mother of Heracles, placed on the funeral pyre by her husband Amphitryon, and rain-nymphs quenching the flames (Plate I. fig. 55).

FIG. 33.—Cup with exploits of Theseus.

About the end of the 3rd century B.C. the manufacture of painted vases would seem to have been rapidly dying out in Italy, as had long been the case elsewhere, and their place is taken by unpainted vases modelled in the form of animals and human figures, or ornamented with stamped and moulded reliefs. These in their turn gave way to the Arretine and so-called "Samian" red wares of the Roman period. In all these wares we see a tendency to the imitation of metal vases, which, with the growth of luxury in the Hellenistic age, had entirely replaced painted pottery both for use and ornament; the pottery of the period is reduced to a subordinate and utilitarian position, merely supplying the demands of those in the humbler spheres of life.

Collections.—The majority of the painted vases now in existence are to be found in the various public museums and collections of Europe, of which the largest and most important are the British Museum, the Louvre and the Berlin Museum. Next to these come the collections at Athens, Naples, Munich, Vienna, Rome and St Petersburg; isolated specimens of importance are to be found in other museums, as at Florence, Madrid or the Bibliothèque Nationale at Paris. Most of the great private collections of the two preceding centuries have now been dispersed. In recent years the Boston Museum has raised America to a level with Europe in this respect; and the Metropolitan Museum at New York contains a vast collection of Cypriote pottery.

LITERATURE.—Important original articles are to be found in various archaeological journals such as *American Journal of Archaeology* (1885, &c.); *Annual of the British School at Athens* (1894, &c.); *Athenische Mitteilungen* (1876, &c.); *Bulletin de correspondance hellénique* (1877, &c.); *Comptes rendus de la commission impériale archéologique* (St Petersburg, 1859–1888); *Gazette archéologique* (Paris, 1875–1889); *Jahrbuch des kaiserlichen deutschen archäologischen Instituts, Berlin* (1886, &c.); *Journal of Hellenic Studies* (1880, &c.); *Monumenti antichi* (Milan, 1890, &c.); *Monuments grecs* (Paris, 1872–1898); *Monuments Piot* (Paris, 1894, &c.); *Revue archéologique* (Paris, 1844, &c.). The older works have been recently superseded by important publications embodying the latest views such as Hartwig, *Die griechischen Meisterschalen des strengen rotfigurigen Stils* (1893); Louvre, *Catalogue des vases antiques de terre cuite*, by E. Pottier (1896, &c.); S. Reinach, *Répertoire des vases peints* (Paris, 1899–1900); H. B. Walters, *History of Ancient Pottery* (Greek, Etruscan and Roman), 1905, with an excellent bibliographical list; also art. "Hischylos" in *J.H.S.* xxix. (1909) p. 103.

ETRUSCAN POTTERY.—Parallel with the development of the art of pottery in Greece runs the course of the art in Etruria, though with far inferior results; in its later stages it is actually no more than a feeble imitation of the Greek. The period of time which we must consider extends from the Bronze age (1000 B.C. or earlier) down to the 3rd century B.C., when Etruscan civilization was merged into Roman.

The earliest civilization traced in Italy is not, strictly speaking, Etruscan, but may perhaps be more accurately styled "Umbrian." It is usually referred to as the "Terramare" period from the remains discovered in that district in the basin of the Po. These people were lake-dwellers, barely removed from the Neolithic stage of culture, and their pottery was of the rudest kind, hand-made and roughly baked. Cups and pots have been found sometimes with simple decoration in the form of knobs or bosses, and many have a crescent-shaped handle serving as a support for the thumb.

The next period, the earliest which can be spoken of as "Etruscan," is known as the "Villanova" period, from a site of that name near Bologna, or as the period of pit-tombs (*a pozzo*), from the form of the graves in which the pottery has been found (see VILLANOVA). It begins with the 9th century B.C. and lasts for about two hundred years. The pit-tombs usually contain large cinerary urns or *ossuaria* (containing the ashes of the dead), fashioned by hand from a badly-levigated volcanic clay known as *impasto Italico*. These vessels were irregularly baked in an open fire, and the colour of the surface varies from red-brown to greyish black. They appear to have been covered with a polished slip, intended to give the vases a metallic appearance. The shape of the urns is peculiar, but uniform; they have a small handle at the widest part and a cover in the form of an inverted bowl with handle (Plate III. fig. 63). Their ornamentation consists of incised or stamped geometrical ornaments formed in the moist clay in bands round the neck and body; more rarely patterns painted in white are found. Common pottery is also found showing little advance on that of the Terramare

period except in variety of decoration. The technique and ornament are the same as in the case of the urns. They correspond in development, though not in date, to the early pottery of Troy and Cyprus, as well as to the primitive pottery of other races, but one marked difference is the general fondness of the Italian potter for vases with handles.

Sometimes the cinerary urns take the form of huts (*tuguria*), though these are more often found in the neighbourhood of Rome. One of the best examples is in the British Museum; it still contains ashes which were inserted through a little door secured by a cord passing through rings. The ornamentation suggests the rude carpentry of a primitive hut, the cover or roof being vaulted with raised ridges to represent the beams. The surface is polished, and other specimens are occasionally painted with patterns in white.

In the next stage a change is seen in the form of the tombs, the pit being replaced by a trench; this is accordingly known as the "trench-tomb" or *a fossa* period, and extends from the 8th century B.C. to the beginning of the 6th. Importations of Greek pottery now first make their appearance. The character of the local pottery actually remains for some time the same as that of the preceding period, but it improves in technique. By degrees an improvement in the forms is also noted, and new varieties of ornamentation are introduced; there is, however, no evidence that the wheel was used.

Two entirely new classes of pottery are found at Cervetri (Caere) belonging to the 7th century. One consists of large jars (πίθοι) of red ware, the lower part being moulded in ribs, while the upper has bands of design stamped round it in groups or friezes. These designs were either produced from single stamps or rolled out from cylinders like those used in Babylonia. The subjects are usually quasi-oriental in character, and it is not certain that this ware was made in Etruria, especially as similar vases have been found in Rhodes and Sicily; either it was imported, or it was a local imitation of Greek models.

The other class is similar as regards the shapes and the nature of the clay, but is distinguished by having painted subjects in white outlines on a red glossy ground. The clay, a kind of *impasto Italico*, was first hardened by baking, and then a mixture of wax, resin and iron oxide was applied and polished; on this the pigments, a mixture of chalk and earth, were laid. The subjects are from Greek mythology or are at least Greek in character, but the technique is purely Etruscan, and the drawing is crude and un-Greek in the extreme.

The fourth period shows a close continuity with the third; but the difference is defined firstly by the appearance of a new type of tomb in the form of a chamber (*a camera*), secondly, by the all-pervading influence of oriental art, and to a less extent of that of the Greeks. The period extends from about 650 to 550 B.C., and is further marked by the general introduction of the wheel into Etruria and by the appearance of inscriptions in an alphabet derived from western Greece. In the earlier tombs the typical local pottery is of hand-made *impasto Italico* resembling that of the previous periods; in the later we find what is known as *bucchero* ware—the national pottery of Etruria—which is made on the wheel and baked in a furnace, and shows a marked tendency to imitate metal.

To this period also belongs the famous Polledrara tomb or Grotto d'Iside at Vulci, the contents of which are now in the British Museum and include some remarkable specimens of pottery. It dates from about 620–610 B.C. The most remarkable of the vases is a *hydria*, of reddish-brown clay covered with a lustrous black slip on which have been painted designs in red, blue and a yellowish white. The colours have unfortunately now almost disappeared, and it is doubtful if they had been fired. The principal subject is from the story of Theseus and Ariadne. This tomb also contained a large wheel-made *pithos* of red *impasto* ware with designs painted in polychrome. In the Regulini-Galassi tomb at Cervetri (about 650 B.C.) large cauldrons of red glossy ware were found, with gryphons' heads projecting all round, to which chains were attached. A similar cauldron from Falerii on a high open-work stand is now in the British Museum.

We now come to the *bucchero* ware, which is characteristic of the later portion of this period, though the earliest examples go back to the end of the 7th century. Its main feature is the black paste of which it is composed, covered with a more or less shining black slip. Modern experiments seem to indicate that the clay was smoked or fumigated in a closed chamber after baking, becoming thereby blackened throughout, and the surface was then polished with wax and resin. Analyses of the ware have proved that it contains carbon and that it had been lightly fired. The oldest *bucchero* vases are small and hand-made, sometimes with incised geometrical patterns engraved with a sharp tool like metal-work. Oriental influence then appears in a series of chalice-shaped cups found at Cervetri with friezes of animals. From about 560 B.C. onwards the vases are all wheel-made, with ornaments in relief either stamped from a cylinder or composed of separate medallions attached to the vase. The subjects range from animals or monsters to winged deities or suppliants making offerings (fig. 34); in other cases we find meaningless groups of figures or plant forms. These types are found chiefly in southern Etruria, but at Chiusi (*Clusium*) a more elaborate variety found favour from about 500 to 300 B.C. The shapes are very varied and the ornament covers the vase from top to bottom, the covers of the vases being also frequently modelled in various forms. The figures are stamped from moulds, incised designs being added to fill up the spaces. The range of subjects is much widened, including scenes from Greek mythology and oriental types combining Egyptian and Assyrian motives, which must have been introduced by the Phoenicians.

FIG. 34.—Etruscan oinochoe, of black bucchero ware, with figures in relief. (British Museum.)

Thus the technique of the *bucchero* wares is purely native, but the decoration is entirely dependent on foreign types whether Greek or oriental, and throughout the whole series the tendency to imitate metal-work is to be observed in every detail, both in the forms and in the methods of decoration. Some are mere counterparts of existing work in bronze.

The last variety of peculiarly Etruscan pottery which calls for notice is the Canopic jar, so called from its resemblance to the κάνωποι in which the Egyptians placed the bowels of their mummies. They are rude representations of the human figure, the head forming the cover, and in the tombs were placed on round chairs of wood, bronze or terra-cotta. An example of such a jar on a bronze-plated chair may be seen in the Etruscan Room of the British Museum (Plate III. fig. 65). Their origin has been traced to the funeral masks found in the earliest Etruscan tombs. From these a gradual transition may be observed from the mask (1) placed on the corpse, (2) on the cinerary urn, (3) the head modelled in the round and combined with the vase, and (4) at last the complete human figure. The earliest of these jars are found in the "pit-tombs" of the 8th century B.C., and the latest and most developed types belong to the 5th century B.C.

The skill shown by the Etruscans in metal-work and gem-engraving never extended to their pottery, which is always purely imitative, especially when they attempted painted vases after the Greek fashion. The kinds already described are all more or less plastic in character and imitative of metal, except in the case of the Cervetri and Polledrara finds, which have little in common with anything Greek, and exhibit a quite undeveloped art. But towards the end of the 6th century B.C., when Greek vases were coming into the country in large numbers, attempts were made to

imitate the black-figure style, especially of a particular class of Ionian vases. Imitations of these are to be found in most museums and may be readily recognized as Etruscan from peculiarities of style, drawing and subject, as well as their inferior technique (fig. 35).

FIG. 35.—Etruscan Amphora imitating Greek style; parting scene of Alcestis and Admetus, with Etruscan inscriptions.

At a later date (4th-3rd century B.C.) they began to copy red-figured vases with similarly unsuccessful results. With the exception of a small class of a somewhat ambitious character made at Falerii (Civita Castellana), of which there is a good example in the British Museum with the subject of the infant Heracles strangling the serpents, they are all marked by their inferior material and finish and their bizarre decoration. The style is often repulsive and disagreeable, as well as ineffective, and the grim Etruscan deities, such as Charun, are generally introduced. Some of these vases have painted inscriptions in the Etruscan alphabet. The latest specimens positively degenerate into barbarism.

Painted vases of native manufacture are also found in the extreme south of Italy and have been attributed to the indigenous races of the Peucetians and Messapians; their decoration is partly geometrical, partly in conventional plant forms, and is the result of natural development rather than of imitation of Greek types. Some of the shapes are characteristic, especially a large four-handled *krater*. They cover the period 600–450 B.C., after which they were ousted by the Graeco-Italian productions we have already described.

ROMAN POTTERY.—Roman vases are far inferior to Greek; the shapes are less artistic, and the decoration, though sometimes not without merits of its own, owes most of its success to the imitation or adaptation of motives learnt from earlier Grecian, Egyptian or Syrian potters. They required only the skill of the potter for their completion, and, being made by processes largely mechanical, they are altogether on a lower scale of artistic production.

It has been noted that during a certain period—namely, the 3rd and 2nd centuries B.C.—ceramic art had reached the same stage of evolution all round the Mediterranean, painted pottery had been ousted by metal-work, and such vases as continued to be made were practically imitations of metal both in Greece and Italy. These latter we must regard as representing ordinary household pottery, or as supplying to those who could not afford to adorn their houses and temples with costly works in metal, a humble but fairly efficient substitute. There is a terra-cotta bowl of the 2nd century B.C. in the British Museum which is an exact replica of a chased silver bowl with reliefs in the same collection, and may serve as an illustration of this condition of things (Plate II. fig. 56).

These imitations of metal were largely made in southern Italy, a district which enjoyed close artistic relations with Etruria, and we have already seen that the same principle had long been in vogue among the Etruscans. Hence it is not suprising that an important centre of pottery manufacture should have sprung up in Etruria, in the 2nd century B.C., which for many years set the fashion to the whole Roman world. But before discussing such products it may be as well to say something on the technical character, shapes and uses of Roman pottery in general.

Technical Processes.—Roman pottery regarded in its purely technical aspect is in some ways better known to us than the Greek, chiefly owing to extensive discoveries of kilns and potters' apparatus in western Europe. It may be classified under two heads, of which only the second will concern us for the most part as yielding by far the greater amount of material and interest: (1) the plain, dull earthenware used for domestic purposes, and (2) the fine, red, shining wares, usually known to archaeologists as *terra sigillata*, clay suited to receive stamps (*sigilla*) or impressions.

For both classes all kinds of clay were used, varying somewhat in different regions, and ranging in colour when fired from black to grey, drab, yellow, brown and red. The clays varied greatly in quality; most of the pottery made in southern Gaul was fashioned from the ferruginous red clay of the Allier district, but at St-Remy-en-Rollat and in that neighbourhood a white clay was used. In Italy we find a carefully levigated red clay in use, great care being devoted to its preparation and admixture. But apart from decoration and style there is a great similarity in the general appearance of the Italian and provincial pottery made under Roman influence, and it is often very difficult to decide whether the vases were manufactured where they had been found or were imported from some famous centre of manufacture. The secret of the glossy red surface seems to have been common property and found its way from Italy to Gaul, Spain and Germany, and perhaps even to Britain.

The manner in which this glossy red surface was produced has been a much-disputed question, some, as for instance Artis, the excavator of the Castor potteries in Northamptonshire, claiming that it was a natural result obtained in the baking, after polishing of the surface, by means of specially contrived kilns. But it is now generally agreed that it was artificial. It is true that the Roman lamps and many of the commoner wares have a gloss produced by polishing only, varying in colour and brightness with the proportion of iron oxide in the clay and the degree of heat at which the pieces were fired. But the surface finish of the finer or *terra sigillata* wares is something quite distinct, and reaches a high and wonderfully uniform perfection.

It is possible that the technical secret of the potters of the Roman world was only a development from the practice of the Greeks, but it does seem as if the finer Roman wares were coated with a brilliant glossy coating so thin as to defy analysis, yet so persistent as to leave no doubt of its existence as a definite glossy coat. Repeated attempts have been made to determine its nature by analysis, but chemists ought to have known better, for the coating is so thin that it is impossible to remove it without detaching much more body than glaze. Examination shows it to be much more than a surface polish or than the gloss of the finest Greek vases, and we shall have to wait for a final determination of its nature until some one who is at once a chemist and a potter can reconstruct it synthetically. Whatever its nature and method of production, it is certain that the glaze itself was a transparent film which heightened the natural red colour of the clay, until in the finest specimens it has something of the quality of red coral.

In the manufacture of vases the Romans used the same processes as the Greeks. They were all made on the wheel, except those of abnormal size, such as the large casks (*dolia*), which were built up on a frame. Specimens of potters' wheels have been found at Arezzo and Nancy, made of terra-cotta, with a pierced centre for the pivot, and bearing small cylinders of lead round the circumference to give a purchase for the hand and to aid the momentum of the wheel. For the ornamental vases with reliefs an additional process was necessary, and the decoration was in nearly all cases produced from moulds. The process in this case was a threefold one: first the stamps had to be made bearing the designs; these were then pressed upon the inside of a clay mould which had been previously made on the wheel to the size and shape required; finally, the clay was impressed in the mould and the vase was thus produced, decoration and all. Handles being of rare occurrence in Roman pottery, the vases were thus practically complete, requiring only the addition of rim and foot. The stamps were made in various materials, and had a handle at the back (Plate III. fig. 64). The moulds were of lighter clay than the vases, and were lightly fired when completed, so as to absorb the moisture from the pressed-in clay. Large numbers of these moulds are in existence (Plate III. fig. 61), and the British Museum possesses a fine series from Arezzo. Those discovered in various parts of Gaul have afforded valuable evidence as to the sites of the various pottery centres, as their presence obviously denoted a place of manufacture, and the value of this evidence is increased when they bear potters' names.

Remains of kilns for baking Roman pottery[1] are very numerous in western Europe, especially in Gaul, where the best examples are at Lezoux near Clermont, at Châtelet in Haute-Marne, and near Agen in Lot-et-Garonne. In Germany good remains have come to light at Heiligenberg in Baden, at Hedderheim near Frankfort, Rheinzabern near Carlsruhe, and Westerndorf in Bavaria. In England the best kilns are those discovered by Artis in 1821–1827 at Castor in Northamptonshire (see fig. 4).

Shapes.—As is the case with Greek vases, a long list of names of

[1] For a full description and lists of such kilns see Walters, *Ancient Pottery*, ii. 443-454.

shapes may be collected from Latin literature, and the same difficulties as to identification arise in the majority of cases. They may, however, be classified in the same manner; as vases for storing liquids, for mixing or pouring wine, for use at the table, and so on. In addition Varro and other writers have preserved a number of archaic and obscure names chiefly applied to the vases used in sacrifices.

The principal vases for storing liquid or solid food were:—The *dolium*, a large cask or barrel of earthenware; the *amphora*, a jar holding about six gallons; and the *cadus*, a jar about half as large as the *amphora*. The *dolium* had no foot, and was usually buried in the earth; it was also used for purposes of burial. The *amphora* corresponds to the Greek wine-jar of that name, and had, like its prototype, a pointed base. Many examples were found at Pompeii stamped with the names of consuls (cf. Hor. *Od.* iii. 21. 1), or with painted inscriptions relating to their contents. The *cadus* is mentioned by Horace and Martial.

Of smaller vases for holding liquids, such as jugs, bottles and flasks, the principal were the *urceus*, answering to the Greek οἰνοχόη, the *ampulla*, a kind of flask with globular body, and the *lagena*, a narrow-necked flask or bottle. Of drinking-cups the Romans had almost as large a variety as the Greeks, and the great majority of the ornamented vases preserved to the present day were devoted to this purpose. The generic name for a cup was *poculum*, but the Romans borrowed many of the Greek names, such as *cantharus* and *scyphus*. The *calix* appears to have answered in popularity, though not in form, to the Greek *kylix*, and is probably the name by which the ornamented bowls were usually known. The names for a dish are *lanx*, *patina* and *catinum*. Another common form is the *olla* (Greek χύτρα), which served many purposes, being used for a cooking-pot, for a jar in which money was kept, or for a cinerary urn. The form of vase identified with this name has a spherical or elliptical body with short neck and wide mouth. Of sacrificial vases the principal was the *patera* or libation-bowl, corresponding to the Greek φιάλη.

Arretine Ware.—The Latin writers, and in particular Pliny, mention numerous places in Italy, Asia Minor and elsewhere, which were famous for the production of pottery in Roman times. Pliny mentions with special commendation the "Samian Ware," the reputation of which, he says, was maintained by Arretium (Arezzo). Samian pottery is also alluded to by other writers, and hence the term was adopted in modern times as descriptive of the typical Roman red wares with reliefs, whether found in Italy, Germany, Gaul or Britain. But it was only accepted with diffidence as a convenient name, and as early as 1840 discoveries at Arezzo made it possible to distinguish the vases found there as a local product, now known as "Arretine" ware. The name "Samian" has, however, adhered to the provincial wares and at the present day is often used even by archaeologists. But recent researches have shown that nearly all the provincial wares can be traced to Gaulish or German potteries, and, since it is implied by Pliny that "Samian" pottery is older than "Arretine," the name may now be fairly rejected altogether, as we have rejected the name "Etruscan" for Greek pottery. The Romans probably used it as a generic term, just as we speak of "china," and the real Samian ware is to be seen in the later Greek pottery, with reliefs, of the 3rd century B.C.

There were, as Pliny and other writers imply, many pottery centres in Italy, at Rhegium, Cumae, Mutina and elsewhere, as well as at Saguntum in Spain, but all were surpassed in excellence by Arretium. In more modern times its pottery came under notice even in the middle ages, and discoveries were made in the time of Leo X. (about 1500) and again in the 18th century. The Arretine ware may be regarded as *the* Roman pottery *par excellence*, and its popularity extended from about 150 B.C. down to the end of the 1st century of the Empire, reaching its height in the 1st century B.C., after which it rapidly degenerated, and its place was taken by the wares of the provinces. Its general characteristics may be summed up as follows:—(1) The fine local red clay, carefully levigated and baked very hard to a rich coral red or a colour like sealing-wax; (2) the fine red glaze, which has already been discussed; (3) the great variety of forms employed, showing the marked influence of metal-work; (4) the almost invariable presence of stamps with potters' names. The majority of the specimens have been found at Arezzo itself, but there was a branch of the industry at Puteoli, producing pottery almost equal in merit, and it was also exported to central and eastern Europe and Spain.

The earliest examples are of black glossy ware, but the red appears to have been introduced by 100 B.C., when the first potters' stamps appear. These are usually quadrangular in form, though other shapes are found, and are impressed in the midst of the design on the ornamented vases, or on plain wares on the bottom of the interior. The number of potters' names is very large, though some appear to have been more prolific than others, and to have employed a large number of slaves, whose names appear with their masters' on the stamps. The best known is Marcus Perennius, whose wares take highest rank for their artistic merit, the designs being copied from good Greek models. He employed seventeen slaves, of whom the best known is Tigranes, the stamps usually appearing as M·PEREN and TIGRAN. The slave-name of Bargates is found on one of his finest vases, in the Boston Museum, the subject being the fall of Phaethon. We may suppose that the stamps for the figures were designed by the masters, but that the vases were actually moulded by the slaves. Other important artists are Calidius Strigo, who had twenty slaves; P. Cornelius, who had no less than forty; Aulus Titius, who signs himself A·TITI·FIGVL·ARRET; the Annii and the Tetii; and L. Rasinius Pisanus, a degenerate potter of the Flavian period, who imitated Gaulish wares.

The forms of the vases are all, without exception, borrowed from metal shapes and are of marked simplicity (see fig. 37, Nos. 1, 8, 9, 11). They are mostly of small size and devoid of handles, but a notable exception is a bell-shaped *krater* or mixing-bowl, of which there is a very fine example in the British Museum, found at Capua and decorated with the four seasons (Plate III. fig. 62). For the decoration and subjects the potters undoubtedly drew their inspiration from the "new-Attic" reliefs of the Hellenistic period, of which the *krater* just cited is an example. So, too, are such subjects as the dancing maenads or priestesses with wicker head-dresses, or the Dionysiac scenes which are found, for instance, on the vases of Perennius. Others again are distinguished by a free use of conventional ornament, figures when they occur being merely decorative. There is throughout a remarkable variety both in the ornamentation and in the methods of composition.

Provincial Wares.—The Arretine ware, as has been noted, steadily degenerated during the 1st century of the Empire, and the manufacture of ornamental pottery appears to have entirely died out in Italy by the time of Trajan. Its place was taken by the pottery of the provinces, especially by that of Gaul, where the transference of artistic traditions led to the rise of new industrial centres in the country bordering on the Rhone and the Rhine.

As to the general characteristics of the provincial wares, that is, of the ornamented wares or *terra sigillata*, the clay is fine and close-grained, harder than the Arretine, and when broken shows a light red fracture; the surface is smooth and lustrous, of a brighter yet darker red colour (*i.e.* less like coral) than that of Arretine ware, but the tone varies with the degree of heat used. The most important feature is the fine glaze with which it is coated, similar in composition to that of the Arretine; it is exceedingly thin and transparent, and laid equally over the whole surface, only slightly brightening the color of the clay. The ornament is invariably coarser than that of Arretine ware, by which, however, it is indirectly inspired.

The vases are usually of small dimensions, consisting of various types of bowls, cups and dishes, of which two or three forms are preferred almost to the exclusion of the rest, and they frequently bear the stamp of the potter impressed on the inside or outside. Although this ware is found all over the Roman world, by far the greater portion comes from Gaul, Germany or Britain, and evidence points to two—and only two—districts as the principal centres of manufacture: the valleys of the Loire and the Rhine and their immediate neighbourhood. In the 1st century A.D. Gaulish pottery was largely exported into Italy, and isolated finds of it occur in Spain and other parts.

The recent researches of Dr Dragendorff and M. Déchelette have shown that a chronological sequence of the pottery may be clearly traced, both in the shapes employed and in the method of

decoration; and, further, that it is possible—at least as regards Gaul—to associate certain potters' names and certain types of figures, though found in many places, with two centres in particular, Graufesenque near Rodez (department of Aveyron) in the district occupied by the Ruteni, and Lezoux near Clermont (department of Puy-de-Dôme) in the country of the Arverni. The periods during which these potteries flourished are consecutive, or rather overlapping, but not contemporaneous, the former being practically coincident with the 1st century A.D., the latter with the 2nd and 3rd down to about A.D. 260, when the manufacture of *terra sigillata* practically came to an end in Gaul.

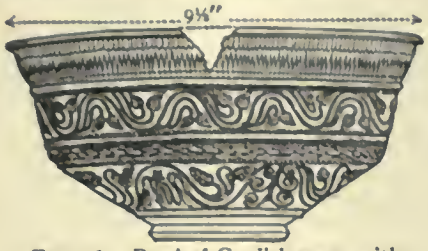


FIG. 36.—Bowl of Gaulish ware, with moulded patterns in slight relief.

There were also certain smaller potteries, some of which mark a transition between the Italian and provincial wares, in the north of Italy and on the Rhine and upper Loire, *e.g.* St Remy-en-Rollat, and others of later date, as at Banassac and Montans in the latter district, but none of these produced pottery of special merit or importance. The early Rhenish wares are, strictly speaking, of a semi-Celtic or Teutonic character, while the later German *terra sigillata*, for which the principal centres were Rheinzabern near Carlsruhe and Westerndorf in Bavaria, are of similar character but inferior to the 2nd-century pottery of Lezoux. A mould from Rheinzabern is illustrated, Plate IV. fig. 66.

The ornamented vases produced in these potteries are, as we have said, almost confined to two or three varieties, which follow one another chronologically. A shape favoured at first is the *krater*, which has been mentioned as one of the characteristic Arretine forms; but this enjoyed but a short term of popularity. Early in the 1st century we find a typical form of bowl in use, which, following the numeration of Dr Dragendorff's treatise, is usually spoken of as No. 29. This is characterized by its moulded rim engraved with finely incised hatchings, and by the division of the body by a moulding into two separate friezes for the designs (fig. 36). Its ornament is at first purely decorative, consisting of scrolls and wreaths, then small animals and birds are introduced, and finally figure subjects arranged in rectangular panels or circular medallions. About the middle of the century a second variety of bowl (known as No. 30; see fig. 37) was introduced; this is cylindrical in form, and, being found both at Graufesenque and Lezoux, may be regarded as transitional in character. In the latter half of this century a new form arises (No. 37; fig. 37), a more or less hemispherical bowl which holds the field exclusively on all sites down to the termination of the potteries. In this form and in No. 30 a new system of decoration is introduced, the upper edge being left quite plain. The panels and medallions at first prevail, but are then succeeded by arcading or inverted semicircles enclosing figures, and finally after the end of the 1st century (and on form 37 only) we find the whole surface covered with a single composition of figures unconfined by borders or frames of any kind, but in a continuous frieze; this is known as the "free" style (Plate IV. fig. 69).

As regards the figure subjects, it may be generally laid down that the conceptions are good, but the execution poor. Many are obvious imitations of well-known types or works of art, and the absence of Gaulish subjects is remarkable. They include representations of gods and heroes, warriors and gladiators, hunters and animals, the two latter classes being pre-eminently popular.

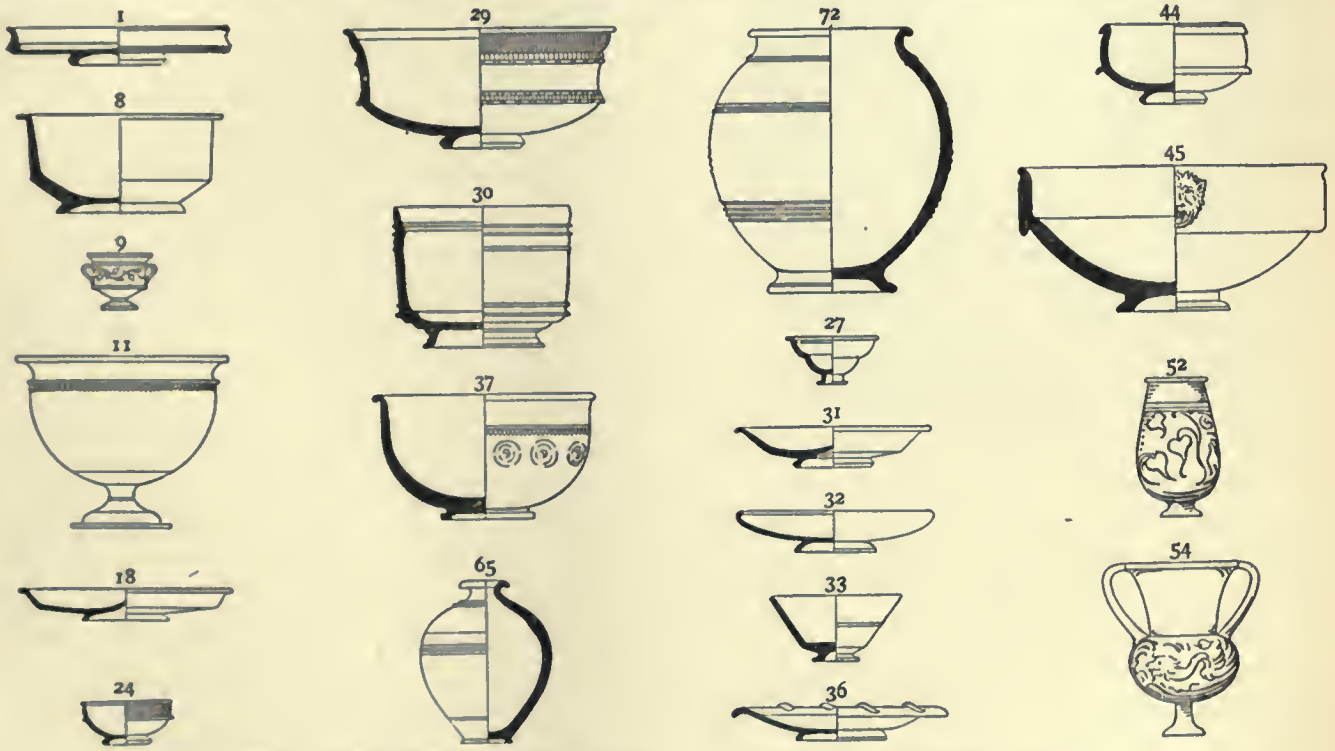


FIG. 37.—Shapes used in Roman Pottery. 1-11, Arretine; 18-65, Gaulish and German.

The potters' names at Graufesenque are nearly all of a common Roman type, such as Bassus, Primus, Vitalis; those at Lezoux are Gaulish in form, such as Advocisus, Butrio, Illixo or Laxtrucisa. This seems to imply that Roman influence was still strong in the earlier centre which drew its inspiration more directly from Arretium. But even the purely Roman names are sometimes converted into Gaulish forms, as *Masclus* for Masculus, or *Tornos* for Turnus. The stamps are quadrangular in form, depressed in the surface of the vase with the letters in relief; on the plain wares they are usually in the centre of the interior, but on the ornamented vases are impressed on the exterior among the figures. The usual formula is OF (for *officina*) or M (for *manu*)

with the name in the genitive, or F, FE or FEC for *fecit* with the nominative.

Besides the ordinary *terra sigillata* with figures produced in moulds we find other methods of decoration employed. In the south of France, about Arles and Orange, vases were made with medallions separately moulded and attached round the body; these have a great variety of subjects, both mythological and gladiatorial or theatrical, or even portraits of emperors. There is a remarkable specimen in the British Museum with a scene from the tragedy of the *Cycnus*, on which Heracles and Ares are represented, with seated deities in the background (Plate IV. fig. 67). The date of these reliefs is the 3rd century after Christ.

Of the same date is a somewhat similar ware made at Lezoux. Here each figure is attached separately to the vase, and the background is filled in with foliage produced by the method known as *en barbotine* (slip-painting), of which we shall speak presently. The effect of these vases, which are mostly large jars or *ollae* (Plate IV. fig. 70), is often very decorative, and there is a fine specimen in the British Museum from Felixstowe, on which the modelling is really admirable. Other good examples have been found in various parts of Britain.

The " slip-decoration " process is practically unknown in Italy, but it is found early in the 1st century of our era in Germany, and appears to have originated in the Rhine district. It is not confined to the red ware, but in the early German examples is applied on a dull grey or black background. On the continent its use is almost limited to simple decorative patterns of scrolls or foliage, but in Britain it was largely adopted, as in the well-known Castor ware made on the site of that name (*Durobrivae*) in Northamptonshire. Many of the vases found or made here have gladiatorial combats, hunting-scenes, or chariots executed by this method (fig. 38). The decoration was applied in the form of a thick viscous slip, usually of the same colour as the clay, but reduced to this consistency with water, and was laid on by means of a narrow tube or run from the edge of a spatula. The Castor ware appears to date from the 3rd and 4th centuries A.D.

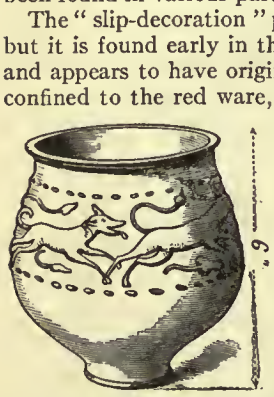


FIG. 38.—Jar of Castor ware, with reliefs of a stag pursued by a hound, executed in semi-fluid slip. 6 in. high.

Painted wares are at all times rare, but were occasionally produced in Gaul, Germany and Britain. A notable class of such ware seems to have been produced in the Rhine district, represented by small jars covered with a glossy black coating, on which are painted in thick white slip inscriptions of a convivial character, such as BIBE, REPLE, DA VINUM, or VIVAS (Plate IV. fig. 68). A very effective ware, obviously imitating cut glass, by means of sharply incised patterns, was made at Lezoux in both the red and black varieties.

LITERATURE.—Dragendorff in *Bonner Jahrbücher*, xcvi. 37 ff.; Déchelette, *Vases céramiques de la Gaule romaine* (1904); Walters, *Ancient Pottery*, ii. chaps. xxi.-xxiii.; *British Museum Catalogue of Roman Pottery* (1908). (H. B. WA.)

PERSIAN, SYRIAN, EGYPTIAN AND TURKISH POTTERY[1]

Formerly, in all general accounts of the potter's art, it was the custom to pass over the period between the fall of the Roman empire and the appearance of the beautiful Persian and Syrian pottery of the early middle ages, as if the intervening centuries had produced nothing worthy of note. Even yet the successive steps by which this beautiful art arose are largely matters of inference and deduction, but it must be borne in mind that while the Greeks and Romans made singularly little use of glaze and painted colour, the Egyptians and the inhabitants of Syria and Mesopotamia had long been noted for their skill in this direction. In discussing the pottery of these peoples we have already pointed out at what a very early period they had developed the production of rich and beautiful coloured glazes—the Egyptians as a jewel-like decoration of small pieces made in a very sandy paste, or actually carved from stone, and the Assyrians, on a bolder scale, in their glazed and coloured brickwork. Though the Egyptian and Syrian empires were overthrown, the peoples of these countries remained; and, as we are now aware, carried on their traditional craft, though in a less splendid way. There is abundant evidence that pottery was made in the Egypt of Roman times and later with rich turquoise blue and yellow glazes, though the potters had learned to produce this glaze on a material containing more clay and less sand than that used in earlier days. We know also that they had learned that the addition of lead oxide to a glaze enabled such glaze to be applied on vessels formed from clay which was sufficiently plastic to be shaped on the wheel. This knowledge was not confined to Egypt, but appears to have been spread over Syria and parts of Asia Minor; and throughout the Byzantine empire many forms of pottery were made which were clearly the starting-points of much of the fine pottery produced in Europe in later times. We find, for instance, side by side, a manufacture of bowls, dishes and vases of very simple shape, yet made of two distinct materials: (1) a whitish sandy body on which turquoise blue, green or even white glaze, consisting mainly of silicates of soda and lime, was used either without ornament or with simple painted patterns in black or cobalt blue under the glaze; (2) similar vessels made of a lightish red clay, also rather sandy and porous, coated with a white slip (pipeclay or impure kaolin) covered with a yellowish lead glaze. These vessels were decorated in a variety of ways: (1) *Graffiati*; patterns cut or scratched through the coating of white slip while it was still soft, down to the red ground, so that when the vessel was glazed it displayed a pattern in dark upon a light ground. (2) Yellow and red ochre and copper scales were rudely " dabbed " over the white slip surface, so that when the vessel was glazed it presented a marbled or mottled appearance with touches of red, yellow, brown or green, on a yellowish-white ground. (See the section on *Egyptian pottery* above.) (3) Oxides of copper or iron were added to the lead glaze, and the resulting green or yellow glazes were applied to plain vases or to vessels decorated with moulded reliefs. In all these methods we see the continuation of old tradition in simpler forms, but we shall also see that these, in their turn, became the starting-point of much of the medieval pottery of Europe, particularly of Italy and the other southern countries.

In the same way, a little farther east, the Persians of Sassanian times seem to have preserved some of the traditions of the potters of Assyria, just as they inherited their skill; and the Assyrian device of raising strong brown outlines round a design to control the flow of coloured glazes, which is exemplified in the Frieze of Archers in the Louvre, was carried on by them, for it appears unchanged in the tiles of the Mosque of Mahommed I. built at Brusa in the 15th century. The intercourse between the Persian and Byzantine empires at this time must have led to a general diffusion of technical knowledge among the pottery centres of the various countries round the eastern end of the Mediterranean, though our knowledge is too fragmentary to furnish sufficient data for any definite placing of the progress made. Our information is mainly derived from the examination of the rubbish mounds at Fostat, or Old Cairo, in Egypt, by Dr Fouquet, and by eager inquirers like Henry Wallis. Fostat was built in A.D. 640 by Amr and destroyed in the 12th century; partially rebuilt, it was given over to pillage in 1252 by a Mameluke sultan, and all that remains is the Old Cairo of to-day, the rest of the site being covered with accumulated rubbish heaps. In the same way Rhagae or Rai, one of the ancient capitals of Persia, the site of which lies a few miles east of Teheran, was destroyed about 1220 by Jenghiz Khan. Like Fostat it was partially rebuilt, but was destroyed again in the following century, so that its existence practically ceased in the 14th century. Rhagae was once an important centre of the ceramic industry, but this was transferred to the neighbouring town of Veramin, in the 13th century. Excavations have also been made on the site of Rakka, near Aleppo, in Syria, and from all these sources, and a few others of

[1] See examples in colour on Plate V.

minor importance, much interesting light has been thrown on the development of the potter's art in these countries during the period between the 4th and 12th centuries. Yet, until systematic excavations have been made in Persia, Anatolia, Syria and the Delta, on the same scale as those which have proved so valuable in Greece, Crete, Cyprus and the valley of the Nile, we cannot hope to possess sound chronological data of the developments of the arts in these countries. Meantime the exact share which should be allotted to each district for its discoveries will remain ground of contention for scholars of conflicting schools, though there can be little doubt that Egypt and the southern part of Syria played a more important part than has generally been supposed in the development of the potter's art at this period.

Persian Pottery.—The most important pottery of the nearer East, whether considered on its own merits or from the influence it has exercised on the pottery of later times, is that so highly valued by collectors under the distinctive name of Persian; though much that passes under that name may not have been made in Persia. From the 10th to the 16th centuries the craftsmen of Persia were perfect masters of decorative design and colour; and, as potters, they possessed a sense of the forms proper to clay, such as none of the great races of antiquity ever exhibited. The shapes of Greek pottery speak more strongly of metal than of clay, but the best Persian work exhibits a feeling for the material that has rarely been equalled. The shapes are not only true clay-shapes but they are designed so as best to exhibit the qualities of the glaze and colour with which they were to be decorated. Certainly from the 12th to the 16th centuries the pottery of the Persians must rank among the greatest achievements of the potter's art. The ware was shaped from various mixtures such as we have already spoken of—but whether its body was a mixture of white clay with a large proportion of sand, or some inferior clay that burnt to a yellowish or red tint, and was surfaced with a fine white coating of siliceous slip, or with a mixture of soda-glass, clay and oxide of tin, which made it whiter still—the one aim was to produce a white pottery. On this white ground—with a coarsish absorbent surface—beautiful patterns, in conventional floral or animal forms, were deftly painted in cobalt-blues, manganese-purples, copper-greens and turquoise, with mixtures for intermediate tints; while a strong brownish-black outline colour was compounded by mixing the oxides of iron and manganese, to be turned into a fine, still black by the addition of a trace of cobalt and later of oxide of chromium. Over this freely painted colour, often used in broad flat masses, a singularly limpid alkaline glaze, generally of considerable thickness, was fired until it just fused; and the resultant effect is of the most rich and brilliant colour relieved on a ground of slightly toned white. Judging from fragments which have been found at Rai, and which can scarcely therefore be later than the 13th century, we find the characteristic Persian style of ornament already developed; dumpy little figures kneeling, standing or riding on grass between cypress trees, or animals and birds similarly disposed, with conventional borders and bands of Cufic inscriptions. Another well-known type of pattern consists of highly conventionalized floral ornament which often runs to a beautiful tracery of "arabesque" lines. The drawing is generally finely outlined with brown or black (a survival of the ancient Assyrian practice), and in the earliest pieces the flat washes of colour are laid in only in cobalt-blue, turquoise or green from copper, and shades of purple and brown from manganese. From the 16th century onwards Chinese influence is strongly felt both in the designs and in the colour schemes, particularly in the wares painted with patterns in blue only (fig. 39), which sometimes carry the imitation of Chinese porcelain so far as to bear forged Chinese marks. Finally, Shah Abbas I. (1587–1629) is said to have brought a number of Chinese artificers, among them many potters, to Ispahan, and we find that Chinese porcelain was largely painted at King-tê-Chên, with blue decorations in the Persian taste, so that we cannot be surprised at the growth of a hybrid Perso-Chinese style of decoration. From this period, however, Persian pottery deteriorated both in its technical and artistic aspects. Crudely moulded figures in fairly high relief, coloured with an opaque yellow and green as well as with transparent blue and turquoise, began to make their appearance, especially on the famous Persian tiles; and in the 18th century the brown and black outlines of the drawing (a most valuable decorative resource) vanish, and we get brighter and more glittering, yet poorer colours, including a rose-red enamel fired over the glaze, evidently imitated from the Chinese *famille-rose* porcelains of the 18th century.

The finest work appears to have been produced from the 11th to the 14th centuries; yet so imperfect is our knowledge of what is truly Persian, Syrian or Egyptian, that we are forced to accept many conventional names that have perhaps little but custom to recommend them. There is, for instance, an important class of pottery known, until recently, only from a few remarkably handsome vases, and once called "Siculo-Arab" because these few examples had been mostly found in Sicily. This ware is characterized by its fine quality and its distinguished ornament—leaf-shaped panels with arabesques; interlacing patterns; striped and dotted bands; friezes of animals or birds amidst

FIG. 39.—Persian Plate painted in blues only. (Victoria and Albert Museum.)

flowers and foliage, inscriptions, &c.; all strongly and firmly drawn in black or brown outlines and washed in with a very pure cobalt-blue or with turquoise. In spite of the resemblance of these pieces to the oldest Persian wares, we know that bowls, dishes, vases and spoilt pieces of the same kind have been dug up on the site of Rakka near Aleppo; similar ware has been found at Fostat, together with evidences of local manufacture, and occasional pieces have been brought from Persia; so that probably this distinguished ware was made at Rakka in Syria between the 9th and the 13th centuries, and was afterwards made by Syrian potters both in Persia and Egypt.

Other Persian Wares.—We have already spoken of the prevalent use of coloured glazes in all the countries of the nearer East—from Egypt to Persia—from remote times, either as the sole colour decoration or in conjunction with modelled or painted ornament. The fragments from Rai and Fostat include rich turquoise glazes (derived from the ancient Egyptian), deep and light-green glazes containing lead and copper, imitations of ancient Chinese céladon-green, a brownish-purple glaze, a coffee-brown glaze and a deep cobalt-blue glaze.[1] All these may be

[1] A peculiarity of the Persian and allied blue glazes, of many shades, is that they appear to have been produced not by dissolving the colouring matter in the glaze, but by coating the white ground of the ware with a thin wash of some cobaltiferous substance—probably an earth containing varying proportions of cobalt, manganese and iron—and then melting a thick alkaline glaze over it.

found either on plain vases, or on vessels with modelled ornament; or covering delicate floral or arabesque patterns painted in white slip or incised in the paste. Sometimes, even at this early period, there are traces of applied gold-leaf attached, but not fired, to the glaze.

At a very early period, too, we find those beautiful bowls, dishes and vases decorated with geometrical or arabesque patterns in a singularly still underglaze black, and covered with the blue turquoise or green copper glazes. This characteristic and beautiful ware is common to Persia, Syria and Egypt in Saracen times, and it was soon prized in Europe, as is shown by the famous fragment found by the late Mr Drury Fortnum built into the outer walls of S. Cecilia in Pisa, where it was apparently placed in the 12th century.[1]

At a later date a shining black glaze made its appearance, and in the 13th century pale and lapis-lazuli blues, while there is a comparatively modern sage-green glaze found only on pieces bearing patterns modelled in low relief.

Persian Porcelain.—This beautiful and somewhat mysterious ware—often called "Gombroon" ware—apparently made its appearance in the 13th century, though the bulk of the known examples are not earlier than the 17th or 18th century. The ware is quite translucent and is of soft and delicate texture. Unlike Chinese porcelain, it was made from a mixture of pipe-clay and glass, and was glazed with a soft lead glaze; so that a fragment of it would melt to an opaque glass in an ordinary porcelain oven. It is principally met with in the form of dishes, bowls (often mounted on feet) and saucers. The pieces are generally very thin and are either perfectly plain or bear flutings or simple wavy patterns incised in the paste. Most characteristic and beautiful is the decoration by means of delicate perforations either straight or lozenge-shaped. In the finest pieces the perforations are filled with glaze, and then they form a decoration analogous to the well-known "rice-grain" decoration of the Chinese. Occasional pieces are found decorated with colour, either a delicate green, producing an effect like pale bright céladon, or the well-known Persian blue ground; and this is sometimes decorated with lustre patterns. Nowhere can this rare and delicately beautiful ware be so well studied as in the Victoria and Albert Museum.

Lustred Ware.—The decoration of pottery with iridescent metallic films is one of the most astonishing and beautiful inventions ever made by the potter. Hitherto we have seen only coloured clays, coloured glazes, or colours fired under the glaze, but we are now brought face to face with a colour effect produced by refiring the finished glazed pieces, at a lower temperature, with pigments painted upon the glaze (fig. 40; see also Plate V. 13th-century Persian lustre). How such a practice originated is probably an idle speculation, but it may have come through repeated attempts to decorate pottery with gold. If gold was painted under the glazes of these ancient vases, it would probably vanish and leave no trace; but gold, alloyed with much silver, applied over the finished glaze and refired, in the attempt to make it adhere, may have given the first films of iridescent colour. We know certainly that before the 13th century the elements of the process had been mastered, and that the potters of the nearer East had learnt that by mixing some compound of silver (doubtless the sulphide) with clay, and painting the mixture on the finished vase, which was refired in such a way that the pieces were only raised to a dull red heat and were then exposed to the vapours of the wood-fuel, glowing lustrous patterns were left on the ware that looked like metal—but metal shot over with all the hues of the rainbow, golden, rosy, purple and green. Numerous fragments of this lustred pottery had been disinterred from the site at Rhagae, and it was therefore assumed that the beautiful process was of Persian origin, particularly as most of the examples then known bore designs of distinctly Persian style. We are now inclined to think that the process really arose in Egypt or in Syria, and was carried eastward to Persia, just as it was afterwards carried westward to Spain. In support of this view there is the written record of the Persian traveller Nasiri Khosrau, who visited Old Cairo in the 11th century (1035–1042). He was apparently familiar with the pottery of his own country, and notes all the novel forms that he found in the bazaars of Old Cairo, which was both a great trading emporium for the traffic of East and West, and a pottery centre of note. He mentions, specially, certain translucent bowls of earthenware decorated with colours resembling a stuff called "bougalemoun," "the tints changing according to the position which one gives to the vase." Such a description could only apply to "lustred" pottery, and it would seem as if this process must have been known in Egypt or Syria before it was practised in Persia (see Plate V., 13th-century Syro-Persian). In any case the secret was soon carried to Persia, for we have ample evidence that it was practised at Rhagae in the next century.

The earliest dated example of Persian lustred ware is a star-shaped tile of the year A.D. 1217 (A.H. 614), decorated with spotted hares, heraldically confronted, in a ground of lustre relieved by dots and curls, and surrounded by an inscribed border. A vase in the Godman collection bears the date A.D. 1231 (A.H. 629), and some of the well-known "star and cross" tiles from Veramin belong to the year A.D. 1262. The early Persian lustre is chiefly known to us through the tiles with which the walls of mosques and public buildings were decorated; the more ephemeral vases, bowls and dishes have survived in smaller numbers and very rarely in perfect condition. Common motives of decoration were animals and birds (sometimes showing Chinese influence), the hare and the deer being favourites; roughly drawn sack-like figures of men and women, mounted or on foot (probably heroes of Persian legend), conventional foliage and arabesques. The designs are usually reserved in a lustred ground, which is relieved by small scrolls, curls and dots etched in the lustre (as though the glazed piece had been covered all over with the lustre mixture and the ornament scratched out of this when it was dry), and showing beneath the ivory-white tin-enamel with which the early wares are generally coated. The lustre itself when viewed directly may look like some golden or deep chocolate-brown colour, but as the piece is turned to catch a side-light this deep colour is seen to bear a thin iridescent film, which glows with golden, green, purple or ruby-red metallic *reflets*. On the earliest examples the decoration is often entirely in lustre, but later, lustre is often used to eke out a pattern painted with masses of pale cobalt-blue or turquoise under the glaze. Similar tiles with rather more elaborate ornament bear 14th-century dates, and another variety has parts of the decoration, more particularly the large letters of the inscriptions, raised in low relief and heightened with blue. Yet another class, belonging to the 14th century, has a fine dark-blue alkaline glaze,

FIG. 40.—Persian Ewer, white ground, with pattern in brown copper lustre; the upper part has a blue ground. The mounting is gilt bronze, Italian 16th-century work. (British Museum.)

[1] See Drury Fortnum, *Archaeologia*, vol. xlii.

with designs in low relief, picked out with scrolls and arabesques in white enamel or bold floral sprays in leaf-gold. Lustre is frequently found applied to the rich cobalt-blue ground, and there are still existing a few magnificent vases which show the artistic possibilities of this scheme of decoration. It should be noted that when the pieces are in the round, the pattern is usually painted in lustre and not reserved in a lustre ground as on the flat tiles. In the later examples the tin-enamel was replaced entirely by white slip, and the lustre decoration continued in use until the end of the reign of Shah Abbas I. (1587–1629). To the last period belong many charming bowls, narghilis, cups and dishes in a brown lustre, with ruby *reflets*, on a white or a deep blue ground; this ware is pure white in substance and generally translucent, and the pieces are occasionally signed (see *Persian porcelain* above).

Damascus Ware.—This time-honoured name (for "Damas Ware" was often mentioned in medieval inventories, and appears to have included many varieties of oriental pottery which were highly prized in Italy, France and England in the middle ages)[1] forms rather a puzzle nowadays for the archaeologist, for many diverse wares have been included under this title, some of which were not made at Damascus. Yet Damascus is one of the oldest cities in the world, and has seen unnumbered dynasties come and go around its desert-fringed oasis. An important centre of caravan traffic, a nexus of palpitating life from east and west, north and south, we cannot wonder if it developed a special pottery of its own, tinged with something of a cosmopolitan spirit. Formerly the Damascus wares were treated as a variety of the Persian pottery we have just described, but the best examples of the class now known under this name exhibit a mingling of various influences such as we might expect, and have well-marked affinities both with the Persian wares and those brilliant productions now commonly recognized as Syrian and Turkish, while even far-off echoes of Chinese decorative mannerisms are not wanting. The characteristic Damascus ware of the collector is marked by its quality; the ground is of very clear white, the colours are pure and brilliant, and the vessels, whether dishes or vases, are soundly made. The decoration, which is purely floral or conventional, recalls the more formal Persian style, but the colours recall those of the Turkish pottery with one remarkable substitution. The piled-up red-clay pigment of the latter is absent, but where it would inevitably occur in the design of a Turkish piece its place is taken by a purple made from manganese, which is often thin and rather washy in quality. Fine examples of this famous ware are to be seen in the British Museum and in the Louvre; its characteristic style of pattern is well shown in the 16th-century Damascus piece reproduced in Plate V. Another splendid example is the lamp from the Mosque of Omar at Jerusalem, also in the British Museum (fig. 41); and this has generally been classed with the Damascus wares, though its colouring and its technique belong rather to Lower Syria or to Egypt. This magnificent piece bears a dated inscription, "In the year 956 in the month *Jemazi-l-oola*. The painter is the poor and humble Mustafa." This is reckoned as June A.D. 1549. It may be remarked that our difficulties of identification are increased by the fact that, under Arab rule, Syrian and Persian potters were at work in Damascus, in Old Cairo and elsewhere. Among the Fostat fragments classified by Dr Fouquet are many bearing the signatures of Syrian workmen. In the 15th and 16th centuries, too, imitations of Chinese blue-and-white porcelain became common throughout the nearer East, and quantities of fragments have been found at Fostat, Ephesus and elsewhere.

FIG. 41.—Lamp from the Mosque of Omar.

Turkish Pottery.—This beautiful and striking ware, formerly called Persian, and till lately Rhodian because Rhodes was a known centre of manufacture, seems to have been fabricated in all the countries overrun by the Ottoman Turks in the 13th century, so that the name "Turkish," in spite of some opposition, is now generally applied to it. (See fig. 42; and the 16th-century Rhodian or Turkish pieces, Plate V.) It has a fine white body of the usual sandy texture, covered, as a rule, with a wash of pure white slip; it is painted in strong brilliant colours, chiefly blue, turquoise, green, and a peculiar red pigment which is heaped up in palpable relief—the whole of the ornament being outlined with black or dark green. The ware was glazed with an alkaline glaze of great depth, so that the colours soften and sometimes run, producing one of the most brilliant and attractive of all the oriental wares. In certain districts the white ground was not used, but over it a slip of the red colour (Armenian bole), varying in strength from bright red to pale salmon, was laid over the piece, reserving the pattern only in the white slip, which consequently lies lower than the red ground. Other examples are known where the ground has been covered with lavender, blue, sage, apple and turquoise greens, chocolate or coffee-brown, and the sumptuous effect of the whole was often increased by the application of gold-leaf over the fired glaze. The decorative motives are distinguished from those of the Persian wares by a breadth and boldness which are in keeping with the brilliant, and not always harmonious, colouring. They include, it is true, the Persian arabesque, the floral scroll with feathery leaf, the thistle-bloom and the cypress tree, but the naturalistic treatment which permits immediate recognition of the favourite Turkish flowers such as the tulip, hyacinth, carnation, fritillary, corn-flower and lily (some of which were imported into Europe by the Turks), is as original and distinctive as the arrangement of the different elements of the design is artistic and charming. Other styles of design include formal patterns and diapers, rarely human and animal figures, and occasionally armorial devices and ships. Tiles of this ware were extensively used for lining the walls of public buildings, replacing the carpets and textile hangings which their designs so freely imitated. Of domestic articles, dishes are the most numerous, though vases, ewers, sprinklers, jugs, tankard-shaped flower-holders, covered bowls and mosque lamps are also plentiful. The tiles are found in all parts of the Turkish empire, though they were probably made at certain centres, such as Nicaea (which gave its name to the ware in the 16th century and no doubt supplied many of the mosques in Constantinople), Kutaia, Demitoka, Lindus and other centres in Rhodes and Damascus. Individual wares cannot be

FIG. 42.—Rhodian Jug.

[1] Specimens of Turkish and other Eastern wares exist with elaborate English silver mounts of the time of Elizabeth, and these were doubtless included under the name of "Damas Wares."

distinguished, except in some measure those of Damascus and Kutaia. A small jug in the Godman Collection has an Armenian inscription stating that it was made by "Abraham of Kutaia" in the 16th century. A few fine bowls and vases, painted in a beautiful blue with Persian arabesques and rosette scrolls, recalling Chinese porcelains of the Ming dynasty, but of very characteristic appearance, are also attributed to this place; and later, in the 18th and up to the end of the 19th century, an inferior ware was largely manufactured here. This late ware usually takes the form of small objects—plates, cups, jugs, egg-shaped ornaments, &c.—with a thin, well-potted, white body and slight patterns of radiating leaves, scale diapers, &c., in blue, black and yellow. Turkish pottery was at its best in the 16th and the early part of the 17th century, and though good tile work of later date exists, the general pottery deteriorated before the 18th century. An inferior ware of poor colour is still produced in Turkey, Persia and Syria, and some attempt has been made of late to revive the old lustre decoration, but the results are not likely to be mistaken for those of old times.

Collections.—The Victoria and Albert Museum contains the finest collection of the medieval pottery of the nearer East—the British Museum collection, though much smaller, has some magnificent examples. The Cluny Museum in Paris has a never-to-be-forgotten collection of Turkish pottery, especially plates and dishes. The museums of the Louvre and of Sèvres have also many beautiful examples. Berlin, Frankfort and other German towns have collections, but much smaller in extent. Private collectors in England and France own many fine specimens, and mention may be made particularly of those owned by Mr Ducane Godman and Mr George Salting.

LITERATURE.—Fortnum, *Majolica* (1896) (also in South Kensington Museum Handbook); Falke, *Majolica* (Berlin, 1896); Fouquet, *Contributions à l'étude de la céramique orientale* (Cairo, 1900); Karabacek, "Zur muslimischen Keramik," in *Monatsschrift für den Orient* (1884); Lane-Poole, *Art of the Saracens in Egypt* (1886); Migeon, *Manuel de l'art musulman*, vol. ii. (1907); Sarre, *Persische Keramik*; and *Jahrbuch der königlichen preussichen Kunstsammlung* (1905), part ii.; H. Wallis, *The Godman Collection* (1) *Lustred Vases* (London, 1891); (2) *The Tenth Century Lustred Wall-tiles* (1894); *Notes on some Early Persian Lustre Vases* (1885); *Egyptian Ceramic Art* (1898). (R. L. H.; W. B.*)

HISPANO-MORESQUE POTTERY

With the doings of the Moslem potters of the countries round the eastern Mediterranean fresh in our minds, it is interesting to follow the westward trend of the Moslem conquests, and see how in their wake there also sprung up in Spain a ware of high distinction and beauty. The Iberian peninsula had been the scene of pottery-making from prehistoric times—a red unglazed ware was made before the dawn of civilization as finely finished as that found in the Nile valley by Flinders Petrie (see EGYPT: *Art and Archaeology*), and the Romans had one of their great provincial pottery centres at Saguntum; but it was only when a great part of Spain lay under Mussulman rule that artistic and distinctive pottery was produced. What is by no means clear is how it came to pass that when the traditional methods, learnt by the Arabs in Egypt and Syria, were carried westward they should have undergone such a radical change. Oxide of tin, the opacifying and whitening material in glazes *par excellence*, was certainly known and used in the East from at least the 6th century B.C.; the ancient wares are coated with a covering of white tin-enamel to hide the buff or reddish-coloured clay, and it was similarly used elsewhere; but its use was sporadic and not general in those countries, where we find instead a consistent development of the pottery made with a white slip-coating and a clear alkaline glaze. Perhaps it was that at this period tin was almost as costly as gold, and it was only when potters with an oriental training brought their skill to Spain, where tin abounded, that the relative cheapness of the material led them to employ it, so far as is known, exclusively. (There is a wide distinction between the tin-enamelled and the slip-faced wares, glazed with an alkaline glaze. In the latter, the more oriental type, the slip-coating is of fine white clay and sand, and this is finished with a transparent alkaline glaze containing little or no lead; in the former there is no need of a coating of slip, for the addition of oxide of tin to a glaze rich in lead gives a dense coating of white enamel, opaque enough to disguise the color of the clay beneath.) Such colours as were used for painted patterns were painted over this enamel coating before it was fired, so that they became perfectly incorporated with it, and then this ground furnished a splendid medium for the development of those thin iridescent metallic films that we call "lustres." The knowledge of this lustre process had been brought from the East also, where it was used on another ground, and with the growing use of lustre pigments containing copper as well as silver—until the red, strongly metallic copper lustre almost ousted the quieter silver lustres—we get the simple technique of one of the most distinctive kinds of pottery known.

Briefly, the wares were "thrown" upon the wheel or "pressed" on modelled forms—handles, ribs and dots of clay, or strongly incised patterns were often added by hand—and they were then fired a first time. A coating of the tin-enamel (rich in lead as well as tin) was applied, and on this coating designs were painted in cobalt and manganese; sometimes these colours were only used as masses to break up the background. Then the second firing took place and the piece came from the firing all shining and white, except where the blue or brownish purple

FIG. 43.—Hispano-Moorish Plate, painted in blue and copper lustre.

had been painted (see fig. 43). The lustre pigments, a mixture of sulphide of copper or sulphide of silver, or both with red ochre or other earth, was then painted over the glazed surface with vinegar as a medium. The repainted piece was fired a third time to a dull red heat, and smoked with the smoke from the wood used in firing, and when cold the loosely adherent ochre and metallic ash left were washed off, leaving the iridescent films in all their beauty.

The technical practices of the Spanish potters and the composition of the lustre pigments are given in Cocks's account of the processes followed at Muel (Aragon) in 1585. The Manises receipt of 1785 gives:—copper 3 oz., red ochre 12 oz., silver 1 peseta piece, sulphur 3 oz., vinegar 1 qt. and the ashes scraped off the pots after lustring 36 oz.[1] Interesting documents have recently been published concerning the works executed by the "Saracen," John of Valencia, at Poitiers in 1384, and it is certain, from the list of materials supplied to him, that he made there tiles that were enamelled and lustred.

The earliest record of lustred pottery in Spain is the geographer Edrisi's mention of the manufacture of "golden ware" then carried on at Calatayud in Aragon in 1154. Ibn Sa'id (1214–1286)

[1] See Riaño, *Spanish Arts*, Victoria and Albert Museum Handbook, pp. 149-151; and *Sobre la manera de fabricar la antigua loza dorada de Manises* (1878).

speaks of the glass and the golden pottery made at Murcia (city), Almeria and Malaga. From the 14th century the notices which have come down to us divide themselves into two main groups relating to the industry (*a*) at Malaga; (*b*) at various localities, but especially Manises in Valencia.

Malaga.—Malaga was situated within the Moorish kingdom of Granada, which formed, from 1235 until the late 15th century, the last remnant of Moorish dominion in Spain. Here under the art-loving Nasride dynasty, Mussulman arts and learning flourished to an unprecedented degree. In 1337 Ahmed ben-Yahya al-Omarí enumerates, among the craft productions of Malaga, its golden pottery, the like of which he declares is not to be met with elsewhere. The Moroccan traveller Ibn Batuta mentions (1350) the Malagan golden pottery, as does Ibn al-Hatib (1313–1374) of Granada, in his description of Malaga. The principal monument of the period is the royal palace of Granada, begun in 1273, and finished during the 14th century, from which period most of its ornamentation dates. Two vases were discovered there, of which the existing one, known as the "Alhambra vase," is admittedly the most imposing product of Hispano-Moresque ceramic art extant. Its amphora-shaped body (4 ft. 5 in. high) is encircled by a band of Arabic inscription, above which are depicted gazelles reserved in cream and golden lustre upon a blue field; the rest of the body and the prominent handles are covered with compartments of arabesques and inscriptions in the same colours; and panels on the neck, divided by mouldings and decorated with strap-work and arabesques. Vases similar in shape and technique, with ornament of Cufic characters and arabesques in horizontal rows, are to be found in the museums at St Petersburg, Palermo and Stockholm. As to the exact date of these, experts are not agreed. Though presenting all the characteristics of the 14th-century Hispano-Moresque ornament, it seems probable that they were produced at the same period as the large lustred wall-tile formerly in the Fortuny (now in the Osma) collection, an inscription upon which is by some held to refer to Yusuf III. of Granada (1409–1418), not to Yusuf I. (1333–1354). Another remarkable example is a dish (Sarre collection, Berlin), which, it is claimed, bears upon its back, in Arabic, the word Malaga; it is ornamented with eight segmental compartments filled alternately with strap-work designs and arabesques in lustre. Malaga was reconquered by Ferdinand and Isabella in 1487, and after this its industry probably decayed, as it is not mentioned by Lucio Marineo in 1539 among the localities where ceramics then flourished.

Valencia.—The emirate of Valencia was reconquered by Aragon in 1238. The history of its lustred ware is known from 1383, when Eximenes (whose evidence has been erroneously held to date from 1499) mentions the golden ware (*Obra dorada*) of Manises. Valencian pottery of this kind was an offshoot of the Malagan industry, as in documents lately published (ranging from 1405 to 1517) it is repeatedly designated Malaga ware (*Obra de Malaga*). Its decorative qualities became famous throughout the whole of Europe and North Africa. The ware was chiefly manufactured at Manises by the Moorish retainers of the Buyl or Boil family, lords of Manises, who levied dues upon the output of the kilns, and occasionally arranged for its sale. It is distinguished as regards its ornamentation from the pottery of Malaga by the adoption of a more natural rendering of plant form motives and by the use of armory. The ware consists of drug pots, deep dishes, large and small plates, aquamaniles, vases, &c. Some dozen varieties of ornament were employed during the 15th and early 16th centuries, including mock arabic inscriptions, various flower or foliage patterns taken from the vine, bryony, &c., and gadroons. The centres of dishes frequently bear the arms of a king or queen of Aragon, of the Buyls of Manises, or other Valencian or Italian families for whom they were made. Great dexterity is shown in the execution of minute and complicated schemes of ornament and in the richness of the colour schemes; golden lustre of various hues, with blue and manganese, form the simple combinations, but the ruby, violet or opalescent lustre combine to produce with the colours a wonderful decorative effect. From 1500 the use of blue and manganese was gradually discontinued and the ornament quickly became nondescript, but the brilliancy of the lustre pigment nevertheless obtained a wide popularity for the ware, as is attested by Marineo (1539), Viciana (1564) and Escolano (1610). After the expulsion of the Moriscoes (1609) the industry was carried on by those who had escaped deportation or by Spaniards who had learnt the craft; generally speaking their productions can be summed up in the word "decadence." In the course of the 15th century the manufacture of lustred pottery was carried on at various other small towns near Valencia; in 1484 it was produced at Mislata, Paterna and Gesarte. It is known to have flourished at Calatayud in 1507, and at Muel, also in Aragon, in 1589. In the Valencia district much pottery for ordinary use, ornamented with blue on white, was also produced.

Majorca.—Scaliger, in 1557, states that Chinese porcelain was imitated in the Balearic Isles, and that the Italians called these imitations "majolica," changing the letter in the name of the islands (then called Majorica) where they originated. The truth would appear to be that Valencian wares, being exported in Balearic vessels that called at Majorca on the voyage to Italy, acquired a reputed Mallorcan origin. There is extant a potter's petition praying for permission to establish himself in Majorca (1560), in which he states that "Manises ware," &c., had to be imported, as it was not made there.

Collections.—In England, the Victoria and Albert and the British Museums have fine collections of this ware. At Paris the Cluny Museum collection, and the Louvre; the museum at Sèvres contains many fine typical pieces. Another good collection is that of the archaeological museum at Madrid. The Berlin and the Hamburg museums, the Metropolitan Art Museum at New York and the Boston Museum of Fine Arts also contain good specimens. The private collections of England, France and Italy are rich in these wares, among the finest being those of Mr F. D. Godman (Horsham), and of Don G. J. de Osma (Madrid).

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MEDIEVAL AND LATER ITALIAN POTTERY[1]

Little is known of the potter's art in Italy after the fall of the Roman empire till the 13th century. The traditions of the Roman potters appear to have been gradually lost, leaving behind only sufficient skill to make rude crocks for domestic use and to coat them, if required, with a crude yellowish lead glaze sometimes stained to a vivid green with copper oxide. Applied ornament of roughly modelled clay and scratched designs were the chief embellishments of such wares, which were of the same class as the medieval pottery of Great Britain and the north of Europe. In the 12th and 13th centuries, however, contact with Asia Minor, Syria, Egypt and Spain, where ceramic skill had been highly developed in fresh directions, as we have seen, introduced into Italy as well as the rest of Europe those superior wares characterized by a white surface decorated with bright colours under a brilliant transparent glaze, and glorified by metallic lustres. The Italian potters did not long remain unaffected by these influences, but though Persian, Syrian and Egyptian pottery must have been fairly plentiful in the households of the wealthy, it was the distinctively Hispano-Moresque wares from which the potters of Italy drew the inspiration for a new ware of their own. The technique of a siliceous slip-coating with colour painted on that and covered with a transparent alkaline-glaze, was only sparingly used, and then not very successfully; it is only the introduction of the tin-enamel that was turned to fruitful account and led to the production of the magnificent Italian majolica of the 15th and 16th centuries.

[1] See examples in colour, Plate VI.

In the same way the practice of lustre decoration might have been learnt from the Orient, but its late appearance on Italian wares (16th century) and its evident relationship to the lustres of Spain, rather than to the earlier lustres of Egypt, Syria and Persia, are further evidence that though oriental decorative motives gave the Italians certain early types of design, it is the Hispano-Moresque potters from whom the Italians learnt the art they were afterwards to develop so splendidly in a new direction.[1]

All the Italian pottery above the level of common crocks may be conveniently grouped into four classes.

1. The native wares, made of coarse and often dark-red clay, coated with a white clay slip (a kind of pipe-clay) and covered with a crude lead glaze, either yellow or green. The idea of rendering this ware ornamental, and fitting it for more than vulgar use, led to a great development of the *graffiato* process; where, while the vessel, with its white clay coating was firm yet soft enough, patterns were scratched or engraved through the white slip to the red body beneath. This decorative method has been already mentioned several times, for it was practised during the early middle ages in all the countries from India to Italy, and the Byzantine potters were adepts in its use. Nor has its practice ever ceased in Italy, for through all the times

FIG. 44.—Italian Graffiato Plate, 16th century. (South Kensington Museum.)

when painted majolica was the ware of the wealthy, this earlier and humbler pottery was used by those who could not afford the former; and the gaily-coloured later wares of this kind have a fine decorative quality of their own. From the depth beneath the present soil at which fragments of this ware have been disinterred, it is obvious that the method was widely practised in early times, and no simpler glazed wares are known except those covered all over with green, yellow or brown glazes. Early examples have been found all over northern Italy—in Faenza, Florence, Pisa, &c., and particularly in Padua, where it seems to have been extensively made. Pavia was another centre of its manufacture, even to the end of the 17th century, and Citta di Castello must have been noted for it in the 16th century, for Piccolpasso describes this ware as "alla Castellana" (see fig. 44). Apparently in the latter half of the 15th century a sudden advance takes place in the colouring of this *graffiato* ware. Instead of the simple glazes, of uniform colour, of the earlier productions, underglaze colours—green, purple, blue and a brown of the tint of burnt sienna which passes into a glossy black where it is thick—were applied in bold splashes under the straw-coloured glaze, producing a rich and decorative effect by very simple means. As fine examples of this kind we may mention the dish with the mandoline players, and one with cupids disporting themselves in a tree, in the Victoria and Albert Museum; the tazza, supported by three modelled lions, in the Louvre; and the dish, with figures of the Virgin and two saints, in the museum at Padua. The ware has often been called, quite erroneously, *mezza-majolica*. It had nothing to do with majolica, being the natural development of a much older process; and its manufacture was carried on all through the period of majolica manufacture and has never ceased.

2. *Mezza-Majolica.*—This name is accurately applied to certain Italian wares that made their appearance in the 12th century or even earlier, when rude patterns—a clumsy star, a rude crossing of strokes or some equally elementary work—are found painted on a thin white ground covering a drab body. The pieces, generally pitchers of ungainly forms, are uncouth in the extreme; the body has been shaped in local clay and then thinly coated by dipping it into a white slip, which seems at first to have been of white clay only, though oxide of tin and lead were added to it even in the 12th century. The colours used for the rude painting were oxide of copper and oxide of manganese, and the final glaze, which is generally thin and often imperfectly fused, seems to have been based on the alkaline glazes of the nearer East. The specimens so assiduously recovered by Professor Aragnani, some of which, or similar wares, are to be found in the Louvre, the British and the Victoria and Albert museums, are typical of the rude work out of which, by a fuller knowledge of Spanish methods, the painted majolica grew.

3. *Majolica.*—For the last three centuries the word majolica has been used to signify an Italian ware with a fine but comparatively soft buff body, coated with an opaque tin-enamel of varying degrees of whiteness and purity, on which a painted decoration was laid and fired. In the later pictorial wares, a fine coating of transparent alkaline glaze was fired over the painting to soften the colours—really to varnish them. The word itself appears to have been derived from the name of the island Majorca, and was originally applied by the Italians to the lustred wares of Spain which were largely imported into Italy, probably arriving in ships that called at or hailed from Majorca, as we do not believe that the ware was actually made in that island. That the secret of the tin-glaze, which is the essential feature of Italian majolica, was known in Italy in the 13th century is practically proved; and there is both literary and archaeological proof of its use there in the 14th. Mention of it is made in the *Margarita Preciosa* published at Pola by Pierre Le Bon in 1336, and the well-known jug, bearing the arms of Astorgio I., discovered under the Manfredi palace at Faenza, must have been made shortly after 1393. Its development marched side by side with that of the mezza-majolica, until it practically superseded the latter for painted wares in the 15th century; but the earliest examples have little more than an archaeological interest, and it was only after the last decade of the *quattrocento* or the first of the *cinquecento* that it blossomed into an artistic creation. In its prime the production of majolica was confined to a very small part of Italy. Bologna on the north, Perugia to the south, Siena on the west, and the Adriatic to the east, roughly enclose the district in which lie Faenza, Forli, Rimini, Pesaro, Cafaggiolo, Urbino, Castel Durante, Gubbio, Perugia and Siena. Towards the middle of the 16th century Venice on the one hand, and in the 17th and 18th centuries the Ligurian factories at Genoa, Albissola and Savona, made majolica of the later decadent styles, while, at the end of the 17th and in the early part of the 18th centuries, the southern town of Castelli, near Naples, produced a ware which closes the period of artistic majolica.

4. *Lustred Majolica.*—This brilliant species of Italian pottery (to which alone Piccolpasso applied the name majolica) seems to have been mainly produced at Deruta and Gubbio, though experiments were made at Cafaggiolo and probably at Faenza and Siena. Considering how much the Italian majolist owed to the Spanish-Moorish potter, it is remarkable that this beautiful method of decoration should have made so tardy an appearance, for the earliest specimens do not appear to be much earlier than

[1] There is ample documentary evidence to prove how largely the lustred pottery of Spain was imported into Italy from the 12th century onwards; and it is important to note in this connexion that almost all the fine examples of Hispano-Moresque in our modern collections have been obtained from the palaces of ancient Italian families.

FIG. 52.—CORINTHIAN JAR.

FIG. 53.—FRANÇOIS VASE.
(From Furtwängler and Reichhold, *Griechische Vasenmalerei*, by permission of F. Bruckmann.)

FIG. 54.—BLACK-FIGURED AMPHORA BY EXEKIAS.

V. 732.

FIG. 55.—VASE FROM SOUTHERN ITALY.
Signed by Python.

CERAMICS

FIG. 56.—BOWL MADE AT CALES IN IMITATION OF METAL. (2ND CENT. B.C.)

FIG. 57.—VASE OF 5TH CENT. B.C., MODELLED IN FORM OF HEAD.

FIG. 58.—VASE OF 6TH CENT. B.C., IN FORM OF HELMETED HEAD.

FIG. 59.—FLASK OF VITREOUS GLAZED WARE. (ROMAN PERIOD.)

FIG. 60.—AMPHORA OF APULIAN STYLE, WITH SCENE FROM EURIPIDES' "HECUBA."

FIG. 61.—MOULD FOR ARRETINE BOWL.

FIG. 62.—JAR OF ARRETINE WARE FROM CAPUA.

FIG. 63.—EARLY ETRUSCAN JAR. (VILLANOVA PERIOD.)

FIG. 64.—STAMP FOR ORNAMENTING ARRETINE VASE.

FIG. 65.—ETRUSCAN "CANOPIC" JAR PLACED IN BRONZE CHAIR.

FIG. 66.—MOULD FOR BOWL OF GERMAN WARE. (2ND CENT. AFTER CHRIST.)

FIG. 67. — MEDALLION FROM VASE MADE IN S. FRANCE, WITH SCENE FROM TRAGEDY. (3RD CENT. AFTER CHRIST.)

FIG. 68. — JAR OF RHENISH WARE WITH INSCRIPTION. (3RD CENT. AFTER CHRIST.)

FIG. 69.—BOWL OF GAULISH (LEZOUX) WARE WITH FIGURES IN "FREE" STYLE. (2ND CENT. AFTER CHRIST.)

FIG. 70.—JAR OF LATER LEZOUX WARE. (3RD CENT. AFTER CHRIST.)

the end of the 15th century, and the process was apparently abandoned by the middle of the 16th. The lustre wares of Deruta, probably the earliest made in Italy, have strongly-marked affinities with their Spanish prototypes; the earlier examples are hardly to be distinguished from Spanish wares, and to the last the ware remained technically like the earlier ware, though with perfectly Italian decorative treatment. Yet the best examples of Deruta silver lustre have a quality of tone that has never been surpassed; a colour resembling a wash of very transparent umber bearing a delicate nacreous film of the most tender iridescence. The Gubbio lustre is best known to us through the works of Maestro Giorgio, whose distinctive lustre is a magnificent ruby-red unlike any other. In all probability the lustre process was so quickly abandoned on the fine painted majolica, because the increasing efforts to make a "picture" were discounted by so uncertain a process. When one of the later majolica painters had spent weeks on the decoration of some vase or dish, with an elaborate composition of carefully drawn figures, it was not likely that he would care to expose it to any risks that could be avoided. The risks of the lustre process were inordinately great—Piccolpasso says, "Frequently only six pieces were good out of a hundred"—so that its use was relegated only to inferior wares, and then the process was relinquished and forgotten until its rediscovery in the second half of the 19th century.

The history of the development of these noble wares is by no means clear, nor is it always certain what part was played by each town in the successive inventions of technical methods, decoration and colouring, so that it is better, in such a general sketch as this, to treat the subject in its broadest features only. In the earlier painted wares the only colours used were manganese-purple and a transparent copper-green as on the mezza-majolica; but early in the 15th century cobalt-blue was added to the palette, and, later on, the strong yellow antimoniate of lead, mixed with iron. The decorations at this period were largely influenced by the wares imported from Persia, Syria, Egypt and Spain, specimens of which were so prized as to be used for the decoration of church fronts and the façades of public buildings. The lustre of the Saracenic wares was not yet understood, but its place was taken first by manganese and afterwards by yellow. The designs were chiefly conventional flower-patterns in the Persian or Moorish style, arabesques, and floral scrolls, the ground being filled at times with those tiny spirals, scrolls and dots to which the Eastern potters were so partial. Figures, human and animal, were introduced either among the formal ornament or only sundered from it by panels, of which the outlines often followed the contours of the central design (see the early 15th-century Faenza piece, Plate VI.). The figures were, in fact, drawn to conform to the outline of the vessel, and not the vessel made to display the figure-subject as in the majolica of the succeeding century. The earliest dated example of this period is the pavement laid down in the Caracciolo chapel in the church of San Giovanni a Carbonara, in Naples, about 1440. Specimens of these tiles may be seen in the British Museum, and from their style it has been suggested that they were made by some Spanish potters brought over to Naples by Queen Joanna, who was of the royal house of Aragon. To this period also have been referred the large ovoid jars made to contain drugs or confections, and decorated with bold scrolls of formal oak leaves enclosing spirited figures of men or animals, or heraldic devices. These are characterized by a rich blue colour generally piled up in palpable relief and sometimes verging on black; the outlines are usually in manganese, and transparent green is used for details and occasionally even as a ground colour. This ware has been definitely assigned to Florence on what seem very inadequate grounds, and it is better to speak of it simply as Tuscan. Then, essentially Italian ornament began to assert itself, and it redounds to the credit of the Italian majolist that he soon freed himself from repeating the styles of the wares from which he obtained his methods, and produced a distinctive type of ornament of his own. He revelled in patterns with bold floral scrolls, or those based on peacocks' feathers (see fig. 45), and then he advanced to concentric bands of painted ornament, borrowed from classic art yet breathing the true spirit of the Renaissance; while cable borders, chequer and scale patterns, bands of stiff radiating leaves, festoons of fruit and flowers, zigzags and pyramidal scrolls occupied nearly the whole surface or framed an armorial or emblematic central subject. Figure-subjects occur with increasing frequency as the century advanced; Madonnas and other sacred subjects, portraits, and, occasionally, groups of figures after the early Italian masters, or scenes borrowed from the first illustrated editions of the classics, gradually encroach on the conventional borders and occupy more and more of the surface of the piece. The provenance of these 15th-century pieces still remains uncertain—Faenza, Forli, Florence, Siena and other places offering rival claims,—but there is no doubt that from the earliest times Faenza was the most fertile centre of their manufacture, and almost all the motives of the *quattrocento* wares are found on fragments discovered there or on examples that can be traced to Faventine factories.

FIG. 45.—Early Faenza plate, with peacock-feather design, in blues, yellow and orange-red. (Victoria and Albert Museum

Early Faenza Potter's mark.

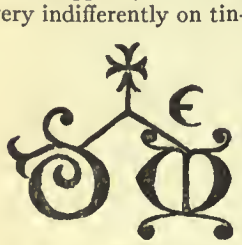
Late Faenza Potter's mark.

It is customary to treat the enamelled terra-cottas of Luca della Robbia, the great Florentine sculptor (1399–1482), and his followers, Andrea and Giovanni della Robbia and other members of the family, as belonging rather to the domain of sculpture than of pottery, and this is right, for there is nothing certainly known of the work of this great sculptor which connects it with painted majolica. The old theory that Luca invented the tin-glaze is long since exploded; what he did was to use coloured glazes made with a basis of tin-enamel on his boldly modelled terra-cottas—a very different thing,—and it is by no means certain that he was the first to do even that. The Victoria and Albert Museum is extraordinarily rich in della Robbia ware of every kind; and one may see there these beautifully modelled figures in high relief covered with pure white tin-enamel, set in a background of slatey blue or rich manganese purple and framed in wreaths of flowers and fruit which are coloured with blue, green, purple and sometimes yellow. There are altar vases too, of classic shape with low relief ornament, covered with the same peculiar blue glaze; these are sometimes furnished with modelled fruit and flowers; and finally there is the rare set of roundels painted on the flat with figure-subjects typifying the months; but the attribution of these remains doubtful, and their method is not that of painted majolica.

A remarkable development took place at the beginning of the 16th century, and in the forty succeeding years the highest perfection of manipulative skill, both in potting and painting, was attained. Artistically regarded, the elaborate and detailed methods of painting then adopted are too much allied to fresco-painting to be considered as fit treatment for enamelled clay; but this view was certainly not accepted at the time, nor is it subscribed to by many modern collectors; yet, regarded as decorated pottery, the 15th-century majolica, simpler and more conventional in design and treatment, is eminently preferable. The ruling families of northern Italy, who now took the industry under their personal patronage, clearly inclined to the opposite view and spared no expense to provide subjects for their

pot-painters. During the first two decades the influence of Faenza was paramount, and though the encroachments of purely pictorial motives are clearly indicated on the wares, room was still found for ornamental patterns. The broad rims of the dishes were covered with beautiful arabesque designs, frequently including grotesque figures, masks, dolphins and cherubs (see the Faenza Casa Pirota piece, 1525, Plate VI.). Sometimes reserved in the white on a dark blue ground and shaded with light blue and yellow, sometimes traced in dark blue on a paler grey-blue glaze (called *berettino*) or painted in darker tints on a ground of orange or full yellow, the Faventine arabesques form a conspicuous feature of the early wares of this century. Honeysuckle patterns and interlaced lines drawn in pure white on a toned tin-enamel (white on white or *sopra-bianco* decoration) commonly appear on the sides of the deep wells of the dishes, while in the centre is a single figure, a coat of arms, or a small figure-subject. A similar treatment, without the *sopra-bianco*, was accorded to the fruit-dishes, shallow bowls on low feet, &c., with moulded gadroons or scalloped sides, which are generally attributed to Faenza or Castel Durante. The workshops of Siena were also noted for delicately painted grotesques and arabesques, with a rich brownish-yellow or deep black ground. At Gubbio, too, the " grotesque " decoration was practised with marked success. Other developments of this style are the " *a candelieri* " designs, in which grotesques were symmetrically arranged round some central subject, such as a candelabrum or vase, and " *a trofei* " in which trophies of arms, musical instruments, and other objects were symmetrically disposed, or arranged in studied disarray throughout the design; these patterns are generally associated with the wares of Castel Durante and Deruta. Lovers' gifts, dishes in which the whole space is occupied by a portrait bust of a girl or man, with the name and a complimentary adjective inscribed on a ribbon in the background, were common to Faenza, Castel Durante and many other factories. Elaborate figure-subjects also were attempted early in the century at Faenza and with no little success, as may be seen from a dish in the British Museum, which is entirely occupied by the scene of the death of the Virgin, after a print by Martin Schöngauer, delicately painted in shades of blue, and dated about 1500.

In the early Faventine school the outlines of the figures are almost always traced in blue, even when they are laid on the grey-blue *berettino* ground, and blue was the prevailing colour of the shading and details. In the third decade of the century the style affected at Urbino superseded that of Faenza. The majolica painter's palette was now complete; in addition to the primitive blue, manganese-purple, transparent green and yellow, we find black, white, orange, greens of varying shades, brown, and a great number of intermediate tints obtained by mixing the standard colours. All the colours of the majolica of the best periods were painted on the tin-enamel before the final glazing, and were capable of standing the full heat of the fire. Such a thing as painting in enamels on the finished ware and refiring them at a lower heat was unknown before the end of the 17th or beginning of the 18th century. A true red colour seems to have been beyond the power of most of the Italian majolists, and was only attained at Faenza, and with less complete success at Cafaggiolo; the famous red of the Turkish pottery behaves very indifferently on tin-enamel.


Urbino Potter's mark.

In the Urbino style, which now became general, the ware was given over entirely to pictorial subjects, scenes from history or romance, scriptural and mythological, copied from the compositions of the Italian painters and usually set in a background of Italian landscape. Guidobaldo II., duke of Urbino, spared no pains to develop this phase of the art; the cartoons of Raphael, engraved by Marc Antonio and others, were placed at the disposal of the pot-painters, as well as the paintings of Michelangelo, Giulio Romano, Battista Franco, Rosso Rossi, Perugino, Parmeggiano and many more, and these, together with engravings by Agostino Venetiano, Marco Dente, Enea Vico and others, were copied, with more or less fidelity, on the majolica. Some of the painters, as, for instance, Xanto Avelli, were eclectic in their tastes and made up their subjects by taking a figure here or there from various pictures. Thus of three figures on a plate in the British Museum, painted with the Dream of Astyages, one is borrowed from Raphael and another from Mantegna. These " *istoriati* " wares reached their zenith at Urbino between the years 1530 and 1560, when the workshops of the Fontana family were in full activity; but their popularity was very general, and skilful painters at many other towns produced specimens that it is hard to distinguish from those of Urbino. Baldasara Manara was a prolific painter in this style at Faenza; Pesaro and Castel Durante were little behind Urbino in the skill of their artists, the Lanfranchi family in the former town having a well-deserved reputation, while the founders of the Fontana factories learnt their art in the latter; and a few pieces of considerable merit bear the name of Rimini as their place of origin.

There will always remain a large number of specimens of majolica which cannot be assigned with certainty to any particular factory, partly because the same style of painting was in vogue at many places at the same time, and partly because of the itinerant propensities of many of the painters, whose signed works prove that they moved from place to place to practise their art. There are, however, a few prominent artists whose touch is sufficiently well known from the examples that bear their signatures to enable us to classify a considerable proportion of the finest pieces. First of these is Niccola Pellipario, the founder of the Fontana family, who moved from Castel Durante to Urbino in 1519, and worked at the latter place in the factory of his son, Guido Fontana. There is little doubt that he was the painter of the famous service in the Correr Museum at Venice, which marks the transition from the style of Faenza to that of Urbino, and his free figure-drawing, the oval faces with strongly marked classical features, the peculiarly drawn knees, the careful landscapes and the characteristic balls of cloud are easily recognized in quite a number of pieces in the British Museum (see the Gonzago Este piece, Plate VI.). His pupil, who frequently signed his name in full, Xanto Avelli da Rovigo, was one of the foremost Urbino painters, and his work is characterized by bold colouring and fine figure-drawing, with a marked fondness for yellowish flesh tints. But Niccola's grandson, Orazio Fontana (see example, Plate VI.), was perhaps the most celebrated exponent of the pure Urbino style, and his free drawing and soft harmonious colouring, in which a brilliant blue is usually conspicuous, are unequalled by any other majolica painter of the period.

Certain characteristic wares of Faenza have already been noted. Those with the grey-blue (*berettino*) glaze were principally made at the factory called Casa Pirota, though inferior imitations were also produced at Padua, and a blue glaze of paler tint was largely used at Venice. Dolphins are a frequent motive in the arabesque ornaments of the same Faventine workshop, and many of the wares are marked with a circle divided by a cross and containing a dot in one of the quarters. A capital P crossed with a line or paraph is another Faventine mark, and a somewhat similar monogram, with an S added to the upper part, is found in the wares of Cafaggiolo. It has already been stated that a red colour is peculiar to Faenza and in an inferior and browner tint to Cafaggiolo; it was used, according to Piccolpasso, at the factory of Vergiliotto in the former place. At Cafaggiolo, the factory of the Medici family, many fine pieces were painted, mostly in the Faventine style; a deep blue, heavily applied and showing the marks of the brush, was freely used in backgrounds, and delicate running leaf scrolls in paler blue and reminiscent of

Venetian Majolica Potter's mark.

Persian style often appear on the Cafaggiolo wares (see example, Plate VI.). Not a little can be learnt from the ornament on the reverse sides of the dishes and plates; those of Faenza and Siena are richly decorated with scale patterns and concentric bands; those of Cafaggiolo and Venice are either left blank or have one or two rings of yellow. A few pre-eminently beautiful dishes, with central figure subjects of miniature-like finish in delicate landscapes with poplar trees in a peculiar mannered style, are probably the work of M. Benedetto of Siena. Borders of arabesques with black or deep orange ground belong to the same factory and were perhaps decorated by the same hand. The dishes covered, except for a few small medallions, with interlaced oak branches ("*a cerquate*" decoration), are no doubt the productions of Castel Durante; and a certain class of large dishes with figure subjects in blue on a toned blue glaze, and sometimes with formal ornaments in relief, are of undisputed Venetian origin.

Later Cafaggiolo Potter's mark.

Another phase of majolica decoration began about the middle of the 16th century and synchronized with the decline of the pictorial style. The figure subjects were relegated to central panels or entirely replaced by small medallions, and the rest of the surface covered with fantastic figures among floral scrolls, inspired by Raphael's grotesques painted on the walls of the Loggie in the Vatican. The prevailing tone of this ornament was yellow or orange, and the tin-enamel ground, which is always more or less impure in colour on Italian pottery, was washed over with a pure milk-white, known as *bianco di Ferrara* or *bianco allatato*, said to have been invented by Alphonso I., duke of Ferrara, who took an active interest in his private factory founded at Ferrara, and managed by potters from Faenza and Urbino.

The new style flourished at Urbino, Pesaro and Ferrara; at the first-named particularly in the workshops of the Patanazzi family, and lasted far into the 17th century. But the majolica was now in full decline, partly through the falling off of princely patronage, and partly, perhaps, owing to a reaction in favour of Chinese porcelain, which was becoming more plentiful and better known in Europe. The manufacture, however, never entirely ceased, and revivals of the old style were attempted at the end of the 17th century by Ferdinando Maria Campori of Siena, who copied Raphael's and Michelangelo's compositions, and by the families of Gentile and Grue at Naples and Castelli. The majolica of Castelli is distinguished by the lightness of the ware, good technique, and harmonious but pale and rather weak colouring; it continued into the 18th century. A coarse and inferior ware was made at Padua and Monte Lupo; and the factories of Faenza were still active, producing, among other kinds, a pure white ware with moulded scallops and gadroons. The industry continued to flourish in Venice and the north. Black ware with gilt decoration was a Venetian product of the 17th century, and at Savona and Genoa blue painted ware in imitation of Chinese blue and white porcelain made its appearance. In the 18th century a new departure was made in the introduction of enamel painting over the glaze, a method borrowed from porcelain; but this process was common to all the faience factories of Europe at the time, and though it was widely practised in Italy no special distinction was attained in any particular factory. In our own days imitations of the 16th century wares continue to be made in the factories of Ginori, Cantigalli and others, not excepting the lustred majolica of Gubbio and Deruta; but, compared with the old pieces, the modern copies are heavy to handle, stiff in drawing, suspiciously wanting in the quality of the colours and the purity of the final glaze which distinguish the work of the best period.

Turin Potter's mark.

Savona Potter's marks.

Lustred Wares.—The lustred wares of Deruta have marked characteristics, and, though differing in actual treatment from the Hispano-Moresque, their appearance is eloquent in favour of such a derivation. The most characteristic examples are large dishes and plateaux, thickly made and with the enamel on the upper face only, the back having a lead glaze. They are often decorated (see fig. 46) with a single figure or bust in the centre (with or without an inscribed ribbon), which is usually set against a dark blue background which covers only half the field, while in the other half is a formal flower, and in the borders are radiating panels with palmettes alternating with scale pattern, or some other formal design. The whole style is archaic, the designs being heavily outlined in blue and washed over with a greenish yellow lustre, with beautiful opalescent *reflets* recalling mother of pearl. The lustre varies from this *madreperla* tint to a brassy metallic yellow, and parts of the ornament are sometimes modelled in low relief. In spite of its archaic appearance, the Deruta lustred wares are scarcely older than the 16th century, and the style was continued as late as the second half of that century. Deruta pottery was not always lustred, and some of the pieces signed by the painter El Frate, who flourished between

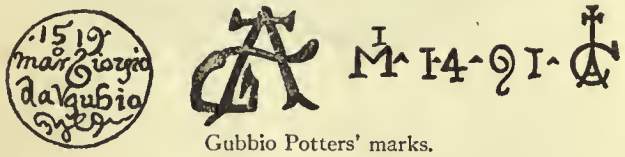
FIG. 46.—Early majolica plate, in blue and yellow lustre only, made at Pesaro or Deruta, *c.* 1500. The motto on the scroll may be Englished as follows: "He who steers well his ship will enter the harbour." (Louvre.)

1541 and 1554, are without the lustre pigment; though showing the heavy blue outlines of the lustred wares. The lustred majolica of Gubbio owes its celebrity almost entirely to the work of one man, Maestro Giorgio Andreoli, who came thither from Pavia, with his brothers Salimbene and Giovanni, and obtained citizenship in 1498. His earliest efforts were in the direction of sculpture, and some of his reliefs in the style of della Robbia are still in existence; indeed the earliest dated piece of lustred majolica attributed to him is a plaque of 1501, with the figure of St Sebastian in relief, in the Victoria and Albert Museum. It is not known whence he learnt the secret of the beautiful transparent ruby lustre peculiar to Gubbio. A red or rosy lustre is found in both Persian and Hispano-Moresque wares, and no doubt the process was learnt from some Moslem potter and developed by Giorgio to unusual perfection. Golden, yellow, brown and opalescent lustres were also freely used at Gubbio, the ruby being only sparingly applied. Finished painted pieces were sent from other factories to receive the addition of lustre at Gubbio, but these can almost always be distinguished from the true Gubbio wares, in which the lustre is an integral part of the decoration. Apart from the lustred enrichment, the majolica of Gubbio has few distinctive qualities, for its styles were various and almost all borrowed (see fig. 47). The archaic taste of Deruta, the arabesques and grotesques of

Faenza and Castel Durante, and in a lesser degree the "*istoriato*" style of Urbino, reigned in turn. Perhaps the most characteristic paintings of Maestro Giorgio are the central medallions of cups and deep dishes enclosing a single figure of a child or a cupid in *grisaille*. Giorgio's larger figure compositions, if indeed his

FIG. 47.—Gubbio plate, with portrait in ruby lustre and blue outline. (Victoria and Albert Museum.)

signature in lustre may be taken to imply that he painted the designs as well as lustred them, show great inequality, some rising to a very high standard—as the dish with "the Three Graces" in the Victoria and Albert Museum, and the "Bath of Nymphs" in the Wallace collection—while in others the figure drawing is quite inferior. The arabesques and grotesques on the Gubbio wares are usually of great merit. There are a few known pieces of unlustred Gubbio wares with figure subjects, painted chiefly in blue and in the style of the early Faventine artists. After 1517, when we may assume that the lustre process was thoroughly mastered, the Gubbio wares were usually signed with the initials or full name of Maestro Giorgio, and a few rapidly executed



Gubbio Potters' marks.

scrolls in lustre completed the decorations of the reverse of the plates and dishes. The master's latest signed work is dated 1541, and he died in 1552. It is probable that his brother Salimbene assisted him, and Piccolpasso names his son Vincentio as possessor of the lustre secret. Possibly the latter was the painter who signed his wares with the initial N, but this conjecture rests solely on the ingenious, but unsupported notion that N is a monogram of the first three letters of the name Vincentio. Other initials, M, D, R, also occur on Gubbio plates, and the latest dated example of the ware is signed by one "Mastro Prestino" in 1557, but it has little to recommend it save that it is enriched with the Gubbio lustres, which after this time entirely disappear.

The old majolica shapes are briefly as follows:—among the earliest are small bowls (*scodelle*), often with flattened sides; jugs (*boccali*) with large lip-spouts, and mouths pinched into trefoil form; large dishes with gradually shelving sides (*bacili*), or with flat broad rims and deep centres; akin to these are the plateaux with a raised flat disk in the centre; small dishes with broad flat rims and deep though narrow central walls (*tondini*), suitable for handing a wine-glass or sweetmeats; flat trencher-shaped plates (*piatti* or *taglieri*); saucer-shaped dishes on low feet and sometimes with moulded sides (*tazze* or *fruttieri*) suitable for holding fruit. Among the vase forms ovoid shapes with short necks and a pair of flat handles are common in the Tuscan wares of the 15th century; the jars for confectionery, drugs, or syrups were often of the cylindrical form with graceful concave sides known as the "*albarello*," in shape of Eastern origin, and in name perhaps derived from the Persian *el barani* (a vase for drugs, &c.); other vase forms with spouts and handles were used for the same purpose; ornamental vases after classical designs (*vasi a bronzi antichi*); and in the best Urbino period a great variety of fanciful forms—ewers, vases, cisterns, shells, salt-cellars, ink-pots, &c., with applied masks and serpentine handles, were made in the exuberant taste of the time. A complex piece of furniture for the bedside of ladies in childbirth (*vaso puerperale*) consisted of a bowl with a foot surmounted by a flat trencher on which fitted an inverted drinking-bowl (*ongaresca*); and above this again a salt-cellar with cover. Many of these shapes were suited to daily use, but the richly decorated majolica was designed to adorn the walls, the *credenze*, table-centres and cabinets of the rich. This alone could have been the destination of the large dishes (*piatti di pompa*) with rim pieces for suspension, and the smaller dishes (*coppe amatorii*) with portraits of young men and girls and lovers' symbols; and it is inconceivable that the costly lustred wares of Gubbio or the fine *madreperla* dishes of Deruta were designed for anything but decorative use. The ware was in fact an article produced for the wealthy in the century of Italy's glory, and under no other conditions could such magnificent and expensive pieces have been made.

Technical Methods.—This is a convenient place to give an account of the methods used by the early mediæval potters—(1) because they represent what had been learnt from Roman times to the 16th century, and indeed to the introduction of modern methods, (2) because, besides all that a potter could derive from an examination of the wares, we have ample written accounts of the methods and processes followed by the Italian majolist. Mr Solon has recently published an epitome of the account given in Biringuccio's *La Pyrotechnica* (Venice, 1540), and there is the memorable MS. of Piccolpasso, a potter of Castel Durante, now in the library of the Victoria and Albert Museum, which, besides giving an account of the processes, contains illustrations of kilns, mills, decorative motives, &c.[1]

1. The potter's clay was prepared from mixtures of various kinds prepared by (*a*) beating and picking out coarse particles, (*b*) mixing with water, (*c*) passing through a sieve, (*d*) drying again into plastic clay ready for the working potter. The essential point about the potter's clay of the best tin-enamelled wares, whether Spanish, Italian, French or Dutch, is that the clays are those known geologically as "marls," which contain a large percentage of carbonate of lime. Such clays always fire to a pinky red or buff colour, and give a ware that is strong and yet light in substance, and on no other kind of clay does the tin-enamel display its full perfection (see Deck's *La Faïence*). The analyses of certain tin-enamelled wares are useful as showing the essential constitution of the best pottery bodies for such purposes.

	Della Robbia.	Majolica.	Delft.	French Faience.
Silica	49·65	48·00	49·07	48·65
Alumina . . .	15·50	17·59	16·19	17·05
Lime	22·40	20·12	18·01	19·43
Magnesia. . .	0·17	1·17	0·82	0·27
Oxide of iron .	3·70	3·75	2·82	4·33
Carbonic Acid, water, &c. . .	8·58	9·46	13·09	10·27

2. *Shaping.*—The vessels were either "thrown" on the potter's wheel (which had remained practically unaltered from Egyptian times), or they were formed by "pressing" thin cakes of clay into moulds, made of a composition of plaster (*gesso*), bone-ash and marble dust. In the latter way all shapes that were not circular were made, as well as those with heavy bosses or gadroons imitated from embossed metal forms. It is interesting, though not surprising, to note that for the fine later wares, the roughly thrown vases, when sufficiently dry, were recentred on the wheel or were placed in a joiner's lathe and smoothed to a clean and accurate surface. The Greek potters did the same, and this practice must always be followed where fine painting or gilding is afterwards to be applied. In the later florid vases of the Urbino style the piece was built up of thrown parts and moulded parts (handles, masks, spouts, &c.), luted together with slip when they were dry enough to be safely handled, and then retouched by the modeller or vase-maker, a method followed to this day for elaborate pieces of pottery or porcelain.

3. *The Glaze.*—The white enamel which formed at first both the glaze and the ground for painting upon—*bianco*, as it was called—was prepared in a complicated way. A clear potash glass (*marzacotto*) was made by melting together clean siliceous sand (*rena*) and the potash salt left as the lees of wine (*feccia*). This corresponds to the alkaline glaze of the Egyptians with the substitution of potash for soda. Such a glaze alone would have been useless to the Italian potter, and accordingly the *bianco* was made by melting together

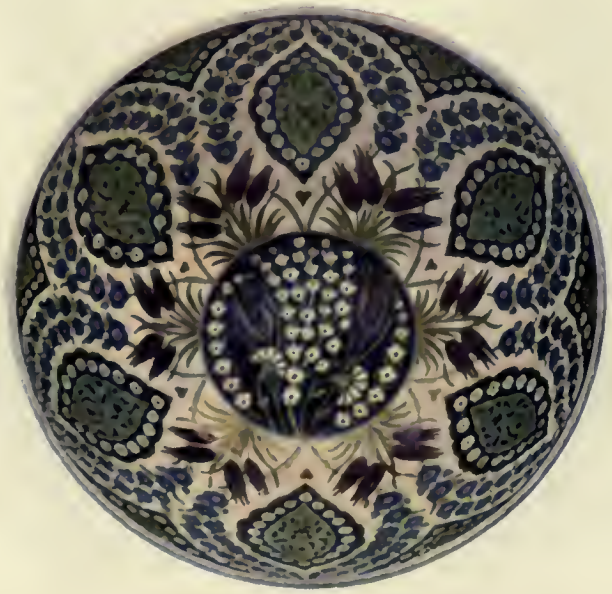
[1] Piccolpasso, *I tre libri dell' arte del Vasajo*, dated 1548. It has been several times translated both into modern Italian and French. The English reader will find an excellent abstract of this interesting MS. in the volumes on *Majolica* by Drury E. Fortnum.

Rhodian or Turkish;
16th century.

Syro-Persian;
13th century.

Rhodian or Turkish;
16th century.

Rhodian or Turkish;
16th century.



Damascus: 16th century.

Persian, lustre and underglaze colour: 13th century.

thirty parts of *marzacotto* and twelve parts of lead and tin ashes. The white enamel as used was therefore a mixed silicate of lead and potash rendered opaque with oxide of tin.

4. Pigments (*colori*) were compounded from metallic oxides or earths; the yellow, from antimoniate of lead, which was mixed with oxide of iron to give orange; the green, from oxide of copper (the turquoise tint given to the Egyptian and Syrian glazes by oxide of copper is impossible with a glaze of lead and tin); and the greens were made by mixing oxide of copper with oxide of antimony or oxide of iron; blue, from oxide of cobalt, used in the form of a blue glass (*smalto*, or *zaffara*); brownish-purple, from manganese; black, from mixtures of the other colours; and the rare red, or reddish brown, of Faenza and Cafaggiolo was probably the same Armenian bole that was used so magnificently by the makers of the Turkish pottery, but on the white enamel ground this colour was most treacherous and uncertain. It must be remembered that many of these colours owe their tint to the lead used in their composition, or to the grounds containing oxides of lead and tin on which they were painted. Piccolpasso describes the preparation and composition of the various colours used in his day.

5. *Coperta*, or transparent glaze. In the later majolica a thin coating of soft rich glaze was applied over the fired painting to give a smooth bright surface. This *coperta* was a soft lead glass consisting of silica (sand), 20 parts; oxide of lead, 17 parts; potash, 12 parts; and common salt, 8 parts; fused together and then finely ground in water.

6. *Methods of Glazing and Decorating.*—In the mezza-majolica and the early majolica it is probable that the clay vessel was dipped in the white bath to give it an envelope (*invetriatura*) before it was fired at all; but it must soon have become apparent that it was much better to fire first the shaped vessel until it was about as hard and brittle as a clay tobacco-pipe, and then coat it with the white enamel, by dipping it into a bath or pouring the fluid material upon it. This was the practice described by Piccolpasso. A coating of white enamel, the thickness of glove leather, having been obtained, the piece was carefully taken by the painter, who first etched in the outline on the absorbent powdery ground, and then shaded the figures, landscapes, &c., in blue or in a mixture of blue and yellow, adding the other colours as gradated washes. The vase was then fired a second time to a heat greater than the first, so that the enamel was melted on the vessel and the colours sunk into the enamel at one and the same operation. This method of painting on the unbaked enamel demanded a bold direct treatment—for alteration or retouching was impossible—and much of the vigour of the earlier designs is due to this fact. As the ware became more refined in its treatment it was felt that this method did not yield a sufficiently brilliant surface, and so the painted and fired piece was coated with a film of *coperta* and fired again at a slightly lower temperature to make it smoother and more glossy. Still pursued by the idea of rivalling the triumphs of pictorial art, the majolist carried his methods a step farther. The white enamel coating was fired before painting, giving a glossy surface on which the painter could draw or wipe out, and so could execute outlining, tinting, or shading of the utmost delicacy. A film of *coperta* was then washed over the painting, and the piece was fired a third time in the cooler parts of the kiln. In some instances it is not easy even for an experienced potter to decide which method has been pursued, owing to the softening of the colours. Generally we should expect that the later and more pictorial pieces had been painted on a ground of fired white enamel, and we may be absolutely certain when delicate white patterns have been "picked out" in a coloured ground.

Where lustre decoration has been added to a piece of majolica it indicates, as elsewhere, the use of a special process, and a final firing at a lower heat. The lustre pigments were the same as those used on the earlier lustred wares, and these were painted over an otherwise finished piece. To obtain the lustre effect these were placed in a special kiln, so contrived that when the pots were just visibly red the smoke of the burning fuel (rosemary or gorse) was allowed to play upon them long enough to drive the metallic films (silver or copper) into the already-fired glaze.[1]

Collections.—The Victoria and Albert Museum contains perhaps the most widely representative collection in the world, especially as at the present time the pieces of the Salting and Pierpont Morgan collections are on exhibition there. The British Museum collection is valuable, being rich in "signed" pieces of the first quality. The Wallace collection and the Ashmolean Museum at Oxford (Fortnum collection, &c.) are also valuable and contain some remarkable examples. The Cluny Museum, the Louvre and the museum at Sèvres have fine collections; while noteworthy pieces are to be found in the Ceramic Museum at Limoges. In Germany the museum at Brunswick contains one of the largest collections known, but many inferior and doubtful examples. Berlin, Munich, Vienna and St Petersburg have noteworthy collections. In Italy, the Bargello at Florence and the museums of Venice, Milan, Turin, Faenza, Pesaro, Urbino, Rome and Naples all have collections, whilst interesting examples of local manufactures are to be found in many of the smaller Italian towns. The American museums, especially those in New York, Boston and Philadelphia, have some fine examples.

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FRENCH POTTERY FROM THE 15TH TO THE 19TH CENTURY

The pottery of medieval France needs little attention here, for it was, in the main, similar to that which was made generally in Europe—rudely shaped vessels of ordinary clay often decorated with modelled ornament and glazed with yellow or brown lead glaze, or, if coated with white slip, decorated with bright green glazes, and towards the end of the 15th century with greyish blue. The later specimens of this simple ware—pronouncedly Gothic in feeling—were often extremely decorative. Avignon, Beauvais and Savigny are the best-known centres of this truly national manufacture, and, as we might expect in French work, the reliefs are often sharp and well designed. Evidence accumulates that from time to time the princes and great nobles imported Spanish or Italian workmen to make special tiles for the decoration of their palaces or chapels. The duke of Burgundy brought Jehan de Moustiers and Jehan-le-Voleur, "*ouvriers en quarrieaux peints et jolis*," in 1391, to paint tiles for his palaces at Hesdin and Arras in the north, and we have already referred to the tile-work in the Spanish fashion made at Poitiers by John of Valencia, the "Saracen," in 1384 for Duke Jean de Berry.[2] Other instances might be multiplied but that this foreign work left little or no traces on contemporary French pottery. Even at a later date, when Francis I. brought Girolamo della Robbia from Italy to decorate his "Petit Château de Madrid" in 1529, or when Masseot Abaquesne, about 1542, manufactured at Rouen the painted tile pavements for the château of Ecouen, the cathedral of Langres, and other places, nothing came of the imported methods; the works were executed and left no traces on the general pottery of the country. During the 15th century, however, two remarkable kinds of pottery were made in France of distinctive quality, and both eminently French—the Henri-Deux ware and the pottery of Bernard Palissy and his imitators.

Henri-Deux, Oiron or *St Porchaire* ware, for all these names have in turn been applied to the enigmatic and wonderful pottery, specimens of which are now valued at more than their weight in

[1] For a full account of the lustre process see Franchet, *Comptes rendus* for December 1905, and W. Burton, *Society of Arts Journal*, 2846, vol. lv., 1907.

[2] See Magne, *Le Palais de Justice de Poitiers* (Paris, 1904); also Solon in *Burlington Magazine* (November 1907).

gold, was once believed to have been made by the librarian Bernard, and his assistant Charpentier, for their patroness Helène de Hangest about 1529 at her château at Oiron, near Thouars.[1] A few years ago this theory was discarded in favour of one which assigned them to some unknown potter of St Porchaire in the same region;[2] but even of this theory there is insufficient proof, and we are left in doubt both as to the maker and the place of origin. All we know is that the ware dates from the reign of Henry II., and that it was probably made somewhere near Oiron, as most of the specimens have been found in that district. The work is *sui generis*, for it had no direct ancestry, neither did it leave any mark on contemporary French pottery. Sixty-five pieces of the ware (see fig. 48) are known to be in museums and private collections; the Louvre and the Victoria and Albert Museum have the best collections of their kinds, but the Rothschilds still hold the greater number of examples. The ware is fashioned in a simple whitish pipeclay, and ornamented with interlacing strap-work patterns, typical of the period, inlaid in yellow, buff or dark-brown clay. The forms are generally graceful, but some examples are over-elaborate and overloaded with modelled ornament. The pieces were designed to serve as candlesticks, salt-cellars, tazzas, ewers, holy-water pots and dishes. After the vessels had been "thrown" and "turned" to a perfect shape, metal tools, such as were used by the bookbinders and casemakers of that day, were pressed into the clay, so as to form sunk cells of ornamental tooling. These cells were carefully filled with finely-prepared slips of other clays, that would burn yellow, buff or dark-brown; and when the whole was dry the piece was carefully smoothed again, and moulded reliefs were attached, or touches of colour were applied. After being fired the ware was glazed, apparently with the ordinary lead glaze of the time carefully prepared and fired again. At a later period the ornament was not inlaid in this elaborate manner, but was simply painted, as indeed it might all have been so far as decorative effect is concerned.

FIG. 48.—Tazza of Oiron pottery. (Louvre.)

Oiron Potter's mark.

Palissy Ware.—Bernard Palissy was a genius of original talent, but, at the hands of his literary admirers, he has gained a legendary rank as one of the great potters of the world which his pottery does not warrant. He is supposed to have spent sixteen years in the search for the white enamel which was being used all the time in Italy and Spain—probably he was searching for the mystery of Chinese porcelain—and when he settled down to make the "Palissy ware," he did nothing more than carry to perfection the methods of the village pot-makers of his own district. On a hard-fired red clay he disposed groups of moulded plants, shells, fish and reptiles, painted them with crude green, brown and yellow colours, and glazed the whole with a well-prepared lead glaze. His style soon had numerous imitators, like A. Clérícy and B. de Blémont, who executed works quite as good as those of their master; but their works also vanished and left no permanent impression on the general trend of French pottery.

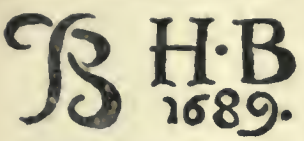
Meantime Italian, and, it may be, Spanish potters strayed over the French border and attempted to introduce the manufacture of their tin-enamelled wares; for we know of the works of Gambin and Tardessir of Faenza, established at Lyons about 1556; of Sigalon at Nîmes in 1548; of Jehan Ferro at Nantes about 1580, and other sporadic efforts. The needed impetus came, however, when the Mantuan duke, Louis de Gonzague, became duke of Nevers in 1565; and we find Italian majolists, working under princely patronage, planting their decadent art in the centre of France. The first efforts met with little success until, with the appearance of the Conrades from Savona, who were domiciled in Nevers in 1602, we get the genuine ware of Nevers. Naturally the first productions, whether of the Conrades or their predecessors, were in the style of the debased majolica of Savona, but the body and glaze of the ware is harder, the colours are not so rich, and the execution is less spirited. The first departure from Italian traditions is seen in the ware of the so-called "Persian style" of Nevers—probably adopted from contemporary work in Limoges enamels on metal—where conventional and fanciful designs of flowers and foliage, birds, animals or figures were thickly raised in white enamel on a ground of bright, intense cobalt-blue glaze. After the middle of the 17th century the Italian style of design appears to have been entirely replaced by pseudo-oriental patterns painted in blue or in polychrome, but really imitated from the "Delft" copies of Chinese and Japanese porcelain. When Rouen and Moustiers became famous for their distinctive wares Nevers copied their designs also, and on a gradually descending scale the manufacture continued to the end of the 18th century, when France was flooded with the rude *Faïences patriotiques* from this centre.

FIG. 49.—Dish of Rouen enamelled pottery, painted in blues and deep red.

The genuine French tin-enamelled ware, freed from the traces of Italian influence, first developed itself at Rouen under the famous Poterats in the later part of the 17th century. A new scheme of ornamentation was gradually evolved in the daintily-designed scalloped and radiating patterns adapted from oriental fabrics, lace and needlework, and from the ornamental devices of contemporary printers. These designs, having been skilfully drawn on the pieces, were filled in with bright blue, strong yellow, light green, or a bright bricky-red in palpable relief, applied as flat washes or in fine lines; and the result was a gay and sparkling ware much superior in decorative value to the later Italian majolicas (see fig. 49). So successful was this Rouen ware that rival factories were quickly started at Saint Cloud, Sinceny,

[1] See B. Fillon, *Les Faïences d'Oiron* (1862).
[2] See E. Bonaffe, *Les Faïences de Saint-Porchaire* (1898).

Quimper, Lille, and other places in the north. Saint Cloud and Lille made fine pottery of this class at the end of the 17th and in the early 18th century. It was imitated at Nevers, the potters' marks shown being those of J. Bourdu and H. Borne.



Nevers Potters' marks.

In the south of France, Pierre Clérissy established the industry at Moustiers in 1686, and, though the early Moustiers ware bears a strong resemblance to the debased Italian majolica of the time, the Moustiers painters soon left that behind, and on a glaze of inimitable whiteness and softness they deftly pencilled blue patterns based on the engravings of designs after Berain, Marot and Toro. At a later date Olerys, who had been to Alcora to introduce the French faience into Spain, returned to Moustiers and introduced a pale polychrome style very inferior to that of Rouen. These pieces are covered with patterns outlined in blue and filled in with yellow, pale green and light purple. Olerys is also said to have introduced the grotesque style of Moustiers, founded on the caricatures of Callot. Other factories were started from Moustiers, such as those at Apt, Ardus and Montauban, and even at Narbonne, Bordeaux and Clermont-Ferrand; just as the northern factories had sprung from Rouen.

We have already seen at Nevers the introduction of patterns in the Chinese style, and the same course was increasingly followed at all the French factories during the 18th century. At Strassburg a fresh impetus was given in this direction when, about 1721, Charles Hannong introduced the practice of painting his white tin-enamelled ware with the on-glaze colours used by the porcelain painters. This process enabled the French potter to produce many colours unobtainable by his older process, and moreover helped him to make his wares look more like the coveted porcelain, then becoming the rage all over Europe. This new departure marks the end of the best period of French faience, but so successfully did it meet the demands of the time that it gradually displaced the old method of decoration where the colours were painted on the raw glaze and fired along with it. Factories sprang up for the manufacture of this new ware in the first half of the 18th century at Niederviller, Lunéville and Sceaux, and it was quickly adopted by the older factories at Rouen, Sinceny, Marseilles, &c. With its general adoption the old French faience, developed from the Italian stock, departed, to make way for a tin-enamelled imitation of *famille-rose* porcelain. But this last style was not of long life. The wealthy classes were no longer patrons of pottery but of porcelain, and when, after 1786, the newly perfected English earthenware was thrown upon the French market, the French faience-makers had to give up their works, or adopt the manufacture of this neater and, for domestic purposes, more suitable form of pottery. This change, together with the disturbances of revolutionary times, brought artistic pottery in France to a standstill, and we shall treat of its revival during the last forty or fifty years in a subsequent section.

Collections.—The Victoria and Albert Museum and the British Museum contain typical examples; but not such collections as are to be seen in the Cluny Museum, the Louvre, the museum at Sèvres, or the French provincial museums at Rouen, Limoges, Marseilles, Lille, St Omer, &c.

LITERATURE.—Deck, *La Faïence* (Paris, 1887); Gasnault and Garnier, *French Pottery* (Victoria and Albert Museum Handbooks, 1884); Le Breton, *Le Musée céramique de Rouen* (Rouen, 1883); Milet, (?) *Historique de la faïence et de la porcelaine de Rouen* (Rouen, 1898); Pottier, *Histoire de la faïence de Rouen* (Amiens, 1870); L'Abbé H. Requin, *Histoire de la faïence artistique de Moustiers*, tome 1er (Paris, 1903); M. L. Solon, *The Old French Faïence* (London, 1903)—the best survey of the whole subject, with a very full bibliography. The various volumes of the *Gazette des beaux-arts* contain many valuable original articles. (W. B.*)

GERMAN, DUTCH AND SCANDINAVIAN POTTERY

In northern Europe until the time of the Renaissance the making of tiles is the only branch of the potter's craft of artistic rank. The pavement tiles of Germany of the Gothic period, examples of which have been found in the valley of the Rhine from Constance to Cologne, often bear designs of foliage or grotesque animals full of character and spirit. Their decoration is effected either by impression with a stamp of wood or clay, or by "pressing" the tile in a mould to produce a design in relief. The surface is sometimes protected by a lead glaze—green, brown or yellow—but is generally left unglazed.

Glazed tiles with relief ornament were also made as early as the 14th century for the construction of stoves, such as have continued in use in Germany to the present day. About 1500 a development took place in the combination of glazes of different colours on a single tile. In the middle of the 16th century Renaissance ornament appears in place of Gothic canopies and tracery, and blue and white enamels begin to be used in combination with lead glazes of other colours. Figures in the costume of the period, or shields of arms, in round-arched niches are a favourite motive alike in the stove tiles and in the wares of similar technique known as *Hafnergefässe*, which have been wrongly attributed to Hirsvogel of Nuremberg. These were made not only in that city but also in Silesia and at Salzburg, Steyr, and elsewhere in Upper Austria; their manufacture continued into the 18th century.

Imitations of Italian majolica with polychrome painting on a white enamelled ground were first made in southern Germany about 1525, and it is with these wares that the name of Hirsvogel should really be associated. The same style survived for more than a century and a half in the stoves and pottery made by the Pfau family at Winterthur in Switzerland, from the end of the 16th century onwards. An interesting development is exhibited by certain rare productions, of Silesian origin, dating from about 1550, with decorations in coloured enamels which are prevented from flowing together by a strong outline incised in the clay.

Stoneware.—The most important feature of the history of German pottery is the development of stoneware along the valley of the Rhine. This ware is of a highly refractory white or grey body of intense hardness, glazed by the introduction of salt into the kiln when the highest temperature was reached. It was exported in large quantities through the markets of Cologne and Aachen (Aix-la-Chapelle) to England, France and other parts of northern Europe. The frequent occurrence in its decoration of the arms of foreign cities and princes shows that the German potters were alive to the requirements of foreign customers.

The oldest centre of this manufacture seems to have been at Siegburg near Coblenz, where the white stoneware peculiar to the neighbourhood, made from local clay, must have been made and exported in considerable quantities at least as early as the 15th century; plain beer-jugs of that date with cylindrical neck and slightly swelling body have been unearthed in London and the eastern counties of England. In the 16th century an artistic development took place, and the potters were formed into an exclusive gild under stringent regulations. The manufacture lasted till the sack of the town by the Swedes in 1632, subsequent attempts to re-establish it being unsuccessful. This ware, of a creamy white colour, generally thinly glazed and only rarely coloured by staining with cobalt blue, is decorated by impression with small stamps or by the application of reliefs pressed from separate moulds. The motives include sacred and classical figure subjects, portraits of contemporary sovereigns, and armorial bearings, with accessory foliage in which a survival of Gothic feeling is often perceptible. Characteristic forms are the high tankard (*Schnelle*) and the ewer with long spout (*Schnabelkrug*), but the fancy of the potter also found expression in various quaint or extravagant forms.

At Raeren in the duchy of Limburg this industry attained importance about 1550, and was continued for over seventy years; 1539 is the earliest date known to occur on this ware. The pieces were of two kinds, brown-glazed and grey; the latter usually decorated with blue. The favourite form is a baluster-shaped jug with heraldic designs or a frieze of figures round the middle. The subjects are from Scripture history or contemporary peasant life as interpreted by Hans Sebald Beham and the German and French "Little Masters." Examples are known

bearing dates and names or initials of mould-cutters, among them Ian Emens and Baldem Mennicken; but it must not always be inferred that a piece is as old as the date introduced in its decoration, for the same set of moulds might be used for many years.

Another important centre in the 16th century was at Frechen near Cologne. Round-bellied jugs known as *Bartmänner*, from the bearded mask applied in front of the neck, covered with a brown glaze, which in later examples is often coagulated into thick spots, were first made here towards the end of the 15th century, and continued to be the staple product well into the 17th. The jugs of this type, known as Greybeards or Bellarmines, which were exported in profusion to England, Scandinavia and the Low Countries, were mostly made here. At Cologne itself there were also factories, probably before the 16th century, the later productions of which resemble those of Frechen.

During the 17th and 18th centuries the busiest stoneware centre was the district surrounding Höhr-Grenzhausen in Nassau known as the Kannebäckerländchen, where artistic ware was being made before 1600. Soon after that date manganese purple was first used in the decoration in addition to cobalt blue, and henceforward colour in combination with impressed and incised ornament tended more and more to supersede decoration in relief. Figure subjects gave place to rosettes, foliage on wavy stems, and geometrical patterns. Vessels of large size and fantastic shape appear beside the standard forms of the earlier factories. In the 18th century the forms of beer-vessels became stereotyped in the globular jug with cylindrical neck and the cylindrical tankard, while tea and coffee pots, inkstands and other vessels, hitherto unknown, began to be made. A stoneware manufacture dating back to the middle ages existed at Creussen in Bavaria. The productions of this district during the 17th and 18th centuries consist of tankards of squat shape, jugs and jars, of a dark red body, covered with a lustrous dark brown glaze, frequently painted after the first firing in brilliant enamel colours with figures of the Apostles, the electors of the Empire, or other oft-repeated motives. Imitations of the wares of Raeren and Grenzhausen were made at Bouffioulx near Charleroi; other minor centres of the manufacture were at Meckenheim near Cologne and Bunzlau in Silesia.

As in England, so in Holland (by Ary de Milde and certain Delft potters) and in Germany, attempts were made with some success, early in the 18th century, to imitate the Chinese red stoneware, known as *boccaros*. The early efforts of Böttger, the discoverer of the secret of true porcelain, at Meissen, belong to this category. His red ware is of such hardness that it was cut and polished on the lapidary's wheel. For some time after the manufacture of red ware at Meissen had ceased, a glazed brown ware of less hard body with gilt or silver decoration was made at Bayreuth. The products of other minor factories of this class cannot now be identified.

Mention may be made of the lead-glazed peasant pottery, such as the bowls produced at Marburg with quaint symbolical devices modelled in relief and applied. Slip-covered wares with *graffiato* decoration, apparently of indigenous growth and not inspired by foreign examples, were made well on into the 19th century near Crefeld and elsewhere in Germany, at Langnau in Switzerland, and by German emigrants in Pennsylvania. In Holland a peculiar green-glazed ware was made in the 18th century with pierced geometrical decoration recalling the Dutch carved woodwork of the period.

Delft.—One of the most remarkable phenomena in the history of pottery is the appearance about 1600, in a highly developed state, of the manufacture of a tin-enamelled earthenware at Delft. It was introduced in that town by Herman Pietersz of Haarlem, but whence he learned his art is unknown. The faience-makers (*plateelbackers*) were one of the eight crafts of Delft which formed the Gild of St Luke founded in 1611. About 1650 a great development took place, and till the latter years of the 18th century, when its faience was ousted by the more serviceable wares of the English potteries, Delft remained the most important centre of ceramic industry in northern Europe. The ware is of fine buff-coloured clay, dipped after the first firing in a white tin-enamel, which formed the ground for painted decoration; after painting, this was covered with a transparent lead glaze and fired a second time, so that in its technique it belongs to the same class as the painted Italian majolica and the old French faience. At its best it is rightly ranked among the greatest achievements of the potter's art.

Characteristic of the first period are dishes and plaques in blue monochrome with somewhat overcrowded scenes of popular life in the style of the engravings of Goltzius. Imitations of the oriental porcelain imported by the Dutch East India Company were introduced about 1650 by Aelbregt de Keizer and continued for some time among the finest productions. At the same time the earlier tradition was developed in the finely painted landscapes and portraits of Abraham de Kooge and Frederick van Frytom. Other potters of the best period were Lambartus van Eenhorn and Louwys Fictoor, makers of the large reeded vases with Chinese floral designs in polychrome, Augestyn Reygens, Adriaen Pynacker, and Lucas van Dale; to the last are attributed the pieces with yellow decoration on an olive-green enamel ground. The rare examples with polychrome decoration on a black ground in imitation of Chinese lacquer are the work of Fictoor and Pynacker. With the 18th century came a largely increased demand and a consequent deterioration in artistic quality. The rise of the German porcelain factories had its effect in the introduction of overglaze painting fired in a muffle kiln, typified by the work of the Dextras, father and son. This innovation, by which the Delft potters attempted to compete with European porcelain, contributed to the ruin of their art by eliminating the skilled touch required for painting on the unfired enamel. The ware frequently, but not invariably, bears a mark derived from the sign of the factory (the rose, the peacock, the three bells, &c.), or the name or initials of its proprietor.

A small faience factory was started by Jan van Kerkhoff about 1755 at Arnhem; its productions were of good quality, chiefly in the rococo style, marked with a cock.

The exportation of the Delft ware to Germany occasioned the rise of numerous factories in that country for making faience in imitation of the Dutch. Among these may be named Hanau (founded about 1670), Frankfort and Cassel. Others, such as Kiel and Stralsund, drew their inspiration from the productions of Marseilles and Strassburg (*q.v.*). At Nuremberg a factory was founded in 1712, which was but little affected by extraneous influences; among its characteristic productions are dishes with sunk decoration in the form of a star, and jugs with long necks and pear-shaped bodies, often spirally fluted. Similar wares were made at Bayreuth. The Dutch and French styles were carried by German potters into Scandinavia; factories were established at Copenhagen in 1722, at Rörstrand and Marieberg near Stockholm in 1728 and 1758, and at Herrebøe in Norway about 1759.

At the close of the 18th century the influence of imported English earthenware was strongly felt. In Holland workshops were established for painting the English cream-coloured ware with subjects suited to the Dutch taste; and in Germany cream-coloured wares and *steingut* in imitation of Wedgwood's productions were manufactured at Cassel, Proskau and elsewhere. The "Delft" ware of Holland during the 17th century was a beautiful decorative ware, in which the Dutch painters caught successfully the spirit, and often the very colour value, of Chinese blue and white porcelain. Its fame spread over the whole of Europe, and its styles were readily imitated by the potters of all other countries who made a similar ware. Even the polychrome Delft, though not nearly so beautiful as the "blue and white," is strongly decorative, and one sees in the polychrome faience of northern France and of Germany more than a trace of its influence. When this ware was supplanted by English earthenware it was a clear instance of a ware that was technically superior displacing a more artistic product.

Cafaggiolo: 16th century.

Faenza. Casa Pirota, 1525.

Urbino.
Decorated by
Orazio Fontana.

Urbino, 1525 (?).
A plate of the famous Gonzaga-Este service.

Faenza: early 15th century.

Collections.—For German wares the German museums are naturally best. The museums at Munich and Nuremberg contain splendid collections of the tin-enamelled and peasant wares of South Germany. Cologne has a wonderful collection of the Rhenish stoneware, and Berlin and Hamburg have good general collections. Copenhagen and Stockholm are especially good for Scandinavian wares, and Zürich for Swiss. There are also good collections of German stoneware in the Victoria and Albert and the British museums, and in the Cluny Museum, the Louvre, and the museum at Sèvres; but there are no notable collections of the German tin-enamelled wares out of Germany. The wares of Delft may be best studied in the museums at the Hague and Amsterdam. There is an interesting collection at the factory of Thooft and Labouchère in Delft. The principal museums in England, France and Germany all have fair to good collections of this renowned ware.

LITERATURE.—For tiles and peasant pottery, see Forrer, *Geschichte der europäischen Fliesen-Keramik* (Strassburg, 1900; chapters on the Netherlands and Germany); Walcher von Molthein, *Bunte Hafnerkeramik der Renaissance in Österreich ob der Enns und Salzburg* (Vienna, 1906); Hafner, *Das Hafnerhandwerk und die alten Öfen in Winterthur* (Winterthur, 1876–1877); Barber, *Tulip-ware of the Pennsylvania German Potters* (Philadelphia, 1903). For stoneware, see Solon, *The Ancient Art Stoneware of the Low Countries and Germany* (London, 1892); Van Bastelaer, *Les Grès wallons* (Mons, 1885). For Böttger's red ware, see Berling, *Das Meissner Porzellan* (Leipzig, 1900), chap. iii. For Dutch faience, see Havard, *Histoire de la faience de Delft* (Paris, 1878), and article by same author on "La Faience d'Arnhem" in *Gazette des beaux-arts*, 2nd series, vol. xx. (1879). For German faience, see von Falke, *Majolika* (Berlin, 1896), and articles by Stieda, "Deutsche Fayencefabriken des 18. Jahrhunderts," in *Keramische Monatshefte*, vols. ii. and iii. For Scandinavian pottery, see Nyrop, *Danske Fajence og Porcellainsmaerker* (Copenhagen, 1881); Strâle, *Rörstrand et Marieberg* (Stockholm, 1872); Grosch, *Herrebøe-Fayencer* (Christiania, 1901). Excellent accounts of most branches of the subjects are given by Brinckmann, *Das hamburgische Museum für Kunst und Gewerbe* (Hamburg, 1894). (B. RA.)

LATER WARES OF SPAIN AND PORTUGAL

We shall only deal at length here with those important kinds of pottery that have exerted real influence on the historical development of the art. Offshoots from the main stem that have developed little or no individuality can only be briefly mentioned. When the characteristic Spanish-Moorish lustre wares ceased to be desired by the wealthy they rapidly sank into insignificance, though as a decorative peasant pottery their manufacture never really ceased and has been revived again in our day. The course of pottery importation was changed and the now fashionable Italian majolica was brought into Spain in the 16th and 17th centuries, as Hispano-Moresque wares had followed the opposite course two centuries earlier. Besides the influence which these imported wares had on the Spanish potters, a number of wandering Italian majolists found their way into Spain, so that we find the use of painted colour, particularly blue, yellow, orange, green and purple, making its appearance at various centres, around Valencia, at Triana near Seville, &c., but the most important manufacture was at Talavera in the centre of the peninsula. The best of this ware recalls the late Italian majolica of Savona, and the influence of Chinese porcelain designs, probably filtered through to the Spanish potters by the then popular enamelled Delft wares, is very apparent. The potteries of Talavera are mentioned as early as 1560, and they continued at work, with varying fortunes, down to the end of the 18th century. Many and varied wares were produced, including tiles as well as pottery; the most common pottery pieces are dishes, bowls, vases, *tinajas*, holy-water vessels, drug-pots, and hanging flower vases, together with moulded and painted snails, owls, dogs, oranges, almonds, walnuts, and every kind of fruit. Apart from the poorer colour the baroque style of ornament also rendered the ware much inferior to that of Italy or of France. The popular Talavera wares were imitated elsewhere in Spain, and a number of factories existed at Toledo in the 17th century, but their wares are very inferior. In the 18th century, besides debased imitations of this ware, some coarse but striking pottery was made at Puente del Arzobispo near Toledo.

An interesting offshoot from the Talavera potteries is to be found in the tin-enamelled wares made at Puebla, Mexico, from the early 17th century. It is said that Spanish potters were settled at this place by the Dominicans soon after 1600; and the making of a debased form of Spanish majolica continued there for nearly two centuries. See Barber's "Tin-Enamelled Pottery," *Bulletin of the Philadelphia Museum*, 1907. During the 18th century determined efforts were made by King Charles III. and by the famous Count Aranda to improve the Spanish pottery wares, as well as to introduce the manufacture of porcelain. The efforts of the king led to the foundation of the porcelain works at Buen Retiro near Madrid, which will be mentioned later, and considerable success also attended the revival of strong copper lustre, like that of the late Hispano-Moresque wares; but the finest tin-enamelled wares were those made at Alcora in the important factory founded by Count Aranda in 1726, which continued in operation down to the French wars. For his purposes the count brought from Moustiers, then one of the famous French pottery centres (see above), Joseph Olerys, a well-known pot-painter. He went to Alcora as chief draughtsman and designer, having charge of a number of Spanish potters and painters. Olerys introduced the Moustiers style of decoration, and the glaze and body of the Alcora wares of the best period recall the fine quality of Moustiers faience. It is only fair to add that Olerys in his turn learnt the use of various delicate yellow and green colours from the Spaniards, and when he returned to France in 1737, having acquitted himself most honourably, he introduced this new style of delicate polychrome decoration at Moustiers. The mixture of motives and ideas that animated the duke and his potters may be seen by the following list of wares produced about 1750. • Vases of different shapes; small teapots; teapots and covers, Chinese fashion; teapots and covers, Dutch fashion; cruets, Chinese style; entrée dishes; salt-cellars, Chinese style; *escudillas* (bowls) of Constantinople; *barquillos* (sauce-bowls), Chinese style; cups, plates, and saucers of different kinds with good painted borders in imitation of lace-work, and finally fruit-stands, salad-bowls and dishes, trays and refrigerators. Later in the century the manufacture of porcelain was introduced here, as well as white earthenware made in imitation of the productions of Wedgwood, and the tin-enamelled wares flickered out in Spain as they did elsewhere.

The manufacture of a kind of debased majolica was also practised in Portugal from the 16th century down to our own times; but the ware never attained to any distinction and is little known outside that country. The best-known specimens were made at Rato, near Lisbon, where a factory was founded in 1767 under the patronage of the court.

Mention must be made of the unglazed native pottery of Spain and Portugal, for wine-jars, water-jars and bottles, cooking pots, and other domestic utensils are still made in these countries for ordinary domestic use, in traditional forms and by methods of the most primitive kind. Many of these vessels, especially the *tinajas* (wine-jars) and water-coolers, are based on ancient, classical or Arab forms, and in every country market-place it is still common to see groups of vessels, in unglazed pottery of fine shape and finish, exposed for sale—a very different state of things from what obtains in France, Germany, and particularly in England, where the primitive methods of the peasant are being imitated by those who ought to know better. From the 16th to the 18th century a special kind of unglazed pottery vessels known as *buccaros* was extensively made both in Spain and Portugal. The body of the ware is unglazed, whitish, black or red, according to the special kind of clay. The curious point about this ware is that, if we may believe contemporary documents, the vessels were delicately scented, like a ware imported from Mexico; and the soft vessels are said to have been eaten—a custom common enough in certain parts of Central and Southern America. (See M. L. Solon, *The Noble Buccaros*, 1896.) (W. B.*)

ENGLISH POTTERY FROM THE 16TH TO THE 19TH CENTURY[1]

The course of pottery manufacture in England followed, generally rather in the rear, that of France, Germany and other northern countries. Before the coming of the Romans much pottery of the late Stone age and the Bronze age was made in

[1] See examples in colour, Plate X.

Britain. The Romans introduced their more advanced technique, and, besides importing Italian and Gaulish pottery, they founded numerous centres of pottery manufacture, as at Upchurch, Castor, Uriconium, &c. With the departure of the Roman legions their simple, yet comparatively advanced, pottery vanished, and Saxon and early Norman times have left us little but wares resembling those of the Germanic and Frankish productions (fig. 50). The early middle ages passed without much improvement, and, though rare specimens—like the ewer in

FIG. 50.—Saxon cinerary urns; the stamped patterns are shown full size.

the form of a mounted knight in Salisbury Museum—proved that glazed wares were made in this country, the general run of our medieval pottery vessels never soared above the skill of the travelling brick or tile maker.[1] The monastic tile-makers, with their strong, Gothic tile pavements, produced artistic work of a very high order; but the patrons of the common potter remained content with his rudely made and simply glazed pitchers, flagons, dishes and mugs (see fig. 51). Even in the 16th century the excellence of English pewter probably acted as a barrier to the introduction of finer pottery, and it was only the importation of foreign wares—Italian, German, Dutch and French—that stirred up our native clay-workers to the possibilities of their art. In early Tudor times there was some importation of Italian majolica as well as of the Hispano-Moresque pieces, and the religious wars as well as the constant intercourse with the Low Countries brought over to the eastern counties not only the stonewares of the Rhineland and the "Delft" wares of Holland, but also emigrant potters from those countries who tried to practise their native crafts amongst us. The Civil War appears to have been unable to check this new spirit, for we have the evidence of dated examples to show that various immigrants went on quietly practising their trade along the Thames side, in what were then the outskirts of London, and probably in the eastern counties and Kent as well. It seems probable that the earliest influence was an Italian one, but before this was firmly domiciled it was supplanted by that of the Dutch and Germans. The first wares of an improved kind that were made in England are so closely related to the German stonewares and the "Delft" wares that it is often difficult to determine whether actual specimens are of English or foreign origin. The first, and in some senses the greatest, of English potters was John Dwight, an educated man,

FIG. 51.—Common forms of medieval pottery; the upper part of the slender jug is covered with a green vitreous lead glaze; the other is unglazed with stripes of red ochre.

who had held the office of secretary to three successive bishops of Chester, and who obtained a patent in 1671 for the manufacture of certain improved kinds of pottery. We have no knowledge where Dwight acquired his skill in the potter's art, for when he obtained his patent he was residing at Wigan (Lancashire), far removed from the districts where foreign potters had settled. About 1672–1673 Dwight set up a factory at Fulham, where he resided till his death in 1703. He was always an eager experimenter, and from his diaries it seems certain that he was searching after the, then, mysterious Chinese porcelain. We have no grounds for believing that he ever attained success in this search, for his known productions may be grouped into two main classes: (1) Hard-fired red stoneware—mostly small vessels, teapots, mugs, &c., in imitation of the Chinese buccaros.[2] (2) Whitish, grey, or drab salt-glazed stoneware made in imitation of, and often not to be distinguished from, the wares of the Rhineland. But Dwight produced a considerable number of modelled portrait-busts, statuettes, &c., all in stoneware of various tints, which entitle him to a place in the very first rank of potters. The portrait-bust of Prince Rupert (British Museum), the statuettes of Meleager (British Museum), of Jupiter (Liverpool), &c., are worthy of a sculptor of the Italian Renaissance, while the recumbent effigy of Lydia Dwight (Victoria and Albert Museum) is one of the most beautiful works ever executed by an English potter.

Meantime the manufacture of tin-enamelled pottery, in the style of "Delft," was prosecuted with increasing industry in London on the south side of the river, and particularly at Lambeth. By the end of the 17th century the same imitation "Delft" wares were made at Bristol and Liverpool, continuing until, in the closing years of the 18th century, tin-enamelled earthenware was abandoned in favour of the perfected English cream-colour. There is a strong family likeness in all this English "Delft," whether made at Lambeth, Bristol or Liverpool. The body of the ware is harder and denser than in the tin-enamelled wares of the continent, and is not so suitable for its special purpose, as it is generally deficient in lime. The decoration is usually painted in cobalt blue of good tone, though inferior in softness and richness of tint to that of the best Delft pieces; polychrome painting was not so common, and it differs from that of the Dutchmen in the greater prevalence of a pale yellow colour and the general absence of any good red like that found on the polychrome wares of Delft, Rouen, &c.

German stoneware also received a well-merited share of attention long before the time of Dwight, and it is often impossible to distinguish the grey and brown ale-jugs, greybeards, &c., presumably of English manufacture in the 17th and early 18th centuries, from their German prototypes. Fulham remained an important centre of this manufacture, and a fine brown stoneware was largely made at Nottingham as early as 1700; in each case the manufacture continues in neighbouring districts to this day.

The development of a native English pottery took place in North Staffordshire. A growing community of peasant potters, who manufactured some strongly decorative English wares by very simple means, was established here from the middle of the 17th century. Rudely fashioned dishes, jugs, bottles, &c., were shaped in the local red-burning brick clays, and, while the pieces were still soft, simple but effective decorative patterns were drawn upon them in diluted white clay (slip), trailed on through a quill or from a narrow-spouted vessel. This ancient and world-wide process (for it was used by the Ptolemaic Egyptian, the Roman and the Byzantine potters) has furnished the peasant potters of every European country with characteristic wares, but nowhere was it used with greater skill than in England. The English slip-decorated wares are often spoken of as "Toft ware," because Thomas Toft, living in what is now Hanley (Staffordshire) boldly signed and dated many of his pieces (1670, &c.); but similar wares were made at Wrotham in Kent, in Derbyshire, Wales and elsewhere. The repute of

[1] An excellent summary of the remains of English medieval pottery will be found in Hobson's "Medieval Pottery found in England," *Archaeological Journal*, vol. lix.

[2] Böttger at Meissen made a similar ware as his prelude to the discovery of white porcelain, but this was after Dwight's death.

the Staffordshire district must have spread by the time of the Revolution, for soon after 1690 John Philip Elers, a Dutchman of good family, settled there and began to make a superior pottery to any previously made in the district. Elers is generally described as a great inventor who brought all kinds of knowledge into the district, but the only wares he is known to have made were singularly like those of Dwight, and, quite recently, records of a lawsuit in which Dwight charged Elers and some other Staffordshire potters with suborning his workmen and infringing his patents have been brought to light. It is certain that, from the time of Elers, the Staffordshire potters made great advances in the fabrication of their wares, and during the 18th century they evolved two distinctively English kinds of pottery, (1) the white and drab salt-glaze, (2) English earthenware.

Staffordshire Salt-glaze.—It is uncertain when and how the Staffordshire potters learnt that a highly siliceous pottery could be glazed by throwing common salt into the kiln at the height of the firing, for the practice had originated in the Rhineland more than a century before. Many writers have maintained that the practice was introduced by Elers, but this is uncertain. Early in the 18th century a fine, white, thin, salt-glazed ware was made in Staffordshire, in many quaint and fanciful forms largely influenced by Chinese porcelain—still an object of wonder and mystery. Teapots, coffee-pots, tea-caddies, plates, dishes, bowls, candlesticks, mugs and bottles were made in great variety, and at its best the ware is a dainty and elegant one, so that a brisk trade was developed in the district, and, for the first time, a distinctively English pottery was exported to the continent and to the American colonies.

English Earthenware.—The manufacture of tin-enamelled pottery scarcely obtained a foothold in Staffordshire, but the invention of the white salt-glazed ware paved the way for one of the greatest revolutions in the potter's art that the world has ever seen. This was nothing less than the abandonment of the ordinary red or buff clays with a coating of white slip or of tin-enamel, and the substitution of a ware white throughout its substance, prepared by mixing selected white-burning clays and finely-ground flint (silica).[1] The change has generally been associated with Wedgwood, most famous of English potters, but he really only perfected, along with his contemporaries, the Warburtons, Turners and others, the work of half a century's experiment and discovery. The ware compared most favourably, from the point of view of serviceableness, neatness and mechanical finish, with all that had gone before it, and as the tin-enamelled wares had almost everywhere in Europe sunk to the position of domestic crockery—for the Chinese, German, French and English porcelains had displaced it with the wealthy—this better-fashioned and more durable English ware gave it its final death-blow. English earthenware in its various forms was to be met with all over Europe, from London to Moscow, and from Cadiz to Stockholm; and, aided by emigrant English potters, the continental nations soon began a similar manufacture for themselves. Everywhere this great change was encouraged by the growing fondness for mechanical perfection, and it is not without a sigh that a lover of pottery can witness the gradual disappearance of the painted tin-enamelled wares—degenerate survivals though they were of Italian majolica, French faience and Dutch "Delft"—before the unconquerable advance of another form of pottery which in its inception was based on technical rather than artistic qualities, especially as nearly a century passed before the new material was turned to artistic account.

By general consent the name of Josiah Wedgwood has been pre-eminently associated with this great change, and with good reason, for though he had many contemporaries who equalled or even excelled him in certain kinds of pottery, no other potter ever approached him in the range of his products and the varied applications to which he turned the exercise of his remarkable talents.[2] True, he soon abandoned the simple Staffordshire wares, coloured with mottled glazes or clay-slips, to which the names of Astbury or Whieldon are commonly attached, but the varied productions of his factory united the best work of a district fruitful in new kinds of pottery, with something especial to Wedgwood himself. Thus he adopted and improved the green and yellow glazes which had come down from medieval times (see the cauliflower ware piece, Plate X.), and gave a new direction to their use in his green-glazed dessert services, candlesticks, &c. He carried on the manufacture of hard-fired red-clay teapots, mugs, coffee-pots, cream-jugs, &c., introduced by Elers; and, along with his fellow-potters, he invented drab, grey, brown and other colours in similarly hard-fired unglazed bodies. He neither invented nor alone perfected the Staffordshire cream-coloured earthenware, but he made it so well that his "Queen's ware" was the best of its class. He undoubtedly invented the Jasper ware, in which on grounds of unglazed blue, green, black, &c., white figures and ornamental motives, adapted from the antique by Flaxman, Webber and other sculptors, were applied; and he even attempted to reproduce the painted vases of the Greek decadence in dry colours painted over a hard black body.

Wedgwood's "Jasper ware," his most original production (see Plate X.), differed both in nature and composition from all the species of pottery that had preceded it. In an attempt to obtain the qualities of the finest porcelain biscuit, Wedgwood discovered, after years of experiment, that by mixing together a plastic white clay and "cawk" or barytes he could obtain a "body" which might be "thrown" on the wheel or "pressed" in moulds, and which, while it fired to a white and sub-translucent pottery, was capable of being coloured, by the usual metallic oxides, to various shades of blue, green, yellow, lilac and black. The ware resembled "biscuit" porcelain in that it needed no glaze to render it impervious to water, and it thus marked the culmination of those "dry" or unglazed wares that had been so largely made in China, Japan and Europe, where the quality resides in the fired clay material without any adventitious aid from a glaze. The general practice was to make the body of the vessel of a coloured material and to ornament this with applied figures or ornamental reliefs, in "white" of the same kind, "pressed" from intaglio moulds and then applied by wetting the surface and squeezing—leaving the fire to unite the vessel and its applied ornament into one piece. Sometimes the ornament was in a coloured clay applied on a white body, and we get in the same way black on red, buff on red or black, and red or black on buff and drab bodies. The variety of bodies produced by Wedgwood and his followers in this way is exceedingly great, and is only to be equalled by the diversity of their application, for the pieces made include plaques, vases, plates, dishes, jardinières, bulb-pots, teapots, cups and saucers, inkstands, scent-bottles, buttons, buckles, and, in a word, every kind of thing that could be made in clay. Many of the applied designs, whether of figures or ornament, were very beautiful in a way, being copied or adapted from Greek and Roman gems, vases, &c. At their best they are marvellous for the precision and delicacy of their execution, and it is impossible to imagine that anything better could have been done in this style. So perfectly did they represent the taste of their period that attempts were made at Sèvres, Meissen, Berlin and Buen Retiro to produce something of the same kind in porcelain; but none of these can be compared with the works of Wedgwood, or his great contemporary Turner (see Plate X.), in beauty of colour or perfection of workmanship.

It is obvious nowadays that much of this work was inspired by mistaken motives; that it was founded on an imperfect view of ancient art; and that it was marred by its mechanical ideals; but it must be remembered that it was in perfect harmony

[1] For a discussion of the stages through which this was achieved the reader is referred to special works, such as Prof. A. H. Church's *English Earthenware*, and W. Burton's *English Earthenware and Stoneware*.

[2] It is amusing or annoying to find in European museums the wares of Wedgwood, Turner, Adams and one of the Leeds potteries, all lumped together as "Wedgwood," and yet one can hardly wonder at it, remembering how much has been written of Wedgwood and how little of the other English potters of the 18th century.

with the spirit of the times, and that while it emphasizes for us the pseudo-classic taste of the late 18th century, it marks an advance in the technical skill of the potter which is simply astounding. The co-ordination of labour, which had gone further with the Greek and the Italian potter than is generally supposed, was now brought to a climax. Mechanical appliances were introduced for the performance of many portions of the potter's work that had hitherto been indifferently performed by rude and exhausting manual toil; and while the application of mechanism was pushed too far—so that in the first half of the 19th century we find the most inartistic pottery the world has ever seen—we must regard this even more as a cyclic movement of human feeling than as the work of any individual, or group of men. The late 18th century marks the period when pottery was no longer produced, as Italian majolica, the Henri-Deux ware, the Palissy wares, the best faience of Nevers, Rouen, Moustiers, Delft or Nuremberg had been, for the noble or the wealthy, but when it was largely in demand by the poorer classes, anxious in their turn to have a useful ware which should imitate the more costly porcelain used by the great. France, Germany, Sweden, Russia, and later the United States, all followed in the wake of the English potters, and the printing-press was applied in all countries to produce elaborate engraved patterns in blue, brown, green, &c., in order to get an effective-looking ware in harmony with the spirit of the times, and at the same time cheaper in price than the simple painted patterns of the vanquished tin-enamel.

Collections.—The British and the Victoria and Albert Museums naturally contain the most representative collections of English pottery. The museums at Liverpool, Bristol, Burslem, Hanley and Nottingham, also have good collections, while Birmingham, Manchester and Stoke-upon-Trent may be mentioned. The Guildhall Museum, London, is rich in early wares found or made in London and its vicinity. Continental collections of English pottery are meagre in the extreme and badly described, even in the ceramic museums at Sèvres and Limoges. The collection at Dresden is interesting, as it was purchased from the collection made by Enoch Wood, a Staffordshire potter. In America, the Boston Museum of Fine Arts, the Metropolitan Museum of New York, and the Pennsylvania Academy of Fine Arts at Philadelphia, contain interesting examples of wares exported to America in the late 18th and early 19th centuries.

LITERATURE.—The earliest compilations, such as Jewitt's *Ceramic Art in Great Britain* (1878), and *Life of Josiah Wedgwood* (1865); Chaffers, *Marks and Monograms* (1863; 9th edition revised, 1900); Meteyard's *Life of Wedgwood* (1865–1866), and Shaw's *History of the Staffordshire Potteries* (1829; reissued London, 1900), must always be of interest as original sources of information; but the later works, such as Church, *English Earthenware* (1884; new edition, 1906); *Josiah Wedgwood* (1894, reissue 1903 and 1907); Solon, *Art of the Old English Potter* (1883; 2nd ed., 1885); Hobson, *Catalogue of English Pottery in the British Museum* (1903); Burton, *English Earthenware and Stoneware* (1904), are the best authorities. (W. B.*)

CHINESE POTTERY AND PORCELAIN[1]

In China, as in every other country where pottery-making has been practised for centuries, we find a natural progression from primitive pottery akin in shape, decoration and manufacture to the pottery of other primitive races the world over. We find too the early use of bricks, tiles, &c., as in Egypt and Assyria; and then the usual succession of domestic utensils, funeral vases, and vessels for religious ceremonials. There is nothing to show that the potter's wheel made its appearance in China earlier than elsewhere, and the Chinese potters have used the simple methods of carving and "pressing" from moulds which preceded the use of the potter's wheel, even more than other nations. In books of the Chow dynasty (1122–249 B.C.) the difference between the processes of "throwing" and of "pressing" from moulds is clearly described,[2] and it is instructive to note that many early as well as late forms of Chinese pottery are remarkably like their works in bronze. In the same way there is no definite date to which we can refer the introduction of glazed pottery. The earliest specimens of glazed ware known are referred by the Chinese to the times of the Han dynasty (206 B.C.–A.D. 220), a date much later than that of the earliest glazed wares of Egypt and Assyria. Remembering the intercourse between China and the West, at times historically remote, it is not impossible that the idea of coating a vessel of clay with a glaze was carried into China from Chaldaea or Assyria. In any case the Chinese developed the potter's art on their own lines, for we have ample evidence that from very early times they fired their pottery to a much higher temperature than was common in the west of Asia, and so discovered types of glaze and of pottery that remained for centuries a mystery elsewhere. The glazed wares of the Han dynasty already mentioned are quite unlike any contemporary pottery produced in Syria, Egypt or Europe, for the body of the ware is so hard that it can scarcely be scratched by a knife, and the dark-greenish glaze has become iridescent by age as though it contained oxide of lead. The easily-fired friable wares of Assyria, Egypt and Greece seem to have had no attraction for the Chinese, and the glazes on their hard-fired wares were naturally different from those already described. The Chinese appear to have been the first potters in the world to discover that at a sufficiently high temperature pottery can be glazed with powdered felspathic rock mixed with lime. At first these glazes were used on any ordinary refractory clay which might burn red, drab or buff; but in this technique lay the germ of Chinese porcelain, the most advanced form of pottery the world has yet seen. It is necessary to consider the pottery that preceded porcelain, for not only was it the matrix out of which porcelain grew, but in certain districts of China, where the necessary materials for porcelain are not found, similar wares have been manufactured without intermission to the present time. Naturally, in progress of time, the technique of this pottery has been greatly improved, both by developments in the preparation and mixture of the clays, the shaping and modelling of the wares, the introduction of coloured enamels or glazes, and the like. Dr Bushell, who is our great authority on the Chinese arts and handicrafts, rightly seizes on two outstanding types of Chinese pottery other than porcelain which have exercised considerable influence on the doings of European potters.

1. *Yi-Hsing-Yao.*[3]—This is the pottery, generally of unglazed fawn, red or brown stoneware, made at Yi-hsing-hsien in the province of Kiang-su. Articles of every kind are made in these fine-coloured clays, but the general forms are dainty and skilfully finished pieces, such as small teapots, cups, saucers, dishes, trays, water-bottles and wine cups. This ware was largely manufactured under the Ming dynasty (A.D. 1368–1643) and later.[4] It was imported into Europe by the Portuguese, who applied to it the name *boccaro*, formerly given only to a scented terra-cotta brought from Mexico and Peru.[5] This pottery and Chinese porcelain were wide asunder as the poles in nature as well as origin, but the potters of northern Europe regarded every kind of pottery coming from the Far East as a species of porcelain, and the manufacture of red teapots, mugs, bowls, cups, &c., in imitation of the Yi-Hsing-Yao was widespread during the late 17th and early 18th centuries under the name of red porcelain. Dwight, Elers and Böttger are notable names in this connexion.

2. *Kuang-Yao.*—The name given by the Chinese to the pottery made in the province of Kwang-tung. There are several centres of manufacture in this extensive province, but for the purposes of this article it is sufficient to state that the best-known of these wares are dense, hard-fired and glazed stonewares, which are always dark-coloured grey, red, brown or blackish. They are usually glazed with thick, variegated or opalescent glazes, grey, blue, green, yellow or red, but flecked, veined and streaked with other tints. The wares are so like the productions of the Sung dynasty (A.D. 960–1279) that modern pieces are often confounded with the more precious productions of that epoch. One of the first lessons to be learnt by the student of Chinese pottery is that, with great reverence for their own antiquities, the Chinese of every period have endeavoured to reproduce the famous wares of their ancestors, and often with such skill as to deceive the most expert. Even when the manufacture of porcelain was at its highest in King-tê-chên, the potters in other parts of China carried on the production of glazed or unglazed pottery in coloured clays, and, further, the directors of the imperial factory from time to time strove to reproduce the most archaic wares that could be found in the Empire.

[1] See examples in colour, Plates VII. and VIII.

[2] S. W. Bushell, *Chinese Art* (Victoria and Albert Museum Handbooks, ii. 5-6).

[3] *Yao* is the Chinese term equivalent of the English "pottery" or "ware."

[4] See Brinkley, *Japan and China*, ix. 353-365.

[5] Solon, *The Noble Buccaros* (Stoke-upon-Trent, 1896).

Chinese. Sang de Bœuf

Chinese. Turquoise glaze "crackled."

Chinese. Flambé.

Purple Soufflé.

Coral red.

Peach blow.
Pigeon's blood.

Lemon yellow.

Apple green.

Porcelain.—By this word we distinguish broadly all those pieces of pottery in which the body of the ware is vitrified and translucent, and also, broadly speaking, in which the material is white throughout, unless minute quantities of metallic oxides have been definitely added to colour it. It is impossible to draw any hard and fast line between porcelain and stoneware, for both may be thoroughly vitrified and translucent in thin pieces—but generally the stonewares are drab, red or brown in the colour of the fired clay, and they seldom exhibit the precious quality of translucence. If the body of a piece of pottery is not even vitrified, however hard it may be, it is terra-cotta or earthenware. The Chinese, accustomed from a very early period to fire their pottery to a high temperature, produced vitrified stonewares before any other nation. Moreover, they glazed these stonewares with fusible mineral substances, and from that stage the natural refinements of methods must necessarily have produced porcelain. In regions where beds of primary clay were found, the body of the ware would burn whiter than elsewhere, and a mixture of limestone or marble with the felspathic rock would give a glaze of greater purity and brilliance and one that was more readily fusible and would spread better over the whole piece. How many centuries were needed before a ware white enough and translucent enough to be now classed as porcelain was produced we cannot know; but the process was certainly one of gradual evolution. Some Chinese writers in their zeal for ancient things have ascribed to remote periods the production of wares of this class. Where authentic specimens are not to be found it is necessary to proceed with caution, and literary evidence alone cannot be deemed sufficient to settle such a difficult point. The balance of opinion at the present time is that something worthy of the name of porcelain was made during the Tang dynasty (A.D. 618–907), but we have no pieces earlier than the Sung dynasty (A.D. 960–1259), and the majority of these are perhaps more fitly described as stoneware than as porcelain.

Under the Sung dynasty China enjoyed great material prosperity, and all the arts were cultivated assiduously. Pottery of distinguished merit was made in many districts, and much of it has been classified as porcelain because the body is whitish and vitrified, though it is much inferior in finish and in translucence to the perfect white porcelain of later times. It is necessary to realize, too, that we have no record of any pottery with painted decoration until perhaps the very end of the 13th century; such ornament as was used consists entirely of designs incised or modelled in the clay. But the principal decoration is to be found in the varied coloured glazes with which the wares, whether stoneware or porcelain, were covered. The glaze is never clear and white as at later times; it is generally uneven, imperfectly fused and presents all the marks of an imperfect technique. The nearest approach to white is found in an opalescent grey which shades off to greenish and bluish tints. The glazes of this period which are most highly valued are the *céladons*, a family of cool bluish or yellowish greens of indescribable depth and softness. Besides the *céladons* which are the most uniform in tints of the Sung glazes, we get many shades of palish lavender, brownish yellow and brownish black, but these are all subtly or boldly mottled, splashed, clouded or veined with strange tones of red, blue, purple, opalescent grey and black. The most famous of these now very rare Sung wares were the stonewares of Chun-chow, remarkable for their rich and varied glazes, the black variegated glazed wares of Fu-kien province, "hare's fur cups" and "partridge cups" of collectors, and the four principal wares that may be called porcelain, viz.—the *Ju-Yao*, made at Ju-chow in Honan; the *Kuan-Yao* (*Kuan*="official" or "imperial"), made first at Pien-chow and afterwards at Hang-chow; the *Ko-Yao*, made at Liu-t'ien; and the *Ting-Yao*, made at Tung-chow in Chih-li.

This was the period when Chinese porcelain became known beyond its native country, for the first mention of porcelain outside China appears in the writings of a Mahommedan traveller, Sulaiman, who visited China in the 9th century and wrote: "They have in China a very fine clay with which they make vases which are as transparent as glass; water is seen through them";[1] and its first appearance in the west is always given as A.D. 1171 (or 1188), when Saladin sent a present of forty pieces to the sultan of Damascus. From this time onwards an export trade was developed, particularly in the *céladon* wares of Lung-chüan, a city in the south-west of the province of Chehkiang. This famous ware, the "green porcelain" of the Chinese, probably made as an imitation of jade, exists mostly in the form of thick heavy dishes, bowls and jars, bearing incised or fluted patterns, and coated with a remarkable thick green glaze of indescribable softness of tone. Though the body of the ware is white when it is broken through, any parts not covered by the glaze have a reddish-brown colour due to the unrefined paste, and when the ware was reproduced in later times this reddish-brown tint had to be imitated artificially. The ware was highly prized both in China and Japan, in the islands of the East Indies, and in all Mahommedan countries. In Persia it was largely used, and specimens of it have been recovered during the last century from the east coast of Africa and as far west as Morocco. "Archbishop Warham's cup" at New College, Oxford, which is the first specimen of Chinese porcelain to reach England that we can now produce, is a *céladon* bowl with a silver-gilt mount of the time of Henry VIII.[2]

The Sung dynasty was overthrown by the Tatars under Kublai Khan (grandson of Jenghiz Khan), and the power remained in Tatar hands until 1368, when the great native dynasty of the Mings was established. During this period (Yuan dynasty), roughly a century, one can say little of ceramic progress, for the wares of the period are singularly like those of Sung times. But two important changes took place which had a marked influence on the subsequent development of Chinese porcelain—(1) the concentration of the industry at King-tê-chên, which was consummated in the early years of the Ming dynasty; (2) the introduction of painted decoration under a white transparent glaze, the idea of which (and perhaps the necessary cobalt mineral) was brought from Persia.

King-tê-chên was already a pottery centre when its factories were rebuilt in 1369 by Hung-Wu, the founder of the Ming dynasty, who made it the imperial factory, so that the best porcelain workers were attracted thither, and in the other old centres the industry was abandoned or some earlier manufacture was continued, as in the southern province of Kiang-su. In the province of Fu-kien a distinct kind of porcelain manufacture has also continued. We have already mentioned the black glazed cups, "hare's fur," &c., made in this province in Sung times, and, while King-tê-chên was to be the scene of the developments of the coloured and painted porcelains, Te-hwa in Fu-kien perfected the manufacture of the famous and beautiful white porcelain in bowls, dishes, cups and statuettes, best known under its French title of *blanc de Chine*.

The earliest painted Chinese porcelains, which are referred to the beginning of the Ming period, though some of them may be older, speak strongly of ideas imported from the west of Asia. The pieces are massive both in form and substance, and the ornament, consisting of figures mounted or on foot, animals, bands of diaper or foliage, or pendant necklaces, is strongly silhouetted by a raised outline recalling the decorative methods of the Assyrian brickwork. The technical methods also recall the methods of western Asia, for the ware was fired before it was glazed, and then yellow, turquoise, green or purple glazes, similar in nature to the glazes of Egypt, Syria and Persia, and quite unlike the Chinese Sung glazes, were filled into the outlined spaces and melted at a lower temperature. The Grandidier

[1] M. Reinand, *Relation des voyages faits par les Arabes et les Persans dans l'Inde et à la Chine dans le IXe siècle* (Paris, 1845).

[2] The suggestion has been made that the *céladon* wares found in Western countries were made by Moslem potters and not by the Chinese, but this theory is not generally accepted. On this point consult Karabacek, "Zur muslimischen Keramik" in *Österreichische Monatsschrift für den Orient*, vol. x., 1884; A. B. Meyer, "Über die Herkunft gewisser Seladon-Porzellane" under "Über die Marta banis," *ibid.* vol. xi., 1885; Hirth, *Ancient Porcelain* (1888), and Bushell, *Oriental Ceramic Art* (1899).

collection in the Louvre, the Franks collection at the British Museum, the Victoria and Albert Museum, as well as all the great private collections of Chinese porcelain, contain samples of this primitive and archaic-looking ware.

The great stream of porcelain decoration was, however, to take an entirely different direction. The Persian pottery with its brilliant painted decorations in blue, green and purple on a pure white ground, exercised its natural fascination over men as keen in colour-sense as the Chinese potters. With the concentration of the industry at King-tê-chên, and the rapid improvement in technical skill and knowledge that followed, the production of a fine porcelain with a transparent white glaze was perfected. Of all the colours used by the Persian pot-painter the only one that would endure the fierce fire of the Chinese porcelain was the blue obtained by using the ores of cobalt, and with this colour, and a wonderful blood-red obtained from copper, the foundation of Chinese painted porcelain was laid. It would be idle to try and fix any specific date for this important development, which took more than a generation to perfect, but it is reasonably accurate to say that the blue and white painted porcelains were unknown in the 13th century and were fully developed at the beginning of the 15th century. Chinese collectors prize most highly the blue and white of the reign of Suen-tê (A.D. 1426–1435), of Chêng-hwa (1465–1487), and next of Yung-lo (1403–1424). It is interesting to note that the colour used during these reigns is spoken of as "Mahommedan" blue, so that it was evidently brought from some country to the west. This 15th-century blue and white porcelain is admittedly the finest of its class, and though the Chinese never abandon an old method and have continued to make blue and white porcelain, often of very good quality, the later wares, fine as they may be, rarely equal these.

The under-glaze red, an invention of the Chinese, has already been mentioned, and this most difficult of all ceramic colours was largely used during the same period. At first it appears as a general ground colour for the outside of bowls and cups, then vessels were made in special forms (persimmon fruit, &c.) to display its qualities, finally it was used either alone or in conjunction with blue in painted designs under a white glaze of exceptional quality. A Chinese connoisseur of the 15th century describes one of his pieces as being decorated with "three red fishes on a white ground, pure as driven snow; the fish boldly outlined and red as fresh blood, all with colour so brilliant as to dazzle the eye."

Other characteristic wares which made their appearance in Ming times are the marvellous "eggshell" porcelains, called by the Chinese "bodyless" from their extreme thinness. As early as the reign of Yung-lo (1403–1424) these delicate wares were in high repute, and their manufacture has been continued ever since with varying skill and success. In spite of their extreme thinness the specimens have designs of dragons in the midst of clouds and waves, inscriptions, &c., engraved in the paste before firing. In the fine white specimens the design is so delicate that it is barely visible until the vessel is filled with liquid or held to the light. Others were covered with a coloured glaze which serves to accentuate the design, and the most prized of these are the yellow pieces made during the reign of Hung-Chi (1488–1505) and Chêng-tê (1506–1521).

Another wonderful variety of Chinese porcelains which made its appearance at this period is the well-known perforated ware, commonly spoken of, from the shape of the perforations, as "grain of rice" porcelain, though the Chinese have exhibited consummate skill in the manufacture of perforated pieces of all kinds. Sometimes the perforations are left clear, but in the rice-grain pattern the incisions are generally filled up with the melted glaze so that they become like so many windows in the walls of the piece. We have already seen that the Persian potters used a similar method of decoration in the 16th century, but we are unable to say at present whether the device originated in China or in Persia. Its use in both countries is only an additional proof of the intercourse between eastern and western Asia.

It is only toward the end of the 16th century that we find the first examples of porcelain decorated with colours fired over the glaze. It seems probable that the practice grew out of the use of enamels on metal, which had spread from Byzantium to China, and which the Chinese developed with remarkable skill. It is important to remember that the very nature of the glaze of Chinese porcelain, necessitating such a high temperature to melt it, severely restricted the under-glaze palette to cobalt-blue and the glorious but uncertain copper-red. To obtain the rich polychromatic schemes of the potters of the West some other means must be found, and so the device was adopted of taking a finished piece of blue and white and decorating it further by very fusible colours painted over the fired glaze and then attached to it by refiring at a lower temperature equal only to that used by the enameller on metals. At first the on-glaze or enamel colours were applied as thin washes, as in the Ming (*San ts' ai*) three-colour decoration of green, purple, and yellow. Then we get the Ming (*Wan-li Wu ts' ai*) five-colour scheme, in which the same three colours are combined with an over-glaze red and all are painted over a skeleton pattern in under-glaze blue. This development, as its name implies, only took place in the reign of Wan-li (1573–1620).

At this time King-tê-chên must have produced a very large quantity of porcelain. The requirements of the court were enormous, for in 1583 one of the supervising censors, remonstrating with the emperor, declared that one year's demands comprised over 96,000 pieces; and Dr Bushell writes: "The colossal production of the reign of Wan-li is shown by the abundance of porcelain of this time to be found in Pekin at the present day, where a garden of any pretensions must have a large collection of bowls or cisterns for goldfish, and street-hawkers may be seen with sweetmeats upheld by dishes a yard in diameter, or ladling syrup out of large bowls, and there is hardly a butcher's shop without a cracked Wan-li jar standing on the counter to hold scraps of meat."

Such profuse orders may be accountable for the fact that the wares of this reign are inferior both in material and workmanship to the wares of the preceding and also of later periods, but the influence of the growing export trade doubtless told in the same direction. For several centuries the native Chinese porcelain had been exported to all the neighbouring countries, and through Persia and Cairo to the West. No long time elapsed before the Chinese adopted forms, colours and decorations for these export wares, not in accordance with Chinese usage, but presumably more suited to the tastes of the foreigner. Hence the Persian and Syrian style of the painted blue decoration of the 15th and 16th century wares found in other Asiatic countries. Now, for the first time, there came a direct European demand, and cargoes of ware were brought to Europe by the Portuguese and afterwards by the Dutch, which were increasingly decorated in fashions foreign to Chinese taste. The production of these export wares slowly modified the taste of the Chinese themselves and paved the way for the new styles of the late 17th and early 18th centuries.

The political troubles which marked the downfall of the Ming dynasty definitely separated the first great period of Chinese porcelain from its second and culminating period. The works at King-tê-chên were destroyed more than once in the 17th century, but in spite of these difficulties the potters must have remained, for the reigns of K'ang-hi (1662–1722), Yung-chêng (1722–1735), and K'ien-lung (1736–1795) covered a century and a half, within which the high-water mark of artistic production was reached and passed. It is only possible here to sketch in broadest outline the course of this Renaissance, which has formed the subject of many learned works.

It is characteristic of the Chinese mind that during this period, when a spirit of eager experiment was abroad, the productions of their ancient kilns should receive no less attention than the new methods of decoration in on-glaze colours, while at the same time many of the discoveries of the later Ming days were carried on to perfection. The first remarkable productions of the reign of K'ang-hi, the famous green and blood-red *Lang-yao* glazes, were made in the attempt to produce glazes like those

of old times. With the more carefully prepared body and glaze the results are strikingly different and, as we think, superior, for it is difficult to believe that any example of the "sacrificial" red of the reign of Suen-tê can have been as glorious as the red *Lang-Yao*, the crown of all that group of glazes known from their general colour as *sang de bœuf* (see example, Plate VII.). In the same way the traditional blue and white of the Ming period was continued with the greatest skill, and, if the blue pigment be not so pure as that of the 15th century, the decorative effect of the blue and white of the reign of K'ang-hi (see example, Plate VIII.) has never been equalled in Europe. The subjects of the blue and white pieces of this period are very varied, including religious, ceremonial, battle and hunting subjects, homely scenes such as ladies and children amusing themselves in gardens, or animals, birds, dragons and other fabulous monsters disporting themselves in clouds or waves. The so-called "hawthorn ginger jars" form a class by themselves in the opinion of modern collectors (see the plum-blossom jar, Plate VIII.), a specimen being sold at the Louis Huth sale (1906) for £5900. The fertility of the painters was remarkable, and a collection of the blue and white of this reign offers a fine feast of ceramic colour from the harmonious relation between the tones of the white and the blue, especially when it is seen *en masse*, as in the famous Dresden collection.[1]

The practice of painting the ground of a piece in blue so that the pattern was reserved in white (even artfully heightened by the use of slip) dates from Ming times, but the grounds of powder-blue appear to have originated at this time. The cobalt-pigment was not applied by a brush, but was blown on through a tube, one end of which was covered with fine muslin, in a rain of minute drops. This ground was either carried over the whole piece so as to give the effect of a vibrating blue glaze—in which case it was generally covered with conventional designs pencilled in ground-up gold-leaf over the glaze—or panels were reserved in white on which floral designs were afterwards painted in on-glaze colours.

In the same way the decoration in underglaze red was revived or re-introduced, and probably the finest pieces of this ware, as of so many others in our great European collections, date only from the beginning of the 18th century. Eggshell wares and pierced or reticulated pieces were made to great perfection, and the coloured glazes in light green, turquoise, purple and black (see Plate VII.) reached their height. The early glazes of this type appeared in Sung times (see above), but on the finely prepared K'ang-hi wares much more striking and brilliant colour effects were obtained. As in old times, for the production of some of these glazes a departure was made from the general Chinese methods. The vessels were first fired to the "biscuit" state, and then soft alkaline glazes coloured with copper or manganese were fired over them at a much lower temperature so as to give the "peacock-blue," "kingfisher-green" and "aubergine-purple" glazes. Many varieties of single-coloured glazes were made by covering a white glazed piece with on-glaze colour, and in this way new shades of coloured glaze, such as the coral-reds (Plate VII.), were obtained. The various brown or bronze-coloured grounds, so well known in the so-called "Batavian" porcelain, were obtained by coating the piece with a slip of some ochreous clay under the usual white glaze. Even these methods do not exhaust the fertile resources of the potters of this period, for they carried on concurrently the style of decoration in overglaze colours, first in the schemes characterized by the predominance of a vivid green enamel (*famille verte*; see Plate VIII.), and finally, in the 18th century, in the schemes in which rose, pink and purple colours predominate (*famille rose*; see Plate VIII.). It is probable that these latter colours, which owe their tint to gold, were introduced into China from Europe, but the Chinese employed them whole-heartedly, until in fact they largely ousted all the earlier types of colour decoration.

During the reign of Yung-Chêng (1723–1735) the diverse styles seem to have been finally struggling for mastery. Yung-Cheng was an ardent collector of ancient Chinese porcelains, and he sent to King-tê-chên specimens of the most ancient wares, whether of pottery or porcelain, to be reproduced, while at the same time he and his court patronized the wares in foreign styles and colours (Japanese and European.)

The struggle continued practically to the end of the 18th century, but in spite of certain brilliant inventions, such as the "iron-rust" and "tea-dust" glazes of the reign of K'ien-lung in harmony with old Chinese effects, what we must regard as the inferior decorative style triumphed, and we see the gradual disappearance of the ancient methods in favour of (1) wares of a beautiful white body decorated only with on-glaze colours, principally those of the *famille rose*, and (2) a very large production of inferior wares, made in European shapes and decorated with on-glaze painting and gilding to suit the European taste of the 18th century.

This "armorial" china, so much of which was once foolishly ascribed to Lowestoft, has little to commend it. The material is seldom of the best quality, and the Chinese rendering of European arms and crests, or stiff copies of European engravings surrounded by quasi-oriental borders of diaper, &c., does nothing to recommend it. A great deal of this ware, though manufactured at King-tê-chên, was decorated at Canton, and the school of pottery decorators founded there by reason of this export trade also produced a certain number of pieces in pure Chinese taste, especially some of the ruby-backed plates and dishes and the small cups and saucers decorated with deftly-painted designs of cocks, peonies, &c.

It must be pointed out that the great change implied in the replacement of patterns painted in blue under the glaze by those painted in colours over the glaze profoundly influenced the style of painting. In the earlier wares the treatment is bold and vigorous as becomes true pottery colour, and the softening of the colour by the melting glaze adds to the artistic charm of the result. Painting on a fired glaze is like painting on glass—fine lines, delicate drawing, and skilful stippling or cross-hatching are just as natural in this method as they are impossible or uncertain in the other. Naturalism of rendering takes the place of conventional decorative treatment, and elaborate minuteness of finish supplants the broad freedom of direct brushwork. During the 18th century the same leaven was at work on the porcelains of China and of Europe, the East influenced the West, and the West in its turn bore down the East. If Chinese porcelain remained superior to its European counterfeits, it was because the Chinaman was still the better potter and had a longer tradition of decorative art behind him.

There is little to be said of Chinese porcelain during the 19th century. The European demand was practically killed by the growth of porcelain works at home, and the imperial patronage, so great a factor in the production of artistic wares, was fitful and uncertain. Tao-Kwang (1821–1850) gave some attention to porcelain, and the pieces made for him and marked "*Shen-te-t'ang*" are valued by collectors. The so-called Peking bowls of his reign (made of course at King-tê-chên) are also of repute. But the political difficulties of China left little leisure for the cultivation of the arts; the successive wars with France and England served only to scatter the splendid wares of the past (see the Musée Chinoise at Fontainebleau), and during the reign of the next emperor Hien-fêng (1851–1861) the T'aipings overran the province of Kiang-si and destroyed King-tê-chên and its factories. Since then the town has been rebuilt and is once again producing Chinese porcelain. Tempted doubtless by the high prices now paid in Europe and America for examples of the Chinese porcelains of the 18th century, modern copies of the single-coloured, *sang de bœuf*, *flambé* and other glazes are being made, while the highly prized "hawthorn" jars and black-ground vases are receiving the same undesirable attention.

Materials and Manufacture of Chinese Porcelain.—For many centuries after its first appearance Chinese porcelain differed from every other known species of pottery both in its material and its manufacture. While the pottery of all other countries was generally

[1] It is of interest to note that the "Delft" of Holland, also a product of the 17th and early 18th centuries, makes the nearest approach in quality to the blue and white porcelain of the Chinese.

made of coloured clays mixed only with sand or broken "shards" and fired at a comparatively low temperature, Chinese porcelain was compounded from the purest white clays, sand and fusible rock; it was glazed with fusible rock, and it was so hard fired that the entire mass became vitrified and translucent. The germ of the manufacture lay in the discovery of large masses of primary clay (kaolin) mixed with finely-ground felspathic rock (petuntse), both of which were carefully washed, levigated and purified. The body of Chinese porcelain varied from time to time within wide limits, but, broadly speaking, it always consists of purified kaolin, petuntse and quartz (sand), mixed in various proportions, sometimes with additional ingredients, according to the quality of ware desired. For the glaze the purest and cleanest portions of the felspathic rock (petuntse) were selected and mixed with lime—all being ground to fine powder. The lime causes the glaze to melt at a lower temperature than would be necessary for petuntse alone. The lime also gives the Chinese glazes their luscious softness of aspect and the faint greenish or bluish tone, while it enabled them to receive the later decorations in piled-up enamels, impossible on the harder European porcelain glazes of the 18th century. The finely-prepared glaze was applied to the clay vessels, before they had been fired, either by dipping, by painting, or by insufflation; and then glaze and body were fired together at a very high temperature. For certain glazes—turquoise, purple, &c.—which were not of the felspathic type, the vessels were first fired to the "biscuit" state, and the glazes were then applied and fired at a much lower temperature—the usual practice of the potters of other countries. When painted wares in blue and red were first introduced, the necessary pigments were painted on the pieces before firing, the glaze was applied over them, and then all was finished at one and the same firing. With the later enamel colours the piece was first fired as above described, and the fusible colours were then painted on the glaze, which was of course like glass. A second firing at a lower temperature fused these on-glaze colours to the ware. For information on Chinese materials and methods the reader is referred to the letters of Père d'Entrecolles in the collection of Jesuit letters known as *Lettres édifiantes et curieuses*. The English reader will find reliable translations of the essential parts in Bushell's *Oriental Ceramic Art*, Dillon's *Porcelain*, and Burton's *History of Porcelain*. Later information will be found in Brongniart's *Traité des arts céramiques*, especially in the 3rd edition, 1877; and in an article by G. Vogt, *Bulletin de la Société d'encouragement pour l'industrie nationale*, April 1900, pp. 530-612.

Collections.—The Franks collection in the British Museum; the Victoria and Albert Museum, where the famous collection of Mr George Salting has for years been displayed, together with the collections belonging to the museum. Paris, the Grandidier collection at the Louvre; the collection at the Musée Guimet; the Sèvres Museum. Fontainebleau, the Musée Chinoise. Dresden, the Porcelain Collection—the oldest in Europe. Boston, the Museum of Fine Arts. New York, the Metropolitan Museum containing the Garland and other collections. Washington, the Hippisley collection; as well as magnificent private collections, at the head of which is that of the late W. T. Walters of Baltimore.

LITERATURE.—The older European works on Chinese porcelain have been superseded by the later books. The following list contains the best recent books:—S. W. Bushell, *Oriental Ceramic Art* (New York, 1897; text separately 1899); *Chinese Porcelain before the present Dynasty* (Pekin, 1886); *Chinese Art*, vol. ii.; Victoria and Albert Museum Handbooks (1906); Brongniart, *Traité des arts céramiques* (3rd edition, with valuable supplements by Salvétat, 1877); Dillon, *Porcelain* (1900); Sir A. W. Franks, *Catalogue of Oriental Pottery and Porcelain* (1878); Grandidier, *La Céramique chinoise* (1894); Griggs, *Examples of Armorial China* (1887); Hippisley, *Ceramic Arts in China* (Smithsonian Institute, Washington, 1890); Hirth, *Ancient Chinese Porcelain* (Leipzig, 1888); Julien, *Histoire et fabrication de la porcelaine chinoise* (Paris, 1856); Meyer, *Lung-chüan Yao, oder alter Seladon Porzellan* (Berlin, 1889); Monkhouse, *History of Chinese Porcelain* (1901); O. du Sartel, *La Porcelaine de Chine* (Paris, 1881); Burton, *Porcelain* (1906); Bushell and Laffan, *The Garland Collection in the Metropolitan Museum of New York* (1907). (W. B.*)

European Porcelain to the end of the 18th Century

Europe can claim no share in the discovery of porcelain, the white and translucent pottery *par excellence*, for when the first specimens of Chinese porcelain were brought to Europe, perhaps as early as the 11th or 12th century, they excited the greatest wonder and admiration. Cairo was at this time the great mart for the exchange of the products of East and West, and from this centre porcelains were sent into Europe. Nasir i Khosrau, the Persian traveller, who visited Old Cairo in A.D. 1035–1042, was evidently acquainted with Chinese porcelain, and he also speaks of a translucent ware made at Fostat (Old Cairo) which may well have been the progenitor of the glassy porcelains of Persia, as well as of those made in Italy during the 15th and 16th centuries. In A.D. 1171 the famous Saladin sent from Cairo a present of forty pieces of Chinese porcelain to the sultan of Babylon; and from that time onwards we have frequent records of pieces of this exotic pottery finding their way into the treasuries of European princes. With the renewed attention paid to the potter's art in Europe after the 14th century, it was but natural that efforts should be made to imitate a material so mysterious and beautiful. But knowledge of Chinese materials and methods was *nil*, and for a further two centuries all that Europe manufactured in the shape of translucent pottery was the artificial porcelain made with glass, which can only be looked upon as a substitute for true porcelain. In Italy during the 16th century, and in France during the century from 1670 to 1770 roughly, this artificial porcelain was made and developed. At Meissen in Saxony the famous Böttger made a true porcelain from materials analogous to the Chinese about 1710–1712, and this manufacture was pursued in Germany, Austria and elsewhere in Europe (even in France, the home of the artificial glassy porcelain, after 1770), so that by the end of the 18th century, when Chinese porcelain had reached and passed its zenith, the manufacture of a similar material was well established in Europe, and the glassy porcelains had been generally abandoned. The only country which offered any departure from this general rule was England. The earliest English porcelains were derived from the French, and, like them, owed their translucence to the use of glass. Efforts were made at Plymouth and at Bristol (1758–1781) to introduce the manufacture of porcelain, like the Chinese and its German counterparts, but these failed and the English potters finally invented a third kind of porcelain, in which calcined ox-bones were added to the clay and ground rock to give a white translucent porcelain capable of receiving any form of decoration. This distinctively English porcelain, perfected about 1800, is not only the principal kind made in England in our own times, but its manufacture has been adopted, to some extent in France, Germany and Sweden, as well as in the United States.

It is impossible to describe these various efforts of European potters without a certain amount of overlapping, for during the 18th century all the three kinds of European porcelain were struggling for supremacy. It is advisable, therefore, to keep clearly in mind which kind of porcelain is in question, for many problems of manufacture and decoration are absolutely determined by the nature of the materials.

If we could trust to documentary evidence alone, the earliest European porcelains were made at Venice in 1470, and again in 1519; while we also read of its manufacture at Ferrara in 1561.[1] Unfortunately, documentary evidence alone is not conclusive, and the first European porcelain, known from actual specimens as well as by documentary evidence, was that made at Florence in the laboratory of Francesco de' Medici, between 1575 and 1585. Specimens of this rare porcelain are to be found only in great museums and private collections, where they rank among our chief ceramic treasures. They show clearly that the Florentine potters never fully mastered their difficult material, for the ware is always imperfect and compares indifferently in whiteness and translucence with fine porcelain, while the glaze is neither smoothly melted nor free from defects. Obviously the effect of Chinese blue and white porcelain was aimed at, the decorations, reminiscent of the style of the Persian pot-painters, being executed in cobalt blue alone. These rare and interesting pieces bear distinctive marks; for at their period the use of painters' marks or monograms had become fairly general on artistic pottery in Europe. One of the best known marks is the "palle" or balls of the arms of the Medici family, bearing the letters "F M M·E D II." for "Franciscus Medici Magnus Etruriae Dux II."; while other pieces have a rude representation of the Great Dome of Florence and the letter "F."

Florentine Potter's mark.

Fortunately, too, besides the few specimens of Florentine porcelain that have survived to our day a manuscript has been

[1] See Drake, Sir W., *Venetian Ceramics*; and Davillier, Baron Ch., *Les Origines de la porcelaine en Europe.*

Chinese. K'ang-hsi period.

Chinese. Black ground. K'ang-hsi period.

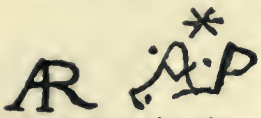
Chinese (*Famille Verte*). K'ang-hsi period.

Chinese (*Famille Rose*). Ch'ien-lung period.

Chinese. Plum-blossom jar. K'ang-hsi period.

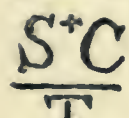
found in the Magliabechian Library at Florence which states that the paste was composed of 24 parts of sand, 16 of a glass (powdered rock crystal 10 and soda 8), and 12 parts white earth of Faenza. To 12 parts of this mixture 3 parts of the kaolinic clay of Vicenza were to be added, and the pieces glazed with a lead glaze, or sometimes with the tin-enamel of the Italian faience maker. We are in the presence, therefore, of a material unlike Chinese porcelain in every respect, the Florentine porcelain being the first of a long line of European porcelains the artistic qualities of which were obtained by mixing a large quantity of glass with a small quantity of clay, so that they may almost be regarded as a species of glazed and painted glass. The technical methods used in their manufacture and decoration, however, were those of the potter and not of the glass maker.

With the death of Francesco de' Medici in 1587 it seems probable that this wonderful innovation came to an untimely end, and we hear no more of porcelain in Italy for more than a century. During this century (1587–1687) there can be no doubt that efforts were made all over Europe to discover the secret of porcelain manufacture; but the first reliable date we can point to is 1673, when Louis Poterat, a faience maker of Rouen, obtained a privilege from the French king for the manufacture of porcelain in that town. The Rouen porcelain in turn ceased with the death of Poterat in 1696. Authentic specimens are extant in the shape of salt-cellars, mustard pots and some few vases, the latter of considerable size. The pieces are usually decorated in blue with patterns in the Rouen style and were evidently painted by an expert faience painter. In composition, the porcelain of Rouen, like that of Florence, was of the artificial or glassy type, and shortly afterwards a similar ware made its appearance at the faience works of St Cloud near Paris, and at various works in the city of Paris. Well-known pieces, bearing the marks here shown, formerly supposed to be the earliest specimens of French porcelain and the work of Poterat at Rouen, are probably experimental pieces made in Paris after the date of Poterat's discovery, as they differ in important particulars from his ware.



Paris Potters' marks.

Once firmly established in France, this manufacture, under the patronage of the French court or of some great French noble, rapidly assumed a position of importance. The works at St Cloud received letters-patent from Louis XIV. in 1696, and the manufacture was continued there down to 1773. The appearance of the St Cloud porcelain is very characteristic, for though the paste has a yellowish tinge it is of fine quality with a clear and brilliant glaze. The first efforts appear to have consisted in frank imitations of the much-prized Oriental wares, and white pieces decorated only with branches of flowering plum in relief, or pieces modelled with imbricated or scale pattern or with delicate flutings, were made. The earliest colour decoration was naturally in under-glaze blue, and while quasi-oriental designs were largely used, the commonest feature is the prevalence of painted borders like those used on the faience of Rouen and St Cloud. At a later date decoration in over-glaze colours and gilding was also employed, and though the ware never reached to such a pitch of excellence as that of the Royal Manufactory at Sèvres, the St Cloud porcelain is one of the most distinctive French porcelains of the 18th century.



St Cloud Potter's mark.

German Porcelains.—While the glassy porcelains of France were being developed at St Cloud, success of a more permanent order was reached in Germany. Augustus the Strong, elector of Saxony (1670–1733), had formed an extensive collection of Chinese and Japanese porcelains, still to be seen in the Dresden Museum, and he had established experimental pottery works, bringing skilled potters from Holland and elsewhere. His chief investigators appear to have been Tschirnhaus and Böttger, both alchemists, and it was the glory of the latter to be the first European to produce a porcelain like the Chinese, both in the nature of its materials, and in the appearance of its paste and glaze. It may be surmised that Böttger was guided toward this momentous discovery by information brought from China, though such an idea is always stoutly denied by German authorities, who, with pardonable pride, claim that Böttger at the age of twenty-four succeeded where all other European experimenters had failed. He was certainly working at the problems offered by the exotic wares of China, for his first production was an extremely hard redstone-ware—often erroneously called "Böttger's red porcelain"—resembling the Chinese "boccaros" or red teapots of the Yi-hsing potteries. He had been anticipated in this direction by Dwight of Fulham, but the red pottery of Böttger was so intensely fired that it became dense enough to be cut and polished by the lapidary as if it were a piece of jasper or carnelian. It was first offered for sale at the Leipzig fair of 1710, and for many years it enjoyed great popularity, as well as the undesirable honour of wide imitation. At the same time (1710) Böttger exhibited a few crude specimens of greyish-white porcelain. Imperfect pieces were on sale in 1713, and by 1716 its manufacture was definitely established, though the pieces were still far from perfect. Böttger died in 1719, having had the rare fortune, in his short and eventful life, to establish in Europe the manufacture of true porcelain.

The life of Böttger reads like a page of romance, and the story of the subsequent development of porcelain manufacture throughout the German empire is hardly less romantic. When the importance of Böttger's discovery was recognized, he and his workmen were removed from Dresden to the Albrechtsburg, a fortress situated at Meissen some 16 m. away, so that the manufacture could be conducted with the greatest secrecy. All concerned were practically state prisoners, and this extreme rigour doubtless defeated the end in view, for workmen escaped from time to time, and professing, more or less truthfully, a knowledge of the manufacture, found patrons among the German princes all eager to gain reputation as experimenters in the new art of porcelain. Some of these wandering "Arcanists," like Ringler and Hunger, and the men who learnt from them, travelled all over the empire, and the following list of dates will show how porcelain factories sprang up from the parent factory at Meissen:—

Meissen	1710	St Petersburg	1744
Vienna	1718	Berlin	1750
Ansbach	1718	Nymphenburg	1758
Bayreuth	1720	Ludwigsburg	1758

Meissen.—Although the factory which was founded at Meissen as a result of Böttger's discovery remained on its old site until 1863, the porcelain made there has been commonly known as Dresden porcelain; probably because Dresden was the seat of the Saxon court, and the enterprise was conducted at the expense of the electors of Saxony. So jealously were the secrets of this factory guarded that when Napoleon, the master of Europe, sent Brongniart to investigate the methods in use at Meissen in 1812, the elector of Saxony had to release Steinauer, the director, from his oath of secrecy before he would explain the processes. Meissen porcelain, therefore, affords us the best example by which we may follow the changes of fashion and taste that governed the styles of porcelain decoration in Europe during the 18th century. The early Meissen porcelain was made from the kaolin found at Aue, near Schneeberg, and while there is no mention of any other material, we may be sure that clay and felspathic rock, analogous to the Chinese *kao-lin* and *pe-tun-tse*, were obtained from the same quarries, and were used together. Until after the death of Böttger in 1719 it cannot be said that the venture was more than a *succès d'estime*. The specimens preserved in the Dresden Museum show that the pieces were generally thick in substance and clumsy in shape, being often made from the moulds that had been designed for Böttger's red-stoneware. Naturally enough these early examples were inspired by Chinese models, both in shape and decoration. As at St Cloud, white pieces with modelled decoration were common. Unlike the contemporary French glassy porcelains, the decorations in under-glaze blue were very imperfect, the

blue colour being much run and blistered; and when attempts were made at decoration in enamel colours (*i.e.* colours fired on the finished glaze) the result was unsatisfactory, as, owing to the refractory nature of the hard felspathic material, these colours frequently scaled off. The later success of the Meissen factory must be attributed to Herold or Höroldt (who joined the staff in 1720 as a colour maker and painter), and to Kandler, a sculptor, who came to the works in 1731. In the hands of these two men the forms and decorations, still largely based on Chinese and Japanese models, assumed a definitely European style, while the composition of the body and the glaze, and the application of colours and gold, were brought to perfection. Herold was appointed director of the works a few years after 1720, and retained that post until 1765, while Kandler was chief modeller from 1731 to 1775. The years from 1730 (when the work definitely emerged from its experimental stage) to 1775 (when Kandler died) mark the most distinctive period of the Meissen porcelain. In the estimation of collectors also the Meissen porcelain of this period is the most valuable, and genuine examples of *Alt-Meissen* command high prices in the sale rooms, especially in Germany. This appreciation was quite as apparent in the 18th century, for by 1740 Meissen porcelain had won the greatest renown in Europe, and was actually exported by way of Constantinople over the Mahommedan countries of the Nearer East. It is frequently described by contemporary writers as being far superior to the porcelain of China, and so great was its vogue between 1740 and 1750 that as many as 700 workmen—a large number for those days—were employed, and the industry brought large profits as well as great reputation to the Saxon court. Each year saw some fresh departure from the original inspiration of the work, some fresh innovation of European style in design. After 1730 the rude reproductions of Chinese forms and decorations in white or blue and white were replaced by imitations of the Imari porcelains, especially those decorated in the style of Kakiemon. Here Meissen was running a race with Chantilly in setting the fashion for the dainty decorations in red and green and gold which spread in time to all the porcelain factories of Europe. Gradually European *motifs* became predominant. The simple oriental forms were replaced by distinctively European shapes with architectural mouldings, handles and feet. Instead of the dainty Japanese patterns, we perceive the gradual introduction of "Rococo" scroll-work (as interpreted by the Germans) to form a framework or border for miniature-like paintings of landscapes, ruins, figure-subjects, hunting scenes, &c., executed in the limited palette of on-glaze colours then available. Further evidence of the departure from oriental influence is to be found in the numerous "armorial" services produced between 1730 and 1740; and at the same period we find the first appearance of a style of decoration that has persisted to our own times, as a means of passing off pieces with small flaws in body or glaze, by hiding them among sprays of naturalistic flowers, with an occasional fly or some other winged creature thrown with seeming artlessness over the surface of the piece. This idea, though it seems to have been first used at Meissen, was so useful to the potter that it became general, and a device originally adopted to cover faults of manufacture was elevated into a distinct style of decoration by later European factories (*e.g.* Strassburg, Niederviller, &c.).

The talents of Kandler were applied in ambitious but unsatisfactory attempts to produce life-sized figures of the twelve apostles, an equestrian statue of Augustus the Strong of heroic proportions, and many models of animals intended for the decoration of the Japanese palace at Dresden. Many of these latter are to be seen in the Dresden Museum, and create an unfavourable impression of the taste of their period. The fame of Kandler is better perpetuated (see example, Plate IX.) by the little statuettes and groups of figures and animals that flowed in a steady stream from his facile hand; for though these figures have prettiness rather than grace, and *flair* rather than style, they are instinct with the spirit of the middle 18th century, and were eagerly imitated or boldly copied at every factory in Europe. Only in the *biscuit* porcelain figures of Sèvres, and in some few of the portrait figures of Derby, do we find anything artistically superior. These Meissen statuettes look their best when they are simply in white; many are grotesque and ugly, and the colour decorations are usually in very poor taste, the harsh, shining colours contrasting unpleasantly with the pronounced white of the porcelain.

Mention must be made of the use of modelled flowers at Meissen. Originating in the simple application of modelled branches of prunus, &c. in imitation of the white porcelains of Fu-kien, the method developed until we get not only the characteristic "May-flower" decoration (see example, Plate IX.), but also independent sprays and bouquets modelled in porcelain and coloured with the utmost mechanical precision. It is not quite clear whether this production of porcelain flowers was first perfected at Meissen or at Vincennes,[1] but it was largely practised at both places.

Toward the end of this period, vases, candelabra, mirror-frames and clock cases were modelled in the most *outré* rococo forms with applied scrolls, shells and flowers. These pieces had their modelled details picked out in gold and colours, while the success of the French styles of decoration is still further shown by the copies of Watteau figures and groups on the more important vases, dishes and plates. Frederick the Great made sad havoc with the prosperity of Meissen during the Seven Years' War. He looted the factory both in 1759 and 1761, and is said on the latter occasion to have carried away to Berlin both models, working moulds and many workmen. This misfortune marks the end of the most distinctive Meissen porcelain, for after this time Sèvres became the most important porcelain factory in Europe, and the later productions of Meissen were, for the most part, German versions of the styles initiated at the French royal factory. From 1764 to 1774 Dietrich, a painter, was at the head of affairs, while a Frenchman named Acier succeeded Kandler. They introduced the neo-classical style, which was spreading like a blight all over Europe, and this departure was perfected under the directorship of Count Marcolini (1774–1814), when Meissen, fallen from its high estate, was content to follow the lead of Sèvres.

After the Marcolini period there is nothing to be said of Meissen. The old productions of the factory had become valuable, and the custom of reproducing them, marks included, was adopted. Such a practice was not likely to lead to further progress, and, though the factory was removed from its old site in the Albrechtsburg in 1863, it cannot be said to have added anything to the progress of European porcelain during the 19th century.

"Dresden" Potter's mark.

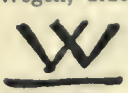
During the initiatory period the "Dresden" pieces bore the monogram "A. R." interlaced (Augustus Rex), and between 1712 and 1716 pieces intended for sale and not for the use of the court were marked with the sign of Aesculapius (a snake twining round a staff). From about 1720 two crossed swords, painted in blue under the glaze, with or without accompanying stars, crosses, &c., formed the general mark, but the mark has been so often used on other porcelains that, in itself, it is of slight value as a means of identification.

Vienna.—The first mention of the manufacture of porcelain in Vienna occurs in 1718, when a Dutchman, Claude du Paquier, was granted a patent. He had secured two runaways from Meissen, Stölzel and Hunger, yet little progress was made until after 1744, when the factory was bought by the empress Maria Theresa. At first the traditional styles of Meissen were continued, but the characteristic Viennese porcelain was produced after 1785. In this ware figure-painting, rich ground colours and elaborate gilding are associated in an unmistakeable manner. Leithner, who was chemist and colour maker at this period, succeeded in producing a more extensive and brilliant palette of colours than was in use at any other European porcelain factory in the last quarter of the 18th century; and the gilding

[1] A perfect *tour de force* in this inartistic style of work, preserved in the Dresden Museum and formerly attributed to Meissen, has been shown to be the work of Vincennes. See *Gaz. des beaux-arts*, September 1904.

was rich and elaborate. Apart from its technical merits the ware has nothing to recommend it, for the styles of decoration showed pronounced neo-classical influence, and lacked the saving merits of the French work in the same style. The works was closed in 1864, on account of the heavy expenses, and collectors should be reminded that many spurious imitations, the product of small Viennese factories, are to be found on the market.

Berlin.—The first Berlin porcelain was made by W. Casper Wegeli, aided by workmen from other German factories, as early as 1750. This business was unsuccessful and came to an end in 1757, but its productions are highly prized on account of their rarity. Success only came when Frederick the Great brought workmen, moulds and materials from Meissen in 1761, and, becoming proprietor of the works in 1763, founded the Royal Berlin Porcelain Manufactory. Though Meissen workmen and methods had been imported, and the Meissen style governed the earliest productions, Frederick's well-known *penchant* for French art was doubtless responsible for the fact that the rococo style of decoration was more determinedly followed here than elsewhere in Germany. The colour schemes of this ware are unusually simple, pieces being seldom decorated in more than three colours, while a rose-coloured enamel, a favourite colour with the great Frederick, is quite characteristic. The Royal Berlin Factory passed under a cloud in the troubled condition of the Prussian monarchy during the early years of the 19th century, and down to 1870 it was content to follow in the wake of Sèvres like most of the other European factories. Since about the year 1880, however, it has developed into the most scientific of European porcelain works, and it was here that Seger manufactured his special porcelain, made to reproduce the qualities of the finest Japanese wares. In spite of this scientific success it must be remarked that the late Berlin porcelain is artistically disappointing, being too exuberant for our taste and recalling anything rather than porcelain in its treatment.



Wegeli's mark.

Minor German Factories.—It is unnecessary to describe the productions of all the German porcelain works of the 18th century, for not only is there a strong family likeness, but all the works aimed at producing pieces comparable with those of Meissen, Vienna or Berlin. In every case the industry was established under the patronage or at the direct charge of princes or great nobles, anxious to emulate the success of the elector of Saxony or the king of Prussia, and generally the enterprise came to an end with the death of a patron or from his unwillingness to sustain the continued drains upon his purse.

The factory at Höchst was started about 1720 by wanderers from Meissen, but it was only carried to a successful issue through the patronage of the archbishop-elector of Mainz after 1746. The general style of Höchst is a palpable imitation of the contemporary wares of Meissen, but this factory was noted for its excellent figures and groups, especially those modelled by Melchior (1770–1780). He modelled, at Höchst, more than three hundred figures, as well as many portrait medallions. The works came to an untimely end during the French invasion of 1794.

Frankenthal had a porcelain factory (founded by the Hannongs of Strassburg) in 1756, and patronized by Karl Theodor, elector palatine from 1762 to 1795, when the French invasion put an end to its activities. Melchior, the sculptor, came here from Höchst after 1780, and elaborate pieces in the current styles of Sèvres and Dresden were made.

Nymphenburg, near Munich, had a factory which was made a royal factory in 1758 by Max Joseph III. of Bavaria. The ware was of fine quality, but without special distinction. Melchior came on here about 1800, remaining till his death in 1825; his Nymphenburg figures are as highly esteemed as those he modelled at Höchst and Frankenthal. In the early years of the 19th century elaborate painting became the rule here, as at the other royal factories, and copies were made on porcelain of some of the famous paintings in the Munich galleries. The works is still in existence, in the hands of a private company, who unfortunately sell many reproductions of the 18th-century wares.

Ludwigsburg, some 9 m. from Stuttgart, had a porcelain factory from 1758 to 1824, liberally subsidized by the dukes of Württemberg. Highly-finished painting was the rule at this factory, and because the ware bore a crown as one of its marks, it has rather foolishly been called "Kronenberg" porcelain.

Fürstenberg was the factory patronized by the dukes of Brunswick. Experiments were made as early as 1746, but little ware was produced before 1770. Fürstenberg set itself to imitate all the best-known styles of the day, and its only distinctive productions are its "biscuit" statuettes and medallions. The factory remained in operation until 1888, but as the moulds were then sold by auction, imitations of the old pieces are now common.

Other 18th-century German factories were those of Fulda, Bayreuth, Cassel, Ansbach, Kloster-Veilsdorf, Wallendorf and Limbach.

Mention must also be made of the work of certain famous decorators, like Bottengruber and Preussler, who decorated both German and oriental pieces; while Busch, the canon of Hildesheim, produced effects like fine engraving by etching the glaze with a diamond and rubbing black colour into the lines.

While France and Germany were each developing their own particular type of porcelain, it was only natural that the kings and princes of other countries should strive to emulate them in the manufacture of this still rare and highly esteemed form of pottery. Naturally, perhaps, the countries to the north and east seem to have been influenced most by German methods, whilst those to the south and west followed the French example.

Holland.—The earliest Dutch factories were started as early as 1704, first at Weesp near Amsterdam, and afterwards at Oude Loosdrecht. The mark of this factory occurs as M: O.L., or M. o. L. After 1782 the works was removed to Nieuwe Amstel, but the "Amstel" porcelain came to an end with the French invasion. The ware resembled the German both in material and decoration. The best porcelain made in Holland was produced at a factory at the Hague, founded some time after 1775. There is a choice collection of this ware in the Gemeente Museum at the Hague. No porcelain appears to have been made in Holland after about 1810 until 1890 or later.

Denmark.—It has been stated that porcelain of the German type was made in Copenhagen as early as 1731, but there is no definite record of the production of true porcelain until about 1772, when potters, modellers and painters from some of the German works founded the enterprise which was taken over by King Christian VII. in 1779 and converted into a royal factory. Fostered by the king's patronage, fine porcelain of pronouncedly German style was largely made down to the end of the 18th century. The collection in the castle of Rosenburg contains many examples of the work of this period. In the early years of the 19th century the Empire style of decoration was adopted, and the artistic influence of Sèvres became paramount. Large sums of money were continually required from the crown to maintain the establishment until, in 1867, it was sold into private hands to get rid of an encumbrance. The subsequent new-birth of the existing royal Copenhagen porcelain works must be noted in the next section.

Sweden.—The history of Swedish porcelain in the 18th century is connected with the factories at Rörstrand and Marieberg, both in the environs of Stockholm. Tentative experiments were made at both these places before 1760, but these came to an end by the close of the 18th century, though the Rörstrand works was reopened some fifty years ago and will be subsequently referred to. The Swedish porcelains were of two kinds, one a true felspathic porcelain like the German, and the other a glassy porcelain resembling that made at Mennecy in France. It is interesting to note that the decorative styles in both cases are distinctly French in character.

Russia.—Peter the Great is said to have projected a porcelain factory at the suggestion of his ally Augustus the Third of Saxony, but the scheme was not carried into execution until the days of the empress Elizabeth. Catherine II. subsidized the work in prodigal fashion, but although she brought over French artists, the Russian porcelain more closely resembles its German than its French prototype. In the early years of the 19th century the imperial Russian factory followed the example of Sèvres in producing costly dinner services and extravagant vases of large dimensions.

Small independent factories were started in the neighbourhood of Moscow: one by an Englishman named Gardner about 1780, and another by A. Popoff. Besides producing ordinary table ware these Moscow factories sent forth a considerable number of statuettes, the most interesting being those representing Russian peasant types.

Hungary.—The one Hungarian porcelain factory of note is that at Herend, which was founded about 1830 by Moritz Fischer. At this factory copies of oriental porcelain were made that have deceived many collectors, though the pieces are usually impressed with the word "Herend" in the paste.

Switzerland.—Little porcelain has been produced in Switzerland, and considering the geographical position of the country it seems natural that porcelain of the German type should have been made at Zurich and of the French type at Nyon on the lake of Geneva, but these productions are of no particular importance.

French Porcelains.—The beginnings of French porcelain at Rouen and St Cloud have already been mentioned, as they preceded Böttger's discovery of true porcelain; but as nothing was known in France of the methods and materials used by the German porcelain makers, the artificial or glassy porcelain held sway in France through the greater part of the 18th century.

The next important factory after St Cloud was that founded at Chantilly about 1725 under the patronage of the Prince de Condé, an enthusiastic collector of Chinese and Japanese porcelains. One distinctive feature of the Chantilly porcelain is its imitation of the Japanese Imari wares of the 17th century, especially those bearing delicate patterns in the Kakiemon style. This imitation was not confined to the decoration alone, but great efforts were made to reproduce the delicious tender whiteness of the original ware, by covering the body of the soft porcelain with a coating of the tin-enamel used by the French faience makers. Similar imitation of the Kakiemon style of decoration became the rage all over Europe, and was largely followed at Meissen and in England as well as in France; but no European imitations equalled those of the famous Chantilly ware.

Lille and Chantilly Potters' marks.

Other porcelain factories were started at Mennecy-Villeroy and at Lille, but the most important French factory was that founded at Vincennes about 1740, not only because of the many beautiful pieces produced there, but also because the works was taken under the direct patronage of the king in 1753 and was transferred to Sèvres in 1756, becoming ultimately the most important porcelain factory in Europe.

Fortunately we have documentary information of the exact composition of the artificial porcelain (*pâte tendre*) of Sèvres, and a brief account of its manufacture will serve to explain how all the glassy porcelains of Europe were made. The potter commenced by preparing a glass or frit, melting together pure sand, alum, sea-salt, gypsum, soda and nitre. The clear portions of this frit were powdered and washed with boiling water, and the working clay was compounded by adding to such powdered frit a small quantity of chalky clay or marl and sometimes pure chalk as well. This mixture was ground in water until the fluid was as fine as cream, and it was then boiled to a thick paste which was so little plastic in itself that black soap or parchment size was added to it to give it enough plasticity for the workman to be able to shape it. Vases and other pieces were made from this paste by pressing cakes of it in plaster moulds of considerable thickness. After pressing, the pieces were dried and were then either turned on a lathe or rubbed down with sand-paper to reduce them to sufficient thinness; while handles, spouts or other ornaments in relief were applied with a lute of slip, as is customary with every other species of pottery. The fragile objects were then fired into what is known as the "biscuit" condition; the most difficult part of the whole process. During this firing the pieces frequently went out of shape because of the excessive shrinkage of the material and its tendency to soften as it approached the melting point of the frit. Consequently an elaborate system of "propping" the pieces had to be resorted to, and even then a very large proportion became deformed. When the porcelain was drawn from the oven after the first firing, the supports were removed and the pieces were rubbed with sand to clean the surface, and were then coated with glaze by sprinkling with a brush; the glaze being a fusible glass very rich in lead. The glaze coat was melted by refiring the piece at a lower temperature; and it was frequently necessary to repeat this process several times in order to get a perfectly even and brilliant result. The difficulties of such a process were enormous, and it was only by the financial support of wealthy patrons, or of the state, that such a method of manufacture was ever carried on for any length of time. At its best the material is an exceedingly beautiful one, lending itself especially to decoration in on-glaze colours, and the pieces produced at Vincennes and at Sèvres, between 1745 and 1770 or thereabouts, form a distinct class by themselves. Skilful chemists like Hellot and Macquer were employed to direct the operations, and many beautiful ground colours, such as the famous *gros-bleu*, *bleu de roi*, *rose Pompadour*, pea-green and apple-green were invented.

Sèvres Porcelains.—The forms of the Sèvres porcelain are exceedingly varied. Many of the older shapes were designed by Duplessis, the king's silversmith, and, as is perhaps natural, are more proper to metal than to pottery; but the French glassy porcelain is such an artificial material in every respect that such a point should not be strained too far. Owing to the want of plasticity in the paste the pieces were always made in moulds of plaster of Paris, while in many cases they were moulded in separate parts and these united together with metal screws or mounted in bands of chased ormolu. Table services made for actual use were usually painted on a plain white ground with the full palette of on-glaze colours (or enamels) and much rich gilding. The decorative pieces such as vases, candelabra, jardinières, &c., were decorated in a much more sumptuous fashion by covering the greater part of the piece with a ground of one of the rich enamel colours previously mentioned, reserving only panels in white on which delicate miniature-like decorations of the most varied kind were subsequently painted and fired (see fig. 52; and examples of Sèvres, Plate IX.). Such collections as the Wallace at Hertford House, or the Jones Bequest in the Victoria and Albert Museum, show at once the variety and perfection to which the work attained.

Fig. 52.—Sèvres vase, *pâte tendre*; green body and gilt imitation mounting. (Victoria and Albert Museum.)

This Sèvres porcelain is entirely devoid of the broad decorative treatment and rich full colour of any of the great kinds of fine pottery or porcelain. Artistically considered, it has no place beside the triumphs of the Chinese or Persian potters, or of the Italian majolists. Its shapes are too formal, and are not sufficiently imbued with a sense of the qualities of the material. The ground colours defy every natural tendency of pottery colour for they are even, flawless and mechanical, with none of the palpitating richness that comes so naturally from the potter's processes. The paintings, whether of flowers, birds or figure-subjects, are extraordinarily skilful regarded as miniatures, but as examples of pottery decoration they cannot be compared to the swift, apparently careless, brushwork of the great masters of earlier times. So pronounced was the demand of the period for smooth even finish that such ground colours as *gros-bleu* and *bleu de roi*, where the colour naturally came varied and uneven, were subsequently decorated with small diapers or lines of gold in the form of *œil de perdrix* or *vermicelle*, so as to produce a more regular and even effect. The most elaborate and costly of all the varieties of old Sèvres is what is known as "jewelled Sèvres," which is richly sown with imitation jewels, such as turquoises, pearls and rubies, closely resembling the real stones. These imitation jewels were in every case set in beautifully chased mountings of gold, and in the museum at Sèvres are to be found examples of the punches and other tools used in making these mounts. On account of the enormous expense involved in the production of such costly triumphs of skill, examples of jewelled Sèvres are rare even in the best collections, but the English student is fortunate in the fact that the Wallace collection contains a considerable number of them.

Many reasons—the prestige attaching to a Royal Manufactory, the knowledge that the porcelain was produced regardless of cost, the mechanical perfection of its colours, gilding and decoration, as well as the fact that the glassy porcelain was abandoned as too costly and risky after about 1780—have all conspired to raise the prices which modern collectors are prepared to pay for fine examples of *vieux Sèvres*. It is doubtful whether even the prices paid for paintings by old masters have advanced so rapidly as those paid for Sèvres porcelain of the best period. In the 'seventies of the 19th century it was deemed worthy of remark that a sum of £10,000 should have been paid at public auction for three old Sèvres vases; thirty years later one such piece would probably fetch the same price. It should be added that the extravagant prices now paid for Sèvres porcelain, which is much more a triumph of technical than of artistic skill, have led

Sèvres Potters' marks, 1753 and 1772.

to an extensive system of "faking" and even forging specimens which are purchased at high prices by amateurs.

Beautiful as the old Sèvres porcelain was, those who were responsible for its manufacture could not fail to recognize that the porcelain made at Meissen and other German factories was both harder and whiter in substance, more truly resembling the oriental porcelain in every respect. It was also known that these German porcelains were not so difficult, and therefore so costly to manufacture as the French, and all these causes combined to make the directorate of Sèvres unremitting in their efforts to discover in France natural materials analogous to those used by the German and Chinese potters. Père d'Entrecolles, the famous Jesuit missionary, had forwarded to France long before an account of the methods used by the Chinese, as well as samples of the materials they employed; and after many years' research Millot and Macquer discovered the precious materials at St Yrieix near Limoges (see Auscher, *History of French Porcelain*, pp. 77-81). The first experimental pieces of this French porcelain, similar in material to the German and Chinese, appear to have been made about 1769; but it was some years after this before the manufacture of the new product was firmly established, and then to the end of the 18th century more and more of the hard porcelain and less of the glassy porcelain was made at Sèvres. Speaking broadly, we might say that after 1780 comparatively little of the original French porcelain was made in France; and from that time to this practically all French porcelain has been of the same type as the German porcelain, viz. made with china clay and felspathic rock. This technical change in the nature of the materials had a profound influence on the artistic qualities of French porcelain, and the change was doubtless accentuated by the neo-classical rage which followed on the discovery of Herculaneum and Pompeii. The influence of antique vase shapes and of modern renderings of Greek motives in design spread over Europe like a plague, and whether in France, Germany or England the last quarter of the 18th and the first quarter of the 19th century mark a definite period in pottery design and decoration. The introduction of hard-paste porcelain rendered the manufacture of large vases and other pieces possible; and after 1780 we find the manufactory at Sèvres engaged in the production of enormous vases 5 or 6 ft. in height, a manufacture which has been continued there to this day. About the same time, too, we find the first production of large plaques or slabs of porcelain on which copies of well-known pictures were painted in enamel colours. The earliest of these slabs were in soft-paste porcelain, but in this material it was only possible to make them of quite modest dimensions; with the introduction of hard-paste porcelain very large slabs were manufactured, and a series of these are to be seen in the museum at Sèvres.

The most artistic of all the productions of Sèvres are undoubtedly the "biscuit" figures and groups. These were modelled with great skill by many of the best French sculptors of the day, such as Pajou, Pigalle, Clodion, La Rue, Caffieri, Falconet, Boizot, Julien, Le Riche, &c. The best of these Sèvres "biscuits" have a real artistic value which places them in a class quite apart from the German porcelain figures made at Meissen, Frankenthal and Höchst.

Paris.—Although during the reign of Louis XV. many privileges and prerogatives had been given to the Sèvres manufactory, such as the exclusive right to gild or paint in colours on porcelain, the breakdown of the monarchical régime, which was rapidly accelerated after the accession of Louis XVI., led to the establishment in Paris and its environs of a number of factories for the production of hard-paste porcelains more or less in open rivalry with the royal manufactory of Sèvres. In order that the royal edicts might be more easily evaded, most of these factories were placed under the patronage of one of the French princes of the blood or even of Queen Marie Antoinette. There is little need to dwell on the doings of these Parisian factories, but the productions of the best of them, such as those of Clignancourt (patronized by Monsieur, the king's eldest brother); Rue Thiroux (patronized by Queen Marie Antoinette); Rue de Bondy (patronized by the duc d'Angoulême), compare not unfavourably with those of Sèvres itself.

It is impossible to do more than mention the other important French factories at Mennecy, Sceaux, Bourg-la-Reine, Strassburg, Niederviller, Marseilles, Limoges and Caen. In the disastrous years of the French revolution (between 1789 and 1800), such of these factories as had survived came to an untimely end, even the royal factory at Sèvres passing through a kind of lingering death between 1792 and 1801, and it was not until Napoleon decided to revive the glories of Sèvres that modern French porcelain really came into being.

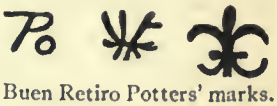
Just as the manufacture of German porcelain spread into Holland, Denmark, Sweden, Russia, &c., we find the manufacture of a glassy porcelain analogous to the early French arising in Belgium, Italy, Spain and England. The materials and methods were so like those used in France that it would be ridiculous to claim for them an independent origin, even were we unable to prove by documentary evidence that workmen trained in the French factories had migrated into those countries.

Italy.—In Italy we have the factories at Le Nove near Bassano (1762–1825); Doccia near Florence (founded in 1735 by the marchese Carlo Ginori, and still carried on by the same family); and Capo-di-Monte near Naples (1736–1820); with minor factories like those at Vinovo, Treviso, and the Volpato factory at Rome. The most important of these were the factories at Doccia and Capo-di-Monte. The porcelain made at Doccia was famous for its soft translucent texture, so that it lent itself beautifully to the production of white glazed porcelain figures resembling in quality the white pieces of Fu-kien.

Capo-di-Monte Potters' marks; 1736, 1759, 1780.

The factory at Capo-di-Monte was under the direct patronage of Charles III., king of Naples. The earliest and best of its productions are in pure white, probably made in imitation of Chinese white pieces, though modelled in the form of natural shells supported by corals and seaweed. Figure-modelling was also largely practised, and besides groups of statuettes and figures in conjunction with vases, we have the typical Capo-di-Monte examples in which vases, cups, saucers, plates, &c., are covered with groups of figures modelled in high relief on a minute scale. This trivial style of work is greatly admired because of the minuteness of its execution. At a later period the works was removed to Portici and ultimately to Naples, but after about 1770 the classic style was adopted for the shapes and decorations. The factory came to an end as late as 1820.

Spain.—Charles III. of Naples ascended the throne of Spain in 1759 and took with him to Madrid many of the workmen from the Capo-di-Monte factory, as well as the best moulds and models. He established a new china factory in the gardens of Buen Retiro, a palace outside Madrid. As long as Charles III. lived immense sums were lavished on this factory, and the ware was not allowed to be sold, but was either used for the decoration of the royal palaces or for presentation to other European sovereigns. Enormous vases were made, following the example of Sèvres, and these were often filled with bouquets of flowers modelled in porcelain. The most famous productions of this factory, however, were the plaques and slabs of porcelain used for lining the walls of certain rooms in the royal palaces. Two of these rooms still remain, and are frightful examples of the Spanish *rococo* style. The factory was entirely destroyed in 1812 during the French war, and since that date no porcelain of any importance has been made in Spain.



Buen Retiro Potters' marks.

English Porcelains of the 18th century.—There can be no doubt that whatever experimental work may have been conducted by our early English potters, such as the famous John Dwight of Fulham, nothing like an established manufacture of porcelain existed in this country prior to about 1740–1745. There are records of many tentative experiments before this date, but no real history. Between 1745 and 1755 important porcelain works were established at Chelsea, Bow, Worcester and Derby, and when we examine the productions of these factories it is impossible to avoid the conclusion that the processes had been imported from France. The early English porcelains, like all the French porcelains of that date, were composed of artificial or glassy mixtures.

We may take the early productions of Bow and Chelsea as typical of the earliest English porcelain of which there is any definite record. The material was a mixture of pipe-clay, sand from Alum Bay in the Isle of Wight, and glass, while the glaze was a fusible English flint-glass rich in lead. It is obvious, therefore, that we are dealing with substances very similar to those used in the glassy French porcelain (see above), and such mixtures were very difficult of fabrication, being subject to great loss in the process of firing. In the other European countries

the manufacture of porcelain was almost invariably carried on at the expense of some royal or princely patron; in England, however, the manufacture was not subsidized in this way, and it is probably for this reason that at a very early date we find the English porcelain-makers experimenting with other materials than glass and clay in order to make their processes more certain. In a patent taken out in 1749 by Thomas Frye of the Bow works we find mention of the use of bone-ash—the material that was to make English porcelain a distinct species by itself. From 1750 onwards there can be little doubt that, though a large proportion of glass was still used in the composition of the English porcelains, bone-ash was more and more introduced into the paste in order to obtain a more refractory material; yet it was not until about 1800 that Josiah Spode of Stoke-upon-Trent abandoned entirely the use of glass and composed his porcelain of china clay, bone-ash and felspathic rock for the body, glazing it with a rich lead glaze, and so laid the foundation of distinctively English porcelain. The material has many merits both from the useful and artistic points of view; it is much more easily fabricated than the old glassy porcelains, it endures better for ordinary table use than any other kind of porcelain, and it permits the fullest range of decoration.

Before entering upon a detailed notice of the important English factories of the 18th century, something should be said of the various influences that were at work in determining what the porcelain-maker should do, both in the way of shape and decoration. The eyes of all men were, of course, turned first to the porcelain brought from the far East; and in the early efforts of the English factories, as of those of France and Germany, we notice a predominance of white pieces or of pieces decorated with paintings in under-glaze blue alone, obviously inspired by the current importations from China. Bow and Chelsea produced large quantities of ware of this class, and in the early days of the Worcester factory little else was made there than white, or blue and white pieces closely simulating the Chinese. Another oriental influence was to be found in the Imari patterns of Japan, particularly those in the style of Kakiemon. It has been noted that Meissen, Chantilly and other continental factories had already created a vogue for these reproductions of Japanese decorations, and in our own country Bow, Chelsea and Worcester followed suit. The later Imari patterns, heavily decorated with blue and red and gold for the use of "the foreigner," furnished another popular style for Worcester and Derby, and the vogue of these English "Japan" patterns, in the last quarter of the 18th century and the first half of the 19th century, was so great that they represent a large proportion of the output of our English porcelain works during that period. The productions of the German and French factories also exerted a profound influence on English potters; so that throughout the 18th century English porcelains largely consisted of imitations of the foreign wares brought into the country by the wealthy.

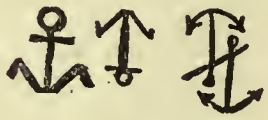
We can only point to one method of porcelain decoration which undoubtedly arose in England. This is the method of transfer-printing, whereby patterns printed on paper from engraved copper plates are transferred to porcelain or pottery and subsequently fired, either under or on the glaze. At the best these printed patterns are in no way superior to the stencilled work of modern oriental porcelain, while, at the worst, European and American printed patterns have been perhaps the most inappropriate decoration ever applied to porcelain in the world. It has been generally urged on behalf of transfer-printing that it enables elaborate effects to be produced at a small cost and so brings decorated pottery within the reach of the humblest. The truer view is, that the simplest brushwork patterns, or even no pattern at all, would be preferable to the tawdry results that the cheapest forms of transfer-printing have rendered possible.

Chelsea.—Between 1750 and 1770 the Chelsea factory was the most important of all the English porcelain works, and fine specimens of this period command high prices in the saleroom to-day. We know little of the origin of this important factory, though it is believed to have been in existence from some time after 1740 to 1784, when it was finally demolished and some of the workmen and part of the plant were removed to the then important works at Derby. The first manager was one Charles Gouyn, who was followed by a Mr Sprimont before 1750. Sprimont retained possession of the works until 1769, and died in 1771. It was during his management, from 1750 to 1770, that the finest and most characteristic pieces of Chelsea porcelain were made.

Although the styles in vogue at Chelsea are extremely varied, little was produced there that was really English in character. The earliest pieces appear to have been either in pure white or in white decorated with paintings in under-glaze blue. The goat-and-bee cream jugs, crawfish salt cellars, the shell and rockwork salt cellars, jugs, sauce boats, small cups and saucers of this type are fairly plentiful. Then came the decorations, mainly in red and gold, of the Kakiemon style, followed by reproductions of the brocade patterns of Imari porcelain. Afterwards we find the appearance of table wares modelled in imitation of leaves, animals, fruits, birds and fishes, apparently adopted from current French and German practice.

In another direction the influence of Meissen was also shown by the production of statuettes (see in Chelsea figure, Plate X.), and of the small modelled trinkets, scent-bottles and toys of which there is such a fine collection in the British Museum. In the latter days of the factory (say after 1758) we find Chelsea following in the wake of Sèvres in the production of large and elaborate rococo vases, with pierced necks and covers, scroll-work bases and interlacing handles such as are to be seen in the Jones Bequest in the Victoria and Albert Museum. Pieces of this elaborate kind are overlaid with rich grounds of Mazarine blue, turquoise, pea-green, or the famous Chelsea claret-colour, while white panels are reserved framed with gilt scrolls and painted in enamel colours with flowers, birds or figure-subjects in absolute rivalry with the pieces manufactured at Sèvres.

The Chelsea works appears to have come to an end through the ill-health of Sprimont, and it was sold in 1769–1770 to Duesbury, the proprietor of the Derby works. He carried on the establishment from 1770 to 1784, but in this period a great change is noticeable in the product of the factory. The "rococo" forms and decorations of the true Chelsea porcelain were replaced by works in the neo-classical style already rendered popular by the success of Josiah Wedgwood, and the Derby-Chelsea porcelain is quite a distinct production from the early works of Chelsea. The most distinctive mark of the Chelsea porcelain is an anchor—either embossed in the paste or painted in gold or colour. Often the anchors occur in pairs, and it is frequently associated with other marks such as a dagger or a cross. Some of the Derby-Chelsea pieces are marked with a conjoined D and an anchor.



Chelsea Potters' marks.

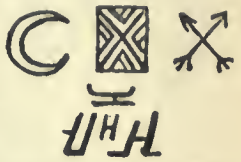
Bow.—The date of the establishment of the factory at Stratford-le-Bow, in what is now the East End of London, is quite uncertain, but in 1744 Edward Heylyn and Thomas Frye, who were connected with this factory, took out a patent for the manufacture of porcelain. The materials mentioned in this patent are not such as would produce porcelain at all, and it appears likely that the specification was made purposely defective. In 1748 a further patent was applied for in which we get the first mention of bone-ash, so that from the technical point of view the wares made at the Bow factory are of the utmost importance as indicating the experimental beginnings of our English porcelain in which bone-ash plays such an important part. In 1750 the works at Bow belonged to Messrs Weatherby & Crowther, and was then known as "New Canton," and as 300 workpeople were employed, the operations must have been conducted on a large scale; but ultimately, from causes that can only be surmised, the partnership was dissolved and the business failed, so that in 1775 the works was bought for a very small sum by the William Duesbury already mentioned, who transferred part of the plant and moulds to his more prosperous works at Derby. It would appear from what we know of the factory and its

productions that the business was conducted on simpler lines than at the Chelsea works. We have, for instance, no elaborate vases in imitation of Sèvres, and no important groups of figures which might challenge rivalry with Meissen. We find, as is common with all the early porcelain factories of Europe, first the production of white pieces with modelled reliefs, or of pieces painted with under-glaze blue in imitation of Chinese porcelain. Then followed the well-known "Quail," or "Partridge," and "Wheatsheaf" patterns in red and green and gold in imitation of the Japanese patterns; and the manufacture of table ware decorated with these simple yet bright and pleasant devices seems to have formed the greater part of the work at the factory. Many figures and statuettes were also produced at Bow, but they are fewer in number and less cleverly made and decorated than the contemporary productions of the Chelsea factory. We may surmise that there was considerable rivalry between these two works situated on the outskirts of the metropolis, for we find the "anchor" mark, which is the best recognized mark of Chelsea porcelain, often occurring on specimens that from internal evidence or from the piece itself we should rather attribute to Bow. The Bow marks are not very certain, but some of the likeliest are here given.

Bow Potters' marks.

Worcester.—The third of the early English factories, and ultimately the most important of all, was that founded at Worcester in 1751 by Dr Wall, a man of unusual attainments, and a number of his friends. How Dr Wall came to learn the secret of porcelain making is absolutely unknown, but even assuming that he acquired some information from wandering workmen it is certain that the Worcester porcelain was soon developed on original lines. The nature of the paste and the glaze of the early Worcester productions, as well as the sobriety of their decorations, stamp this factory as the first where Englishmen really developed a native porcelain. Between 1751 and 1770, the first period of Worcester porcelain, the prevalent influence was that of Chinese blue-and-white, and the pieces of that period are rightly esteemed by collectors for their artistic quality. Probably nowhere in Europe, certainly nowhere in England, was oriental blue-and-white more carefully studied, and a collection of this blue-and-white Worcester is most satisfactory from the aesthetic point of view. The productions at this time were tea and coffee services, bowls, dishes, mugs and plates. The cups were usually made without handles in imitation of the oriental practice, but large, two-handled covered cups for caudle, broth and chocolate were also made during the early period. Many of these larger cups bore an embossed pattern resembling a pine-cone, possibly imitated from a shape produced at St Cloud; while openwork dishes, plates and fruit baskets were also made in imitation of a popular Meissen fashion.

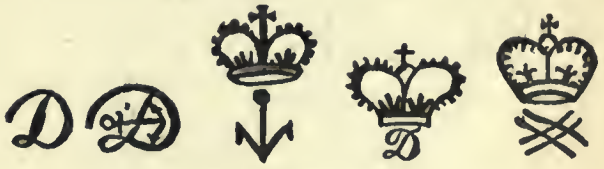
The method of decorating porcelain with transfer prints was introduced at Worcester as early as 1756, when Robert Hancock, an engraver, came from York House, Battersea, where the process was first employed for the decoration of the Battersea enamels. The early Worcester prints comprised portraits of celebrities of the time (the Frederick the Great mug), or adaptations of the works of great artists such as Gainsborough and Watteau, or copies of current engravings or sporting prints. The first printing was done in black or purple, and transferred on to the fired glaze, and it was not until about 1770 that the process of printing in blue under the glaze was perfected. It is interesting to note that for many years this process of transfer printing was developed side by side with the older method of porcelain painting, and until the end of the 18th century the processes appear to have been used at Worcester quite independently. The closing of the Chelsea factory in 1770 led to the migration of some of the Chelsea painters to Worcester, and from about that date a considerable amount of Worcester porcelain was decorated on the glaze with enamel colours and gilding after the styles that had been rendered popular at Chelsea and Bow. It is only fair to remark, however, that the Worcester patterns are always distinguished by a certain English character both in the style and the workmanship (see example, Plate X.). The first and most artistic period of Worcester porcelain came to an end before 1783, when, after the death of Dr Wall, the works passed under the control of Thomas Flight and his two sons, who had been jewellers. The Flight influence was soon noticeable from the fact that the new shapes were more and more based on those of Sèvres and Meissen, while the decoration became more mechanical and precise as befitted the work of jewellers rather than potters. King George III. and Queen Charlotte visited the works in 1788 and bestowed upon the firm the privilege of styling themselves "China Manufacturers to Their Majesties," since when the works has always been known as the Worcester Royal Porcelain Works. In 1793 Martin Barr was taken into partnership; the "Flight & Barr" period, so well known to collectors, lasted until 1807.



Early Worcester Potters' marks.

Another Worcester porcelain works was in existence after 1784, viz. the Chamberlain factory, which was working in rivalry with the original establishment; but its productions are of no particular artistic merit, and in 1840 the two firms became amalgamated, and so gave rise to the present Worcester Royal Porcelain Co. The most noteworthy feature of the productions of both the Worcester works at the end of the 18th century were the "Armorial" services made for various royal and noble families, and those adaptations of Imari patterns known as "Old Japan."

Derby.—Experiments in the manufacture of porcelain appear to have been made at Derby as early as 1750 by a French refugee, Andrew Planché; but the business, which was afterwards to attain such a great development, was only founded in 1756 with William Duesbury as its manager. Duesbury was originally a decorator of china figures in London, and his career proves that he was a man of great industry and energy, for within twenty-five years he not only built up a large business at Derby, but he absorbed the decadent works at Bow and Chelsea, so that in the last quarter of the 18th century Derby was the most important china manufactory in England. As is so often the case, a commercial success like this implied the absence of any distinct artistic impulse. The porcelain produced at Derby is for the most part only an echo of the successes of Meissen, Sèvres, or the earlier English factories. It is only fair to remark that a very deep and rich under-glaze blue was attained at the Derby works,



Derby Potters' marks.

and that this was associated with very mechanical painting of birds and flowers and with gilding of exceptional quality. At this factory, too, the old Japan patterns were imitated with exceptional vigour, until "Crown-Derby Japan" became a standard trade name for this clobbered oriental style.

Mention has already been made of the "biscuit" porcelain figures made at Derby, which are superior in style to anything else made in Europe in the 18th century except the "biscuit" porcelains of Sèvres. The Derby "biscuits" of the best type range from 1790 to 1810, and the finest specimens have a "waxy" surface, though there is little or no sheen and every detail remains as crisp as when the figure left the hand of its maker. The most famous of these figures are the portrait medallions and statuettes of British generals and admirals which were modelled by an artist named Stephan. Spengler, a Swiss, modelled numerous groups adapted from the drawings of Angelica Kaufmann, while a workman named Coffee seems to have modelled only rustic figures and animals.

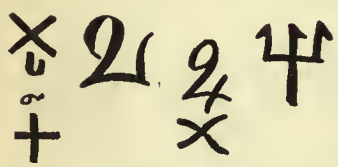
Plymouth and Bristol.—The porcelain factories at Plymouth

and Bristol are mainly noteworthy because they were the only English factories in which a true porcelain strictly analogous to the Chinese was ever manufactured. William Cookworthy, a Quaker druggist of Plymouth, was greatly interested in attempting to discover in Cornwall and Devonshire minerals similar to those which were described in the letters of Père d'Entrecolles as forming the basis of Chinese porcelain. After many years of travel and research he ascertained the nature of the Cornish stone and Cornish clay, and in 1768 he founded a works at Plymouth for the production of a porcelain similar to the Chinese from these native materials. Readers interested in this abortive enterprise, from which such great results were afterwards to come, can only be referred to the general histories of English porcelain, for the factory was removed to Bristol in 1770 and was shortly afterwards transferred to Richard Champion, a Bristol merchant, who had already been dabbling in the fashionable pursuit of porcelain making. Champion's Bristol factory lasted from 1773 to 1781, when the business had to be sold to a number of Staffordshire potters owing to the serious losses it had entailed. The Bristol porcelain, like that of Plymouth, was always a true felspathic porcelain resembling the Chinese, but made from the china clay and china stone of Cornwall. It is, therefore, harder and whiter than the other English porcelains, and its cold, harsh, glittering glaze marks it off at once from the wares of Bow, Chelsea, Worcester or Derby.

The Bristol porcelain resembled that of Meissen quite as much in its style of decoration as in the nature of its materials. One can point to nothing distinctly English about it, and if specimens now command very high prices in the salerooms it is on account of their rarity rather than of any intrinsic quality or beauty that they possess.

Table ware of various kinds formed the greater part of the production of the Bristol works, but a considerable number of figures are known, in many cases obviously copied from those of Meissen, and a few large hexagonal vases similar in style to specimens produced at Chelsea and at Worcester. The most distinctive pieces made at the Bristol factory are certain small plaques or slabs in " biscuit " porcelain, usually bearing in the centre a portrait medallion or armorial bearings surrounded by a wreath of skilfully modelled flowers. Good examples of these choice productions are to be seen in the British Museum.

The Plymouth factory is supposed to have adopted as its general mark the alchemical symbol for tin. This mark was also used to a limited extent at the Bristol factory, though the general Bristol mark was a cross or a copy of the crossed swords of Meissen. The Staffordshire potters who bought the rights of the Bristol porcelain factory from Champion established a works at Shelton, near Stoke-upon-Trent, in Staffordshire, under the name of New Hall Porcelain Co., but they never manufactured anything of artistic account.



Plymouth, Bristol, Champion and Swansea marks.

Minor English Factories.—A number of other porcelain factories were founded in England in the latter half of the 18th century, but none of these produced ware of any particular merit. The porcelain made at Longton Hall by William Littler (1752–1758), always clumsy and ugly in form, is interesting for a splendid blue colour characteristic of the factory. This small venture was ultimately absorbed by William Duesbury.

The colony of potters established in Liverpool also made a certain amount of porcelain, as well as " Delft " and other earthenwares, and the Liverpool Museum contains some good examples of their productions.

A little factory at work at Lowestoft in the last quarter of the 18th century has attracted much more attention than it deserves, because certain writers foolishly attributed to it large quantities of " Armorial " porcelain which had, undoubtedly, been made in China. Recent excavations have established the fact that this factory was only of minor importance, and was mainly occupied in producing cheap wares in rivalry with, and even in imitation of, those of the more important English factories.

Towards the end of the 18th century the manufacture of English porcelain spread into the Staffordshire potteries, and the firms of Spode, Davenport and Minton became the most important English factories of the early 19th century. For notices of the minor English factories of the late 18th century and early 19th century, such as Caughley, Coalport, Swansea and Nantgarw, the student is referred to the special works dealing with the history of English porcelain.

Collections.—The British Museum and the Victoria and Albert Museum contain the best general collections of English porcelain. The museums at Bristol and Liverpool contain examples of the local wares; while the museum at the Worcester Royal Porcelain works has an admirable collection of the wares of that factory. Many noteworthy private collections are in existence, of which we may mention those of Mr Dyson Perrins, Mr Cockshutt and Mr Trapnell.

LITERATURE.—Alex. Brongniart, *Traité des arts céramiques* (1844); Jacquemart, *Histoire de la céramique* (Eng. ed. 1873); Jännicke, *Grundriss der Keramik* (1879); Dr Brinkmann, *Handbook of European Porcelains in the Hamburg Museum*; Marryat, *History of Pottery and Porcelain* (1857); Jewitt, *Ceramic Art of Great Britain* (1878); Auscher, *A History and Description of French Porcelain* (1905); Burton, *A History and Description of English Porcelain* (1902); Dillon, *Porcelain* (1904); Solon, *Old English Porcelain* (1903); Burton, *Porcelain* (1906); R. Almström, *Lervarorna och deras Tillverkning* (1903). (W. B.*)

Pottery and Porcelain during the 19th Century

The development of the manufacture of pottery and porcelain in Europe and America throughout the 19th century need not be treated in such detail as the history of its growth up to that period, for modern means of communication and the general diffusion of knowledge have tended to destroy the individual character which was so marked a feature of the pottery of different countries in previous centuries. The 19th century was distinctly the century of machinery, and, for the most part, it witnessed the displacement by mechanical processes of those methods of handicraft which made the older pottery individual and interesting even in its simplest forms. Collectors are prepared to pay very large sums for choice examples of the potter's art of bygone centuries, but it is doubtful if much of the pottery of the 19th century will ever be collected for its intrinsic merits, though it may be preserved as an illustration of the spirit of the age.

In preceding sections of this article the development of the brightly painted tin-enamelled wares and the gaily decorated porcelains of various European countries have been traced down to the end of the 18th century, because that date marks, quite distinctly, the period when the old handicraft of the potter was for various reasons displaced by organized manufacture. The disturbed economic condition of Europe in the last quarter of the 18th century and the Napoleonic Wars of the early 19th century proved disastrous to most of the pottery and porcelain works where artistic wares were made, and the disturbance of traditional methods was completed by the superior mechanical perfection and cheapness of the English earthenware introduced by Wedgwood and his contemporaries. The English pottery was neater, more perfectly finished and more durable than the painted tin-enamelled pottery of the continent. It vied in finish with the expensive continental porcelains, and for nearly half a century it carried all before it, not only in England, but throughout the world. An intelligent observer, M. Faujas de Saint Fond, writing in the beginning of the 19th century, remarks of English pottery that " Its excellent workmanship, its solidity, the advantage which it possesses of sustaining the action of fire, its fine glaze impenetrable to acids, the beauty and convenience of its form, and the cheapness of its price, have given rise to a commerce so active and so universal, that in travelling from Paris to Petersburg, from Amsterdam to the farthest parts of Sweden, and from Dunkirk to the extremity of the south of France one is served at every inn upon English ware. Spain, Portugal and Italy are supplied with it; and vessels are loaded with it for the East Indies, the West Indies, and the continent of America." [1] It was calculated that at this time three-fourths of the pottery manufactured in England was sent abroad. Such a state of things was not likely to continue, and in most of the European countries, after the settlement of 1815, such of the older factories as had survived, or new factories specially created for the purpose, adopted English methods of manufacture. In many cases

[1] *Travels in England and Scotland* (Eng. trans.), vol. i. p. 97.

Sèvres Pâte-tendre, *c.* 1757, painted by Falot and Morin.

Meissen. May-flower vase mounted in ormolu. Pâte-dure.

Meissen. Crinoline figure (Kandler), Pâte-dure.

Sèvres. Pâte-tendre, *c.* 1756.

experienced Staffordshire potters were procured to direct these works, and so far as ordinary domestic pottery was concerned, the first half of the 19th century witnessed the establishment in every country of Europe and in the United States of America of pottery works managed by Englishmen, where earthenwares were made after the English fashion. We shall refer presently to the survival or revival of the older styles of pottery and porcelain, but the English influence was undoubtedly paramount, with one or two notable exceptions, down to 1850, or even later. England itself witnessed a notable development of its pottery manufacture, which became more and more aggregated in that district of North Staffordshire designated emphatically "The Potteries," where, in spite of later developments, from two-thirds to three-quarters of all the pottery and porcelain made in the British Isles is still produced. This concentration of the industry in England has resulted in a race of pottery workers not to be matched elsewhere in the world, and while it was the supply of cheap coal and coarse clay which first gave Staffordshire its pre-eminence, that pre-eminence is now retained as much by the traditional skill of the workmen of the district as by the enterprise of its manufacturers.

While we must admire, from the economic point of view, the methods of manufacture which have placed England in the first rank as a pottery-producing country, inasmuch as they have brought within the reach of the humblest domestic utensils of high finish and great durability, it is impossible to say much for the taste or art associated with them. Neatness, serviceableness and durability, English domestic wares undoubtedly possess in a degree unknown to any earlier type of pottery, but the general use of transfer-printing as the principal method of decoration, and the absence of any distinctive style of ornament, must cause them to take a low rank in comparison with the wares of past centuries, when mechanical perfection was impossible and rich colour and truly decorative painting were the chief distinctions of the pottery of every country. The London International Exhibition of 1851 is generally supposed to indicate the low-water mark of art as applied to industry; it should rather be regarded as marking the period when many of the old handicrafts had been extinguished by the use of mechanical appliances and the growth of the factory system, and when the delight of men in these current developments was so great that they were regarded as triumphs in themselves, when they were only "means to an end."

Since that period the development of pottery and porcelain has followed two main directions: (1) an attempt on the part of manufacturers to produce the most artistic results possible with modern processes and methods, and (2) the interesting and valuable efforts of those individual potters in every country with whom art was the first consideration and commercial production was disregarded.

Though the English pottery factories were of such paramount importance in the first half of the 19th century, it must be remembered that some of the oldest factories in Europe were still alive and active. The royal factories in Sèvres, Meissen, Berlin, Vienna, St Petersburg and elsewhere, surviving the wreck of the Napoleonic Wars, continued at the expense of their respective states, to produce porcelains which were the legitimate development of their work during the 18th century.

Meissen and Berlin.—At Meissen, efforts were made to improve the technical process in use, but, unfortunately, the old Meissen wares had already become valuable, and they were reproduced, marks included, until all initiative was destroyed, and the factory continued to live, mainly, on its old reputation.

At Berlin, the financial troubles of the Prussian monarchy throughout the early years of the 19th century were severely felt, so that a cheaper class of porcelain was manufactured. The only innovations that can be ascribed to the factory during this period, though highly esteemed at the time, form striking examples of the artistic decadence of the period. Such was the lace-work decoration made by dipping lace in porcelain slip so that on firing the thread burned away, leaving a porcelain facsimile; another was the production of slabs of porcelain modelled in such a way that on viewing the piece by transmitted light it appeared like a picture painted *en grisaille*.

From the artistic point of view there is little to be said for the majority of productions of the Berlin factory, but nowhere in the world has greater attention been paid to the technical and scientific problems of porcelain manufacture, and this establishment has rendered the greatest service in the development of the important chemical and electrical industries of Germany by the splendid appliances it has invented for scientific use.

Since 1870 the works, removed to Charlottenburg, have been conducted with very great enterprise. It was here that Seger perfected his soft porcelain based on the glazes and bodies of the best Japanese porcelains, and here also he developed the manufacture of copper-red glazes in imitation of the old *sang-de-bœuf* and *flambé* glazes of the Chinese, at the same time establishing some of the scientific principles underlying their production. At Berlin, too, all the modern methods of decoration, whether in coloured glazes, raised enamels, *pâte sur pâte*, the elaborate paintings of flowers, birds or figures, or the use of crystalline glazes, have been followed with great success; but the factory has never yet given any special impetus or new direction to the decorative side of porcelain.

Vienna.—Few European factories were so little affected by the general trend of affairs as the royal factory at Vienna. We have already referred to the elaborate paintings and rich gilding which became the distinguishing feature of its wares towards the end of the 18th century, and this style, once perfected, seems to have been continued with little change. It has been stated by a renowned German authority, that the Viennese porcelain was at its best between 1785 and 1815. During this period the plan of painting copies of pictures on porcelain was developed to its utmost, and this, in combination with the richest gilding, marks the apotheosis of Viennese porcelain. The factory came to an end in 1864, but collectors should be warned that a flood of cheap porcelains, decorated in modern Viennese workshops, and therefore styled "Viennese porcelain," has during the last twenty years overwhelmed the English and American markets.

Sèvres.—The important part played by the Royal French manufactory at Sèvres has already been sketched. During the troublous years of the French Revolution the works practically came to a standstill, and under the Directory it was a question whether this manufactory, along with certain other state establishments in France, should be closed. Napoleon, however, decided that for the glory of France and as a means of encouraging its porcelain industry, seriously threatened by the English potters, the establishment at Sèvres should be conducted as a national factory. By a splendid coincidence Alexander Brongniart, a man of great natural ability, and a noted scientist, was appointed director, and retained that post under the successive governments of France until his death in 1847. In the hands of Brongniart the establishment at Sèvres became at once a school of research and a centre of practical accomplishment—the influence of which was felt throughout Europe. Its products were obviously inspired by the demands of successive French monarchs and their courts. It ministered to the grandiose ideas of Napoleon, who demanded pieces that were to speak of his victories, and after every campaign a fresh table service or new suite of vases was produced to commemorate the emperor's successes. The most striking piece of this kind was the vase made to commemorate the marriage of Napoleon and Marie Louise in 1810. It was designed by Isabey and was modelled with figures in bas-relief. The principal group contains not less than 115 such figures, while the subsidiary group, representing the acclaiming populace, contains between 2000 and 3000 figures. This vase was three years in making, and is said to have cost something like £1250. Unfortunately this was not a solitary example of the productions of Sèvres, for under every successive government of the 19th century the factory has been called to produce enormous vases which are to be found in the rooms or corridors of every palace and museum in France, and while these pieces represent wonderful technical skill, both in their manufacture and the decorations with which they are covered, very few of them possess either spontaneity or charm. They are correct, frigid, cold, and compare most unfavourably from

the artistic point of view with the masterpieces of oriental pottery.

Everything was carried out on the grand scale, and once again the influence of Sèvres became paramount in Europe, and its styles of painting and decoration were eagerly followed from 1830 to 1870 by all those European potters who were attempting to make anything beyond useful domestic wares. As an instance of its aims in the period between 1830 and 1850, large sums were spent in the production of great slabs of porcelain many feet in area, on which were painted copies of some of the famous portraits and other pictorial masterpieces in the galleries of the Louvre. A number of these are preserved in the museum at Sèvres, and must always excite admiration and even wonder at their technical accomplishment.

The most noticeable invention of Sèvres in the middle part of the 19th century was the *pâte sur pâte* decoration in which porcelain clays of various colours are used as the artist's medium. The idea appears to have been adopted from an old Chinese vase by Robert, the chief painter, and at the London International Exhibition of 1862 some small cups decorated in this method, by Gely, were first shown. The most successful work in this style was, however, that produced by M. Solon, who worked at Sèvres until 1870. In that year he came to England and was employed at Minton's, where for about thirty-five years he continued this method of work, one of the few artistic and beautiful styles of pottery decoration of the 19th century. As practised by M. Solon the *pâte sur pâte* decoration took the form of paintings of figure subjects or dainty ornamental designs in white slip on a coloured porcelain ground of green, blue, dark-grey or black. On such grounds a thin wash of the slip gives a translucent film, so that by washing on or building up successive layers of slip, sharpening the drawing with modelling tools, or softening or rounding the figure with a wet brush, the most delicate gradations of tint can be obtained, from the brilliant white of the slip to the full depth of the ground. This method was rapidly adopted by all the principal European factories, though nowhere was it carried to such perfection as at Sèvres and at Minton's. M. Taxile Doat has executed many extraordinary pieces in this style of decoration at Sèvres, and in the British Museum there is a large vase of his, presented by the French government at the beginning of the present century. One great feature of French porcelain manufacture during the 19th century was the development of the industry at Limoges and the neighbouring district of central France. Limoges was a small centre of porcelain production in the period between 1780 and 1850, but after the latter date it rapidly developed into a pottery centre second only in importance to that of the Potteries district in England. We can do no more than mention this fact, because, for the most part, the activities of Limoges have been devoted to the production of pottery commercially, rather than pottery as an art.

The Franco-German War proved a disaster for Sèvres, and all work came to a standstill for a time. The existing manufactory, which was almost completed before the outbreak of the war, was opened by Marshal MacMahon in 1876, but for many years the work was continued under great discouragement. Between 1879 and 1889 attention was paid to the study and imitation of old Chinese methods, and this resulted in the reproduction of many of those Chinese glazes which had hitherto been the despair of European potters.

At the Paris Exhibition of 1900 the display made by Sèvres was perhaps the most notable feature of the magnificent collection of ceramics gathered there. The collection included many varieties of porcelain, both hard and soft paste, decorated in all the current styles of the period; under-glaze painting, on-glaze painting, flambé glazes and crystalline glazes, but most beautiful of all were the magnificent groups of "biscuit" figures designed as table garnitures by some of the best French sculptors of the time.

English Progress.—The demand for elaborate specimens of painted porcelain was at its height throughout Europe between 1851 and 1880, and this demand was undoubtedly fostered by the series of international exhibitions held during that period, when every European pottery works of note produced large and costly specimens of porcelain or earthenware, smothered with painting and gilding. Every famous manufactory produced something beyond the ordinary, but undoubtedly the first of European factories during this period was that of Messrs Minton at Stoke-upon-Trent. M. Leon Arnoux, a descendant of the Arnoux's of Apt, an old family of French potters, was at this time the technical and artistic director of Messrs Minton's works, and he was the only pottery director during the 19th century who could in any sense be compared with M. Brongniart of Sèvres. M. Arnoux combined in a remarkable degree artistic with technical skill, and under his management the works of Messrs Minton became the greatest centre of ceramic art in Europe. Skilful modellers, like Jeannest, Carriere-Belleuse, and Protat, and pottery painters such as A. Boullemier, Moussill, E. Lessore and L. Solon were engaged at this factory and produced many of the most characteristic European decorations of the middle of the 19th century.

To this period, too, we must refer another English invention, that of a special porcelain known as "Parian." This in its finest expression was a "biscuit" porcelain used for the production of statuettes and groups rivalling the finest 18th century "biscuit" figures of Sèvres and Derby. It seems probable that this Parian was first made at the works of Copeland and Garratt, at Stoke-upon-Trent; but it was immediately adopted at Minton's, Wedgwood's, and at Worcester; and each of these firms used it in a distinctive way. Glazed Parian was also manufactured at the Belleek Porcelain Works in Ireland (the only Irish porcelain works of any note), and later its manufacture was developed by the Worcester Royal Porcelain Company, Moore Brothers of Longton, and other English manufacturers until it became an important branch of the English porcelain made in the period under review.

Japanese Influence.—At the Paris Exhibition of 1867 the great collection of the applied arts of Japan took Europe by storm, and there was an immediate outbreak of adaptations of Japanese art in Europe once more; not as in the 18th century, when the old Japanese patterns were copied or frankly imitated, but a European-Japanese style arose, based on the methods and ideas of the great Japanese painters and draughtsmen, the workers in metal, in iron, in lacquer and in silk. In England the Worcester Royal Porcelain Company produced a series of elaborate and skilful pieces inspired from this source, which for perfect and minute execution must be ranked before all other European works of their kind.

The most admirable result of this revived interest in Japanese art was, however, developed at the Royal Copenhagen works, the productions of which are not only famous all over the world, but have set a new style in porcelain decoration which is being followed at most of the continental factories. By the use of the pure Swedish felspar and quartz and the finest china clays from Germany or Cornwall a material of excellent quality is prepared, and on this naturalistic paintings of birds, fishes, animals and water or northern landscapes and figure subjects are painted in delicate under-glaze blues, greys and greens. The Royal Copenhagen works has also produced a profusion of skilfully modelled animals, birds and fishes, either in pure white, or delicately tinted after nature, with the same under-glaze colours.

Not only have Berlin, Sèvres and other European factories adopted the modern Copenhagen style of decoration, but the Japanese are now imitating these skilful productions which were originally inspired by their own early work.

Stonewares.—Mention must be made of the revival of the manufacture of artistic stonewares by Doultons of Lambeth, and Villeroy and Boch, the great German potters. Doultons, besides reviving the older forms of English stoneware, made some entirely new departures, and their pieces with designs etched in the clay are admirable examples of the right use of a refractory material. Villeroy and Boch reproduced the old Rhenish stonewares, and many interesting new departures in addition, but mostly in German forms that have not commended the wares to other nations.

Chelsea porcelain; 1745-1770.
Figure after Watteau.

Worcester porcelain; *c.* 1760-1770.

Whieldon and Wedgwood,
cauliflower ware; *c.* 1750-1760.

Wedgwood's jasper; *c.* 1780.

Turner's jasper; *c.* 1780.

Artistic Results.—While the great potteries of Europe have been employed in improving their methods of manufacture and in consolidating their knowledge on the technical and scientific side, so that they are able to produce pottery more perfect in shape, with a higher degree of finish and greater certainty of result than was ever known before, it cannot be said that the artistic results have been commensurate with the labour expended. Fortunately, however, the success of these important industrial concerns in stereotyping modern production has incited a considerable number of clever men, either potters or artists, to become artist-potters and producers of individual wares, often recalling the works of the great schools of bygone centuries. This movement, which to-day has its exponents in every European country as well as in the United States of America, originated in France between 1840 and 1850, when the formation of the earliest ceramic museums and the new-born interest in the old French faience led to various attempts at pottery-making by the old methods of handwork and rule of thumb. Avisseau of Tours (1845), Pull of Paris (1855), and Barbizet (1859) began to make pieces in the style of Palissy, and Ulysse of Blois (1863) revived painted faience in imitation of that of Nevers. Slowly a demand for painted pottery was created among collectors and amateurs, and in France and other countries artists began to dabble in the painting of pottery. In some cases the artist retained his freedom, painting pieces obtained from some pottery manufacturer, which he sold on his own account after they had been decorated and fired; or he became attached to a particular factory and his productions were sold by the potter; or the artist became an amateur potter, and either worked alone or encouraged other artists to co-operate with him.

It is impossible to do more than mention a few of the prominent men in each class, whose works were not only esteemed in their own day, but are also likely to be regarded always as among the distinguished productions of the 19th century. Emile Lessore and Chapelet were both painters who were attracted by the technique of the potter. For some time they bought specimens of pottery from a small manufacturer named Laurin at Bourg-la-Reine, and after a time they definitely forsook pictorial art for that of the potter. Lessore painted in underglaze colours in a delicate sketchy style figure-subjects, mostly adapted from old engravings. He worked for a short time at Sèvres, and then, like so many other French pottery artists of this period, he came to Minton's in England, and finally entered into an engagement with the old firm of Josiah Wedgwood & Sons which continued almost to his death (1860–1876). On their fine cream-coloured earthenware he sketched many thousands of fanciful designs which had a great vogue in the 'seventies and 'eighties of the last century. Chapelet pursued a very different course. His first innovation was a method known as "Barbotine" or slip-painting, in which coloured clays were used "impasto," often in considerable thickness, so that after the work had been fired and glazed it bore some resemblance to an oil painting. For a few years this style of decoration became the rage all over Europe, but it fell into contempt almost as rapidly as it had found favour, and is now only used for the decoration of common wares. Ultimately, Chapelet gave up painting and applied himself to the discovery of technical novelties. He was apparently the first European potter to produce flambé glazes after the manner of the Chinese, and a fine collection of these productions of his is preserved in the museum at Sèvres.

The greatest of all the French innovators was, however, Théodore Deck, who had been trained as a working potter and was led to forsake the management of an ordinary tile and pottery business in Paris to experiment on his own account. He started a little workshop in the Boulevard Montparnasse in Paris and rapidly gathered round him a number of young painters all eager to experiment in the magnificent colours which Deck with his passionate love of Persian and other oriental pottery could place at their disposal. Within a few years this venture was so successful that Deck was known all over the civilized world as a great potter, and his original creations, painted by men like Ranvier, Collin, Ehrmann, Anker and other artists, were readily purchased by the lovers of ceramic art in every country. The crown of his career came in 1887, when he was appointed director of the National Manufactory at Sèvres, for he was the only practical potter who had ever occupied that position; but he died in 1890 before he had been able to impress his personality on the work of Sèvres.

The same movement that was active in France found its exponents in other countries as well. In Italy and the south of France the last quarter of the 19th century witnessed a revival of Italian majolica and of lustre decoration. Prominent in this direction were the productions of Cantegalli of Florence and of the Massiers of Golfe-Juan near Cannes; while in England William de Morgan created an artistic sensation by his tiles and vases decorated with lustres, or with painted colours recalling those of the Persian and Syrian potters of the middle ages. This departure in England was, however, followed up by many manufacturers who were keenly alive to the possibilities of pottery colour, and Mr Bernard Moore, of Longton, Maw & Company of Jackfield, and Minton's of Stoke-upon-Trent, produced much excellent work, in tiles and vases inspired from the same oriental sources.

Meantime, in America there had been growing up a manufacture of pottery after the approved methods, in Trenton, New Jersey; East Liverpool, Zanesville and Cincinnati (Ohio). To all these centres English workmen had been attracted, and earthenware after the current English styles was manufactured; but, as was the case in Europe, individual efforts were made to produce artistic pottery. The first and best known of these artistic departures was that of the Rookwood Pottery at Cincinnati, and again it was an amateur, Mrs Bellamy Storer, who founded an enterprise which has since produced some very original work. From 1880 to 1889 the work was mainly carried on at the expense of this lady, but since that date the enterprise has been self-supporting, and the Rookwood pottery has become known throughout the world.

The latter half of the 19th century also witnessed the development of new branches of pottery manufacture for sanitary purposes—and it is not too much to say that much of the improved sanitation of modern dwellings and towns has been rendered possible by the special appliances invented by potters for these purposes. In this direction the English potters undoubtedly led the way, and not only have their methods been imitated abroad, but English manufacturers have also established large works in Germany, France and the United States of America. Varieties, too, of hard-fired pottery, comprising earthenwares, stonewares and porcelains, have been invented for use in the chemical and electrical industries. But these belong to the great modern branch of pottery manufacture, not to pottery art. In the same way, the revived attention paid to the various forms of pottery for the interior and exterior of buildings belongs rather to the question of mural decoration than of pottery.

At the beginning of the 20th century we find England and Germany the leading pottery manufacturing countries; Germany excelling in the amount of its output, and England in the fineness and finish of its productions. France, in addition to the National Manufactory at Sèvres, as much as ever divorced from commerce, has its porcelain industry at Limoges and large manufactories of tiles and earthenware in many departments; while there are also a number of artist potters like Lachenal, Dalpayrat, Delaherche and Taxile Doat who make purely artistic pottery in hard-fired stonewares (*grès*) and porcelain, while the production of decorative stonewares for building purposes has been developed by such firms as Bigot, Boulanger and E. Müller. A great development has also taken place in the production of decorative pottery and tiles in Holland. The famous Delft works, besides producing quantities of painted blue and white earthenware (made in the English and not in the old Dutch fashion), has been experimenting largely in the development of crystalline and opalescent glazes and in lustres, while the Rozenburg factory at the Hague and a factory at Purmerende, near Amsterdam, have made some distinctive but rather bizarre painted pottery and porcelain. The success of the Royal Copenhagen factory has

already been mentioned, and this success led to the foundation of Bing & Gröndhal of Copenhagen, who largely follow the styles of decoration initiated at the Royal works. In Sweden there are two important factories at Rörstrand and Gustafsberg. Under the accomplished director of the Rörstrand factory, Mr Robert Almström, a great variety of products have been successfully manufactured, including hard-paste porcelain, English bone china, earthenware, majolica and stoves. Italy, Spain and Belgium have also important modern pottery works.

In the United States of America there are large establishments for the manufacture of earthenware, bone china and tiles, all after the English fashion, while in addition there are a number of experimental kilns at work producing artistic pottery. The Rookwood factory has already been mentioned, but the wares produced at the Grueby factory and by Mrs Robineau and T. Brouwer are also worthy of note. (See "Report on American Art Pottery," pp. 922-935 of *Special Reports of the U.S. Census Office, Manufactures*, pt. iii., 1905.)

Technical Pottery Works.—It is only possible to give a selection of the best of the modern standard works dealing with the technical side of pottery production. Brongniart, *Traité des arts céramiques* (3rd ed., Paris, 1877), with notes and additions by Salvétat; E. Bourry, *Traité des industries céramiques* (Paris, 1897); Théodore Deck, *La Faïence* (Paris, 1887); A. Granger, *La Céramique industrielle* (Paris, 1905); E. S. Auscher, *La Céramique cuisant à haute température* (Paris, 1899); *Technologie de la céramique* (Paris, 1901); *Les Industries céramiques* (Paris, 1901); Seger, *Gesammelte Schriften* (Berlin, 1896; Eng. trans., Easton, Pa., U.S.A., 1902); Langenbeck, *The Chemistry of Pottery* (Easton, Pa., U.S.A., 1895); William Burton, *Porcelain* (London, 1906). (W. B.*)

CERARGYRITE, a mineral species consisting of silver chloride; an important ore of silver. The name cerargyrite is a Greek form (from *κέρας*, horn, and *ἄργυρος*, silver) of the older name hornsilver, which was used by K. Gesner as far back as 1565. The chloro-bromide and bromide of silver were also included under this term until they were distinguished chemically in 1841 and 1842, and described under the names embolite and bromargyrite (or bromyrite) respectively; the chloride then came to be distinguished as chlorargyrite, though the name cerargyrite is often now applied to this alone. Chloro-bromo-iodide of silver has also been recognized as a mineral and called iodembolite. All these are strikingly alike in appearance and general characters, differing essentially only in chemical composition, and it would seem better to reserve the name cerargyrite for the whole group, using the names chlorargyrite (AgCl), embolite (Ag(Cl, Bl)), bromargyrite (AgBr) and iodembolite (Ag(Cl, Br, I)) for the different isomorphous members of the group. They are cubic in crystallization, with the cube and the octahedron as prominent forms, but crystals are small and usually indistinct; there is no cleavage. They are soft (H = 2½) and sectile to a high degree, being readily cut with a knife like horn. With their resinous to adamantine lustre and their translucency they also present somewhat the appearance of horn; hence the name hornsilver. The colour varies somewhat with the chemical composition, being grey or colourless in chlorargyrite, greenish-grey in embolite and bromargyrite, and greenish-yellow to orange-yellow in iodembolite. On exposure to light the colour quickly darkens. The specific gravity also varies with the composition: for the pure chloride it is 5·55, and the highest recorded for an iodembolite is 6·3.

The hornsilvers all occur under similar conditions and are often associated together; they are found in metalliferous veins with native silver and ores of silver, and are usually confined to the upper oxidized parts of the lodes. They are important ores of silver (the pure chloride contains 75·3 % of silver), and have been extensively mined at several places in Chile, also in Mexico, and at Broken Hill in New South Wales. The chloride and chloro-bromide have been found in several Cornish mines, but never in very large amounts. (L. J. S.)

CERBERUS, in Greek mythology, the dog who guarded the entrance to the lower world. He allowed all to enter, but seized those who attempted to escape. According to Hesiod (*Theog.* 311), he was a fifty-headed monster with a fearful bark, the offspring of Typhon and Echidna. He was variously represented with one, two or (usually) three heads, often with the tail of a snake or with snakes growing from his head or twined round his body. One of the tasks imposed upon Heracles was to fetch Cerberus from below to the upper world, a favourite subject of ancient vase-paintings.

CERDIC (d. 534), founder of the West Saxon kingdom, is described as an ealdorman who in 495 landed with his son Cynric in Hampshire, where he was attacked at once by the Britons. Nothing more is heard of him until 508, when he defeated the Britons with great slaughter. Strengthened by fresh arrivals of Saxons, he gained another victory in 519 at Certicesford, a spot which has been identified with the modern Charford, and in this year took the title of king. Turning westward, Cerdic appears to have been defeated by the Britons in 520 at Badbury or Mount Badon, in Dorset, and in 527 yet another fight with the Britons is recorded. His last work was the conquest of the Isle of Wight, probably in the interest of some Jutish allies. All the sovereigns of England, except Canute, Hardicanute, the two Harolds and William the Conqueror, are said to be descended from Cerdic.

See *Angto-Saxon Chronicle*, edited by C. Plummer (Oxford, 1892–1899); Gildas, *De excidio Britanniae*, edited by Th. Mommsen (Berlin, 1898); Nennius, *Historia Brittonum*, edited by Th. Mommsen (Berlin, 1898); Bede, *Historiae ecclesiasticae gentis Anglorum libri v.*, ed. C. Plummer (Oxford, 1896); E. Guest, *Origines Celticae* (London, 1883); J. R. Green, *The Making of England* (London, 1897).

CERDONIANS, a Gnostic sect, founded by Cerdo, a Syrian, who came to Rome about 137, but concerning whose history little is known. They held that there are two first causes—the perfectly good and the perfectly evil. The latter is also the creator of the world, the god of the Jews, and the author of the Old Testament. Jesus Christ is the son of the good deity; he was sent into the world to oppose the evil; but his incarnation, and therefore his sufferings, were a mere appearance. Regarding the body as the work of the evil deity, the Cerdonians formed a moral system of great severity, prohibiting marriage, wine and the eating of flesh, and advocating fasting and other austerities. Most of what the Fathers narrate of Cerdo's tenets has probably been transferred to him from his famous pupil Marcion, like whom he is said to have rejected the Old Testament and the New, except part of Luke's Gospel and of Paul's Epistles. (See MARCION, and GNOSTICISM.)

CEREALIS (CERIALIS), **PETILLIUS** (1st century A.D.), Roman general, a near relative of the emperor Vespasian. He is first heard of during the reign of Nero in Britain, where he was completely defeated (A.D. 61) by Boadicea. Eight years later he played an important part in the capture of Rome by the supporters of Vespasian. In 70 he put down the revolt of Civilis (*q.v.*). In 71, as governor of Britain, where he had as a subordinate the famous Agricola, he inflicted severe defeats upon the Brigantes, the most powerful of the tribes of Britain. Tacitus says that he was a bold soldier rather than a careful general, and preferred to stake everything on the issue of a single engagement. He possessed natural eloquence of a kind that readily appealed to his soldiers. His loyalty towards his superiors was unshakable.

Tacitus, *Annals*, xiv. 32; *Histories*, iii. 59, 78, iv. 71, 75, 86, v. 21; *Agricola*, 8, 17.

CERES, an old Italian goddess of agriculture. The name probably means the "creator" or "created," connected with *crescere* and *creare*. But when Greek deities were introduced into Rome on the advice of the Sibylline books (in 495 B.C., on the occasion of a severe drought), Demeter, the Greek goddess of seed and harvest, whose worship was already common in Sicily and Lower Italy, usurped the place of Ceres in Rome, or rather, to Ceres were added the religious rites which the Greeks paid to Demeter, and the mythological incidents which originated with her. At the same time the cult of Dionysus and Persephone (see LIBER AND LIBERA) was introduced. The rites of Ceres were Greek in language and form. Her priestesses were Italian Greeks and her temple was Greek in its architecture and built by Greek artists. She was worshipped almost exclusively by plebeians, and her temple near the Circus Maximus was under the care of the plebeian aediles, one of whose duties was the superintendence

of the corn-market. Her chief festivals were the *ludi Cereris* or *Cerealia* (more correctly, *Cerialia*), games held annually from April 12–19 (Ovid, *Fasti*, iv. 392 ff.); a second festival, in August, to celebrate the reunion of Ceres and Proserpine, in which women, dressed in white, after a fast of nine days offered the goddess the first-fruits of the harvest (Livy xxii. 56); and the *Jejunium Cereris*, a fast also introduced (191 B.C.) by command of the Sibylline books (Livy xxvi. 37), at first held only every four years, then annually on the 4th of October. In later times Ceres was confused with Tellus. (See also DEMETER.)

CERIGNOLA, a town of Apulia, Italy, in the province of Foggia, 26 m. S.E. by rail from the town of Foggia. Pop. (1901) 34,195. It was rebuilt after a great earthquake in 1731, and has a considerable agricultural trade. In 1503 the Spaniards under Gonzalo de Cordoba defeated the French under the duc de Nemours below the town—a victory which made the kingdom of Naples into a Spanish province in Italy. Cerignola occupies the site of Furfane, a station on the Via Traiana between Canusium and Herdoniae.

CERIGOTTO, called locally LIUS (anc. *Aegilia* or *Ogylos*; mod. Gr. officially *Antikythera*), an island of Greece, belonging to the Ionian group, and situated between Cythera (Cerigo) and Crete, about 20 m. from each. Some raised beaches testify to an upheaval in comparatively recent times. With an area of about 10 sq. m. it supports a population of about 300, who are mainly Cretan refugees, and in favourable seasons exports a quantity of good wheat. It was long a favourite resort of Greek pirates. It is famous for the discovery in 1900, close to its coast, of the wreck of an ancient ship with a cargo of bronze and marble statues.

CERINTHUS (*c.* A.D. 100), an early Christian heretic, contemporary with the closing years of the apostle John, who, according to the well-known story of Polycarp, reported by Irenaeus (iii. 3) and twice recorded in Eusebius (*Hist. Eccl.* iii. 28, iv. 14), made a hasty exit from a bath in Ephesus on learning that Cerinthus was within. Other early accounts agree in making the province of Asia the scene of his activity, and Hippolytus (*Haer.* vii. 33) credits him with an Egyptian training. There can be no truth in the notice given by Epiphanius (*Haer.* xxviii. 4) that Cerinthus had in earlier days at Jerusalem led the judaizing opposition against Paul.

The difficulty of defining Cerinthus's theological position is due not only to the paucity of our sources but to the fact that the witness of the two principal authorities, Irenaeus (i. 26, iii. 11) and Hippolytus (*Syntagma*), does not agree. Further, Irenaeus himself in one passage fails to distinguish between Cerinthian and Valentinian doctrines. It would appear, however, that Cerinthus laid stress on the rite of circumcision and on the observance of the Sabbath. He taught that the world had been made by angels, from one of whom, the god of the Jews, the people of Israel had received their Law, which was not perfect. The only New Testament writing which he accepted was a mutilated Gospel of Matthew. Jesus was the offspring of Joseph and Mary, and on him at the baptism descended the Christ,[1] revealing the hitherto unknown Father, and endowing him with miraculous power. This Christ left Jesus again before the Passion, and the resurrection of Jesus was still in the future. Together with these somewhat gnostic ideas, Cerinthus, if we may trust the notices of Gaius the Roman presbyter (*c.* 290) and Dionysius of Alexandria (*c.* 340), held a violent and crude form of chiliasm. But the chief significance of the man is his "combination of zeal for legal observances with bold criticism of the Law itself as a whole and of its origin," which reminds us of the Clementine *Recognitions*. Cerinthus is a blend of judaizing christian and gnostic.

CERIUM (symbol Ce, atomic weight 140·25), a metallic chemical element which occurs with the rare earths in the minerals cerite, samarskite, euxenite, monazite, parisite and many yttrium minerals. The particular earth containing cerium was discovered by M. H. Klaproth in 1803, whilst J. Berzelius at about the same time also examined it and came to the conclusion that it was the oxide of a new metal, which he termed cerium. The crude oxide of the metal is obtained from cerite, by evaporating the mineral with strong sulphuric acid, removing excess of acid and dissolving the residue in ice-cold water; sulphuretted hydrogen is passed through the solution, which is then filtered, acidified with hydrochloric acid, and precipitated as oxalate by oxalic acid; the oxalate is then converted into oxide by ignition. From the crude oxide so obtained (which contains lanthanum and didymium oxides) the cerium may be separated by conversion into its double sulphate on the addition of potassium sulphate, the sulphates of the cerium group being insoluble in a saturated solution of potassium sulphate. The sulphate is subsequently boiled with water, when a basic sulphate is precipitated. For the preparation of pure cerium compounds see Auer v. Welsbach, *Monatshefte*, 1884, v. 508.

The metal was first obtained, in an impure state, by C. G. Mosander, by fusing its chloride with sodium. W. F. Hillebrand and T. Norton have prepared it by the electrolysis of the melted chloride (*Pogg. Ann.*, 1875, 156, p. 466); and C. Winkler (*Berichte*, 1891, xxiv. 884) obtained it by heating the dioxide with magnesium powder. The metal has somewhat the appearance of iron, and has a specific gravity of 6·628, which, after melting, is increased to 6·728. Its specific heat is 0·04479 (W. F. Hillebrand). It is permanent in dry air, but tarnishes in moist air; it can be hammered and rolled; it melts at 623° C. It burns readily on heating, with a brilliant flame; and it also combines with chlorine, bromine, iodine, sulphur, phosphorus and cyanogen. In the case of the two former elements the combination is accompanied by combustion of the metal. With water it is slowly converted into the dioxide. Cold concentrated nitric and sulphuric acids are without action on the metal, but it reacts rapidly with dilute nitric and hydrochloric acids. The dioxide is used in incandescent gas mantles (see LIGHTING).

Three oxides of cerium are known. The sesquioxide, Ce_2O_3, is obtained by heating the carbonate in a current of hydrogen. It is a bluish-green powder, which on exposure rapidly combines with the oxygen of the air. By the addition of caustic soda to cerous salts, a white precipitate of cerous hydroxide is formed. Cerium dioxide, CeO_2, is produced when cerium carbonate, nitrate, sulphate or oxalate is heated in air. It is a white or pale yellow compound, which becomes reddish on heating. Its specific gravity is 6·739, and its specific heat 0·0877. It is not reduced to the metallic condition on heating with carbon. Concentrated sulphuric acid dissolves this oxide, forming a yellowish solution and ozone. By suspending the precipitated cerous hydroxide in water and passing chlorine through the solution, a hydrated form of the dioxide, $2CeO_2 \cdot 3H_2O$, is obtained, which is readily soluble in nitric and sulphuric acids, forming ceric salts, and in hydrochloric acid, where it forms cerous chloride, with liberation of chlorine. A higher hydrated oxide, $CeO_2 \cdot xH_2O$, is formed by the interaction of cerous sulphate with sodium acetate and hydrogen peroxide (Lecoq de Boisbaudran, *Comptes rendus*, 1885, 100, p. 605).

Cerous chloride, $CeCl_3$, is obtained when the metal is burned in chlorine; when a mixture of cerous oxide and carbon is heated in chlorine; or by rapid heating of the dioxide in a stream of carbon monoxide and chlorine. It is a colourless substance, which is easily fusible. A hydrated chloride of composition $2CeCl_3 \cdot 15H_2O$ is also known, and is obtained when a solution of cerous oxide in hydrochloric acid is evaporated over sulphuric acid. Double salts of cerous chloride with stannic chloride, mercuric chloride, and platinic chloride are also known. Cerous bromide, $2CeBr_3 \cdot 3H_2O$, and iodide, $CeI_3 \cdot 9H_2O$, are known. Cerous sulphide, Ce_2S_3, results on heating cerium with sulphur or cerium oxide in carbon bisulphide vapour. It is a red infusible mass of specific gravity 5·1, and is slowly decomposed by warm water. The sulphate, $Ce_2(SO_4)_3$, is formed on dissolving the carbonate in sulphuric acid, or on dissolving the basic sulphate in sulphuric acid, in the presence of sulphur dioxide, evaporating the solution, and drying the product obtained, at high temperature (B. Brauner, *Monatshefte*, 1885, vi. 793). It is a white powder of specific gravity 3·912, easily soluble in cold water. Many hydrated forms of the sulphate are known, as are also double salts of the sulphate with potassium, sodium, ammonium, thallium and cadmium sulphates. Ceric fluoride, $CeF_4 \cdot H_2O$, is obtained when the hydrated dioxide is dissolved in hydrofluoric acid and the solution evaporated on the water bath (B. Brauner). The sulphate, $Ce(SO_4)_2 \cdot 4H_2O$, is formed when the basic sulphate is dissolved in sulphuric acid; or when the dioxide is dissolved in dilute sulphuric acid, and evaporated *in vacuo* over sulphuric acid. It forms yellow crystals soluble in water; the aqueous solution on standing gradually depositing a basic salt. Double sulphates of composition $2Ce(SO_4)_2 \cdot 2K_2SO_4 \cdot 2H_2O$, $Ce(SO_4)_2 \cdot 3(NH_4)_2SO_4 \cdot 4H_2O$ are

[1] So Irenaeus. According to Hippolytus and Epiphanius it was the Holy Ghost that thus descended.

known. Nitrates of cerium have been described, as have also phosphates, carbonates and a carbide.

Cerium compounds may be recognized by the red precipitate of ceric hydroxide, which is formed when sodium hypochlorite is added to a colourless cerous salt. For the quantitative determination of the metal, the salts are precipitated by caustic potash, the precipitate washed, dried and heated, and finally weighed as the dioxide.

The atomic weight of cerium has been determined by B. Brauner, (*Chem. News*, 1895, lxxi. 283) from the analysis of the oxalate; the values obtained varying from 140·07 to 140·35.

CERNUSCHI, HENRI (1821–1896), Italian politician and economist, was born of wealthy parents at Milan in 1821, and was destined for the legal profession. During his studies he became involved in the revolutionary movement. He played a conspicuous part in the insurrection at Milan in 1848, and also at Rome in 1849, where he had a seat in the National Assembly. On the collapse of the revolutionary government he was arrested (1850), but managed to escape to France, where he engaged in commerce and banking, became naturalized, and acquired a large fortune. He took a prominent part in opposing the Socialist movement, and in April 1870, having subscribed a large sum to the funds of a committee formed to combat the Napoleonic plebiscite, had to leave the country. In September the formation of the Third Republic enabled him to return, but he soon left Paris to travel in the East, whence he returned with a fine art collection, particularly of Japanese objects. Cernuschi is best known for his publications on financial questions, more especially bimetallism. Of the latter he was an ardent champion, and the word itself is commonly supposed to have originated with him—at least in its English form it is first found in his *Silver Vindicated* (1876). Among his other works may be mentioned: *Mécanique de l'échange* (1861); *Illusion des sociétés coopératives* (1886); *Le Bimétallisme en Angleterre* (1879); *Le Grand Procès de l'Union latine* (1884). He died at Mentone on the 12th of May 1896.

CEROGRAPHY (from the Gr. κηρός, wax, and γράφειν, to write), the art of painting in wax. (See ENCAUSTIC PAINTING.)

CERRO DE PASCO, or PASCO, a mining town of Peru, capital of the department of Junin, 107 m. (221 m. by rail, via Oroya) N.E. of Lima. Pop. (1907 est.) 10,000. It is situated on the plateau of Bombon, 14,280 ft. above sea-level, and in the midst of one of the oldest and richest silver-mining districts of Peru. There were 342 silver mines in this district in 1890, and at the end of the 19th century the average annual output since the discovery of the mines in 1630 was estimated at 1,600,000 oz. A decline in the silver production having set in, the American company which had become owners of three-fourths of the mining properties in the district turned its attention to the extensive copper deposits there, built a railway to Oroya 83 m. distant, another, 25 m. long, to the coal-fields of Gollarisquisga, north of Pasco, and then erected large smelting works (in which 2500 men were regularly employed in 1907) 8 m. out of town and 4 m. from limestone beds. The railway to Oroya was completed in 1903, the coal mine branch and smelter later on, and in 1907 the copper output was 20,152,000 lb. The town of Pasco is badly built and unattractive, and is inhabited chiefly by mining labourers and their families. Its population is increased 50% in times of great mining activity. The name Cerro de Pasco is that of a "knot" of mountains uniting the two great ranges of the Andes at this point.

CERTALDO, a town of Tuscany, Italy, in the province of Florence, 35 m. S.S.W. by rail and 18 m. direct from the town of Florence. Pop. (1901) town, 4552; commune, 9120. It was the home of the family of Giovanni Boccaccio, who died and was buried here in 1375. His house (of red brick, like the other old houses of the town) was restored in 1823 and fitted up with old furniture. A statue of him was erected in the principal square in 1875. The Palazzo Pretorio, or Vicariale, the residence of the Florentine governors, recently restored to its original condition, has a picturesque façade and court adorned with coats of arms, and in the interior are various frescoes dating from the 13th to the 16th century. The town as a whole is picturesque, and lies on a hill 426 ft. above sea-level.

See R. Pantini, *S. Gimignano e Certaldo* (Bergamo, 1904), p. 101 seq.

CERUSSITE, a mineral consisting of lead carbonate ($PbCO_3$), and an important ore of lead. The name (sometimes erroneously spelt cerusite) is from the Lat. *cerussa*, "white lead." "Cerussa nativa" was mentioned by K. Gesner in 1565, and in 1832 F. S. Beudant applied the name céruse to the mineral, whilst the present form, cerussite, is due to W. Haidinger (1845). Popular names in early use were lead-spar and white-lead-ore.

Cerussite crystallizes in the orthorhombic system and is isomorphous with aragonite. Like aragonite it is very frequently twinned, the compound crystals being pseudo-hexagonal in form. Three crystals are usually twinned together on two faces of the prism $m\{110\}$, producing six-rayed stellate groups (figs. 1 and 2) with the individual crystals intercrossing at angles of nearly 60°. Twinning on the faces of the prism $r\{130\}$, the angles of which are also nearly 60°, produces a similar kind of grouping, but is much less common. Crystals are of frequent occurrence, and they usually have very bright and smooth faces. The mineral also occurs in compact granular masses, and sometimes in fibrous forms. It is usually colourless or white, sometimes grey or greenish in tint; it varies from transparent to translucent, and has an adamantine lustre. It is very brittle, and has a conchoidal fracture. Hardness 3-3½; sp. gr. 6·5. A variety containing 7% of zinc carbonate, replacing lead carbonate, is known as iglesiasite, from Iglesias in Sardinia, where it is found.

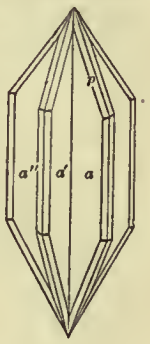


FIG. 1.

The mineral may be readily recognized by its characteristic twinning, in conjunction with the adamantine lustre and high specific gravity. It dissolves with effervescence in dilute nitric acid. Before the blowpipe it fuses very readily, and gives reactions for lead. Cerussite occurs in metalliferous veins in association with galena, and has been formed by the action of carbonated waters on the galena: it is therefore found in the upper parts of the lodes together with other secondary minerals, such as limonite. Finely crystallized specimens have been obtained from the Friedrichssegen mine near Ems in Nassau, Johanngeorgenstadt in Saxony, Mies in Bohemia, Phenixville in Pennsylvania, Broken Hill in New South Wales, and several other localities. Delicate acicular crystals of considerable length were found long ago in the Pentire Glaze mine near St Minver in Cornwall. It is often found in considerable quantities, and contains as much as 77½% of lead. (L. J. S.)

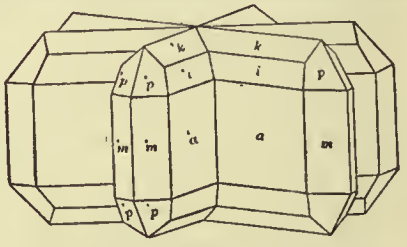


FIG. 2.

CERUTTI, GIUSEPPE ANTONIO GIACHIMO (1738–1792), French author and politician, was born at Turin on the 13th of June 1738. He joined the Society of Jesus and became professor at the Jesuit college at Lyons. In 1762, in reply to the attacks on his order, he published an *Apologie générale de l'institut et de la doctrine des Jésuites*, which won him much fame and some exalted patronage; notably that of the ex-king Stanislaus of Poland and of his grandson the dauphin. During the agitations that preceded the Revolution Cerutti took the popular side, and in 1788 published a pamphlet, *Mémoire pour le peuple français*, in which in a clear and trenchant style he advocated the claims of the *tiers état*. In May 1789 he presided over the electors of Paris, by whom in January 1791 he was chosen member of the administration of the department and afterwards deputy to the Legislative Assembly. He was a friend of Mirabeau, whose policy he supported and whose funeral oration he pronounced. He himself died on the 3rd of February 1792. Of Cerutti's literary enterprises the most interesting, and probably the most influential, was the popular newspaper founded by him, on the 30th of September 1790, in collaboration with Rabaut Saint-Étienne and Philippe Antoine Grouvelle. Its character and

objects are explained by its title: *La Feuille villageoise, adressée chaque semaine à tous les villages de France pour les instruire des lois, des événements, des découvertes qui intéressent tout bon citoyen*, &c. It was continued by Grouvelle after Cerutti's death, the last number appearing on the 2nd of August 1795.

Cerutti's works were published in 1793 in 3 volumes. On the *Mémoire pour le peuple français*, see F. A. Aulard in *La Révolution française*, tom. xv. (1888).

CERVANTES SAAVEDRA, MIGUEL DE (1547–1616), Spanish novelist, playwright and poet, was born at Alcalá de Henares in 1547. The attempts of biographers to provide him with an illustrious genealogy are unsuccessful. The family history begins with the author's grandfather, Juan de Cervantes (b. 1490), a lawyer who at one time (1545-6) administered the estates of the duke de Osuna, and resided later at Cordova, where he died about 1555. Cervantes' father was Rodrigo de Cervantes, an apothecary-surgeon, who married Leonor de Cortinas in 1540 or 1541. The children of this marriage were Andrés (b. 1543), Andrea (b. 1544), Luisa (b. 1546), Miguel, Rodrigo (b. 1550), Magdalena (b. 1554) and Juan (of whom nothing is known beyond the mention of him in his father's will).

The exact date of Cervantes' birth is not recorded: he was baptized on the 9th of October 1547, in the church of Santa María la Mayor at Alcalá. There are indications that Rodrigo de Cervantes resided at Valladolid in 1554, at Madrid in 1561, at Seville in 1564–1565, and at Madrid from 1566 onwards. It may be assumed that his family accompanied him, and it seems likely that either at Valladolid or at Madrid Cervantes saw the famous actor-manager and dramatist, Lope de Rueda, of whose performances he speaks enthusiastically in the preface to his plays. In 1569 a Madrid schoolmaster, Juan Lopez de Hoyos, issued a work commemorative of Philip II.'s third wife, Isabel de Valois, who had died on the 3rd of October 1568. This volume, entitled *Historia y relación verdadera de la enfermedad, felicísimo tránsito y sumptuosas exequias fúnebres de la Serenísima Reyna de España Doña Isabel de Valoys*, contains six contributions by Cervantes: a sonnet, four *redondillas*, and an elegy. Lopez de Hoyos introduces Cervantes as "our dear and beloved pupil," and the elegy is dedicated to Cardinal Espinosa "in the name of the whole school." It has been inferred that Cervantes was educated by Lopez de Hoyos, but this conclusion is untenable, for Lopez de Hoyos' school was not opened till 1567. On the 13th of October 1568, Giulio Acquaviva reached Madrid charged with a special mission to Philip II.; he left for Rome on the 2nd of December, and Cervantes is supposed to have accompanied him. This conjecture is based solely on a passage in the dedication of the *Galatea*, where the writer speaks of having been "*camarero* to Cardinal Acquaviva at Rome." There is, however, no reason to think that Cervantes met Acquaviva in Madrid; the probability is that he enlisted as a supernumerary towards the end of 1568, that he served in Italy, and there entered the household of Acquaviva, who had been raised to the cardinalate on the 17th of May 1570. There exists a warrant (dated September 15, 1569) for the arrest of one Miguel de Cervantes, who had wounded Antonio de Sigura, and had been condemned in absence to have his right hand cut off and to be exiled from the capital for ten years; and it has been sought to identify the offender with the future author of *Don Quixote*. No evidence is available. All that is known with certainty is that Cervantes was in Rome at the end of 1569, for on the 22nd of December of that year the fact was recorded in an official information lodged by Rodrigo de Cervantes with a view to proving his son's legitimacy and untainted Christian descent.

If it is difficult to say precisely when Cervantes was in Acquaviva's service, it is no less difficult to say when he left it to join the regular army. There is evidence, more or less satisfactory, that his enlistment took place in 1570; in 1571 he was serving as a private in the company commanded by Captain Diego de Urbina which formed part of Miguel de Moncada's famous regiment, and on the 16th of September he sailed from Messina on board the "Marquesa," which formed part of the armada under Don John of Austria. At the battle of Lepanto (October 7, 1571) the "Marquesa" was in the thickest of the conflict. As the fleet came into action Cervantes lay below, ill with fever; but, despite the remonstrances of his comrades, he vehemently insisted on rising to take his share in the fighting, and was posted with twelve men under him in a boat by the galley's side. He received three gunshot wounds, two in the chest, and one which permanently maimed his right hand—"for the greater glory of the right," in his own phrase. On the 30th of October the fleet returned to Messina, where Cervantes went into hospital, and during his convalescence received grants-in-aid amounting to eighty-two ducats. On the 29th of April 1572 he was transferred to Captain Manuel Ponce de León's company in Lope de Figueroa's regiment; he shared in the indecisive naval engagement off Navarino on the 7th of October 1572, in the capture of Tunis on the 10th of October 1573, and in the unsuccessful expedition to relieve the Goletta in the autumn of 1574. The rest of his military service was spent in garrison at Palermo and Naples, and shortly after the arrival of Don John at Naples on the 18th of June 1575, Cervantes was granted leave to return to Spain; he received a recommendatory letter from Don John to Philip II., and a similar testimonial from the duke de Sessa, viceroy of Sicily. Armed with these credentials, Cervantes embarked on the "Sol" to push his claim for promotion in Spain.

On the 26th of September 1575, near Les Trois Maries off the coast of Marseilles, the "Sol" and its companion ships the "Mendoza" and the "Higuera" encountered a squadron of Barbary corsairs under Arnaut Mami; Cervantes, his brother Rodrigo and other Spaniards were captured, and were taken as prisoners to Algiers. Cervantes became the slave of a Greek renegade named Dali Mami, and, as the letters found on him were taken to prove that he was a man of importance in a position to pay a high ransom, he was put under special surveillance. With undaunted courage and persistence he organized plans of escape. In 1576 he induced a Moor to guide him and other Christian captives to Oran; the Moor deserted them on the road, the baffled fugitives returned to Algiers, and Cervantes was treated with additional severity. In the spring of 1577 two priests of the Order of Mercy arrived in Algiers with a sum of three hundred crowns entrusted to them by Cervantes' parents; the amount was insufficient to free him, and was spent in ransoming his brother Rodrigo. Cervantes made another attempt to escape in September 1577, but was betrayed by the renegade whose services he had enlisted. On being brought before Hassan Pasha, the viceroy of Algiers, he took the blame on himself, and was threatened with death; struck, however, by the heroic bearing of the prisoner, Hassan remitted the sentence, and bought Cervantes from Dali Mami for five hundred crowns. In 1577 the captive addressed to the Spanish secretary of state, Mateo Vazquez, a versified letter suggesting that an expedition should be fitted out to seize Algiers; the project, though practicable, was not entertained. In 1578 Cervantes was sentenced to two thousand strokes for sending a letter begging help from Martín de Córdoba, governor of Oran; the punishment was not, however, inflicted on him. Meanwhile his family were not idle. In March 1578 his father presented a petition to the king setting forth Cervantes' services; the duke de Sessa repeated his testimony to the captive's merits; in the spring of 1579 Cervantes' mother applied for leave to export two thousand ducats' worth of goods from Valencia to Algiers, and on the 31st of July 1579 she gave the Trinitarian monks, Juan Gil and Antón de la Bella, a sum of two hundred and fifty ducats to be applied to her son's ransom. On his side Cervantes was indefatigable, and towards the end of 1579 he arranged to secure a frigate; but the plot was revealed to Hassan by Juan Blanco de Paz, a Dominican monk, who appears to have conceived an unaccountable hatred of Cervantes. Once more the conspirator's life was spared by Hassan who, it is recorded, declared that "so long as he had the maimed Spaniard in safe keeping, his Christians, ships and city were secure." On the 29th of May 1580 the two Trinitarians arrived in Algiers: they were barely in time, for Hassan's term of office was drawing

to a close, and the arrangement of any ransom was a slow process, involving much patient bargaining. Hassan refused to accept less than five hundred gold ducats for his slave; the available funds fell short of this amount, and the balance was collected from the Christian traders of Algiers. Cervantes was already embarked for Constantinople when the money was paid on the 19th of September 1580. The first use that he made of his liberty was to cause affidavits of his proceedings at Algiers to be drawn up; he sailed for Spain towards the end of October, landed at Denia in November, and made his way to Madrid. He signed an information before a notary in that city on the 18th of December 1580.

These dates prove that he cannot, as is often alleged, have served under Alva in the Portuguese campaign of 1580: that campaign ended with the battle of Alcántara on the 25th of August 1580. It seems certain, however, that he visited Portugal soon after his return from Algiers, and in May 1581 he was sent from Thomar on a mission to Oran. Construed literally, a formal statement of his services, signed by Cervantes on the 21st of May 1590, makes it appear that he served in the Azores campaigns of 1582–83; but the wording of the document is involved, the claims of Cervantes are confused with those of his brother Rodrigo (who was promoted ensign at the Azores), and on the whole it is doubtful if he took part in either of the expeditions under Santa Cruz. In any case, the stories of his residence in Portugal, and of his love affairs with a noble Portuguese lady who bore him a daughter, are simple inventions. From 1582–3 to 1587 Cervantes seems to have written copiously for the stage, and in the *Adjunta al Parnaso* he mentions several of his plays as "worthy of praise"; these were *Los Tratos de Argel*, *La Numancia*, *La Gran Turquesa*, *La Batalla naval*, *La Jerusalem*, *La Amaranta ó la de Mayo*, *El Bosque amoroso*, *La Unica y Bizarra Arsinda*—" and many others which I do not remember, but that which I most prize and pique myself on was, and is, one called *La Confusa* which, with all respect to as many sword-and-cloak plays as have been staged up to the present, may take a prominent place as being good among the best." Of these only *Los Tratos de Argel* (or *El Trato de Argel*) and *La Numancia* have survived, and, though *La Numancia* contains many fine rhetorical passages, both plays go to prove that the author's genius was not essentially dramatic. In February 1584 he obtained a licence to print a pastoral novel entitled *Primera parte de la Galatea*, the copyright of which he sold on the 14th of June to Blas de Robles, a bookseller at Alcalá de Henares, for 1336 *reales*. On the 12th of December he married Catalina de Palacios Salazar y Vozmediano of Esquivias, eighteen years his junior. The *Galatea* was published in the spring of 1585, and is frequently said to relate the story of Cervantes' courtship, and to introduce various distinguished writers under pastoral names. These assertions must be received with great reserve. The birth of an illegitimate daughter, borne to Cervantes by a certain Ana Francisca de Rojas, is referred to 1584, and earlier in that same year the *Galatea* had passed the censor; with few exceptions, the identifications of the characters in the book with personages in real life are purely conjectural. These circumstances, together with the internal evidence of the work, point to the conclusion that the *Galatea* was begun and completed before 1583. It was only twice reprinted—once at Lisbon (1590), and once at Paris (1611)—during the author's lifetime; but it won him a measure of repute, it was his favourite among his books, and during the thirty years that remained to him he repeatedly announced the second part which is promised conditionally in the text. However, it is not greatly to be regretted that the continuation was never published; though the *Galatea* is interesting as the first deliberate bid for fame on the part of a great genius, it is an exercise in the pseudo-classic literature introduced into Italy by Sannazaro, and transplanted to Spain by the Portuguese Montemōr; and, ingenious or eloquent as the Renaissance prose-pastoral may be, its innate artificiality stifles Cervantes' rich and glowing realism. He himself recognized its defects; with all his weakness for the *Galatea*, he ruefully allows that "it proposes something and concludes nothing." Its comparative failure was a serious matter for Cervantes who had no other resource but his pen; his plays were probably less successful than his account of them would imply, and at any rate play-writing was not at this time a lucrative occupation in Spain. No doubt the death of his father on the 13th of June 1585 increased the burden of Cervantes' responsibilities; and the dowry of his wife, as appears from a document dated the 9th of August 1586, consisted of nothing more valuable than five vines, an orchard, some household furniture, four beehives, forty-five hens and chickens, one cock and a crucible.

It had become evident that Cervantes could not gain his bread by literature, and in 1587 he went to Seville to seek employment in connexion with the provisioning of the Invincible Armada. He was placed under the orders of Antonio de Guevara, and before the 24th of February was excommunicated for excessive zeal in collecting wheat at Écija. During the next few months he was engaged in gathering stores at Seville and the adjacent district, and after the defeat of the Armada he was retained as commissary to the galleys. Tired of the drudgery, and without any prospect of advancement, on the 21st of May 1590 Cervantes drew up a petition to the king, recording his services and applying for one of four posts then vacant in the American colonies: a place in the department of public accounts in New Granada, the governorship of Soconusco in Guatemala, the position of auditor to the galleys at Cartagena, or that of *corregidor* in the city of La Paz. The petition was referred to the Council of the Indies, and was annotated with the words:—" Let him look for something nearer home." Cervantes perforce remained at his post; the work was hard, uncongenial and ill-paid, and the salary was in constant arrears. In November 1590 he was in such straits that he borrowed money to buy himself a suit of clothes, and in August 1592 his sureties were called upon to make good a deficiency of 795 *reales* in his accounts. His thoughts turned to literature once more, and on the 5th of September 1592, he signed a contract with Rodrigo Osorio undertaking to write six plays at fifty ducats each, no payment to be made unless Osorio considered that each of these pieces was " one of the best ever produced in Spain." Nothing came of this agreement, and it appears that, between the date of signing it and the 19th of September, Cervantes was imprisoned (for reasons unknown to us) at Castro del Río. He was speedily released, and continued to perquisition as before in Andalusia; but his literary ambitions were not dead, and in May 1595 he won the first prize—three silver spoons—at a poetical tourney held in honour of St Hyacinth at Saragossa. Shortly afterwards Cervantes found himself in difficulties with the exchequer officials. He entrusted a sum of 7400 *reales* to a merchant named Simón Freire de Lima with instructions to pay the amount into the treasury at Madrid; the agent became bankrupt and absconded, leaving Cervantes responsible for the deficit. By some means the money was raised, and the debt was liquidated on the 21st of January 1597. But Cervantes' position was shaken, and his unbusinesslike habits lent themselves to misinterpretation. On the 6th of September 1597 he was ordered to find sureties that he would present himself at Madrid within twenty days, and there submit to the exchequer vouchers for all official moneys collected by him in Granada and elsewhere. No such sureties being available, he was committed to Seville jail, but was released on the 1st of December on condition that he complied with the original order of the court within thirty days. He was apparently unable to find bail, was dismissed from the public service, and sank into extreme poverty. During a momentary absence from Seville in February 1599, he was again summoned to Madrid by the treasury, but does not appear to have obeyed: it is only too likely that he had not the money to pay for the journey. There is some reason to think that he was imprisoned at Seville in 1602, but nothing positive is known of his existence between 1600 and the 8th of February 1603: at the latter date he seems to have been at Valladolid, to which city Philip III. had removed the court in 1601.

Since the publication of the *Galatea* in 1585 Cervantes'

contributions to literature had been limited to occasional poems. In 1591 he published a ballad in Andrés de Villalta's *Flor de varios y nuevos romances*; in 1595 he composed a poem, already mentioned, to celebrate the canonization of St Hyacinth; in 1596 he wrote a sonnet ridiculing Medina Sidonia's tardy entry into Cadiz after the English invaders had retired, and in the same year his sonnet lauding Santa Cruz was printed in Cristóbal. Mosquera de Figueroa's *Comentario en breve compendio de disciplina militar*; to 1597 is assigned a sonnet (the authenticity of which is disputed) commemorative of the poet Herrera; in 1598 he wrote two sonnets and a copy of *quintillas* on the death of Philip II.; and in 1602 a complimentary sonnet from his pen appeared in the second edition of Lope de Vega's *Dragontea*. Curiously enough, it is by Lope de Vega that *Don Quixote* is first mentioned. Writing to an unknown correspondent (apparently a physician) on the 14th of August 1604, Lope de Vega says that "no poet is as bad as Cervantes, nor so foolish as to praise *Don Quixote*," and he goes on to speak of his own plays as being odious to Cervantes. It is obvious that the two men had quarrelled since 1602, and that Lope de Vega smarted under the satire of himself and his works in Cervantes' forthcoming book; *Don Quixote* may have been circulated in manuscript, or may even have been printed before the official licence was granted on the 26th of September 1604. It was published early in 1605, and was dedicated to the seventh duke de Béjar in phrases largely borrowed from the dedication in Herrera's edition (1580) of Garcilaso de la Vega, and from Francisco de Medina's preface to that work.

The mention of Bernardo de la Vega's *Pastor de Iberia* shows that the sixth chapter of *Don Quixote* cannot have been written before 1591. In the prologue Cervantes describes his masterpiece as being "just what might be begotten in a jail"; on the strength of this passage, it has been thought that he conceived the story, and perhaps began writing it, during one of his terms of imprisonment at Seville between 1597 and 1602. Within a few weeks of its publication at Madrid, three pirated editions of *Don Quixote* were issued at Lisbon; a second authorized edition, imperfectly revised, was hurried out at Madrid; and another reprint appeared at Valencia with an *aprobación* dated 18th July 1605. With the exception of Alemán's *Guzmán de Alfarache*, no Spanish book of the period was more successful. Modern criticism is prone to regard *Don Quixote* as a symbolic, didactic or controversial work intended to bring about radical reforms in church and state. Such interpretations did not occur to Cervantes' contemporaries, nor to Cervantes himself. There is no reason for rejecting his plain statement that his main object was to ridicule the romances of chivalry, which in their latest developments had become a tissue of tiresome absurdities. It seems clear that his first intention was merely to parody these extravagances in a short story; but as he proceeded the immense possibilities of the subject became more evident to him, and he ended by expanding his work into a brilliant panorama of Spanish society as it existed during the 16th century. Nobles, knights, poets, courtly gentlemen, priests, traders, farmers, barbers, muleteers, scullions and convicts; accomplished ladies, impassioned damsels, Moorish beauties, simple-hearted country-girls and kindly kitchen-wenches of questionable morals —all these are presented with the genial fidelity which comes of sympathetic insight. The immediate vogue of *Don Quixote* was due chiefly to its variety of incident, to its wealth of comedy bordering on farce, and perhaps also to its keen thrusts at eminent contemporaries; its reticent pathos, its large humanity, and its penetrating criticism of life were less speedily appreciated.

Meanwhile, on the 12th of April 1605, Cervantes authorized his publisher to proceed against the Lisbon booksellers who threatened to introduce their piratical reprints into Castile. By June the citizens of Valladolid already regarded Don Quixote and Sancho Panza as proverbial types. Less gratifying experiences awaited the popular author. On the 27th of June 1605 Gaspar de Ezpeleta, a Navarrese gentleman of dissolute life, was wounded outside the lodging-house in which Cervantes and his family lived; he was taken indoors, was nursed by Cervantes' sister Magdalena, and died on the 29th of June. That same day Cervantes, his natural daughter (Isabel de Saavedra), his sister Andrea and her daughter were lodged in jail on suspicion of being indirectly concerned in Ezpeleta's death; one of the witnesses made damaging charges against Cervantes' daughter, but no substantial evidence was produced, and the prisoners were released. Little is known of Cervantes' life between 1605 and 1608. A *Relación* of the festivities held to celebrate the birth of Philip IV., and a certain *Carta á don Diego Astudillo Carrillo* have been erroneously ascribed to him; during these three years he apparently wrote nothing beyond three sonnets, and one of these is of doubtful authenticity. The depositions of the Valladolid enquiry show that he was living in poverty five months after the appearance of *Don Quixote*, and the fact that he borrowed 450 *reales* from his publisher before November 1607 would convey the idea that his position improved slowly, if at all. But it is difficult to reconcile this view of his circumstances with the details concerning his illegitimate daughter revealed in documents recently discovered. Isabel de Saavedra was stated to be a spinster when arrested at Valladolid in June 1605; the settlement of her marriage with Luis de Molina in 1608 describes her as the widow of Diego Sanz, as the mother of a daughter eight months old, and as owning house-property of some value. These particulars are perplexing, and the situation is further complicated by the publication of a deed in which Cervantes declares that he himself is the real owner of this house-property, and that his daughter has merely a life-interest in it. This claim may be regarded as a legal fiction; it cannot easily be reconciled with Cervantes' statement towards the end of his life, that he was dependent on the bounty of the count de Lemos and of Bernardo de Sandoval, cardinal-archbishop of Toledo. In 1609 he joined the newly founded confraternity of the Slaves of the Most Blessed Sacrament; in 1610 Lemos was appointed viceroy of Naples, and Cervantes was keenly disappointed at not being chosen to accompany his patron. In 1611 he lost his sister Magdalena, who was buried by the charity of the Tertiaries of Saint Francis; in 1612 he joined the Academia Selvaje, and there appears to have renewed his former friendly relations with Lope de Vega; in 1613 he dedicated his *Novelas exemplares* to the count de Lemos, and disposed of his rights for 1600 *reales* and twenty-four copies of the book. The twelve tales in this volume, some of them written very much later than others, are of unequal merit, but they contain some of the writer's best work, and the two picaresque stories—*Rinconete y Cortadillo* and the *Coloquio de los perros*—are superb examples of their kind, and would alone entitle Cervantes to take rank with the greatest masters of Spanish prose. In 1614 he published the *Viage del Parnaso*, a burlesque poem suggested by the *Viaggio in Parnaso* (1582) of the Perugian poet Cesare Caporali. It contains some interesting autobiographical passages, much flattery of contemporary poetasters, and a few happy satirical touches; but, though it is Cervantes' most serious bid for fame as a poet, it has seldom been reprinted, and would probably have been forgotten but for an admirably humorous postscript in prose which is worthy of the author at his best. In the preface to his *Ocho comedias y ocho entremeses nuevos* (1615) he good-humouredly admits that his dramatic works found no favour with managers, and, when this collection was first reprinted (1749), the editor advanced the fantastic theory that the *comedias* were deliberate exercises in absurdity, intended to parody the popular dramas of the day. This view cannot be maintained, but a sharp distinction must be drawn between the eight set plays and the eight interludes; with one or two exceptions, the *comedias* or set plays are unsuccessful experiments in Lope de Vega's manner, while the *entremeses* or *interludes*, particularly those in prose, are models of spontaneous gaiety and ingenious wit.

In the preface to the *Novelas exemplares* Cervantes had announced the speedy appearance of the sequel to *Don Quixote* which he had vaguely promised at the end of the first part. He was at work on the fifty-ninth chapter of his continuation when he learned that he had been anticipated by Alonso Fernandez de Avellaneda of Tordesillas, whose *Segundo tomo del ingenioso*

hidalgo don Quixote de la Mancha was published at Tarragona in 1614. On the assumption that Fernandez de Avellaneda is a pseudonym, this spurious sequel has been ascribed to the king's confessor, Luis de Aliaga, to Cervantes' old enemy, Blanco de Paz, to his old friend, Bartolomé Leonardo de Argensola, to the three great dramatists, Lope de Vega, Tirso de Molina and Ruiz de Alarcón, to Alonso Fernandez, to Juan José Martí, to Alfonso Lamberto, to Luis de Granada, and probably to others. Some of these attributions are manifestly absurd—for example, Luis de Granada died seventeen years before the first part of *Don Quixote* was published—and all of them are improbable conjectures; if Avellaneda be not the real name of the author, his identity is still undiscovered. His book is not devoid of literary talent and robust humour, and possibly he began it under the impression that Cervantes was no more likely to finish *Don Quixote* than to finish the *Galatea*. He should, however, have abandoned his project on reading the announcement in the preface to the *Novelas exemplares*; what he actually did was to disgrace himself by writing an insolent preface taunting Cervantes with his physical defects, his moral infirmities, his age, loneliness and experiences in jail. He was too intelligent to imagine that his continuation could hold its own against the authentic sequel, and malignantly avowed his intention of being first in the field and so spoiling Cervantes' market. It is quite possible that *Don Quixote* might have been left incomplete but for this insulting intrusion; Cervantes was a leisurely writer and was, as he states, engaged on *El Engaño à los ojos*, *Las Semanas del Jardín* and *El Famoso Bernardo*, none of which have been preserved. Avellaneda forced him to concentrate his attention on his masterpiece, and the authentic second part of *Don Quixote* appeared towards the end of 1615. No book more signally contradicts the maxim, quoted by the Bachelor Carrasco, that "no second part was ever good." It is true that the last fourteen chapters are damaged by undignified denunciations of Avellaneda; but, apart from this, the second part of *Don Quixote* is an improvement on the first. The humour is more subtle and mature; the style is of more even excellence; and the characters of the bachelor and of the physician, Pedro Recio de Agüero, are presented with a more vivid effect than any of the secondary characters in the first part. Cervantes had clearly profited by the criticism of those who objected to "the countless cudgellings inflicted on Señor Don Quixote," and to the irrelevant interpolation of extraneous stories in the text. Don Quixote moves through the second part with unruffled dignity; Sancho Panza loses something of his rustic cunning, but he gains in wit, sense and manners. The original conception is unchanged in essentials, but it is more logically developed, and there is a notable progress in construction. Cervantes had grown to love his knight and squire, and he understood his own creations better than at the outset; more completely master of his craft, he wrote his sequel with the unfaltering confidence of a renowned artist bent on sustaining his reputation.

The first part of *Don Quixote* had been reprinted at Madrid in 1608; it had been produced at Brussels in 1607 and 1611, and at Milan in 1610; it had been translated into English in 1612 and into French in 1614. Cervantes was celebrated in and out of Spain, but his celebrity had not brought him wealth. The members of the French special embassy, sent to Madrid in February 1615, under the Commandeur de Sillery, heard with amazement that the author of the *Galatea*, the *Novelas exemplares* and *Don Quixote* was "old, a soldier, a gentleman and poor." But his trials were almost at an end. Though failing in health, he worked assiduously at *Los Trabajos de Persiles y Sigismunda*, which, as he had jocosely prophesied in the preface to the second part of *Don Quixote*, would be "either the worst or the best book ever written in our tongue." It is the most carefully written of his prose works, and the least animated or attractive of them; signs of fatigue and of waning powers are unmistakably visible. Cervantes was not destined to see it in print. He was attacked by dropsy, and, on the 18th of April 1616, received the sacrament of extreme unction; next day he wrote the dedication of *Persiles y Sigismunda* to the count de Lemos—the most moving and gallant of farewells. He died at Madrid in the Calle del León on the 23rd of April; he was borne from his house "with his face uncovered," according to the rule of the Tertiaries of St Francis, and on the 24th of April was buried in the church attached to the convent of the Trinitarian nuns in the Calle de Cantarranas. There he rests—the story of his remains being removed in 1633 to the Calle del Humilladero has no foundation in fact—but the exact position of his grave is unknown. Early in 1617 *Persiles y Sigismunda* was published, and passed through eight editions within two years; but the interest in it soon died away, and it was not reprinted between 1625 and 1719. Cervantes' wife died without issue on the 31st of October 1626; his natural daughter, who survived both the child of her first marriage and her second husband, died on the 20th of September 1652. Cervantes is represented solely by his works. The *Novelas exemplares* alone would give him the foremost place among Spanish novelists; *Don Quixote* entitles him to rank with the greatest writers of all time: "children turn its leaves, young people read it, grown men understand it, old folk praise it." It has outlived all changes of literary taste, and is even more popular to-day than it was three centuries ago.

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CERVERA, PASCUAL CERVERA Y TOPETE (1839–1909), Spanish admiral, was born at Medina Sidonia on the 18th of February 1839. He showed an early inclination for the sea, and his family sent him to the naval cadet school at the age of twelve. As a sub-lieutenant he took part in the naval operations on the coast of Morocco during the campaign of 1859–60. Then he was for some time engaged in operations in the Sulu Islands and the Philippines. Afterwards he was on the West Indian station during the early part of the first Cuban War (1868–78), returning to Spain in 1873 to serve on the Basque coast against the Carlists. He distinguished himself in defending the Carraca arsenal near Cadiz against the Federals in 1873. He won each step in his promotion up to flag-rank through his steadiness and brilliant conduct in action, and was awarded the crosses of the Orders of Military and Naval Merit, Isabella the Catholic, and St Hermengilde, besides several medals. Cervera had a great reputation for decision, unbending temper and honesty, before he was placed at the head of the Bilbao building-yards. This post he resigned after a few months in order to become minister of marine in 1892, in a cabinet presided over by Sagasta. He withdrew from the cabinet when he found that his colleagues, from political motives, declined to support him in making reforms and,

on the other hand, unwisely cut down the naval estimates. When in 1898 the Spanish-American War (*q.v.*) broke out, he was chosen to command a squadron composed of four first-class cruisers, the "Maria Theresa," his flagship, "Oquendo," "Vizcaya," and "Columbus," and several destroyers. This ill-fated squadron only started upon its reckless cruise across the ocean after its gallant commander had repeatedly warned both the minister of marine and the prime minister, Sagasta, in despatches from Cadiz and from the Canary and Cape Verde Islands, that the ships were insufficiently provided with coal and ammunition. Some of them, indeed, even lacked proper guns. In compliance with the instructions of the government, Admiral Cervera made for the landlocked harbour of Santiago de Cuba, where he co-operated in the defence, landing some guns and a naval brigade. In spite of his energetic representations, Cervera received an order from Madrid, dictated by political considerations, to sally forth. It meant certain destruction. The gallant squadron met forces trebly superior to it, and was totally destroyed. The admiral, three of his captains, and 1800 sailors and marines were taken by the victors to Portsmouth, New Hampshire, U.S.A. After the war, Cervera and his captains were tried before the supreme naval and military court of the realm, which honourably acquitted them all. In 1901 he became vice-admiral, in 1902 was appointed chief of staff of the Spanish navy, and in 1903 was made life senator. He died at Puerto Real on the 3rd of April 1909.

CESAREVICH, or more properly TSESAREVICH, the title of the heir-apparent to the Russian throne. The full official title is *Nasliednik Tsesarevich*, *i.e.* "heir of Caesar," and in Russia the heir to the throne is commonly called simply *Nasliednik*, the word *Tsesarevich* never being used alone. *Tsarevich*, a form now much used in England, means simply any "king's son"; it is an antiquated term now out of use in Russia, and was last borne as heir to the throne by the unfortunate Alexius, son of Peter the Great. The style of the wife of the tsesarevich is *Tsesarevna*. The Cesarewitch handicap race at Newmarket, founded in 1839, was named after the prince who was afterwards Alexander II. of Russia, who paid a state visit to England that year.

CESARI, GIUSEPPE, called Il Cavaliere d' Arpino (born in or about 1568 and created a "Cavaliere di Cristo" by Pope Clement VIII.), also named Il Giuseppino, an Italian painter, much encouraged at Rome and munificently rewarded. His father had been a native of Arpino, but Giuseppe himself was born in Rome. Cesari is stigmatized by Lanzi as not less the corrupter of taste in painting than Marino was in poetry; indeed, another of the nicknames of Cesari is "Il Marino de' Pittori" (the pictorial Marino). There was spirit in Cesari's heads of men and horses, and his frescoes in the Capitol (story of Romulus and Remus, &c.), which occupied him at intervals during forty years, are well coloured; but he drew the human form ill. His perspective is faulty, his extremities monotonous, and his chiaroscuro defective. He died in 1640, at the age of seventy-two, or perhaps of eighty, at Rome. Cesari ranks as the head of the "Idealists" of his period, as opposed to the "Naturalists," of whom Michelangelo da Caravaggio was the leading champion, —the so-called "idealism" consisting more in reckless facility, and disregard of the common facts and common-sense of nature, than in anything to which so lofty a name could be properly accorded. He was a man of touchy and irascible character, and rose from penury to the height of opulence. His brother Bernardino assisted in many of his works.

CESAROTTI, MELCHIORE (1730–1808), Italian poet, was born at Padua in 1730, of a noble but impoverished family. At the university of his native place his literary progress procured for him at a very early age the chair of rhetoric, and in 1768 the professorship of Greek and Hebrew. On the invasion of Italy by the French, he gave his pen to their cause, received a pension, and was made knight of the iron crown by Napoleon I., to whom, in consequence, he addressed a bombastic and extravagantly flattering poem called *Pronea*. Cesarotti is best known as the translator of Homer and Ossian. Much praise cannot be given to his version of the *Iliad*, for he has not scrupled to add, omit and modernize. Ossian, which he held to be the finest of poems, he has, on the other hand, considerably improved in translation; and the appearance of his version attracted much attention in Italy and France, and raised up many imitators of the Ossianic style. Cesarotti also produced a number of works in prose, including a *Course of Greek Literature*, and essays *On the Origin and Progress of the Poetic Art*, *On the Sources of the Pleasure derived from Tragedy*, *On the Philosophy of Language* and *On the Philosophy of Taste*, the last being a defence of his own great eccentricities in criticism. His weakness was a straining after novelty. His style is forcible, but full of Gallicisms.

A complete edition of his works, in 42 vols. 8vo, began to appear at Pisa in 1800, and was completed in 1813, after his death. See *Memoirs*, by Barbieri (Padua, 1810), and *Un Filosofo delle lettere*, by Alemanni (Turin, 1894).

CESENA (anc. *Caesena*), a town and episcopal see of Emilia, Italy, in the province of Forlì, 12 m. S.E. by rail from the town of Forlì, on the line between Bologna and Rimini, 144 ft. above sea-level. Pop. (1905) 12,245 (town); 43,468 (commune). The town is picturesquely situated at the foot of the slopes of the Apennines, and is crowned by a medieval fortress (Rocca), begun by the emperor Frederick I. (Barbarossa) probably, but altered and added to later. The cathedral has two fine marble altars by the Lombardi of Venice (or their school). The library, built for Domenico Malatesta in 1452 by Matteo Nuzio, is a fine early Renaissance building, and its internal arrangements, with the original desks to which the books are still chained, are especially well preserved (see J. W. Clark, *The Care of Books*, Cambridge, 1901, p. 199). In it are valuable MSS., many of which were used by Aldus Manutius. It also contains a picture gallery with a good "Presentation in the Temple" by Francesco Francia. There are some fine palaces in the town. Three-quarters of a mile south-east on the hill stands the handsome church of S. Maria del Monte, after the style of Bramante, with carved stalls of the 16th century. Wine, hemp and silk are the main articles of trade. About the ancient Caesena little is said in classical authors: it is mentioned as a station on the Via Aemilia and as a fortress in the wars of Theodoric and Narses. During the middle ages it was at first independent. In 1357 it was unsuccessfully defended by the wife of Francesco Ordelaffi, lord of Forlì, against the papal troops under Albornoz. In 1377 it was sacked by Cardinal Robert of Geneva (afterwards Clement VII., antipope). It was then held by the Malatesta of Rimini until 1465, when it came under the dominion of the church. Both Pius VI. (1717) and Pius VII. (1742) were born at Cesena. (T. As.)

CESNOLA, LUIGI PALMA DI (1832–1904), Italian-American soldier and archaeologist, was born near Turin on the 29th of July 1832. Having served in the Austrian and Crimean Wars, in 1860 he went to New York, where he taught Italian and French and founded a military school for officers. He took part in the American Civil War as colonel of a cavalry regiment, and at Aldie (June 1863) was wounded and taken prisoner. He was released from Libby prison early in 1864, served in the Wilderness and Petersburg campaigns (1864–65) as a brigadier of cavalry, and at the close of the war was breveted brigadier-general. He was then appointed United States consul at Larnaca in Cyprus (1865–1877). During his stay in the island he carried on excavations, which resulted in the discovery of a large number of antiquities. The collection was purchased by the Metropolitan Museum of New York, and Cesnola became director in 1879. Doubt having been thrown by Gaston L. Feuerdant, in an article in the New York *Herald* (August 1880), upon the genuineness of his restorations, the matter was referred to a special committee, which pronounced in his favour.[1] He is the author of *Cyprus, its ancient Cities, Tombs and Temples* (1877), an interesting book of travel and of considerable service to the practical antiquary; and of a *Descriptive Atlas of the Cesnola Collection of Cypriote Antiquities* (3 vols., 1884–6). He died in New York on the 21st of November 1904. He was a

[1] For the Cesnola controversy see C. D. Cobham's *Attempt at a Bibliography of Cyprus* (4th ed., 1900). See also article CYPRUS.

member of several learned societies in Europe and America, and in 1897 he received a Congressional medal of honour for conspicuous military services.

His brother, ALESSANDRO PALMA DI CESNOLA, born in 1839, conducted excavations at Paphos (where he was U.S. vice-consul) and Salamis on behalf of the British government. The results of these are described in *Salaminia* (1882).

CESPEDES (in Ital. CEDASPE), **PABLO DE** (1538–1608), Spanish poet, painter, sculptor and architect, was born at Cordova, and was educated at Alcalá de Henares, where he studied theology and Oriental languages. On leaving the university, he went to Rome, where he became the pupil and friend of Federigo Zuccaro, under whose direction he studied particularly the works of Raphael and of Michelangelo. In 1560, while yet in Rome, proceedings were taken against him by the Inquisition at Valladolid on account of a letter which, found among the papers of the archbishop of Toledo, had been written by Cespedes during the preceding year, and in which he had spoken with great freedom against the holy office and the inquisitor-general, Fernando de Valdés. Cespedes remained in Rome at this critical moment, and he appears rightly to have treated the prosecution with derision. It is not known how he contrived to bring the proceedings to an end; he returned, however, to Spain a little before 1577, and in that year was installed in a prebend of the cathedral at Cordova, where he resided till his death. Pablo de Cespedes has been called the most *savant* of Spanish artists. According to his friend Francisco Pacheco, to whom posterity is indebted for the preservation of all of Cespedes's verse that is extant, the school of Seville owes to him its introduction to the practice of chiaroscuro. He was a bold and correct draughtsman, a skilful anatomist, a master of colour and composition; and the influence he exerted to the advantage of early Spanish art was considerable. Cristobal de Vera, Juan de Peñalosa and Zambrano were among his pupils. His best picture is a Last Supper at Cordova, but there are good examples of his work at Seville and at Madrid. Cespedes was author of several opuscules in prose on subjects connected with his profession. Of his poem on *The Art of Painting* enough was preserved by Pacheco to enable us to form an opinion of the whole. It is esteemed the best didactic verse in Spanish; and it has been compared, not disadvantageously, with the *Georgics*. It is written in strong and sonorous octaves, in the majestic declamatory vein of Fernando Herrera, and is not altogether so dull and lifeless as is most didactic verse. It contains a glowing eulogy of Michelangelo, and some excellent advice to young painters, insisting particularly on hard work and on the study of nature. The few fragments yet remaining, amounting in all to some six hundred lines, were first printed by Pacheco in his treatise *Del arte de la pintura*, in 1649.

CÉSPEDES Y MENESES, GONZALO DE (1585?–1638), Spanish novelist, was born at Madrid about 1585. Nothing positive is known of him before the publication of his celebrated romance, the *Poema trágico del Español Gerardo, y desengaño del amor lascivo* (1615–1617); there is evidence that he had been sentenced to eight years at the galleys previous to the 1st of January 1620, and that the penalty had been remitted; but the nature of his offence is not stated. His treatment of political questions in the *Historia apologética en los sucesos del reyno de Aragón, y su ciudad de Zaragoza, años de 91 y 92* (1622), having led to the confiscation of the book, Céspedes took up his residence at Saragossa and Lisbon. While in exile he issued a collection of short stories entitled *Historias peregrinas y exemplares* (1623), the unfinished romance *Varia fortuna del soldado Pindaro* (1626), and the first part of his *Historia de Felipe IV.* (1631), a fulsome eulogy which was rewarded by the author's appointment as official historiographer to the Spanish king. Céspedes died on the 27th of January 1638. His novels, though written in a ponderous, affected style, display considerable imagination and insight into character. The *Poema trágico* has been utilized by Fletcher in *The Spanish Curate* and in *The Maid of the Mill*.

The *Historias peregrinas* has been reprinted (1906) with a valuable introduction by Sr. Cotarelo y Mori.

CESS (a shortened form of "assess"; the spelling is due to a mistaken connexion with "census"), a tax; a term formerly more particularly applied to local taxation, in which sense it still is used in Ireland; otherwise it has been superseded by "rate." In India it is applied, with the qualifying word prefixed, to any taxation, such as "irrigation-cess" and the like, and in Scotland to the land-tax.

CESSIO BONORUM (Latin for a "surrender of goods"), in Roman law, a voluntary surrender of goods by a debtor to his creditors. It did not amount to a discharge unless the property ceded was sufficient for the purpose, but it secured the debtor from personal arrest. The creditors sold the goods in satisfaction, *pro tanto*, of their claims. The procedure of *cessio bonorum* avoided infamy, and the debtor, though his after-acquired property might be proceeded against, could not be deprived of the bare necessaries of life. The main features of the Roman law of *cessio bonorum* were adopted in Scots law, and also in the French legal system. (See further BANKRUPTCY.)

CESTI, MARC' ANTONIO (1620?–1669?), Italian musical composer, was born at Florence about 1620. He was a pupil of Carissimi, and after holding a post somewhere in Florence as *maestro di cappella* entered the papal chapel in 1660. In 1666 he became *Vice-Kapellmeister* at Vienna, and died at Venice in 1669. Cesti is known principally as a composer of operas, the most celebrated of which were *La Dori* (Venice, 1663) and *Il Pomo d' oro* (Vienna, 1668). He was also a composer of chamber-cantatas, and his operas are notable for the pure and delicate style of their airs, more suited to the chamber than to the stage.

CESTIUS, LUCIUS, surnamed PIUS, Latin rhetorician, flourished during the reign of Augustus. He was a native of Smyrna, a Greek by birth. According to Jerome, he was teaching Latin at Rome in the year 13 B.C. He must have been living after A.D. 9, since we are told that he taunted the son of Quintilius Varus with his father's defeat in the Teutoburgian forest (Seneca, *Controv.* i. 3, 10). Cestius was a man of great ability, but vain, quarrelsome and sarcastic. Before he left Asia, he was invited to dinner by Cicero's son, then governor of the province. His host, being uncertain as to his identity, asked a slave who Cestius was; and on receiving the answer, "he is the man who said your father was illiterate," ordered him to be flogged (Seneca, *Suasoriae*, vii. 13). As an orator in the schools Cestius enjoyed a great reputation, and was worshipped by his youthful pupils, one of whom imitated him so slavishly that he was nicknamed "my monkey" by his teacher (Seneca, *Controv.* ix. 3, 12). As a public orator, on the other hand, he was a failure. Although a Greek, he always used Latin in his declamations, and, although he was sometimes at a loss for Latin words, he never suffered from lack of ideas. Numerous specimens of his declamations will be found in the works of Seneca the rhetorician.

See the monograph *De Lucio Cestio Pio*, by F. G. Lindner (1858); J. Brzoska in Pauly-Wissowa's *Realencyclopädie*, iii. 2 (1899); Teuffel-Schwabe, *Hist. of Roman Lit.* (Eng. tr.), § 268, 6; M. Schanz, *Geschichte der römischen Litteratur*, ii.

CESTUI, CESTUY, an Anglo-French word, meaning "that person," which appears in the legal phrases *cestui que trust*, *use*, or *vie*. It is usually pronounced as "cetty." *Cestui que trust* means literally "the person for whose benefit the trust" is created. The *cestui que trust* is the person entitled to the equitable, as opposed to the legal, estate. Thus, if land be granted unto, and to the use of A. in trust for B., B. is *cestui que trust*, and A. trustee. The term, principally owing to its cumbersomeness, is being gradually superseded in modern law by that of "beneficiary." *Cestui que use* (sometimes *cestui à que use*) means "the person for whose benefit a use" is created (see TRUST). *Cestui que vie* is "the person for whose life" lands are held by another (see REMAINDER).

CETACEA (from the Gr. κῆτος, a whale), the name of the mammalian order represented by whales, dolphins, porpoises, &c. From their fish-like form, which is manifestly merely an adaptation to their purely aquatic life, these creatures are often regarded

as fishes, although they are true mammals, with warm blood, and suckle their young.

The general form is essentially fish-like, the spindle-shaped body passing anteriorly into the head without any distinct neck, and posteriorly tapering gradually towards the extremity of the tail, which is provided with a pair of lateral, pointed expansions of skin supported by fibrous tissue, called "flukes," forming a horizontal triangular propelling organ, notched behind in the middle line. The head is generally large, in some cases attaining more than one-third the entire length; and the mouth is wide, and bounded by stiff, immobile lips. The fore-limbs are reduced to flattened paddles, encased in a continuous skin, showing no external sign of division, and without trace of nails. There are no signs of hind-limbs visible externally. The surface of the skin is smooth and glistening, and devoid of hair, although in many species there are a few bristles in the neighbourhood of the mouth which may persist through life or be present only in the young state. Immediately beneath the skin is a thick layer of fat, held together by a mesh of tissue, constituting the "blubber," which retains the heat of the body. In nearly all species a compressed dorsal fin is present. The eye is small, and not provided with a true lacrymal apparatus. The external ear is a minute aperture in the skin situated at a short distance behind the eye. The nostrils open separately or by a single crescentic aperture, near the vertex of the head.

The bones generally are spongy in texture, the cavities being filled with oil. In the vertebral column, the cervical region is short and immobile, and the vertebrae, always seven in number, are in many species more or less fused together into a solid mass. The odontoid process of the second cervical vertebra, when that bone is free, is usually very obtuse, or even obsolete. In a paper on the form and function of the cervical vertebrae published in the *Jenaische Zeitschrift* for 1905, Dr O. Reche points out that the shortening and soldering is most pronounced in species which, like the right-whales, live entirely on minute organisms, to capture which there is no necessity to turn the head at all. Accordingly we find that in these whales the whole seven cervical vertebrae are fused into an immovable solid mass, of which the compound elements, with the exception of the first and second, are but little thicker than plates. On the other hand, in the finner-whales, several of which live exclusively on fish, and thus require a certain amount of mobility in the head and neck, we find all the cervical vertebrae much thicker and entirely separate from one another. Among the dolphin group the narwhal and the white whale, or beluga, are distinguished from all other cetaceans by the great comparative length of their cervical vertebrae, all of which are completely free. In the case of the narwhal such an abnormal structure is easily accounted for, seeing that to use effectively the long tusk with which the male is armed a considerable amount of mobility in the neck is absolutely essential. The beluga, too, which is believed to feed on large and active fishes, would likewise seem to require mobility in the same region in order to effect their capture. On the other hand, the porpoise preys on herrings, pilchards and mackerel, which in their densely packed shoals must apparently fall an easy prey with but little exertion on the part of their captor, and we accordingly find all the neck-vertebrae very short, and at least six out of the seven coalesced into a solid immovable mass. None of the vertebrae are united to form a sacrum. The lumbar and caudal vertebrae are numerous and large, and, as their arches are not connected by articular processes (zygapophyses), they are capable of free motion in all directions. The caps, or epiphyses, at the end of the vertebral bodies are flattened disks, not uniting until after the animal has attained its full dimensions. There are largely developed chevron-bones on the under side of the tail, the presence of which indicates the distinction between caudal and lumbar vertebrae.

In the skull, the brain-case is short, broad and high, almost spherical, in fact (fig. 1). The supra-occipital bone rises upwards and forwards from the foramen magnum, to meet the frontals at the vertex, completely excluding the parietals from the upper region; and the frontals are expanded laterally to form the roof of the orbits. The nasal aperture opens upwards, and has in front of it a more or less horizontally prolonged beak, formed of the maxillae, premaxillae, vomer, and mesethmoid cartilage, extending forwards to form the upper jaw or roof of the mouth.

There are no clavicles. The humerus is freely movable on the scapula at the shoulder-joint, but beyond this the articulations of the limb are imperfect; the flattened ends of the bones coming in contact, with fibrous tissue interposed, allowing of scarcely any motion. The radius and ulna are distinct, and about equally developed, and much flattened, as are all the bones of the flippers. There are four, or more commonly five, digits, and the number of the phalanges of the second and third always exceeds the normal number in mammals, sometimes considerably; they present the exceptional character of having epiphyses at both ends. The pelvis is represented by a pair of small rod-like bones placed longitudinally, suspended below and at some distance from the vertebral column at the commencement of the tail. In some species, to the outer surface of these are fixed other small bones or cartilages, the rudiments of the hind-limb.

Teeth are generally present, but exceedingly variable in number. In existing species, they are of simple, uniform character, with conical or compressed crowns and single roots, and are never preceded by milk-teeth. In the whalebone whales teeth are absent (except in the foetal condition), and the palate is provided with numerous transversely placed horny plates, forming the "whalebone." Salivary glands are rudimentary or absent. The stomach is complex, and the intestine simple, and only in some species provided with a small caecum. The liver is little fissured, and there is no gall-bladder. The blood-vascular system is complicated by net-like expansions of both arteries and veins, or *retia mirabilia*. The larynx is of peculiar shape, the arytenoid cartilages and the epiglottis being elongated, and forming a tubular prolongation,

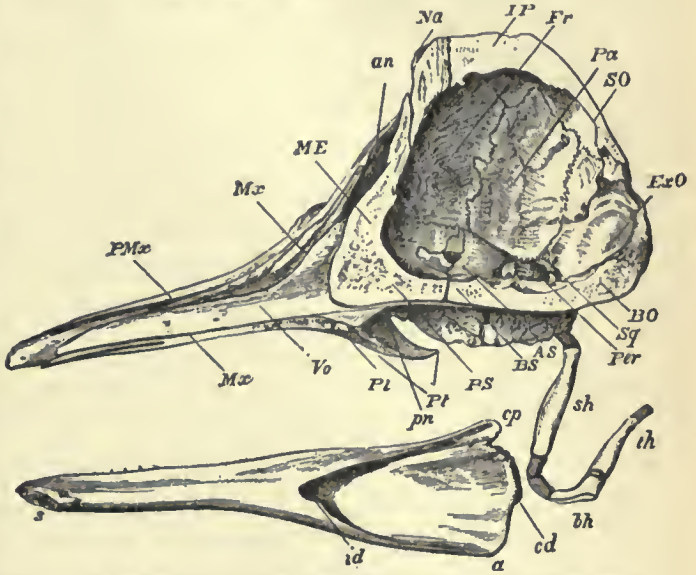

FIG. 1.—A Section of the Skull of a Black-Fish (*Globicephalus melas*) x ⅛.

PMx,	Premaxilla.	*AS*,	Alisphenoid.
Mx,	Maxilla.	*PS*,	Presphenoid.
ME,	Ossified portion of the mesethmoid.	*Pt*,	Pterygoid.
		pn,	Posterior nares.
an,	Nostrils.	*Pl*,	Palatine.
Na,	Nasal.	*Vo*,	Vomer.
IP,	Inter-parietal.	*s*,	Symphysis of lower jaw.
Fr,	Frontal.	*id*,	Inferior dental canal.
Pa,	Parietal.	*cp*,	Coronoid process of lower jaw.
SO,	Supra-occipital.	*cd*,	Condyle.
ExO,	Ex-occipital.	*a*,	Angle.
BO,	Basi-occipital.	*sh*,	Stylo-hyal.
Sq,	Squamosal.	*bh*,	Basi-hyal.
Per,	Periotic.	*th*,	Thyro-hyal.

which projects into the posterior nares, and when embraced by the soft palate forms a continuous passage between the nostrils and the trachea, or wind-pipe, in a more perfect manner. The brain is relatively large, round in form, with its surface divided into numerous and complex convolutions. The kidneys are deeply lobulated; the testes are abdominal; and there are no vesiculae seminales nor an os penis. The uterus is bicornuate; the placenta non-deciduate and diffuse. The two teats are placed in depressions on each side of the genital aperture. The ducts of the milk-glands are dilated during suckling into large reservoirs, into which the milk collects, and from which it is injected by the action of a muscle into the mouth of the young animal, so that sucking under water is greatly facilitated.

Whales and porpoises are found in all seas, and some dolphins and porpoises are inhabitants of the larger rivers of South America and Asia. Their organization necessitates their passing their life entirely in the water, as on land they are absolutely helpless. They have, however, to rise very frequently to the surface for the purpose of respiration; and, in relation to the upward and downward movement in the water thus necessitated, the principal instrument of motion, the tail, is expanded horizontally. The position of the nostril on the highest part of the head is important for this mode of life, as it is the only part of the body the exposure

of which above the surface is absolutely necessary. Of numerous erroneous ideas connected with natural history, few are so widespread as that whales spout through their blow-holes water taken in at the mouth. But the " spouting," or " blowing," of whales is nothing more than the ordinary act of expiration, which, taking place at longer intervals than land-animals, is performed with a greater emphasis. The moment the animal rises to the surface it forcibly expels from its lungs the air taken in at the last inspiration, which is charged with vapour in consequence of the respiratory changes. This rapidly condensing in the cold atmosphere in which the phenomenon is often observed, forms a column of steam or spray, which has been taken for water. It happens, however, especially when the surface of the ocean is agitated into waves, that the animal commences its expiratory puff before the orifice has cleared the top of the water, some of which may thus be driven upwards with the blast, tending to complete the illusion. From photographs of spouting rorquals, it appears that the height and volume of the " spout " of all the species is much less than was supposed to be the case by the older observers; even that of the huge " sulphur-bottom " (*Balaenoptera sibbaldi*) averaging only about 14 ft. in height, although it may occasionally reach 20 ft.

As regards their powers of hearing, the capacity of cetaceans for receiving (and acting upon) sound-waves is demonstrated by the practice of shouting on the part of the fishermen when engaged in driving a shoal of porpoises or black-fish into shallow water, for the purpose of frightening their intended victims. As regards the possession of a voice by cetaceans, it is stated that one species, the " buckelwal " of the Germans, utters during the breeding-season a prolonged scream, comparable to the scream of a steam-siren, and embracing the whole musical scale, from base to treble. In respect of anatomical considerations, it is true that the external ear is much reduced, the " pinna " being absent, and the tube or " meatus " of very small calibre. On the other hand, the internal auditory organs are developed on the plan of those of ordinary mammals, but display certain peculiar modifications (notably the remarkable shell-like form of the tympanic bone) for intensifying and strengthening the sound-waves as they are received from the water. It seems, therefore, perfectly evident that whales must hear when in the water. This inference is confirmed by the comparatively small development of the other sense-organs. The eye, for instance, is very small, and can be of little use even at the comparatively small depths to which whales are now believed to descend. Again, the sense of smell, judging from the rudimentary condition of the olfactory organs, must be in abeyance; and whales have no sense-organs comparable to the lateral-line-system of fishes. Consequently, it would seem that when below the surface of the water they must depend chiefly upon the sense of hearing. Probably this sense is so highly developed as to enable the animals, in the midst of the vibrations made by the screw-like movements of the tail, or flukes, to distinguish the sound (or the vibrations) made by the impact of water against rocks, even in a dead calm, and, in the case of piscivorous species, to recognize by the pulse in the water the presence of a shoal of fish. Failing this explanation, it is difficult to imagine how whales can find their way about in the semi-darkness, and avoid collisions with rocks and rock-bound coasts.

In the Christiania *Nyt Magazin for Naturvidenskaberne*, vol. xxxviii., Dr G. Guldberg has published some observations on the body-temperature of the Cetacea, in which he shows how extremely imperfect is our knowledge of this subject. As he remarks, it is a matter of extreme difficulty to obtain the temperature of living cetaceans, although this has been taken in the case of a white-whale and a dolphin, which some years ago were kept in confinement in a pond in the United States. With the larger whales such a mode of procedure is, however, obviously quite impracticable, and we have, accordingly, to rely on *post-mortem* observations. The layer of blubber by which all cetaceans are protected from cold renders the *post-mortem* refrigeration of the blood a much slower process than in most mammals, so that such observations have a much higher value than might at first be supposed to be the case. Indeed, the blood-temperature of a specimen of Sibbald's rorqual three days after death still stood at 34° C. The various observations that have been taken have afforded the following results in individual cases: Sperm-whale, 40° C.; Greenland right-whale, 38·8° C.; porpoise, 35·6° C.; liver of a second individual, 37·8° C.; common rorqual, 35·4° C.; dolphin, 35·6° C. The average blood-temperature of man is 37° C., and that of other mammals 39° C.; while that of birds is 42° C. The record of 40° C. in the case of the sperm-whale seems to indicate that at least some cetaceans have a relatively high temperature.

With the possible exception of one West African dolphin, all the Cetacea are predaceous, subsisting on living animal food of some kind. One kind alone (*Orca*) eats other warm-blooded animals, as seals, and even members of its own order, both large and small. Many feed on fish, others on small floating crustaceans, pteropods and jelly-fishes, while the principal staple of the food of many is constituted by cuttle-fishes and squids. In size cetaceans vary much, some of the smaller dolphins scarcely exceeding 4 ft. in length, while whales are the most colossal of all animals. It is true that many statements of their bulk are exaggerated, but the actual dimensions of the larger species exceed those of all other animals, not even excluding the extinct dinosaurian reptiles. With some exceptions, cetaceans are generally timid, inoffensive animals, active in their movements and affectionate in their disposition towards one another, especially the mother towards the young, of which there is usually but one, or at most two at a time. They are generally gregarious, swimming in herds or " schools," sometimes amounting to many thousands in number; though some species are met with either singly or in pairs.

Commercially these animals are of importance on account of the oil yielded by the blubber of all of them; while whalebone, spermaceti and ambergris are still more valuable products yielded by certain species. Within the last few years whalebone has been sold in America for £2900 per ton, while it is also asserted that £3000 per ton has been paid for two and a quarter tons at Aberdeen, although there seems to be some degree of doubt attaching to the statement. Soon after the middle of the last century, the price of this commodity was as low as £150 per ton, but, according to Mr Frank Buckland, it suddenly leapt up to £620 with the introduction of " crinoline " into ladies' costume, and it has apparently been on the rise ever since. Ambergris, which is very largely used in perfumery, is solely a product of the sperm-whale, and appears to be a kind of biliary calculus. It generally contains a number of the horny beaks of the cuttle-fishes and squids upon which these whales chiefly feed. Its market-price is subject to considerable variation, but from £3 to £4 per oz. is the usual average for samples of good quality. In 1898 a merchant in Mincing Lane was the owner of a lump of ambergris weighing 270 lb, which was sold in Paris for about 85s. per oz., or £18,360.

Whalebone Whales.—Existing Cetacea are divisible into two sections, or suborders, the relationships of which are by no means clearly apparent. The first section is that of the whalebone whales, or Mystacoceti, in which no functional teeth are developed, although there are tooth-germs during foetal life. The palate is furnished with plates of baleen or whalebone; the skull is symmetrical; and the nasal bones form a roof to the nasal passages, which are directed upwards and forwards. The maxilla is produced in front of, but not over, the orbital process of the frontal. The lacrymal is small and distinct from the jugal. The tympanic is welded with the periotic, which is attached to the base of the skull by two strong diverging processes. The olfactory organ is distinctly developed. The two halves of the lower jaw are arched outwards, their anterior ends meeting at an angle, and connected by fibrous tissue without any symphysis. All the ribs at their upper extremity articulate only with the transverse processes of the vertebrae; their capitular processes when present not articulating directly with the bodies of the vertebrae. The sternum is composed of a single piece, and articulates only with a single pair of ribs; and there are no ossified sternal ribs. External openings of nostrils distinct from each other. longitudinal. A short conical caecum.

When in the foetal state these whales have numerous minute teeth lying in the dental groove of both upper and lower jaws. They are best developed about the middle of foetal life, after which they are absorbed, and no trace of them remains at the time of birth. The whalebone does not make its appearance until after birth; and consists of a series of flattened horny plates, between three and four hundred in number, on each side of the palate, with a bare interval along the middle line. The plates are placed transversely to the long axis of the palate, with short intervals between them. Each plate or blade is somewhat triangular in form, with the base

attached to the palate and the apex hanging downwards. The outer edge of the blade is hard and smooth, but the inner edge and apex fray out into long bristly fibres, so that the roof of the whale's mouth looks as if covered with hair, as described by Aristotle. At the inner edge of each principal blade are two or three much smaller or subsidiary blades. The principal blades are longest near the middle of the series, and gradually diminish towards the front and back of the mouth. The horny plates grow from a fibrous and vascular matrix, which covers the palatal surface of the maxillae, and sends out plate-like processes, one of which penetrates the base of each blade. Moreover, the free edges of these processes are covered with long vascular thread-like papillae, one of which forms the central axis of each of the hair-like fibres mainly composing the blade. A transverse section of fresh whalebone shows that it is made up of numbers of these soft vascular papillae, circular in outline, and surrounded by concentrically arranged epidermic cells, the whole bound together by other epidermic cells, that constitute the smooth (so-called "enamel") surface of the blade, which, disintegrating at the free edge, allows the individual fibres to become loose and assume a hair-like appearance.

Whalebone really consists of modified papillae of the mucous membrane of the mouth, with an excessive and horny epithelial development. The blades are supported and bound together for a certain distance from their base, by a mass of less hardened epithelium, secreted by the surface of the palatal membrane or matrix of the whalebone in the intervals of the plate-like processes. This is the "gum" of the whalers. Whalebone varies much in colour in different species; in some it is almost jet black, in others slate colour, horn colour, yellow, or even creamy-white. In some descriptions the blades are variegated with longitudinal stripes of different hues. It differs also greatly in other respects, being short, thick, coarse, and stiff in some cases, and greatly elongated and highly elastic in those species in which it has attained its fullest development. Its function is to strain the water from the small marine molluscs, crustaceans, or fish upon which the whales subsist. In feeding, whales fill the immense mouth with water containing shoals of these small creatures, and then, on closing the jaws and raising the tongue, so as to diminish the cavity of the mouth, the water streams out through the narrow intervals between the hairy fringe of the whalebone blades, and escapes through the lips, leaving the living prey to be swallowed.

Although sometimes divided into two families, *Balaenidae* and *Balaenopteridae*, whalebone-whales are best included in a single family group under the former name. The typical members of this family are the so-called right-whales, forming the genus *Balaena*, in which there are no folds on the throat and chest, and no back-fin; while the cervical vertebrae are fused into a single mass. The flippers are short and broad, with five digits; the head is very large and the whalebone very long and narrow, highly elastic and black; while the scapula is high, with a distinct coracoid and coronoid process. This genus contains the well-known Greenland right-whale (*B. mysticetus*) of the Arctic seas, the whalebone and oil of which are so much valued in commerce, and also other whales, distinguished by having the head somewhat smaller in proportion to the body, with shorter whalebone and a larger number of vertebrae. These inhabit the temperate seas of both northern and southern hemispheres, and have been divided into species in accordance with their geographical distribution, such as *B. biscayensis* of the North Atlantic, *B. japonica* of the North Pacific, *B. australis* of the South Atlantic, and *B. antipodarum* and *novae-zelandiae* of the South Pacific; but the differences between them are so small that they may probably be regarded as races of a single species, the black whale (*B. australis*). On the head these whales carry a peculiar structure which is known to whalers as the "bonnet." This is a large horny excrescence, worn into hollows like a much-denuded piece of limestone rock, growing probably in the neighbourhood of the blow-hole. More than one theory has been suggested to account for its presence. One suggestion is that it indicates the descent of whales from rhinoceros-like mammals; another that this species of whale is in the habit of rubbing against rocks in order to free itself from barnacles, and thus produces a kind of corn—although why on the nose alone is not stated. Dr W. G. Ridewood, however, considers that the structure is due to the fact that the horny layers which are produced all over the skin are not shed on this particular spot.

The pigmy whale (*Neobalaena marginata*) represents a genus agreeing with the right-whales in the absence of throat-flutings, and with the rorquals in the presence of a dorsal fin. The cervical vertebrae are united, and there are only 43 vertebrae altogether. The flippers are small, narrow, and with only four digits. The ribs remarkably expanded and flattened; the scapula low and broad, with completely developed acromion and coracoid processes. The whalebone is long, slender, elastic and white. The species which inhabits the South American, Australian and New Zealand seas is the smallest of the whalebone-whales, being not more than 20 ft. in length.

In contrast to the preceding is the great grey whale (*Rachianectes glaucus*) of the North Pacific, which combines the relatively small head, elongated shape, and narrow flippers of the fin-whales, with the smooth throat and absence of a back-fin distinctive of the right-whales. The whalebone is shorter and coarser than in any other species. In the skeleton the cervical vertebrae are free, and the first two ribs on each side expanded and united to form a large bony shield. In the humpback-whale (*Megaptera longimana* or *boöps*) the head is of moderate size, the whalebone-plates are short and wide, and the cervical vertebrae free. The skin of the throat is fluted so as to form an expansible pouch; there is a low back-fin; and the flippers, which have four digits each, are extremely long, equalling about one-fourth the total length of the animal. The acromion and coracoid processes of the scapula are rudimentary. See HUMPBACK-WHALE.

The right-whales are built for cruising slowly about in search of the shoals of small floating invertebrates which form their food, and are consequently broad in beam, with a float-shaped body and immovable neck. The humpback is of somewhat similar build, but with a smaller head, and probably attains considerable speed owing to the length of its flippers. The finners, or rorquals (*Balaenoptera*), which prey largely on fish, are built entirely for speed, and are the ocean greyhounds of the group. Their bodies are consequently long and attenuated, and their necks are partially mobile; while they are furnished with capacious pouches for storing their food. They chiefly differ from the humpback by the smaller head, long and slender build, small, narrow, and pointed flippers, each containing four digits, and the large acromion and coracoid processes to the low and broad scapula. Rorquals are found in almost every sea. Among them are the most gigantic of all animals, *B. sibbaldi*, which attains the length of 80 ft., and the small *B. rostrata*, which does not exceed 30. There are certainly four distinct modifications of this genus, represented by the two just mentioned, and by *B. musculus* and *B. borealis*, all inhabitants of British seas, but the question whether almost identical forms found in the Indian, Southern and Pacific Oceans are to be regarded as specifically identical or as distinct awaits future researches, although some of these have already received distinct names. See RORQUAL.

In the report on the zoology of the "Discovery" expedition, published in 1907 by the British Museum, E. A. Wilson describes a whale frequenting the fringe of the Antarctic ice which indicates a new generic type. Mainly black in colour, these whales measure about 20 or 30 ft. in length, and have a tall dorsal fin like that of a killer.

Toothed Whales.—The second suborder is represented by the toothed whales, or Odontoceti, in which there is no whalebone, and teeth, generally numerous, though sometimes reduced to a single pair, and occasionally wanting, are normally developed. Unlike that of the whalebone-whales, the upper surface of the skull is more or less unsymmetrical. The nasal bones are in the form of nodules or flattened plates, applied closely to the frontals, and not forming any part of the roof to the nasal passage, which is directed upwards and backwards. The olfactory organ is rudimentary or absent. Hinder end of the maxilla expanded and covering the greater part of the orbital plate of the frontal bone. Lacrymal bone either inseparable from the jugal, or, if distinct, large, and forming part of the roof of the orbit. Tympanic bone not welded with the periotic, which is usually only attached to the rest of the skull by ligament. Two halves of the lower jaw nearly straight, expanded in height posteriorly, with a wide funnel-shaped aperture to the dental canal, and coming in contact in front by a flat surface of variable length, but constituting a symphysis. Several of the anterior ribs with well-developed capitular processes, which articulate with the bodies of the vertebrae. Sternum almost always composed of several pieces, placed one behind the other, with which several pairs of ribs are connected by well-developed cartilaginous or ossified sternal ribs. External respiratory aperture single, the two nostrils uniting before they reach the surface, usually in the form of a transverse subcrescentic valvular aperture, situated on the top of the head. Flippers with five digits, though the first and fifth are usually little developed. No caecum, except in *Platanista*.

The first family, *Physeteridae*, is typified by the sperm-whale, and characterized by the absence of functional teeth in the upper jaw; the lower teeth being various, and often much reduced in number. Bones of the skull raised so as to form an elevated prominence or crest behind the nostrils. Pterygoid bones thick, produced backwards, meeting in the middle line, and not involuted to form the outer wall of the post-palatine air-sinuses, but simply hollowed on their outer side. Transverse processes of the arches of the dorsal vertebrae, to which the tubercles of the ribs are attached, ceasing abruptly near the end of the series, and replaced by processes on the body at a lower level, and serially homologous anteriorly with the heads of the ribs, and posteriorly with the transverse processes of the lumbar vertebrae. Costal cartilages not ossified.

The first group, or *Physeterinae*, includes the sperm-whale itself, and is characterized by the presence of a full series of lower teeth, which are set in a groove in place of sockets, the groove being imperfectly divided by partial septa, and the teeth held in place by the strong, fibrous gum. No distinct lacrymal bone. Skull strikingly asymmetrical in the region of the nasal apertures, in consequence of the left opening greatly exceeding the right in size.

In the sperm-whale (*Physeter macrocephalus*) the upper teeth are apparently of uncertain number, rudimentary and functionless, being embedded in the gum. Lower jaw with from 20 to 25 teeth on each side, stout, conical, recurved and pointed at the apex

until they are worn, without enamel. Upper surface of the skull concave; its posterior and lateral edges raised into a very high and greatly compressed semicircular crest or wall (fig. 2). Zygomatic processes of jugal bones thick and massive. Muzzle greatly elongated, broad at the base, and gradually tapering to the apex. Lower

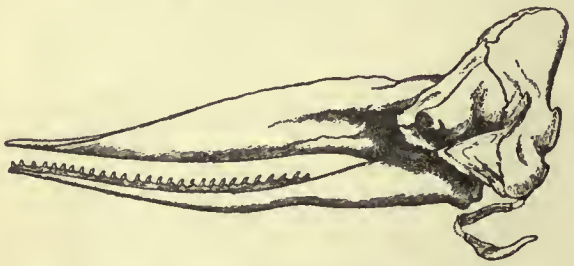

FIG. 2.—Skull of Sperm-Whale (*Physeter macrocephalus*).

jaw exceedingly long and narrow, the symphysis being more than half the length. Vertebrae: C 7, D 11, L 8, Ca 24; total 50. Atlas, or first vertebra, free; all the other cervical vertebrae united by their bodies and spines into a single mass. Eleventh pair of ribs rudimentary. Head about one-third the length of the body; very massive, high and truncated, and rather compressed in front; owing its huge size and form mainly to the accumulation of a mass of fatty tissue filling the large hollow on the upper surface of the skull and overlying the long muzzle. The single blow-hole is longitudinal, slightly S-shaped, and placed at the upper and anterior extremity of the head to the left side of the middle line. The opening of the mouth is on the under side of the head, considerably behind the end of the snout. Flippers short, broad and truncated. Dorsal fin represented by a low protuberance. See SPERM-WHALE.

In the lesser or pigmy sperm-whale (*Cogia breviceps*) there may be a pair of rudimentary teeth in the upper jaw, while on each side of the lower jaw there are from 9 to 12 rather long, slender, pointed and curved teeth, with a coating of enamel. Upper surface of the skull concave, with thick, raised, posterior and lateral margins, massive and rounded at their anterior terminations above the orbits. Muzzle not longer than the cranial position of the skull, broad at the base, and rapidly tapering to the apex. Zygomatic process of the jugal rod-like. Lower jaw with symphysis less than half its length. Vertebrae: C 7, D 13 or 14, L and Ca 30; total 50 or 51. All the cervical vertebrae united by their bodies and arches. The head is about one-sixth of the length of the body, and obtusely pointed in front; the mouth small and placed far below the apex of the snout; the blow-hole

FIG. 3.—Bottle-nose (*Hyperoödon rostratus*). From a specimen taken off the coast of Scotland, 1882.

crescentic, and placed obliquely on the crown of the head in advance of the eyes and to the left of the middle line; while the flippers are bluntly sickle-shaped, and the back-fin triangular. This species attains a length of from 9 to 13 ft.

A second subfamily is represented by the bottle-noses and beaked whales, and known as the *Ziphiinae*. In this group the lower teeth are rudimentary and concealed in the gum, except one, or rarely two, pairs which may be largely developed, especially in the male. There is a distinct lacrymal bone. Externally the mouth is produced into a slender rostrum or beak, from above which the rounded eminence formed by a cushion of fat resting on the cranium in front of the blow-hole rises somewhat abruptly. The blow-hole is single, crescentic and median, as in the *Delphinidae*. Flippers small, ovate, with five digits moderately well developed. A small obtuse dorsal fin situated considerably behind the middle of the back. Longitudinal grooves on each side of the skin of the throat, diverging posteriorly, and nearly meeting in front. In external characters and habits the whales of this group closely resemble each other. They appear to be almost exclusively feeders on cuttle-fishes, and occur either singly, in pairs, or in small herds. By their dental and osteological characters they are easily separated into four genera.

In the first of these, *Hyperoödon*, or bottle-nose, there is a small conical pointed tooth at the apex of each half of the lower jaw, concealed by the gum during life. Skull with the upper ends of the premaxillae rising suddenly behind the nostrils to the vertex and expanded laterally, their outer edges curving backwards and their anterior surfaces arching forwards and overhanging the nostrils; the right larger than the left. Nasal bones lying in the hollow between the upper extremities of the premaxillae, strongly concave in the middle line and in front; their outer edges, especially that of the right, expanded over the front of the inner border of the maxilla. Very high longitudinal crests on the maxillae at the base of the beak, extending backwards almost to the nostrils, approaching each other in the middle line above; sometimes compressed and sometimes so massive that their inner edges come almost in contact. Preorbital notch distinct, and mesethmoid cartilage slightly ossified. Vertebrae: C 7, D 9, L 10, Ca 19; total 45. All the cervical vertebrae united. Upper surface of the head in front of the blowhole very prominent and rounded, rising abruptly from above the small, distinct snout. Two species are known. See BOTTLE-NOSE WHALE.

The typical representative of the beaked whales is *Ziphius cuvieri*, in which there is a single conical tooth of moderate size on each side close to the anterior extremity of the lower jaw, directed forwards and upwards. Skull with the premaxillae immediately in front and at the sides of the nostrils expanded, hollowed, with elevated lateral margins, the posterior ends rising to the vertex and curving forwards, the right being considerably more developed than the left. The conjoint nasals form a pronounced symmetrical eminence at the top of the skull, projecting forwards over the nostrils, flat above, prominent and rounded in the middle line in front, and separated by a notch on each side from the premaxillae. Preorbital notch not distinct. Rostrum (seen from above) triangular, tapering from the base to the apex; upper and outer edges of maxillae at base of rostrum raised into low roughened tuberosities. Mesethmoid cartilage densely ossified in adult age, and coalescing with the surrounding bones of the rostrum. Vertebrae: C 7, D 10, L 10, Ca 22; total 49. The three anterior cervical vertebrae united, the rest free.

In the numerous species of the allied genus *Mesoplodon* there is a much-compressed and pointed tooth in each half of the lower jaw,

FIG. 4.—Sowerby's Beaked Whale (*Mesoplodon bidens*).

variously situated, but generally at some distance behind the apex; its point directed upwards, and often somewhat backwards, occasionally developed to a great size. In the skull the region round the nostrils is as in *Hyperoödon*, except that the nasals are narrow and more sunk between the upper ends of the premaxillae; like those of *Hyperoödon*, they are concave in the middle line in front and above. No maxillary tuberosities. Preorbital notch not very distinct. Rostrum long and narrow. Mesethmoid in the adult ossified in its entire length, and coalescing with the surrounding bones. Vertebrae: C 7, D 10, L 10 or 11, Ca 19 or 20; total 46 to 48. Two or three anterior cervicals united, the rest usually free.

Though varying in form, the lower teeth of the different members of this genus agree in their essential structure, having a small and pointed enamel-covered crown, composed of dentine, which, instead of surmounting a root of the ordinary character, is raised upon a solid mass of osteodentine, the continuous growth of which greatly alters the form and general appearance of the tooth as age advances, as in the case of *M. layardi*, where the long, narrow, flat, strap-like teeth, curving inwards at their extremities, meet over the rostrum, and interfere with the movements of the jaw. In one species (*M. grayi*) a row of minute, conical, pointed teeth, like those of ordinary Dolphins, 17 to 19 in number, is present even in the adults, on each side of the middle part of the upper jaw, but embedded by their roots only in the gum, and not in bony sockets. This, with the frequent presence of rudimentary teeth in other species of this genus, indicates that the beaked whales are derived

FIG. 5.—Skull of a Beaked Whale (*Mesoplodon densirostris*).

from ancestral forms with teeth of normal character in both jaws. The species are distributed in both northern and southern hemispheres, but most frequent in the latter. Among them are *M. bidens*, *M. europaeus*, *M. densirostris*, *M. layardi*, *M. grayi* and *M. hectori*; but there is still much to be learned with regard to their characters

and distribution. This group was abundant in the Pliocene age, as attested by the frequency with which the imperishable long, cylindrical rostrum of the skull, of more than ivory denseness, is found among the rolled and waterworn animal remains which compose the "bone-bed" at the base of the Red Crag of Suffolk.

Finally, in Arnoux's beaked whale (*Berardius arnouxi*), of New Zealand, which grows to a length of 30 ft., there are two moderate-sized, compressed, pointed teeth, on each side of the symphysis of the lower jaw, with their summits directed forwards, the anterior being the larger of the two and close to the front of the jaw. Upper ends of the premaxillae nearly symmetrical, moderately elevated, slightly expanded, and not curved forward over the nostrils. Nasals broad, massive and rounded, of nearly equal size, forming the vertex of the skull, flattened in front, most prominent in the middle line. Preorbital notch distinct. Rostrum long and narrow. Mesethmoid partially ossified. Small rough eminences on the outer edge of the upper surface of the maxillae at base of rostrum. Vertebrae:

FIG. 6.—The Susu, or Ganges Dolphin (*Platanista gangetica*).

C 7, D 10, L 12, Ca 19; total 48. The three anterior cervicals welded, the rest free and well developed. Apparently this whale has the power of thrusting its teeth up and down, exposing them to view when attacked.

In a family by themselves—the *Platinistidae*—are placed three cetaceans which differ from the members of the preceding and the following groups in the mode of articulation of the ribs with the vertebrae, as the tubercular and capitular articulations, distinct at the commencement of the series, gradually blend together, as in most mammals. The cervical vertebrae are all free. The lacrymal bone is not distinct from the jugal. The jaws are long and narrow, with numerous teeth in both; the symphysis of the lower one exceeding half its length. Externally the head is divided from the body by a slightly constricted neck. Pectoral limbs broad and truncated. Dorsal fin small or obsolete. In habits these dolphins are fluviatile or estuarine. In the Indian susu, or Ganges dolphin (*Platanista gangetica*), the teeth number about $\frac{28}{28}$ on each side, are set near together, are rather large, cylindrical, and sharp-pointed in the young, but in old animals acquire a large laterally compressed base, which in the posterior part of the series becomes irregularly divided into roots. As the conical enamel-covered crown wears away, the teeth of the young and old animals have a totally different appearance. The beak and tooth-bearing portion of the lower jaw are so narrow that the teeth of the two sides are almost in contact. Maxillae supporting large, incurved, compressed bony crests, which overarch the nostrils and base of the rostrum, and almost meet in the middle line above. Orbits very small and eyes rudimentary, without crystalline lens. Blow-hole longitudinal, linear. Vertebrae: C 7, D 11, L 8, Ca 25; total 51. A small caecum. No pelvic bones. Dorsal fin represented by a low ridge.

The second genus is represented by *Inia geoffroyi*, of the Amazon, in which the teeth vary from 26 to 33 pairs in each

FIG. 7.—River Plate Dolphin (*Stenodelphis blainvillei*).

jaw; those at the posterior part with a distinct tubercle at the inner side of the base of the crown. Vertebrae: C 7, D 13, L 3, Ca 18; total 41. Transverse processes of lumbar vertebrae very broad. Sternum short and broad, and consisting of a single segment only. Dorsal fin a mere ridge. The long cylindrical rostrum externally furnished with scattered, stout and crisp hairs. The third type is *Stenodelphis blainvillei*, the River Plate dolphin, a small brown species (fig. 7), with from 50 to 60 pairs of teeth in each jaw, furnished with a cingulum at the base of the crown. Jaws very long and slender. Vertebrae: C 7, D 10, L 5, Ca 19; total 41. Transverse processes of the lumbar vertebrae extremely broad. Sternum elongated, composed of two segments, with four sternal ribs attached. Dorsal fin rather small, triangular, pointed. Blow-hole transverse. In several respects this species connects the two preceding ones with the *Delphinidae* (see DOLPHIN).

The last family of existing cetaceans is the above-mentioned *Delphinidae*, which includes the true dolphins, porpoises, grampuses and their relatives. As a rule there are numerous teeth in both jaws; and the pterygoid bones of the skull are short, thin and involuted to form with a process of the palate bone the outer wall of the post-palatine air-sinus. Symphysis of lower jaw short, or moderate, never exceeding one-third the length of the jaw. Lacrymal bone not distinct from the jugal. Transverse processes of the dorsal vertebrae gradually transferred from the arches to the bodies of the vertebrae without any sudden break, and becoming posteriorly continuous serially with the transverse processes of the lumbar vertebrae. Anterior ribs attached to the transverse process by the tubercle, and to the body of the vertebra by the head; the latter attachment lost in the posterior ribs. Sternal ribs ossified. The blow-hole is transverse, crescentic, with the horns of the crescent pointing forwards.

First on the long list is the narwhal, *Monodon monoceros*, in which, apart from some irregular rudimentary teeth, the dentition is reduced to a single pair of teeth which lie horizontally in the maxilla, and in the female remain permanently concealed within the socket, so that this sex is practically toothless, while in the male (fig. 8), the right tooth usually remains similarly concealed while the left is immensely developed, attaining a length equal to more than half that of the entire animal, projecting horizontally from the head in the form of a cylindrical, or slightly tapering, pointed tusk, without enamel, and with the surface marked by spiral grooves and ridges, running in a sinistral direction. Vertebrae: C 7, D 11, L 6, Ca 26; total 50. Cervical region comparatively long, and all the vertebrae distinct, or with irregular unions towards the middle of the series, the atlas and axis being usually free. Flipper small, short and broad, with the second and third digits nearly equal, the fourth slightly shorter. No dorsal fin. See NARWHAL.

Closely allied is the beluga or white-whale (*Delphinapterus leucas*), of the Arctic seas, in which, however, there are from eight to ten pairs of teeth in each jaw, occupying the anterior three-fourths of the rostrum and corresponding portion of the lower jaw, rather small, conical, and pointed when unworn, but usually become obliquely truncated, separated by intervals considerably wider than the diameter of the tooth, and implanted obliquely, the crowns inclining forwards especially in the upper jaw. Skull rather narrow and elongated, depressed. Premaxillae convex in front of the nostrils. Rostrum about equal in length to the cranial portion of the skull, triangular, broad at the base, and gradually contracting towards the apex, where it is somewhat curved downwards. Vertebrae: C 7, D 11, L 9, Ca 23; total 50. Cervical vertebrae free. Flippers broad, short and rounded, all the digits being tolerably well developed, except the first. Anterior part of head rounded; no distinct snout. No dorsal fin, but a low ridge in its place. See BELUGA.

In all the remaining genera of *Delphinidae* the cervical region of the vertebral column is very short, and the first two, and usually more, of the vertebrae are firmly united. The common porpoise (*Phocaena communis*, or *P. phocaena*) is the typical representative of the first genus, in which the teeth vary from $\frac{14}{14}$ to $\frac{28}{28}$, are small, and occupy nearly the whole length of the rostrum, with compressed, spade-shaped crowns, separated from the root by a constricted neck. Rostrum rather shorter than the cranium proper, broad at the base and tapering towards the apex. Premaxillae raised into tuberosities in front of the nostrils. The frontal bones form a somewhat square elevated protuberance in the middle line of the skull behind the nostrils, rising above the flattened nasals. Symphysis of lower jaw very short. Vertebrae: C 7, D 13, L 14, Ca 30; total 64. First to sixth cervical vertebrae and sometimes the seventh also, coalesced. Flippers of moderate size, oval, slightly sickle-shaped, with the second and third digits nearly equal in length, and the fourth and fifth well developed, but shorter. Head short, moderately rounded in front of the blow-hole. Dorsal fin near the middle of the back, triangular; its height considerably less than the length of the base; its anterior edge frequently furnished with one or more rows of conical horny tubercles.

FIG. 8.—Upper surface of the Skull of male Narwhal (*Monodon monoceros*), with the whole of both teeth exposed by removal of the upper wall of their alveolar cavities.

The porpoise, which is so common in British waters and the Atlantic, seldom enters the Mediterranean, and apparently never resides there. There is, however, a porpoise in the Black Sea, which, according to Dr O. Abel, is entitled to rank as a distinct species, with the name of *Phocaena relicta*. This Black Sea porpoise is readily distinguished from the Atlantic species by the contour of the profile of the head, which, in place of forming a continuous curve from the muzzle to what represents the neck, has a marked prominence above the angle of the mouth, followed by an equally marked depression. The teeth are also different in form and number. The absence of porpoises from the Mediterranean is explained by Dr Abel on account of the greater saltness of that sea as compared with the ocean in general; his idea being that these cetaceans are near akin to fresh-water members of the group, and therefore unsuited to withstand an excessively saline medium. From the Taman Peninsula, on the

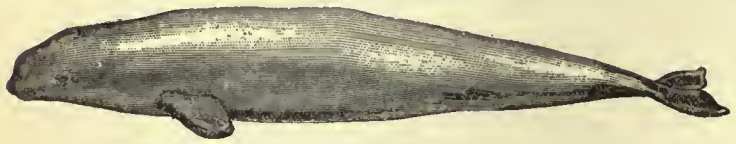

FIG. 9.—Beluga or White-Whale (*Delphinapterus leucas*). From a specimen taken in the river St Lawrence and exhibited in London, 1877.

north shore of the Black Sea, the same writer has described an extinct type of ancestral porpoise, under the name of *Palaeophocaena andrussowi*. Another species is the wholly black *P. spinipennis*, typically from South America. Black is also the hue of the Indian porpoise (*Neophocaena phocaenoides*), which wants a dorsal fin, and has eighteen pairs of teeth rather larger than those of the ordinary porpoise. (See PORPOISE.)

Next comes the Indo-Malay genus *Orcella*, in which the $\frac{1}{1}\frac{2}{2}$ to $\frac{1}{1}\frac{4}{4}$, small, conical teeth are pointed, rather closely set, and occupy nearly the whole length of the rostrum. Skull sub-globular, high. Rostrum nearly equal in length to the cranial portion of the skull, tapering. Flippers of moderate size, not elongated, but somewhat pointed, with all the bones of the digits broader than long, except the first phalanges of the index and third fingers. Head globular in front. Dorsal fin rather small, placed behind the middle of the body. Two species, both of small size—*O. brevirostris*, from the Bay of Bengal, and *O. fluminalis*, from the Irrawaddy river, from 300 to 900 m. from the sea.

In the grampus, or killer, *Orca gladiator* (or *O. orca*) the teeth form about twenty pairs, above and below, occupying nearly the whole length of the rostrum, very large and stout, with conical recurved crowns and large roots, expanded laterally and flattened, or rather hollowed, on the anterior and posterior surfaces. Rostrum about equal in length to the cranial part of the skull, broad and flattened above, rounded in front; premaxillae broad and rather concave in front of the nostrils, contracted at the middle of the rostrum, and expanding again towards the apex. Vertebrae: C 7, D 11-12, L 10, Ca 23; total 51 or 52; bodies of the first and second and sometimes the third cervical vertebrae united; the rest free.

FIG. 10.—The Grampus or Killer (*Orca gladiator*).

Flippers very large, ovate, nearly as broad as long, with all the phalanges and metacarpals broader than long. General form of body robust. Face short and rounded. Dorsal fin near the middle of the back, very high and pointed. See GRAMPUS.

The lesser killer or black killer, *Pseudorca crassidens*, has its $\frac{8\text{-}12}{8\text{-}12}$ teeth confined to the anterior half of the rostrum and corresponding part of the lower jaw; they are small, conical, curved and sharp-pointed when unworn, but sometimes deciduous in old age. Skull broad and depressed; with the rostrum and cranial portions about equal in length. Upper surface of rostrum broad and flat. Premaxillae concave in front of the nostrils, as wide at the middle of the rostrum as at the base, and nearly or completely concealing the maxillae in the anterior half of this region. Vertebrae: C 7, D 11, L 12-14, Ca 28-29; total 58 or 59. Bodies of the anterior five or six cervical vertebrae united. Length of the bodies of the lumbar and anterior caudal vertebrae about equal to their width. Flippers very long and narrow, with the second digit the longest, and having as many as 12 or 13 phalanges, the third shorter (with 9 phalanges), the first, fourth and fifth very short. Fore part of the head round, in consequence of the great development of a cushion of fat, place on the rostrum of the skull in front of the blow-hole. Dorsal fin low and triangular, the length of its base considerably exceeding its vertical height.

Next comes the ca'ing whale, or black-fish (*Globicephalus melas*), with about ten pairs of upper and lower teeth. Cranial and dental characters generally like those of *Orca*, except that the roots of the teeth are cylindrical. Vertebrae: C 7, D 10, L 9, Ca 24; total 50; first to sixth or seventh cervical vertebrae united; bodies of the lumbar vertebrae distinguished from those of the preceding genera by being more elongated, the length being to the width as 3 to 2. Flippers of moderate size, narrow and pointed. Dorsal fin situated near the middle of the back, of moderate size, and sickle-shaped. Head in front of the blow-hole high, and compressed anteriorly, the snout truncated. See CA'ING WHALE.

Risso's dolphin, *Grampus griseus*, represents another genus, characterized by the absence of teeth in the upper and the small number of these in the lower jaw (3 to 7 on each side, and confined to the region of the symphysis). Vertebrae: C 7, D 12, L 19, Ca 30; total 68. General external characters much as in *Globicephalus*, but the fore part of the head less rounded, and the flippers less elongated. *G. griseus* is about 13 ft. long, and remarkable for its great variability of colour. It has been found, though rarely, in the North Atlantic and Mediterranean.

The common dolphin (*Delphinus delphis*) is the typical representative of a large group of relatively small species, some of which are wholly marine, while others are more or less completely fluviatile. They are divided into a number of genera, such as *Prodelphinus*, *Steno*, *Lagenorhynchus*, *Cephalorhynchus*, *Tursiops*, &c., best distinguished from one another by the number and size of the teeth, the form and relations of the bones on the hinder part of the palate, the length of the beak and of the union of the two halves of the lower jaw, and the number of vertebrae. For the distinctive characters of these genera the reader may refer to one of the works mentioned below; and it must suffice to state that, collectively, all these dolphins are characterized by the following features. The teeth are numerous in both jaws, and more than $\frac{8}{8}\frac{8}{8}$ in number, occupying nearly the whole length of the rostrum, and small, close-set, conical, pointed and slightly curved. Rostrum more or less elongated, and pointed in front, usually considerably longer than the cranial portion of the skull. Vertebrae: C 7, D 12-14, L and Ca variable; total 51 to 90. Flippers of moderate size, narrow, pointed, somewhat sickle-shaped, with the first digit rudimentary, the second longest, third nearly equal, and the fourth and fifth extremely short. Externally the head shows a distinct beak or pointed snout, marked off from the antenasal fatty elevation by a V-shaped groove. Dorsal fin rather large, triangular or sickle-shaped, rarely wanting. A curiously marked brown and white species, perhaps referable to *Lagenorhynchus* is found on the fringe of the Antarctic ice (see report on the zoology of the "Discovery," published in 1907 by the British Museum). See DOLPHIN.

Extinct Cetacea.

At present we are totally in the dark as to the origin of the whalebone-whales, not being even assured that they are derived from the same stock as the toothed whales. It is noteworthy, however, that some of the fossil representatives of the latter have nasal bones of a type recalling those of the former. Such fossil whalebone-whales as are known occur in Pliocene, and Miocene formations are either referable to existing genera, or to more or less nearly related extinct ones, such as *Plesiocetus*, *Herpetocetus* and *Cetotherium*.

The toothed whales, on the other hand, are very largely represented in a fossil state, reaching as low in the geological series as the upper Cretaceous. Many of these present much more generalized characters than their modern representatives, while others indicate apparently a transition towards the still more primitive zeuglodonts, which, as will be shown later, are themselves derived from the creodont Carnivora. In the Pliocene deposits of Belgium and England are preserved the teeth and other remains of a number of cetaceans, such as *Physodon*, *Encetus*, *Dinoziphius*, *Hoplocetus*, *Balaenodon* and *Scaldicetus*, more or less nearly related to the sperm-whale, but presenting several primitive characters. A complete skull of a member of this group from the Tertiary deposits of Patagonia, at first referred to *Physodon*, but subsequently to *Scaldicetus*, has a full series of enamelled teeth in the upper jaw; and it is probable that the same was the case in other forms. This entails either a modification of the definition of the *Physeteridae* as given above, or the creation of a separate family for these primitive sperm-whales. In other cases, however, as in the Miocene *Prophyseter* and *Placoziphius*, the anterior portion or the whole of the upper jaw had already become toothless; and these forms are regarded as indicating the descent of the sperm-whales from the under-mentioned *Squalodon*. The beaked whales, again, are believed to be independently descended from the latter type, *Berardius* being traced into the Miocene *Mioziphius*, *Anoplonassa* and *Palaeoziphius*, the last of which shows signs in its dentition of approximating to the complicated tooth-structure of the squalodonts.

Another line of descent from the latter, apparently culminating in the modern *Platanistidae*, is represented by the family

Eurhinodelphidae, typified by the European Miocene *Eurhinodelphis*, but also including the contemporary Patagonian *Argyrocetus* and the nearly allied European *Cyrtodelphis*. All these were very long-beaked dolphins; and in *Argyrocetus*, at all events, the occipital condyles, instead of being closely pressed to the skull, are as prominent as in ordinary mammals, while the nasal bones, instead of forming mere rudimentary nodules, were squared and roofed over the hind part of the nasal chamber.

In the Miocene *Squalodon*, representing the family *Squalodontidae*, the dentition is differentiated into incisors, canines and cheek-teeth, the hinder ones of the latter series having double roots and compressed crowns carrying serrations on the hinder edge; generally the dental formula has been given as *i.* $\frac{1}{1}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{3}{3}$, the single-rooted cheek-teeth being regarded as premolars and those with double roots as molars. Dr Abel is, however, of opinion that the formula is better represented as *i.* $\frac{1}{1}$, *c.* $\frac{1}{1}$, *p.* $\frac{8 \text{ or } 9}{9}$, *m.* $\frac{3}{3}$; the teeth reckoned as molars corresponding to those of the creodont Carnivora. The single-rooted cheek-teeth are regarded as due, not to the division of double-rooted ones, but to the fusion of the two roots of teeth of the latter type. In *Squalodon* the nasal bones were of the modern nodular type, but in the Miocene Patagonian *Prosqualodon* they partially covered the nasal chamber.

At present there is a gap between the most primitive squalodonts and the Eocene zeuglodonts (*Zeuglodontidae*), which are regarded by Messrs Max Weber, O. Abel and C. W. Andrews as the direct forerunners of the modern-toothed whales, forming the sub-order *Archaeoceti*. It is, however, right to mention that some authorities refuse to admit the relation of the Archaeoceti to the whales.

In the typical zeuglodonts the long and flat skull has large temporal fossae, a strong sagittal crest, a long beak formed mainly by the premaxillae (in place of the maxillae, as in modern whales), and long nasal bones covering over the nasal chamber, so that the nostrils opened about half-way down the beak. All the cervical vertebrae were free. Normally the dentition in the typical genus *Zeuglodon* (which is common to the Eocene of North America and Egypt) is *i.* $\frac{1}{1}$, *c.* $\frac{1}{1}$, *p.* $\frac{4}{4}$, *m.* $\frac{3}{3}$; the cheek-teeth being two-rooted, with compressed pointed crowns, of which the fore-and-aft edges are coarsely serrated. In the Egyptian *Zeuglodon osiris* the number of the molars is, however, reduced to $\frac{2}{2}$, while some of the earlier cheek-teeth have become single-rooted, as in the squalodonts. The probable transitional form between the latter and the zeuglodonts is the small *Microzeuglodon caucasicus* described by the present writer, from the Caucasus. As regards the origin of the zeuglodonts themselves, remains discovered in the Eocene formations of Egypt indicate a practically complete transition, so far at least as dental characters are concerned, from these whale-like creatures to the creodont Carnivora. In the earliest type, *Protocetus*, the skull is practically that of a zeuglodont, the snout being in fact more elongated than in some of the earliest representatives of the latter, although the nostrils are placed nearer the tip. The incisors are unknown, but the cheek-teeth are essentially those of a creodont, none of them having acquired the serrated edges distinctive of the typical zeuglodonts; and the hinder premolars and molars retaining the three roots of the creodonts. In the somewhat later *Prozeuglodon* the skull is likewise essentially of the zeuglodont type, although the nostrils have shifted a little more backwards; as regards the cheek-teeth, which have acquired serrated crowns, the premolars at any rate retain the inner buttress supported by a distinct third root, so that they are precisely intermediate between *Protocetus* and *Zeuglodon*. Yet another connecting form is *Eocetus*, a very large animal from nearly the same horizon as *Prozeuglodon*; its skull approaching that of *Zeuglodon* as regards the backward position of the nostrils, although the cheek-teeth are of the creodont type, having inner, or third, roots. It is noteworthy that *Zeuglodon* apparently occurs in the same beds as these intermediate types.

It follows from the foregoing that if zeuglodonts are the ancestors of the true Cetacea—and the probability that they are so is very great—the latter are derived from primitive Carnivora, and not, as has been suggested, from herbivorous Ungulata. The idea that the zeuglodonts were provided with a bony armour does not appear to be supported by recent discoveries.

AUTHORITIES.—The above article is based on that by Sir W. H. Flower in the 9th edition of this work. See also W. H. Flower, "On the Characters and Divisions of the Family Delphinidae," *Proc. Zool. Soc.* (London, 1883); F. W. True, "Review of the Family Delphinidae," *Proc. U. S. Museum*, No. 36 (1889); R. Lydekker, "Cetacean Skulls from Patagonia," *Palaeontol. Argentina*, vol. ii. *An. Mus. La Plata* (1893); W. Dames, "Über Zeuglodonten aus Ägypten," *Paläontol. Abhandlungen*, vol. i. (1894); F. E. Beddard, *A Book of Whales* (London, 1900); O. Abel, "Untersuchungen über die fossilen Platanistiden des Wiener Beckens," *Denks. k. Akad. Wiss. Wien.*, vol. lxviii. (1899); "Les Dauphins longirostres du Bolérien," *Mém. musée d'hist. nat. belgique* (1901 and 1902); "Die phylogenetische Entwickelung des Cetaceengebisses und die systematische Stellung der Physeteriden," *Verhandl. deutsch. zool. Gesellschaft* (1905); E. Fraas, "Neue Zeuglodonten aus dem unteren Mittelocean vom Mokattam bei Cairo," *Geol. und paläontol. Abhandl.* ser. 2, vol. vi. (1904); C. W. Andrews, "Descriptive Catalogue of the Tertiary Vertebrata of the Fayum" (British Museum, 1906). (R. L.*)

CETHEGUS, the name of a Roman patrician family of the Cornelian gens. Like the younger Cato its members kept up the old Roman fashion of dispensing with the tunic and leaving the arms bare (Horace, *Ars Poëtica*, 50; Lucan, *Pharsalia*, ii. 543). Two individuals are of some importance:—

(1) MARCUS CORNELIUS CETHEGUS, pontifex maximus and curule aedile, 213 B.C. In 211, as praetor, he had charge of Apulia; later, he was sent to Sicily, where he proved a successful administrator. In 209 he was censor, and in 204 consul. In 203 he was proconsul in Upper Italy, where, in conjunction with the praetor P. Quintilius Varus, he gained a hard-won victory over Mago, Hannibal's brother, in Insubrian territory, and obliged him to leave Italy. He died in 196. He had a great reputation as an orator, and is characterized by Ennius as "the quintessence of persuasiveness" (*suadae medulla*). Horace (*Ars Poët.* 50; *Epistles*, ii. 2. 117) calls him an authority on the use of Latin words.

Livy xxv. 2, 41, xxvii. 11, xxix. 11, xxx. 18.

(2) GAIUS CORNELIUS CETHEGUS, the boldest and most dangerous of Catiline's associates. Like many other youthful profligates, he joined the conspiracy in the hope of getting his debts cancelled. When Catiline left Rome in 63 B.C., after Cicero's first speech, Cethegus remained behind as leader of the conspirators with P. Lentulus Sura. He himself undertook to murder Cicero and other prominent men, but was hampered by the dilatoriness of Sura, whose age and rank entitled him to the chief consideration. The discovery of arms in Cethegus's house, and of the letter which he had given to the ambassadors of the Allobroges, who had been invited to co-operate, led to his arrest. He was condemned to death, and executed, with Sura and others, on the night of the 5th of December.

Sallust, *Catilina*, 46-55; Cicero, *In Cat.* iii. 5-7; Appian, *Bell. Civ.* ii. 2-5; see CATILINE.

CETINA, GUTIERRE DE (1518?–1572?), Spanish poet and soldier, was born at Seville shortly before 1520. He served under Charles V. in Italy and Germany, but retired from the army in 1545 to settle in Seville. Soon afterwards, however, he sailed for Mexico, where he resided for some ten years; he appears to have visited Seville in 1557, and to have returned to Mexico, where he died at some date previous to 1575. A follower of Boscan and Garcilaso de la Vega, a friend of Jerónimo de Urrea and Baltavar del Alcázar, Cetina adopted the doctrines of the Italian school and, under the name of Vandalio, wrote an extensive series of poems in the newly introduced metres; his sonnets are remarkable for elegance of form and sincerity of sentiment, his other productions being in great part adaptations from Petrarch, Ariosto and Ludovico Dolce. His patrons were Antonio de Leyva, prince of Ascoli, Hurtado de Mendoza, and Alva's grandson, the duke de Sessa, but he seems to have profited little by their protection. His works have been well edited by Joaquín Hazañas y la Rúa in two volumes published at Seville (1895).

CETTE, a seaport of southern France in the department of Hérault, 18 m. S.W. of Montpellier by the Southern railway. Pop. (1906) 32,659. After Marseilles it is the principal commercial port on the south coast of France. The older part of Cette occupies the foot and slope of the Mont St Clair (the ancient *Mons Setius*), a hill 590 ft. in height, situated on a tongue of land that lies between the Mediterranean and the lagoon of Thau. This quarter with its wide streets and lofty stone buildings is bounded on the east by the Canal de Cette, which leads from the lagoon of Thau to the Old Basin and the outer harbour. Across the canal lie the newer quarters, which chiefly occupy two islands separated from each other by a wet dock and limited on the east by the Canal Maritime, parallel to the Canal de Cette. A lateral canal unites the northern ends of the two main canals. A breakwater running W.S.W. and

E.N.E. protects the entrance to the harbour, which is one of the safest in France. The outer port and the Old Basin are enclosed by a mole to the south and by a jetty to the east. Behind the outer port lies an inner and more recent basin which communicates with the Canal Maritime. The entire area of the harbour, including the canals, is 111 acres with a quayage length of over 8000 yds. The public institutions of Cette include tribunals of commerce and of maritime commerce, councils of arbitration in commercial and fishing affairs, an exchange and chamber of commerce, a branch of the Bank of France and a large hospital. There are also a communal college, a naval school, and schools of music, commerce and industry, and navigation. Cette is much resorted to for sea-bathing. The town is connected with Lyons by the canal from the Rhone to Cette, and with Bordeaux by the Canal du Midi, and is a junction of the Southern and Paris-Lyon railways. The shipping trade is carried on with South America, the chief ports of the Mediterranean, and especially with Spain. The chief exports are wines and brandy, chemical products, skins and soap; the chief imports are wine, cereals, coal, timber, petroleum, sulphur, tar and chemical substances. In the five years 1901-1905 the average annual value of imports was £3,720,000 (£4,980,000 in years 1896–1900), of exports £1,427,000 (£1,237,000 in 1896–1900). More than 400 small craft are employed in the sardine, tunny, cod and other fisheries. Large quantities of shell-fish are obtained from the lagoon of Thau. There are factories for the pickling of sardines, for the manufacture of liqueurs and casks, and for the treatment of sulphur, phosphates, and nitrate of soda. The Schneider Company of Creusot also have metallurgical works at Cette, and the establishments for making wine give employment to thousands. The port of Cette was created in 1666 by the agency of Colbert, minister of Louis XIV., and according to the plans of Vauban; toward the end of the 17th century its development was aided by the opening of the Canal du Midi.

CETTIGNE (Servian, *Tsetinye;* also written *Cettinje*, *Tzetinje*, and *Tsettinye*), the capital of Montenegro; in a narrow plain deeply sunk in the heart of the limestone mountains, at a height of 2093 ft. above the sea. Pop. (1900) about 3200. The surrounding country is bare and stony, with carefully cultivated patches of rich red soil among the crevices of the rock. In winter it is often so deeply covered with snow as to be well-nigh inaccessible, while in spring and autumn it is frequently flooded by the waters of a small brook which becomes a torrent after rain or a thaw. Cettigne itself is little more than a walled village, consisting of a cluster of whitewashed cottages and some unadorned public buildings. These include a church; a fortified monastery which was founded in 1478, but so often burned and rebuilt as to seem quite modern, and which is visited by pilgrims to the tomb of Peter I. (1782–1830); residences for the archimandrite and the *vladika* or metropolitan of Cettigne; a palace built in 1863, which accommodates the ministries; the court of appeal, and a school modelled on the gymnasia of Germany and Austria; the newer palaces of the prince and his heir; foreign legations; barracks; a seminary for priests and teachers, established by the tsar Alexander II. (1855–1881), with a very successful girls' school founded and endowed by the tsaritsa Marie; a library and reading-room; a theatre, a museum and a hospital. In an open space near the old palace stood the celebrated plane tree, beneath which Prince Nicholas gave audience to his subjects, and administered justice until the closing years of the 19th century. A zigzag highway, regarded as a triumph of engineering, winds through the mountain passes between Cettigne and the Austrian seaport of Cattaro; and other good roads give access to the richest parts of the interior. There is, however, little trade, though mineral waters are manufactured.

Cettigne owes its origin to Ivan the Black, who was forced, towards the end of the 15th century, to withdraw from Zhabliak, his former capital. It has often been taken and sacked by the Turks, but has seldom been occupied by them for long.

CETUS ("The Whale"), in astronomy, a constellation of the southern hemisphere, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.), and fabled by the Greeks to be the monster sent by Neptune to devour Andromeda, but which was slain by Perseus. Ptolemy catalogued 22 stars in this constellation; Tycho Brahe, 21; and Hevelius, 45. The most remarkable star of this constellation is *o*-(*Mira*) *Ceti*, a long-period variable, discovered by the German astronomer Fabricius; its magnitude varies between about 3 to 9, and its period is 331 days. *τ-Ceti* is an irregular variable, its extreme magnitudes being 5 and 7; *γ-Ceti* is a beautiful double star, consisting of a yellow star of magnitude 3 and a blue of magnitude 6·8; *ν-Ceti* is also a double star.

CETYWAYO (?–1884), king of the Zulus, was the eldest son of King Umpande or Panda, and a nephew of the two previous kings, Dingaan and Chaka. Cetywayo was a young man when in 1840 his father was placed on the throne by the aid of the Natal Boers; and three years later Natal became a British colony. Cetywayo had inherited much of the military talent of his uncle Chaka, the organizer of the Zulu military system, and chafed under his father's peaceful policy towards his British and Boer neighbours. Suspecting Panda of favouring a younger son, Umbulazi, as his successor, Cetywayo made war on his brother, whom he defeated and slew at a great battle on the banks of the Tugela in December 1856. In the following year, at an assembly of the Zulus, it was resolved that Panda should retire from the mangement of the affairs of the nation, which were entrusted to Cetywayo, though the old chief kept the title of king. Cetywayo was, however, suspicious of the Natal government, which afforded protection to two of his brothers. The feeling of distrust was removed in 1861 by a visit from Mr (afterwards Sir) Theophilus Shepstone, secretary for native affairs in Natal, who induced Panda to proclaim Cetywayo publicly as the future king. Friendly relations were then maintained between the Zulus and Natal for many years. In 1872 Panda died, and Cetywayo was declared king, August 1873, in the presence of Shepstone, to whom he made solemn promises to live at peace with his neighbours and to govern his people more humanely. These promises were not kept. Not only were numbers of his own people wantonly slain (Cetywayo returning defiant messages to the governor of Natal when remonstrated with), and the military system of Chaka and Dingaan strengthened, but he had a feud with the Transvaal Boers as to the possession of the territory between the Buffalo and Pongola rivers, and encouraged the chief Sikukuni (Secocoeni) in his struggle against the Boers. This feud with the Boers was inherited by the British government on the annexation of the Transvaal in 1877. Cetywayo's attitude became menacing; he allowed a minor chief to make raids into the Transvaal, and seized natives within the Natal border.

Sir Bartle Frere, who became high commissioner of South Africa in March 1877, found evidence which convinced him that the Kaffir revolt of that year on the eastern border of Cape Colony was part of a design or desire "for a general and simultaneous rising of Kaffirdom against white civilization"; and the Kaffirs undoubtedly looked to Cetywayo and the Zulus as the most redoubtable of their champions. In December 1878 Frere sent the Zulu king an ultimatum, which, while awarding him the territory he claimed from the Boers, required him to make reparation for the outrages committed within the British borders, to receive a British resident, to disband his regiments, and to allow his young men to marry without the necessity of having first "washed their spears." Cetywayo, who had found a defender in Bishop Colenso, vouchsafed no reply, and Lord Chelmsford entered Zululand, at the head of 13,000 troops, on the 11th of January 1879 to enforce the British demands. The disaster of Isandhlwana and the defence of Rorke's Drift signalized the commencement of the campaign, but on the 4th of July the Zulus were utterly routed at Ulundi. Cetywayo became a fugitive, but was captured on the 28th of August. His kingdom was divided among thirteen chiefs and he himself taken to Cape Town, whence he was brought to London in

August 1882. He remained in England less than a month, during which time the government (the second Gladstone administration) announced that they had decided upon his restoration. To his great disappointment, however, restoration proved to refer only to a portion of his old kingdom. Even there one of his kinsmen and chief enemies, Usibepu, was allowed to retain the territory allotted to him in 1879. Cetywayo was reinstalled on the 29th of January 1883 by Shepstone, but his enemies, headed by Usibepu, attacked him within a week, and after a struggle of nearly a year's duration he was defeated and his kraal destroyed. He then took refuge in the Native Reserve, where he died on the 8th of February 1884. For a quarter of a century he had been the most conspicuous native figure in South Africa, and had been the cause of long and bitter political controversy in Great Britain.

His son DINIZULU afterwards attempted to become king, was exiled (1889) to St Helena, permitted to return (1898), and granted the position of a chief. In December 1907 Dinizulu was imprisoned at Maritzburg, being suspected of complicity in the revolt which had occurred in Zululand the previous year. He was kept many months waiting trial, there being considerable friction between the colonial government and the British government over the incident. He was eventually brought to trial in November 1908 before a special court, his defence (to the cost of which the British government contributed £2000) being undertaken by Mr W. P. Schreiner. The trial was not concluded until March 1909. The charge of high treason was not proved, but Dinizulu was convicted of harbouring rebels and was sentenced to four years' imprisonment.

The Life of Sir Bartle Frere, by John Martineau, vol. ii. chaps. 18 to 21, contains much information concerning Cetywayo.

CEUTA (Arabic *Sebta*), a Spanish military and convict station and seaport on the north coast of Morocco, in 35° 54′ N., 5° 18′ W. Pop. about 13,000. It is situated on a promontory connected with the mainland by a narrow isthmus. This promontory marks the south-eastern end of the straits of Gibraltar, which between Ceuta and Gibraltar have a width of 14 m. The promontory terminates in a bold headland, the Montagne des Singes, with seven distinct peaks. Of these the highest is the Monte del Hacko, the ancient *Abyla*, one of the "Pillars of Hercules," which faces Gibraltar and rises 636 ft. above the sea. On the westernmost point—Almina, 476 ft. high—is a lighthouse with a light visible for 23 m. Ceuta consists of two quarters, the old town, covering the low ground of the isthmus, and the modern town, built on the hills forming the north and west faces of the peninsula. Between the old and new quarters and on the north side of the isthmus lies the port. The public buildings in the town, thoroughly Spanish in its character, are not striking: they include the cathedral (formerly a mosque), the governor's palace, the town hall, barracks, and the convict prison in the old convent of San Francisco. Ceuta has been fortified seaward, the works being furnished with modern artillery intended to command the entrance to the Mediterranean. Landward are three lines of defence, the inner line stretching completely across the isthmus. These fortifications, which date from the time of the Portuguese occupation, have been partly modernized. The citadel, El Hacho, built on the neck of the isthmus, dates from the 15th century. The garrison consists of between 3000 and 4000 men, inclusive of a disciplinary corps of military convicts. Of the rest of the population about 2000 are civilian convicts; and there are colonies of Jews, negroes and Moors, the last including descendants of Moors transferred to Ceuta from Oran when Spain abandoned that city in 1796.

Ceuta occupies in part the site of a Carthaginian colony, which was succeeded by a Roman colony said to have been called *Ad Septem Fratres* and also *Exilissa* or *Lissa Civitas*. From the Romans the town passed to the Vandals and afterwards to Byzantium, the emperor Justinian restoring its fortifications in 535. In 618 the town, then known as *Septon*, fell into the hands of the Visigoths. It was the last stronghold in North Africa which held out against the Arabs. At that date (A.D. 711) the governor of the town was the Count Julian who, in revenge for the betrayal of his daughter by King Roderick of Toledo, invited the Arabs to cross the straits under Tarik and conquer Spain for Islam. By the Arabs the town was called *Cibta* or *Sebta*, hence the Spanish form *Ceuta*. From the date of its occupation by the Arabs the town had a stormy history, being repeatedly captured by rival Berber and Spanish-Moorish dynasties. It became nevertheless an important commercial and industrial city, being noted for its brass ware, its trade in ivory, gold and slaves. It is said to have been the first place in the West where a paper manufactory was established. In 1415 the town was captured by the Portuguese under John I., among those taking part in the attack being Prince Henry "the Navigator" and two of his brothers, who were knighted on the day following in the mosque (hastily dedicated as a Christian church). Ceuta passed to Spain in 1580 on the subjugation of Portugal by Philip II., and was definitely assigned to the Spanish crown by the treaty of Lisbon in 1688. The town has been several times unsuccessfully besieged by the Moors—one siege, under Mulai Ismail, lasting twenty-six years (1694–1720). In 1810, with the consent of Spain, it was occupied by British troops under General Sir J. F. Fraser. The town was restored to Spain by the British at the close of the Napoleonic Wars. As the result of the war between Spain and Morocco in 1860 the area of Spanish territory around the town was increased. The military governor of the town also commands the troops in the other Spanish stations on the coast of Morocco. For civil purposes Ceuta is attached to the province of Cadiz. It is a free port, but does little trade.

See de Prado, *Recuerdos de Africa; historia de la plaza de Ceuta* (Madrid, 1859–1860); Budgett Meakin, *The Land of the Moors* (London, 1901), chap. xix., where many works dealing with Spanish Morocco are cited.

CEVA, a town of Piedmont, Italy, in the province of Cuneo, 33 m. E. by rail from the town of Cuneo, 1270 ft. above sea-level. Pop. (1901) 2703. In the middle ages it was a strong fortress defending the confines of Piedmont towards Liguria, but the fortifications on the rock above the town were demolished in 1800 by the French, to whom it had been ceded in 1796. Its cheese (*caseus cebanus*) was famous in Roman times, but it does not seem ever to have been a Roman town. It lay on the road between Augusta Taurinorum and Vada Sabatia. A branch railway runs from Ceva through Garessio, with its marble quarries, to Ormea (2398 ft.), 22 m. to the south through the upper valley of the Tanaro, which in Roman times was under Albingaunum (Th. Mommsen in *Corp. Inscr. Lat.* v. (Berlin, 1877), p. 898). From Ormea a road runs south to (31 m.) Oneglia on the Ligurian coast.

CÉVENNES (Lat. *Cebenna* or *Gebenna*), a mountain range of southern France, forming the southern and eastern fringe of the central plateau and part of the watershed between the Atlantic and Mediterranean basins. It consists of a narrow ridge some 320 m. long, with numerous lofty plateaus and secondary ranges branching from it. The northern division of the range, which nowhere exceeds 3320 ft. in height, extends, under the name of the mountains of Charolais, Beaujolais and Lyonnais, from the Col de Longpendu (west of Chalon-sur-Saône) in a southerly direction to the Col de Gier. The central Cévennes, comprising the volcanic chain of Vivarais, incline south-east and extend as far as the Lozère group. The northern portion of this chain forms the Boutières range. Farther south it includes the Gerbier des Jonc (5089 ft.), the Mont de Mézenc (5755 ft.), the culminating point of the entire range, and the Tanargue group. South of the Mont Lozère, where the Pic Finiels reaches 5584 ft., lies that portion of the range to which the name Cévennes is most strictly applied. This region, now embraced in the departments of Lozère and Gard, stretches south to include the Aigoual and Espérou groups. Under various local names (the Garrigues, the mountains of Espinouse and Lacaune) and with numerous offshoots the range extends south-east and then east to the Montagne Noire, which runs parallel to the Canal du Midi and comes to an end some 25 m. east of Toulouse. In the south the Cévennes separate the cold and barren tablelands

known as the Causses from the sunny region of Languedoc, where the olive, vine and mulberry flourish. Northwards the contrast between the two slopes is less striking.

The Cévennes proper are formed by a folded belt of Palaeozoic rocks which lies along the south-east border of the central plateau of France. Concealed in part by later deposits, this ancient mountain chain extends from Castelnaudary to the neighbourhood of Valence, where it sinks suddenly beneath the Tertiary and recent deposits of the valley of the Rhone. It is in the Montagne Noire rather than in the Cévennes proper that the structure of the chain has been most fully investigated. All the geological systems from the Cambrian to the Carboniferous are included in the folded belt, and J. Bergeron has shown that the gneiss and schist which form so much of the chain consist, in part at least, of metamorphosed Cambrian beds. The direction of the folds is about N. 60° E., and the structure is complicated by overthrusting on an extensive scale. The overthrust came from the south-east, and the Palaeozoic beds were crushed and crumpled against the ancient massif of the central plateau. The principal folding took place at the close of the Carboniferous period, and was contemporaneous with that of the old Hercynian chain of Belgium, &c. The Permian and later beds lie unconformably upon the denuded folds, and in the space between the Montagne Noire and the Cévennes proper the folded belt is buried beneath the horizontal Jurassic strata of the Causses. Although the chain was completed in Palaeozoic times, a second folding took place along its south-east margin at the close of the Eocene period. The Secondary and Tertiary beds of the Languedoc were crushed against the central plateau and were frequently overfolded. But by this time the ancient Palaeozoic chain had become a part of the unyielding massif, and the folding did not extend beyond its foot.

As the division between the basins of the Loire and the Garonne to the west and those of the Saône and Rhone to the east, the Cévennes send many affluents to those rivers. In the south the Orb, the Hérault and the Vidourle are independent rivers flowing to the Golfe du Lion; farther north, the Gard—formed by the union of several streams named Gardon—the Cèze and the Ardèche flow to the Rhone. The Vivarais mountains and the northern Cévennes approach the right banks of the Rhone and Saône closely, and on that side send their waters by way of short torrents to those rivers; on the west side the streams are tributaries of the Loire, which rises at the foot of Mont Mézenc. A short distance to the south on the same side are the sources of the Allier and Lot. The waters of the north-western slope of the southern Cévennes drain into the Tarn either directly or by way of the Aveyron, which rises in the outlying chain of the Lévezou, and, in the extreme south, the Agout. The Tarn itself rises on the southern slope of the Mont Lozère.

In the Lozère group and the southern Cévennes generally, good pasturage is found, and huge flocks spend the summer there. Silkworm-rearing and the cultivation of peaches, chestnuts and other fruits are also carried on. In the Vivarais cattle are reared, while on the slopes of the Beaujolais excellent wines are grown.

The chief historical event in the history of the Cévennes is the revolt of the Camisards in the early years of the 18th century (see CAMISARDS).

CEYLON, a large island and British colony in the Indian Ocean, separated on the N.W. from India by the Gulf of Manaar and Palk Strait. It lies between 5° 55′ and 9° 51′ N. and between 79° 41′ and 81° 54′ E. Its extreme length from north to south is 271½ m.; its greatest width is 137½ m.; and its area amounts to 25,481 sq. m., or about five-sixths of that of Ireland. In its general outline the island resembles a pear, the apex of which points towards the north.

The coast is beset on the N.W. with numberless sandbanks, rocks and shoals, and may be said to be almost connected with India by the island of Rameswaram and Adam's Bridge, a succession of bold rocks reaching almost across the gulf at its narrowest point. Between the island and the opposite coast there exist two open channels of varying depth and width, beset by rocks and shoals. One of these, the Manaar Passage, is only navigable by very small craft. The other, called the Paumben Passage, lying between Rameswaram and the mainland, has been deepened at considerable outlay, and is used by large vessels in passing from the Malabar to the Coromandel coast, which were formerly compelled in doing so to make the circuit of the island. The west and south coasts, which are uniformly low, are fringed their entire length by cocoa-nut trees, which grow to the water's edge in great luxuriance, and give the island a most picturesque appearance. Along these shores there are numerous inlets and backwaters of the sea, some of which are available as harbours for small native craft. The east coast from Point de Galle to Trincomalee is of an entirely opposite character, wanting the ample vegetation of the other, and being at the same time of a bold precipitous character. The largest ships may freely approach this side of the island, provided they take care to avoid a few dangerous rocks, whose localities, however, are well known to navigators.

Coast.

Seen from a distance at sea this "utmost Indian isle" of the old geographers wears a truly beautiful appearance. The remarkable elevation known as "Adam's Peak," the most prominent, though not the loftiest, of the hilly ranges of the interior, towers like a mountain monarch amongst an assemblage of picturesque hills, and is a sure landmark for the navigator when as yet the Colombo lighthouse is hidden from sight amid the green groves of palms that seem to be springing from the waters of the ocean. The low coast-line encircles the mountain zone of the interior on the east, south and west, forming a belt which extends inland to a varying distance of from 30 to 80 m.; but on the north the whole breadth of the island from Kalpitiya to Batticaloa is an almost unbroken plain, containing magnificent forests of great extent.

The mountain zone is towards the south of the island, and covers an area of about 4212 sq. m. The uplifting force seems to have been exerted from south-west to north-east, and although there is much confusion in many of the intersecting ridges, and spurs of great size and extent are sent off in many directions, the lower ranges manifest a remarkable tendency to run in parallel ridges in a direction from south-east to north-west. Towards the north the offsets of the mountain system radiate to short distances and speedily sink to the level of the plain. Detached hills are rare; the most celebrated of these are Mihintale (anc. *Missïaka*), which overlooks the sacred city of Anuradhapura, and Sigiri. The latter is the only example in Ceylon of those solitary acclivities which form so remarkable a feature in the tableland of the Deccan—which, starting abruptly from the plain, with scarped and perpendicular sides, are frequently converted into strongholds accessible only by precipitous pathways or by steps hewn in the solid rock.

Mountains.

For a long period Adam's Peak was supposed to be the highest mountain in Ceylon, but actual survey makes it only 7353 ft. above sea-level. This elevation is chiefly remarkable as the resort of pilgrims from all parts of the East. The hollow in the lofty rock that crowns the summit is said by the Brahmans to be the footstep of Siva, by the Buddhists of Buddha, by the Mahommedans of Adam, whilst the Portuguese Christians were divided between the conflicting claims of St Thomas and the eunuch of Candace, queen of Ethiopia. The footstep is covered by a handsome roof, and is guarded by the priests of a rich monastery half-way up the mountain, who maintain a shrine on the summit of the peak. The highest mountains in Ceylon are Pidurutalagala, 8296 ft. in altitude; Kirigalpota, 7836 ft.; and Totapelakanda, 7746 ft.

The summits of the highest ridges are clothed with verdure, and along their base, in the beautiful valleys which intersect them in every direction, the slopes were formerly covered with forests of gigantic and valuable trees, which, however, have disappeared under the axe of the planter, who felled and burnt the timber on all the finest slopes at an elevation of 2000 to 4500 ft., and converted the hillsides into highly cultivated coffee and afterwards tea estates.

The plain of Nuwara Eliya, the sanatorium of the island, is at an elevation of 6200 ft., and possesses many of the attributes of an alpine country. The climate of the Horton plains, at an elevation of 7000 ft., is still finer than that of Nuwara Eliya, but they are difficult of access, and are but little known to Europeans. The town of Kandy, in the Central Province, formerly the capital of the native sovereigns of the interior, is situated 1727 ft. above sea-level.

The island, though completely within the influence of oceanic evaporation, and possessing an elevated tableland of considerable extent, does not boast of any rivers of great volume. The rains which usher in each monsoon or change of season are indeed heavy, and during their fall swell the streams to torrents and impetuous rivers. But when these cease the water-courses fall back to their original state, and there are few of the rivers which cannot generally be passed on horseback. The largest river, the Mahaweliganga, has a course of 206 m., draining about one-sixth of the area of the island before it reaches the sea at Trincomalee on the east coast. There are twelve other considerable rivers, running to the west, east and south, but none of these exceeds 90 m. in length. The rivers are not favourable for navigation, except near the sea, where they expand into backwaters, which were used by the Dutch for the construction of their system of canals all round the western and southern coasts. Steamers ply between Colombo and Negombo along this narrow canal and lake. A similar service on the Kaluganga did not prove a success. There are no inland lakes except the remains of magnificent artificial lakes in the north and east of the island, and the backwaters on the coast. The lakes which add to the beauty of Colombo, Kandy, Lake Gregory, Nuwara Eliya and Kurunegala are artificial or partly so. Giant's Tank is said to have an area of 6380 acres, and Minneri and Kalawewa each exceed 4000 acres.

Rivers.

The magnificent basin of Trincomalee, situated on the east coast of Ceylon, is perhaps unsurpassed in extent, security and beauty by any haven in the world. The admiralty had a dock-yard here which was closed in 1905.

Geology.—Ceylon may be said to have been for ages slowly rising from the sea, as appears from the terraces abounding in marine shells, which occur in situations far above high-water mark, and at some miles distance from the sea. A great portion of the north of the island may be regarded as the joint production of the coral polyps and the currents, which for the greater part of the year set impetuously towards the south; coming laden with alluvial matter collected along the coast of Coromandel, and meeting with obstacles south of Point Calimere, they have deposited their burdens on the coral reefs round Point Pedro; and these, raised above the sea-level and covered deeply by sand drifts, have formed the peninsula of Jaffna, and the plains that trend westward till they unite with the narrow causeway of Adam's Bridge. Tertiary rocks are almost unknown. The great geological feature of the island is the profusion of gneiss, overlaid in many places in the interior by extensive beds of dolomitic limestone. This formation appears to be of great thickness; and when, as is not often the case, the under-surface of the gneiss series is exposed, it is invariably found resting on granite. Veins of pure quartz and felspar of considerable extent have been frequently met with in the gneiss; while in the elevated lands of the interior in the Galle districts may be seen copious deposits of disintegrated felspar, or *kaolin*, commonly known as porcelain clay. At various elevations the gneiss may be found intersected by veins of trap rock, upheaved whilst in a state of fusion subsequent to the consolidation of the former. In some localities on the seashore these veins assume the character of pitch-stone porphyry highly impregnated with iron. Hornblende and primitive greenstone are found in the vicinity of Adam's Peak and in the Pussellava district. Laterite, known in Ceylon as *kabuk*, a product of disintegrated gneiss, exists in vast quantities in many parts, and is quarried for building purposes.

Climate.—The seasons in Ceylon differ very slightly from those prevailing along the coasts of the Indian peninsula. The two distinctive monsoons of the year are called, from the winds which accompany them, the south-west and the north-east. The former is very regular in its approach, and may be looked for along the south-west coast between the 10th and 20th of May; the latter reaches the north-east coast between the end of October and the middle of November. There is a striking contrast in the influence which the south-west monsoon exerts on the one side of the island and on the other. The clouds are driven against the lofty mountains that overhang the western and southern coasts, and their condensed vapours descend there in copious showers. But the rains do not reach the opposite side of the island: while the south-west is deluged, the east and north are sometimes exhausted with dryness; and it not unfrequently happens that different sides of the same mountain present at the same moment the opposite extreme of droughts and moisture. The influence of the north-east monsoon is more general. The mountains which face the north-east are lower and more remote from the sea than those on the south-west; the clouds are carried farther inland, and it rains simultaneously on both sides of the island.

The length of the day, owing to the proximity of the island to the equator, does not vary more than an hour at any season. The mean time of the rising of the sun's centre at Colombo on February 1st is $6^h\ 23^m$ A.M., and of its setting $6^h\ 5^m$ P.M. On August 15th its rising is at $5^h\ 45^m$ A.M., and its setting at $6^h\ 7^m$ P.M. It is mid-day in Colombo when it is morning in England. Colombo is situated in 79° 50′ 45″ E., and the day is further advanced there than at Greenwich by $5^h\ 19^m\ 23^s$.

Flora.—The characteristics of the low-growing plants of Ceylon approach nearly to those of the coasts of southern India. The *Rhizophoreae* are numerous along the low muddy shores of salt lakes and stagnant pools; and the acacias are equally abundant. The list comprises *Aegiceras fragrans*, *Epithinia malayana*, *Thespesia populnea*, *Feronia elephantum*, *Salvadora persica* (the true mustard tree of Scripture), *Eugenia bracteata*, *Elaeodendron Roxburghii*, *Cassia Fistula*, *Cassia Roxburghii*, &c. The herbaceous plants of the low country belong mostly to the natural orders *Compositae*, *Leguminosae*, *Rubiaceae*, *Scrophulariaceae* and *Euphorbiaceae*.

Leaving the plains of the maritime country and ascending a height of 4000 ft. in the central districts, we find both herbage and trees assume an altered character. The foliage of the latter is larger and deeper coloured, and they attain a height unknown in the hot low country. The herbaceous vegetation is there made up of ferns, *Cyrtandreae*, *Compositae*, *Scitamineae* and *Urticaceae*. The dense masses of lofty forest at that altitude are interspersed with large open tracts of coarse wiry grass, called by the natives *patanas*, and of value to them as affording pasturage for their cattle.

Between the altitudes of 4000 and 8000 ft., many plants are to be met with partaking of European forms, yet blended with tropical characteristics. The guelder rose, St John's wort, the *Nepenthes distillatoria* or pitcher plant, violets, geraniums, buttercups, sundews, ladies' mantles and campanulas thrive by the side of *Magnoliaceae*, *Ranunculaceae*, *Elaeocarpeae*, &c. The most beautiful flowering shrub of this truly alpine region is the rhododendron, which in many instances grows to the height of 70 ft. It is met with in great abundance in the moist plains of the elevated land above Nuwara Eliya, flowering abundantly in June and July. There are two distinct varieties, one similar to the Nilgiri plant, having its leaves broad and cordate, and of a rusty colour on the under side; the other, peculiar to Ceylon, is found only in forests at the loftiest elevations; it has narrow rounded leaves, silvery on the under side, and grows to enormous heights, frequently measuring 3 ft. round the stem. At these altitudes English flowers, herbs and vegetables have been cultivated with perfect success, as also wheat, oats and barley. English fruit-trees grow, but rarely bear. Grapes are grown successfully in the north of the island. The vines were introduced by the Dutch, who overcame the difficulty of perpetual summer by exposing the roots, and thus giving the plants an artificial winter.

The timber trees indigenous to Ceylon are met with at every altitude from the sea-beach to the loftiest mountain peak. They vary much in their hardiness and durability, from the common cashew-nut tree, which when felled decays in a month, to the ebony and satinwood, which for many years resist the attacks of insects and climate. Many of the woods are valuable for furniture, and house and shipbuilding, and are capable of standing long exposure to weather. The most beautiful woods adapted to furniture work are the calamander, ebony, flowered satinwood, tamarind, nedun, dell, kadomberiya, kitul, coco-nut, &c.; the sack-yielding tree (*Antiaris saccidora*), for a long time confounded with the far-famed upas tree of Java (*Antiaris toxicaria*), grows in the Kurunegala district of the island. The *Cocos nucifera*, or coco-nut palm, is a native of the island, and may justly be considered the most valuable

of its trees. It grows in vast abundance along the entire sea-coast of the west and south sides of the island, and furnishes almost all that a Sinhalese villager requires. Its fruit, when green, supplies food and drink; when ripe, it yields oil. The juice of the unopened flower gives him toddy and arrack. The fibrous casing of the fruit when woven makes him ropes, nets, matting. The nut-shells form drinking-vessels, spoons, &c. The plaited leaves serve as plates and dishes, and as thatch for his cottage. The dried leaves are used as torches, the large leaf-stalks as garden fences. The trunk of the tree sawn up is employed for every possible purpose, from knife-handles to door-posts; hollowed out it forms a canoe or a coffin. There are four kinds of this palm—the common, the king, the dwarf and the Maldive. The Palmyra and Areca palms grow luxuriantly and abundantly, the former in the northern, the latter in the western and central districts. The one is valuable chiefly for its timber, of which large quantities are exported to the Indian coasts; the other supplies the betel-nut in common use amongst natives of the eastern tropics as a masticatory. The export trade in the latter to India and eastern ports is very considerable. Next in importance to the cocoa-nut palm among the indigenous products of Ceylon is the cinnamon plant, yielding the well-known spice of that name.

Fauna.—Foremost among the animals of Ceylon is the elephant, which, though far inferior to those of Africa and the Indian continent, is nevertheless of considerable value when tamed, on account of its strength, sagacity and docility. They are to be met with in greater or less numbers throughout most unfrequented parts of the interior. Occasionally they make inroads in herds upon the cultivated grounds and plantations, committing great damage. In order to protect these lands, and at the same time keep up the government stud of draught elephants, "kraals" or traps on a large scale are erected in the forests, into which the wild herds are driven; and once secured they are soon tamed and fit for service. The oxen are of small size, but hardy, and capable of drawing heavy loads. Buffaloes exist in great numbers throughout the interior, where they are employed in a half-tame state for ploughing rice-fields and treading out the corn. They feed upon any coarse grass, and can therefore be maintained on the village pasture-lands where oxen would not find support. Of deer, Ceylon possesses the spotted kind (*Axis maculata*), the muntjac (*Stylocerus muntjac*), a red deer (the Sambur of India), popularly called the Ceylon elk (*Musa Aristotelis*), and the small musk (*Moschus minima*). There are five species of monkeys, one the small rilawa (*Macacus pileatus*), and four known in Ceylon by the name of "wandaru" (*Presbytes ursinus, P. Thersites, P. cephalopterus, P. Priamus*), and the small quadrumanous animal, the loris (*Loris gracilis*), known as the "Ceylon sloth." Of the Cheiroptera sixteen species have been identified; amongst them is the rousette or flying fox (*Pteropus Edwardsii*). Of the Carnivora the only one dangerous to man is the small black bear (*Prochilus labiatus*). The tiger is not known in Ceylon, but the true panther (*Felis pardus*) is common, as is the jackal (*Canis aureus*) and the mongoose or ichneumon (*Herpestes vitticollis*). Rats are numerous, as are the squirrel and the porcupine, and the pig-rat or bandicoot (*Mus bandicota*), while the scaly ant-eater (*Manis pentedactyla*), locally known by the Malay name of pangolin, is occasionally found. The dugong (*Halicore dugong*) is frequently seen on various points of the coast. A game preservation society and the judicious action of government have done much to prevent the wanton destruction of Ceylon deer, elephants, &c., by establishing a close season. It is estimated that there must be 5000 wild elephants in the Ceylon forests. A licence to shoot or capture and an export royalty are now levied by government.

Captain V. Legge includes 371 species of birds in Ceylon, and many of them have splendid plumage, but in this respect they are surpassed by the birds of South America and Northern India. The eagles are small and rare, but hawks and owls are numerous; among the latter is a remarkable brown species, the cry of which has earned for it the name of the "devil-bird." The esculent swift, which furnishes in its edible nest the celebrated Chinese dainty, builds in caves in Ceylon. Crows of various species are numerous, and in the wilder parts pea-fowl are abundant. There are also to be mentioned king-fishers, sun-birds, several beautiful fly-catchers and snatchers, the golden oriole, parroquets and numerous pigeons, of which there are at least a dozen species. The Ceylon jungle-fowl (*Gallus Lafayetti*) is distinct from the Indian species. Ceylon is singularly rich in wading and water birds—ibises, storks, egrets, spoonbills and herons being frequently seen on the wet sands, while flamingoes line the beach in long files, and on the deeper waters inland are found teal and a countless variety of ducks and smaller fowl. Of the birds familiar to European sportsmen there are partridge, quail and snipe in abundance, and the woodcock has been seen.

The poisonous snakes of Ceylon are not numerous. Four species have been enumerated—the ticpolonga (*Daboia elegans*), the cobra di capello (*Naja tripudians*), the carawilla (*Trigonocephalus hypnale*), and the *Trigonocephalus nigromarginatus*, which is so rare that it has no popular name. The largest snake in Ceylon is the "boa," or "anaconda" of Eastern story (*Python reticulatus*); it is from 20 to 30 ft. in length, and preys on hog-deer and other smaller animals. Crocodiles infest the rivers and estuaries, and the large fresh-water reservoirs which supply the rice-fields; there are two species (*C. biporcatus* and *C. palustris*). Of lizards the most noteworthy are the iguana, several bloodsuckers, the chameleon and the familiar geckoes, which are furnished with pads to each toe, by which they are enabled to ascend perpendicular walls and adhere to glass and ceilings.

Insects exist in great numbers. The leaf and stick insects are of great variety and beauty. Ceylon has four species of the ant-lion, renowned for the predaceous ingenuity of its larvae; and the white ants or termites, the ravages of which are most destructive, are at once ubiquitous and innumerable in every place where the climate is not too chilly or the soil too sandy for them to construct their domed dwellings. They make their way through walls and floors, and in a few hours destroy every vegetable substance within their reach. Of all the insect pests that beset an unseasoned European the most annoying are the mosquitoes. Ticks are also an intolerable nuisance; they are exceedingly minute, and burrow under the skin. In the lower ranges of the hill country land leeches are found in tormenting profusion. But insects and reptiles do not trouble European residents so much as in early years—at any rate in the towns, while in the higher planting districts there is almost complete exemption from their unwelcome attentions. Bungalows are more carefully built to resist white ants, drainage and cleanliness prevent mosquitoes and ticks from multiplying, while snakes and leeches avoid cultivated, occupied ground.

Of the fish in ordinary use for the table the finest is the seir, a species of scomber (*Cybium guttatum*). Mackerel, dories, carp, whitings, mullet (red and striped), soles and sardines are abundant. Sharks appear on all parts of the coast, and the huge saw fish (*Pristis antiquorum*) infests the eastern coast of the island, where it attains a length of 12 to 15 ft. There are also several fishes remarkable for the brilliancy of their colouring; *e.g.* the Red Sea perch (*Holocentrum rubrum*), of the deepest scarlet, and the great fire fish (*Scorpaena miles*), of a brilliant red. Some are purple, others yellow, and numbers with scales of a lustrous green are called "parrots" by the natives; of these one (*Sparus Hardwickii*) is called the "flower parrot," from its exquisite colouring—irregular bands of blue, crimson and purple, green, yellow and grey, crossed by perpendicular stripes of black. The pearl fishery, as indicated below, is of great importance.

Population.—The total population of Ceylon in 1901, inclusive of military, shipping and 4914 prisoners of war, was 3,578,333, showing an increase of 18·8% in the decade. The population of Colombo was 158,228.

The population and area of the nine provinces was as follows:—

District.	Population.	Area in sq. m.
Western Province	925,342	1,432
Central Province	623,011	2,299½
Northern Province	341,985	3,363¼
Southern Province	566,925	2,146¼
Eastern Province	174,288	4,036½
North-Western Province	353,845	2,996⅝
North Central Province	79,110	4,002¼
Province of Uva	192,072	3,154½
Province of Sabaragamuwa	321,755	1,901⅛
	3,578,333	25,332

The table of nationality gives the principal groups as follows:—

Europeans	9,509
Burghers and Eurasians	23,539
Low-country Sinhalese	1,458,320
Kandyan Sinhalese	872,487
Tamils	953,535
Moors (Mahommedan)	228,706
Malays	11,963
Veddahs (Aborigines)	3,971

Altogether there are representatives of some seventy races in Ceylon. The Veddahs, who run wild in the woods, are the aborigines of the island.

Language.—The language of nearly 70% of the population is Sinhalese, which is nearly allied to Pali (*q.v.*); of the remaining 30%, with the exception of Europeans, the language is Tamil. A corrupt form of Portuguese is spoken by some natives of European descent. The Veddahs, a small forest tribe, speak a distinct language, and the Rodiyas, an outcast tribe, possess a large vocabulary of their own. The Sinhalese possess several original poems of some merit, and an extensive and most interesting series of native chronicles, but their most valuable literature is written in Pali, though the greater portion of it has been translated into Sinhalese, and is best known to the people through these Sinhalese translations.

Religion.—The principal religions may be distributed as follows:—Christians, 349,239; Buddhists, 2,141,404; Hindus, 826,826; Mahommedans, 246,118. Of the Christians, 287,419 are Roman Catholics, and 61,820 are Protestants of various denominations; and of these Christians 319,001 are natives, and 30,238 Europeans. The Mahommedans are the descendants of Arabs (locally termed Moormen) and the Malays. The Tamils, both the inhabitants of the island and the immigrants from India, are Hindus, with the exception of 93,000 Christians. The Sinhalese, numbering 70% of the whole

population, are, with the exception of 180,000 Christians, Buddhists. Ceylon may properly be called a Buddhist country, and it is here that Buddhism is found almost in its pristine purity. Ceylon was converted to Buddhism in the 3rd century B.C. by the great Augustine of Buddhism, Mahinda, son of the Indian king Asoka; and the extensive ruins throughout Ceylon, especially in the ancient cities of Anuradhapura and Polonnaruwa, bear witness to the sacrifices which kings and people joined in making to create lasting monuments of their faith. The Buddhist temples in the Kandyan country possess valuable lands, the greater portion of which is held by hereditary tenants on the tenure of service. These lands were given out with much care to provide for all that was necessary to maintain the temple and its connected monastery. Some tenants had to do the blacksmiths' work, others the carpenters', while another set of tenants had to cultivate the land reserved for supplying the monastery; others again had to attend at the festivals, and prepare decorations, and carry lamps and banners. In course of time difficulties arose; the English courts were averse to a system under which the rent of lands was paid by hereditary service, and a commission was issued by Sir Hercules Robinson (afterwards Lord Rosmead) when governor, to deal with the whole question, to define the services and to enable the tenants to commute these for a money payment. The result of the inquiry was to show that the services, except in a few instances, were not onerous, and that almost without an exception the tenants were willing to continue the system. The anomaly of an ecclesiastical establishment of Anglican and Presbyterian chaplains with a bishop of Colombo paid out of the general revenues has now been abolished in Ceylon, and only the bishop and two or three incumbents remain on the list for life, or till they retire on pension.

Education.—There has been a great advance in public instruction since 1875, through the multiplication of vernacular, Anglo-vernacular and English schools by government, by the different Christian missions and by the Buddhists and Hindus who have come forward to claim the government grant. The government has also started a technical college, and an agricultural school has been reorganized. An agricultural department, recommended by a commission, should profit by the services of the entomologist, mycologist and chemical analyst added by the governor to the staff of the royal botanic gardens at Peradeniya. There are industrial and reformatory schools, which are partially supported by government. In spite of the great advance that has been made, however, at the census of 1901 no fewer than 2,790,235 of the total population were entered as unable to read or write their own tongue. Of this number 1,553,078 were females, showing a very unsatisfactory state of things.

Agriculture.—The natural soils of Ceylon are composed of quartzose gravel, felspathic clay and sand often of a pure white, blended with or overlaid by brown and red loams, resulting from the decay of vegetable matter, or the disintegration of the gneiss and hornblende formations. The whole of the great northern extremity of the island consists of a sandy and calcareous admixture, made to yield productive crops of grain, tobacco, cotton and vegetables by the careful industry of the Tamil population, who spare no pains in irrigating and manuring their lands. Between the northern districts and the elevated mountain ranges which overlook the Bintenne and Uva countries are extensive plains of alluvial soil washed down from the table-lands above, where once a teeming population produced large quantities of grain. The remains of ancient works of irrigation bear testimony to the bygone agriculture of these extensive regions now covered by swamps or dense jungle.

Soil.

The general character of the soil in the maritime provinces to the east, south and west is sandy. Large tracts of quartzose sand spread along the whole line of sea-coast, some of which, of a pure white, and very deficient in vegetable matter, is admirably adapted to the growth of the cinnamon plant. In the light sandy districts where the soil is perfectly free, and contains a portion of vegetable and mineral loam, the coco-nut palm flourishes in great luxuriance. This is the case along the entire coast line from Kalpitiya to Point de Galle, and farther eastward and northward to Matara, stretching to a distance inland varying from 100 yds. to 3 m. From this light sandy belt as far as the mountain-zone of the Kandyan country the land is mainly composed of low hilly undulations of sandstone and ferruginous clay, incapable of almost any cultivation, but intersected in every direction with extensive valleys and wide plains of a more generous soil, not highly fertile, but still capable, with a little industry, of yielding ample crops of rice.

The soil of the central province, although frequently containing great quantities of quartzose sand and ferruginous clay, is in many of the more elevated districts of a fine loamy character. Sand sufficiently vegetable and light for rice culture may be seen at all elevations in the hill districts; but the fine chocolate and brown loams overlying gneiss or limestone formations, so admirably adapted for coffee cultivation, are only to be found on the steep sides or along the base of mountain ranges at an elevation varying from 2000 to 4000 ft. Such land, well-timbered, contains in its elements the decomposed particles of the rocks above, blended with the decayed vegetable matter of forests that have for centuries scattered beneath them the germs of fertility. The quantity of really rich coffee land in these districts is but small as compared with the extent of country—vast tracts of open valleys consisting of an indifferent yellow tenacious soil interspersed with many low ranges of quartz rock, but tea is a much hardier plant than coffee, and grows on poorer soil.

Irrigation.—The native rulers covered the whole face of the country with a network of irrigation reservoirs, by which Ceylon was enabled in ancient times to be the great granary of southern Asia. Wars, and the want of a strong hand to guide the agriculture of the country, led to the decay of these ancient works, and large tracts of land, which were formerly highly productive, became swampy wastes or dense forests. The remains of some of the larger irrigation works are amongst the most interesting of the memorials of Ceylon's former greatness. Some of the artificial lakes were of great size. Minneri, formed by damming across the valleys between the low hills which surround it with an embankment 60 ft. wide at the top, is at this day 20 m. in circumference. It has recently been restored by government, and is capable of irrigating 15,000 acres; while the Giant's Tank, which has also been restored, irrigates 20,000 acres. Another lake, with an embankment several miles in length, the Kalawewa, was formed by damming back the waters of the Kalaoya, but they have forced their way through the embankment, and in the ancient bed of the lake, or tank, are now many small villages. In connexion with these large tanks were numerous canals and channels for supplying smaller tanks, or for irrigating large tracts of fields. Throughout the district of Nuwarakalawiya every village has its tank. The embankments have been formed with great skill, and advantage has been taken to the utmost of the slightest fall in the land; but they in common with the larger works had been allowed to fall into decay, and were being brought to destruction by the evil practice of cutting them every year to irrigate the fields. The work of restoring these embankments was undertaken by the government, and 100 village tanks were repaired every year, besides eighteen larger works. In 1900 a sum of five million rupees was set apart for these larger undertakings.

Cultivation and Products.—The area of uncultivated land is little over 3½ million acres, whereas fully four times that amount is capable of cultivation. A great deal is waste, besides lagoons, tanks, backwaters, &c. Thick forest land does not cover more than 5000 sq. m. Scrub, or chena, and patana grass cover a very great area. Tea, cacao, cardamoms, cinchona, coffee and indiarubber are the products cultivated by European and an increasing number of native planters in the hill country and part of the low country of Ceylon. A great change has been effected in the appearance of the country by the introduction of the tea plant in place of the coffee plant, after the total failure of the latter owing to disease. For some time coffee had been the most important crop. In the old days it grew wild like cinnamon, and was exported so far back as the time of the Portuguese, but was lightly esteemed as an article of European commerce, as the berry was gathered unripe, was imperfectly cured and had little flavour. In 1824 the governor, Sir E. Barnes, introduced coffee cultivation on the West Indian plan; in 1834 the falling off of other sources of supply drew general attention to Ceylon, and by 1841 the Ceylon output had become considerable, and grew steadily (with an interval in 1847 due to a commercial crisis) till 1877 when 272,000 acres were under coffee cultivation, the total export amounting to 103,000,000 lb. Then owing to disease came a crisis, and a rapid decline, and now only a few thousand acres are left. On the failure of the coffee crops planters began extensively to grow the tea plant, which had already been known in the island for several years. By 1882 over 20,000 acres had been planted with tea, but the export that year was under 700,000 lb. Five years later the area planted was 170,000 acres, while the export had risen to nearly 14,000,000 lb. By 1892 there were 262,000 acres covered with tea, and 71,000,000 lb were that year exported. In 1897, 350,000 acres were planted, and the export was 116,000,000 lb. By the beginning of the 20th century, the total area cultivated with tea was not under 390,000 acres, while the estimate of shipments was put at 146,000,000 lb annually. Nearly every plantation has its factory, with the machinery necessary to prepare the leaf as brought in from the bushes until it becomes the tea of commerce. The total amount of capital now invested in the tea industry in Ceylon cannot be less than £10,000,000. The tea-planting industry more than anything else has raised Ceylon from the depressed state to which it fell in 1882.

Before tea was proved a success, however, *cinchona* cultivation was found a useful bridge from coffee to the Ceylon planter, who, however, grew it so freely that in one year 15,000,000 lb bark was shipped, bringing the price of quinine down from 16s. to 1s. 6d. an ounce.

In a few places, where the rainfall is abundant, rice cultivation is allowed to depend on the natural supply of water, but in most parts the cultivation is not attempted unless there is secured beforehand a certain and sufficient supply, by means of canals or reservoirs. In the hill country every valley and open plain capable of tillage is made to yield its crops of grain, and the steep sides of the hills are cut into terraces, on which are seen waving patches of green rice watered by mountain streams, which are conducted by means of channels ingeniously carried round the spurs of the hills and along the face of acclivities, by earthen water-courses and bamboo aqueducts, so as to fertilize the fields below. These works bear witness to the patience, industry and skill of the Kandyan villagers. In the low country to the north and east and north-west of the hills,

irrigation works of a more expensive kind are necessary. In January 1892, the immemorial rent or tax on fields of *paddy* (rice in the husk) was removed, but not the customs duty on imported rice. But even with the advantage of protection to the extent of 10% in the local markets, there has been no extension of paddy cultivation; on the contrary, the import of grain from India has grown larger year by year. Through the multiplication of irrigation works and the northern railway, rice culture may be sufficiently extended to save some of the large imports (8,000,000 to 9,000,000 bushels annually) now required from India.

Tobacco is extensively cultivated in various parts of the island, and the growth of particular places, such as Dumbara and Uva, is much prized for local consumption. The tobacco of export is grown in the peninsula of Jaffna. The exports of this article in 1850 were 22,176 cwts., valued at £20,698. The cultivation of the plant has not greatly increased of recent years, and is almost entirely in the hands of natives in the northern and parts of the central Province.

Ceylon has been celebrated since the middle of the 14th century for its cinnamon, and during the period of the Dutch occupation this spice was the principal article of commerce; under their rule and up to 1832 its cultivation was a government monopoly. With the abolition of the monopoly the quantity exported increased, but the value declined.

Unlike the coffee plant, the hardy tea plant grows from sea-level to 7000 ft. altitude; but crown forest-lands above 5000 ft. are no longer sold, so that a very large area on the highest mountain ranges and plateaus is still under forest. Moreover, on the tea plantations arboriculture is attended to in a way unknown in 1875; the Australian eucalypts, acacias and grevilleas, Indian and Japanese conifers, and other trees of different lands, are now freely planted for ornament, for protection from wind, for firewood or for timber. A great advance has been made at Hakgalla and Nuwara Eliya, in Upper Uva, and other high districts, in naturalizing English fruits and vegetables. The calamander tree is nearly extinct, and ebony and other fine cabinet woods are getting scarce; but the conservation of forests after the Indian system has been taken in hand under a director and trained officers, and much good has been done. The cinnamon tree (wild in the jungles, cultivated as a shrub in plantations) is almost the only one yielding a trade product which is indigenous to the island. The coco-nut and nearly all other palms have been introduced.

Among other agricultural products mention must be made of *cacao*, the growth and export of which have steadily extended since coffee failed. Important also is the spice or aromatic product of cardamoms.

The culture of *indiarubber* was begun on low-country plantations, and Ceylon rubber is of the best quality in the market. The area of cultivation of the coco-nut palm has been greatly extended since 1875 by natives as well as by Europeans. The products of this palm that are exported, apart from those so extensively used in the island itself, exceed in a good year £1,000,000 sterling in value. Viticulture and cotton cultivation, as well as tobacco growing, are being developed along the course of the new northern railway.

Taking the trade in the products mentioned as a whole, no country can compete with the United Kingdom as a customer of Ceylon. But there is a considerable trade in nearly all products with Germany and America; in cardamoms with India; in cinnamon with Spain, Italy, Belgium, Australia, Austria and France; and in one or other of the products of the coco-nut palm (coco-nuts, coco-nut oil, copra, desiccated coco-nut, poonac, coir) with Belgium, Russia, France, Austria, Australia and Holland.

Pearl Fishery.—Pearl oysters are found in the Tambalagam bay, near Trincomalee, but the great banks on which these oysters are usually found lie near Arippu, off the northern part of the west coast of Ceylon, at a distance of from 16 to 20 m. from the shore. They extend for many miles north and south, varying considerably in their size and productiveness. It is generally believed that the oyster arrives at maturity in its seventh year, that the pearl is then of full size and perfect lustre, and that if the oyster be not then secured it will shortly die, and the pearl be lost. It is certain that from some unexplained cause the oysters disappear from their known beds for years together. The Dutch had no fishery from 1732 to 1746, and it failed them again for twenty-seven years from 1768 to 1796. The fishery was again interrupted between 1820 and 1828, also from 1833 to 1854, from 1864 to 1873, and again from 1892 to 1900. The fishery of 1903 was the first since 1891, and produced a revenue of Rs.829,348, being the third largest on record. In 1797 and 1798 the government sold the privilege of fishing the oyster-beds for £123,982 and £142,780 respectively. From that time the fishery was conducted by the government itself until 1906, when it was leased to the Ceylon Pearl Fisheries Company for twenty years at a rent of £20,000 a year. Professor Herdman, F.R.S., was appointed to inquire and report on the conservation and cultivation of the Ceylon pearl-oyster, and visited Ceylon in January 1902. In consequence of his report, a marine laboratory for the culture of the pearl oysters was established in Galle harbour under the care of Mr Hornell.

Mineral Industries.—Commercially there are two established mineral industries:—(1) that of digging for precious stones; and (2) the much more important industry of digging for plumbago or graphite, the one mineral of commercial importance found. Further developments may result in the shipment of the exceptionally pure iron ore found in different parts of Ceylon, though still no coal has been found to be utilized with it. Several places, too—Ruanwella, Rangalla, Rangbodde, &c.—indicate where gold was found in the time of the Kandyan kings; and geologists might possibly indicate a paying quartz reef, as in Mysore. Owing to the greatly increased demand in Europe and America, plumbago in 1899 more than doubled in price, rising from £40 to £80, and even £100 a ton for the finest. Latterly there has been a considerable fall, but the permanent demand is likely to continue keen in consequence mainly of the Ceylon kind being the best for making crucibles. The trade with Great Britain and the United States has slightly decreased, but there has been a rapid expansion in the exports to Belgium and Holland, Russia, Japan and Victoria; and the industry seems to be established on a sound basis. One consequence of its development has been to bring European and American capitalists and Cornish and Italian miners into a field hitherto almost entirely worked by Sinhalese. Though some of the mines were carried to a depth of 1000 ft., the work was generally very primitive in character, and Western methods of working are sure to lead to greater safety and economy. Besides a royalty or customs duty of 5 rupees (about 6s. 8d.) per ton on all plumbago exported, the government issue licenses at moderate rates for the digging of plumbago on crown lands, a certain share of the resulting mineral also going to government. The plumbago industry, in all its departments of mining, carting, preparing, packing and shipping, gives employment to fully 100,000 men and women, still almost entirely Sinhalese. The wealthiest mine-owners, too, are Sinhalese land-owners or merchants.

As regards *gems*, there are perhaps 500 gem pits or quarries worked in the island during the dry season from November to June in the Ratnapura, Rakwane and Matara districts. Some of these are on a small scale; but altogether several thousands of Sinhalese find a precarious existence in digging for gems. Rich finds of a valuable ruby, sapphire, cat's-eye, amethyst, alexandrite or star stone, are comparatively rare; it is only of the commoner gems, such as moonstone, garnet, spinels, that a steady supply is obtained. The cat's-eye in its finer qualities is peculiar to Ceylon, and is occasionally in great demand, according to the fashion. The obstacle to the investment of European capital in "gemming" has always been the difficulty of preventing the native labourers in the pits—even if practically naked—from concealing and stealing gems. A Chamber of Mines, with a suitable library, was established in Colombo during 1899.

Manufactures.—Little is done save in the preparation in factories and stores, in Colombo or on the plantations, of the several products exported. The manufacture of jewellery and preparation of precious stones, and, among native women and children, of pillow lace, give employment to several thousands. Iron and engineering works are numerous in Colombo and in the planting districts. The Sinhalese are skilful cabinetmakers and carpenters. The Moormen and Tamils furnish good masons and builders.

Commerce.—There has been rapid development since 1882, and the returns for 1903 showed a total value of 22½ millions sterling. The principal imports were articles of food and drink (chiefly rice from India) manufactured metals (with specie), coal, cotton yarns and piece goods from Manchester, machinery and millwork and apparel. The Ceylon customs tariff for imports is one of 6½% *ad valorem*, save in the case of intoxicating drinks, arms, ammunition, opium, &c. The chief export is tea.

Roads.—The policy of the Sinhalese rulers of the interior was to exclude strangers from the hill country. Prior to the British occupation of the Kandyan territory in 1815, the only means of access from one district to another was by footpaths through the forests. The Portuguese do not appear to have attempted to open up the country below the hills, and the Dutch confined themselves to the improvement of the inland water-communications. The British government saw from the first the necessity of making roads into the interior for military purposes, and, more recently, for developing the resources of the country. The credit of opening up the country is due mainly to the governor, Sir Edward Barnes, by whose direction the great military road from Colombo to Kandy was made. Gradually all the military stations were connected by broad tracks, which by degrees were bridged and converted into good carriage roads. The governors Sir Henry Ward and Sir Hercules Robinson recognized the importance of giving the coffee planters every assistance in opening up the country, and the result of their policy is that the whole of the hill country is now intersected by a vast number of splendid roads, made at a cost of upwards of £2000 per mile. In 1848 an ordinance was passed to levy from every adult male in the colony (except Buddhist priests and British soldiers) six days' labour on the roads, or an equivalent in money. The labour and money obtained by this wise measure have enabled the local authorities to connect the government highways by minor roads, which bring every village of importance into communication with the principal towns.

Railways.—After repeated vain attempts by successive governors to connect Colombo with the interior by railways, Sir Charles MacCarthy successfully set on foot a railway of 75 m. in length from Colombo to Kandy. The railway mileage had developed to 563 m. in 1908, including one of the finest mountain lines in the world—

over 160 m. long, rising to 6200 ft. above sea-level, and falling at the terminus to 4000 ft. The towns of Kandy, Matale, Gampola, Nawalapitiya, Hatton and Haputale (and practically Nuwara Eliya) in the hills, are thus connected by rail, and in the low country the towns of Kurunegala, Galle, Matara, Kalutara, &c. Most of the debt on the railways (all government lines) is paid off, and the traffic receipts now make up nearly one-third of the general revenue. An Indo-Ceylon railway to connect the Indian and Ceylon systems has been the subject of separate reports and estimates by engineers serving the Ceylon and Indian governments, who have pronounced the work across the coral reef between Manaar and Rameswaram quite feasible. A commission sat in 1903 to consider the gauge of an Indo-Ceylon railway. Such a line promised to serve strategic as well as commercial purposes, and to make Colombo more than ever the port for southern India. The headquarters of the mail steamers have been removed from Galle to Colombo, where the colonial government have constructed a magnificent breakwater, and undertaken other harbour works which have greatly augmented both the external trade and the coasting trade of the island.

Government.—Ceylon is a crown colony, that is, a possession of the British crown acquired by conquest or cession, the affairs of which are administered by a governor, who receives his appointment from the crown, generally for a term of six years. He is assisted by an executive and a legislative council. The executive council acts as the cabinet of the governor, and consists of the attorney-general, the three principal officers of the colony (namely, the colonial secretary, the treasurer and the auditor-general), and the general in command of the forces. The legislative council includes, besides the governor as president and nine official members, eight unofficial members—one for the Kandyan Sinhalese (or Highlanders) and one for the "Moormen" having been added in 1890. The term of office for the unofficial members is limited to five years, though the governor may reappoint if he choose. The king's advocate, the deputy-advocate, and the surveyor-general are now respectively styled attorney-general, solicitor-general, and director of public works. The civil service has been reconstituted into five classes, not including the colonial secretary as a staff appointment, nor ten cadets; these five classes number seventy officers. The district judges can punish up to two years' imprisonment, and impose fines up to Rs.1000. The police magistrates can pass sentences up to six months' imprisonment, and impose fines of Rs.150. The criminal law has since 1890 been codified on the model of the Indian penal code; criminal and civil procedure have also been the subject of codification. There are twenty-three prisons in the island, mostly small; but convict establishments in and near the capital take all long-sentence prisoners.

Banks and Currency.—Ceylon has agencies of the National Bank of India, Bank of Madras, Mercantile Bank of India, Chartered Bank of India, Australia and China, and of the Hong-kong and Shanghai Bank, besides mercantile agencies of other banks, also a government savings bank at Colombo, and post-office savings banks all over the island. In 1884, on the failure of the Oriental Bank, the notes in currency were guaranteed by government, and a government note currency was started in supersession of bank notes. The coin currency of Ceylon is in rupees and decimals of a rupee, the value of the standard following that fixed for the Indian rupee, about 1s. 4d. per rupee.

Finance.—With the disease of the coffee plant the general revenue fell from Rs. 1,70,00,000 in 1877 to Rs.1,20,00,000 in 1882, when trade was in a very depressed state, and the general prosperity of the island was seriously affected. Since then, however, the revenue has steadily risen with the growing export of tea, cocoa-nut produce, plumbago, &c., and in 1902 it reached a total of 28 millions of rupees. (J. F. D.; C. L.)

History.—The island of Ceylon was known to the Greeks and Romans under the name of *Taprobane*, and in later times Serendib, Sirinduil and Zeylan have been employed to designate it by writers of the Western and Eastern worlds. Serendib is a corruption of the Sanskrit *Sinhaladvīpa*. Like most oriental countries, Ceylon possesses a great mass of ancient records, in which fact is so confused with fable that they are difficult to distinguish. The labours of George Turnour (1799–1843), however, helped to dissipate much of this obscurity, and his admirable edition (1836) of the *Mahavamsa* first made it possible to trace the main lines of Sinhalese history.

The Sinhalese inscriptional records, to which George Turnour first called attention, and which, through the activity of Sir William Gregory in 1874, began to be accurately transcribed and translated, extend from the 2nd century B.C. onwards. Among the oldest inscriptions discovered are those on the rock cells of the Vessagiri Vihara of Anuradhapura, cut in the old Brahma-lipi character. The inscriptions show how powerful was the Buddhist hierarchy which dominated the government and national life. The royal decrees of successive rulers are mainly concerned with the safeguarding of the rights of the hierarchy, but a few contain references to executive acts of the kings, as in a slab inscription of Kassapa V. (*c.* A.D. 929–939). In an edict ascribed to Mahinda IV. (*c.* A.D. 975–991) reference is made to the Sinhalese palladium, the famous tooth-relic of Buddha, now enshrined at Kandy, and the decree confirms tradition as to the identity of the fine stone temple, east of the Thuparama at Anuradhapura, with the shrine in which the tooth was first deposited when brought from Kalinga in the reign of Kirti Sri Meghavarna (A.D. 304–324).

The earliest inhabitants of Ceylon were probably the ancestors of the modern Veddahs, a small tribe of primitive hunters who inhabit the eastern jungles; and the discovery of palaeolithic stone implements buried in some of their caves points to the fact that they represent a race which has been in the island for untold ages. As to subsequent immigrations, the great Hindu epic, the *Ramayana*, tells the story of the conquest of part of the island by the hero Rama and his followers, who took the capital of its king Rawana. Whatever element of truth there may be in this fable, it certainly represents no permanent occupation. The authentic history of Ceylon, so far as it can be traced, begins with the landing in 543 B.C. of Vijaya, the founder of the Sinhalese dynasty, with a small band of Aryan-speaking followers from the mainland of India. Vijaya married the daughter of a native chief, with whose aid he proceeded to master the whole island, which he parcelled out among his followers, some of whom formed petty kingdoms. The Sinhalese introduced from the mainland a comparatively high type of civilization, notably agriculture. The earliest of the great irrigation tanks, near Anuradhapura, was opened about 504 B.C. by the successor of Vijaya; and about this time was established that system of village communities which still obtains over a large part of Ceylon.

The island was converted to Buddhism at the beginning of the 3rd century B.C. by the preaching of Mahinda, a son of the great Buddhist emperor Asoka; a conversion that was followed by an immense multiplication of *daghobas*, curious bell-shaped reliquaries of solid stone, and of Buddhist monasteries. For the rest, the history of ancient Ceylon is largely a monotonous record of Malabar or Tamil invasions, conquests and usurpations. Of these latter the first was in 237 B.C. when two officers in the cavalry and fleet revolted, overthrew the Sinhalese ruler with the aid of his own Tamil mercenaries, and reigned jointly, as Sena I. and Guptika, until 215. The Sinhalese Asela then ruled till 205, when he was overthrown by a Tamil from Tanjore, Elala, who held the reins of power for 44 years. In 161 B.C. Elala was defeated and slain by Dutegemunu, still remembered as one of the great Sinhalese heroes of Ceylon. The ruins of the great monastery, known as the Brazen Palace, at Anuradhapura, remain a memorial of King Dutegemunu's splendour and religious zeal. He died in 137 B.C., and thenceforth the history of Ceylon is mainly that of further Tamil invasions, of the construction of irrigation tanks, and of the immense development of the Buddhist monastic system. A tragic episode in the royal family in the 5th century A.D. is, however, worthy of notice as connected with one of Ceylon's most interesting remains, the Sigiri rock and tank (see SIGIRI). In A.D. 477 King Datu Sen was murdered by his son, who mounted the throne as Kasyapa I., and when he was driven from the capital by the inhabitants, infuriated by his crime, built himself a stronghold on the inaccessible Sigiri rock, whence he ruled the country until in 495 he was overthrown and slain by his brother Mugallana (495–513), who at the time of his father's murder had escaped to India.

Towards the close of the 10th century Ceylon was invaded by Rajaraja the Great, the Chola king, and after a series of protracted campaigns was annexed to his empire in 1005. The island, did not, however, remain long under Tamil domination. In 1071 Vijaya Bahu succeeded in re-establishing the Sinhalese dynasty, and for a while Ceylon was freed from foreign intervention. The most notable of the successors of Vijaya Bahu, and indeed of all the long line of Sinhalese rulers, was Parakrama Bahu I. (1155–1180), whose colossal statue still stands near Polonnaruwa. He not only took advantage of the unaccustomed

tranquillity of the country to restore the irrigation tanks and the monasteries, but he availed himself of a disputed succession to the Pandya throne of Madura to turn the tables on his Tamil enemies by invading India. According to the *Mahavamsa* his generals met with immediate and unbroken success; according to the more probable account preserved in a long Chola inscription at Arpakkam near Kanchi, they were, though at first successful, ultimately driven out by a coalition of the southern princes (V. A. Smith, *Early History of India*, ed. 1908, p. 411). In any case, within thirty years of Parakrama Bahu's death his work was undone; the Malabar invaders were once more able to effect a settlement in the island, and the Sinhalese capital was moved farther and farther south, till in 1410 it had become established at Kotta, now a suburb of Colombo. In 1408 a new misfortune had befallen the Sinhalese dynasty; in revenge for an insult offered to a Chinese envoy, a Chinese army invaded the island and carried away King Vijaya Bahu IV. into captivity. For thirty years from this date the Sinhalese kings of Ceylon were tributary to China.

When, in 1505, the Portuguese Francisco de Almeida landed in Ceylon, he found the island divided into seven kingdoms. Twelve years later the viceroy of Goa ordered the erection of a fort at Colombo, for which permission was obtained from the king of Kotta; and from this time until the advent of the Dutch in the 17th century the Portuguese endeavoured, amid perpetual wars with the native kings, who were assisted by Arab and other traders jealous of European rivalry, to establish their control over the island. They ultimately succeeded so far as the coast was concerned, though their dominion scarcely penetrated inland. Materially their gain was but small, for the trade of Ceylon was quite insignificant; but they had the spiritual satisfaction of prosecuting a vigorous propaganda of Catholicism, St Francis Xavier being the most notable of the missionaries who at this time laboured in the island.

The fanatical zeal and the masterful attitude of the Portuguese were a constant source of dissension with the native rulers, and when the Dutch, under Admiral Spilberg, landed on the east coast in 1602 and sought the alliance of the king of Kandy in the interior of the island, every inducement was held out to them to aid in expelling the Portuguese. Nothing seems to have come of this until 1638–1639, when a Dutch expedition attacked and razed the Portuguese forts on the east coast. In the following year they landed at Negombo, without however establishing themselves in any strong post. In 1644 Negombo was captured and fortified by the Dutch, while in 1656 they took Colombo, and in 1658 they drove the Portuguese from Jaffna, their last stronghold in Ceylon.

Pursuing a wiser policy than their predecessors, the Dutch lost no opportunity of improving that portion of the country which owned their supremacy, and of opening a trade with the interior. More tolerant and less disposed to stand upon their dignity than the Portuguese, they subordinated political to commercial ends, flattered the native rulers by a show of deference, and so far succeeded in their object as to render their trade between the island and Holland a source of great profit. Many new branches of industry were developed. Public works were undertaken on a large scale, and education, if not universally placed within the reach of the inhabitants of the maritime provinces, was at least well cared for on a broad plan of government supervision. That which they had so much improved by policy, they were, however, unable to defend by force when the British turned their arms against them. A century and a half had wrought great changes in the physical and mental status of the Dutch colonists. The territory which in 1658 they had slowly gained by undaunted and obstinate bravery, they as rapidly lost in 1796 by imbecility and cowardice.

The first intercourse of the English with Ceylon was as far back as 1763, when an embassy was despatched from Madras to the king of Kandy, without, however, leading to any result. On the rupture between Great Britain and Holland in 1795, a force was sent against the Dutch possessions in Ceylon, where the opposition offered was so slight that by the following year the whole of their forts were in the hands of the English commander.

The abiding results of the occupation of Ceylon by the Portuguese and Dutch is described by Sir Emerson Tennent (*Ceylon*) as follows:

"The dominion of the Netherlands in Ceylon was nearly equal in duration with that of Portugal, about 140 years; but the policies of the two countries have left a very different impress on the character and institutions of the people amongst whom they lived. The most important bequest left by the utilitarian genius of Holland is the code of Roman Dutch law, which still prevails in the supreme courts of justice, whilst the fanatical propagandism of the Portuguese has reared for itself a monument in the abiding and expanding influence of the Roman Catholic faith. This flourishes in every hamlet and province where it was implanted by the Franciscans, whilst the doctrines of the reformed church of Holland, never preached beyond the walls of the fortresses, are already almost forgotten throughout the island, with the exception of an expiring community at Colombo. Already the language of the Dutch, which they sought to extend by penal enactments, has ceased to be spoken even by their direct descendants, whilst a corrupted Portuguese is to the present day the vernacular of the lower classes in every town of importance. As the practical and sordid government of the Netherlands only recognized the interest of the native population in so far as they were essential to uphold their trading monopolies, their memory was recalled by no agreeable associations: whilst the Portuguese, who, in spite of their cruelties, were identified with the people by the bond of a common faith, excited a feeling of admiration by the boldness of their conflicts with the Kandyans, and the chivalrous though ineffectual defence of their beleaguered fortresses. The Dutch and their proceedings have almost ceased to be remembered by the lowland Sinhalese; but the chiefs of the south and west perpetuate with pride the honorific title Don, accorded to them by their first European conquerors, and still prefix to their ancient patronymics the sonorous Christian names of the Portuguese."

The British forces by which the island had been conquered were those of the East India Company, and Ceylon was therefore at first placed under its jurisdiction and administered from Madras. The introduction of the Madras revenue system, however, together with a host of Malabar collectors, led to much discontent, which culminated in rebellion; and in 1798 the colony was placed directly under the crown. By the treaty of Amiens, in 1803, this situation was regularized, from the international point of view, by the formal cession to Great Britain of the former Dutch possessions in the island. For a while the British dominion was confined to the coast. The central tract of hilly country, hedged in by impenetrable forests and precipitous mountain ranges, remained in possession of Sri Vikrama Raja Sinha, the last of the Sinhalese dynasty, who showed no signs of encouraging communication with his European neighbours.

Minor differences led in 1803 to an invasion of the Kandyan territory; but sickness, desertion and fatigue proved more formidable adversaries to the British forces than the troops of the Sinhalese monarch, and peace was eventually concluded upon terms by no means favourable to the English. The cruelty and oppression of the king now became so intolerable to his subjects that disaffection spread rapidly amongst them. Punishments of the most horrible kinds were inflicted, but failed to repress the popular indignation; and in 1815 the British, at the urgent request of many of the Adigars and other native chiefs, proceeded against the tyrant, who was captured near Kandy, and subsequently ended his days in exile. With him ended a long line of sovereigns, whose pedigree may be traced through upwards of two thousand years.

By a convention entered into with the Kandyan chiefs on the 2nd of March 1815, the entire sovereignty of the island passed into the hands of the British, who in return guaranteed to the inhabitants civil and religious liberty. The religion of Buddha was declared inviolable, and its rights, ministers and places of worship were to be maintained and protected; the laws of the country were to be preserved and administered according to established forms; and the royal dues and revenues were to be levied as before for the support of government.

With the exception of a serious outbreak in some parts of the interior in 1817, which lasted for upwards of a year, and of two minor attempts at rebellion easily put down, in 1843 and 1848,

the political atmosphere of Ceylon has remained undisturbed since the deportation of the last king of Kandy.

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CHABAZITE, a mineral species belonging to the group of zeolites. It occurs as white to flesh-red crystals which vary from transparent to translucent and have a vitreous lustre. The crystals are rhombohedral, and the predominating form is often a rhombohedron (*r*) with interfacial angles of 85° 14′; they therefore closely resemble cubes in appearance, and the mineral was in fact early (in 1772) described as a cubic zeolite. A characteristic feature is the twinning, the crystals being frequently interpenetration twins with the principal axis as twin-axis

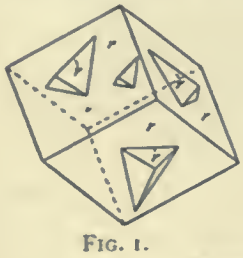


FIG. 1.

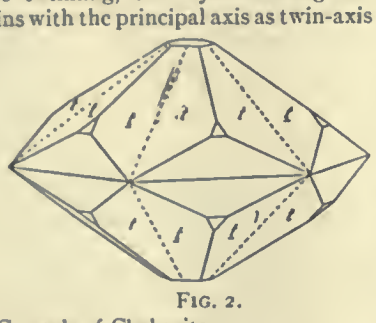


FIG. 2.

Twinned Crystals of Chabazite.

(figs. 1, 2). The appearance shown in fig. 1, with the corners of small crystals in twinned position projecting from the faces *r* of the main crystal, is especially characteristic of chabazite. Such groups resemble the interpenetrating twinned cubes of fluorspar, but the two minerals are readily distinguished by their cleavage, fluorspar having a perfect octahedral cleavage truncating the corners of the cube, whilst in chabazite there are less distinct cleavages parallel to the rhombohedral (cube-like) faces. Another type of twinned crystal is represented in fig. 2, in which the predominating form is an obtuse hexagonal pyramid (*l*); the faces of these flatter crystals are often rounded, giving rise to lenticular shapes, hence the name phacolite (from φακός, a lentil) for this variety of chabazite.

The hardness of chabazite is 4½, and the specific gravity 2·08–2·16. As first noticed by Sir David Brewster in 1830, the crystals often exhibit anomalous optical characters: instead of being uniaxial, a basal section may be divided into sharply-defined biaxial sectors. Heating of the crystals is attended by a loss of water and a change in their optical characters; it is probable therefore that the anomalous optical characters are dependent on the amount of water present.

Besides phacolite, mentioned above, other varieties of chabazite are distinguished. Herschelite and seebachite are essentially the same as phacolite. Haydenite is the name given to small yellowish crystals, twinned on a rhombohedron plane *r*, from Jones's Falls near Baltimore in Maryland. Acadialite is a reddish chabazite from Nova Scotia (the old French name of which is Acadie).

Chemically, chabazite is a complex hydrated calcium and sodium silicate, with a small proportion of the sodium replaced by potassium, and sometimes a small amount of the calcium replaced by barium and strontium. The composition is however variable, and is best expressed as an isomorphous mixture of the molecules $(Ca, Na_2)Al_2(SiO_4)_2+4H_2O$ and $(Ca,Na_2)Al_2(Si_2O_6)_2+8H_2O$, which are analogous to the felspars. Most analyses correspond with a formula midway between these extremes, namely, $(Ca,Na_2)Al_2(SiO_3)_4+6H_2O$.

Chabazite occurs with other zeolites in the amygdaloidal cavities of basaltic rocks; occasionally it has been found in gneisses and schists. Well-formed crystals are known from many localities; for example, Kilmalcolm in Renfrewshire, the Giant's Causeway in Co. Antrim, and Oberstein in Germany. Beautiful, clear glassy crystals of the phacolite ("seebachite") variety occur with phillipsite and radiating bundles of brown calcite in cavities in compact basalt near Richmond, Melbourne, Victoria. Small crystals have been observed lining the cavities of fossil shells from Iceland, and in the recent deposits of the hot springs of Plombières and Bourbonne-les-Bains in France.

Gmelinite and levynite are other species of zeolites which may be mentioned here, since they are closely related to chabazite, and like it are rhombohedral and frequently twinned. Gmelinite forms large flesh-red crystals usually of hexagonal habit, and was early known as soda-chabazite, it having the composition of chabazite but with sodium predominating over calcium $(Na_2,Ca)Al_2(SiO_3)_4 6H_2O$. The formula of levynite is $CaAl_2Si_3O_{10}+5H_2O$. (L. J. S.)

CHABLIS, a town of north-central France, in the department of Yonne, on the left bank of the Serein, 14 m. E. by N. of Auxerre by road. Pop. (1906) 2227. Its church of St Martin belongs to the end of the 12th century. The town gives its name to a well-known white wine produced in the neighbouring vineyards, of which the most esteemed are Clos, Bouguerots, Moutonne, Grenouille, Montmaires, Lys and Vaux-Désirs. There are manufactures of biscuits.

CHABOT, FRANÇOIS (1757–1794), French revolutionist, had been a Franciscan friar before the Revolution, and after the civil constitution of the clergy continued to act as "constitutional" priest, becoming grand vicar of Henri Grégoire, bishop of Blois. Then he was elected to the Legislative Assembly, sitting at the extreme left, and forming with C. Bazire and Merlin de Thionville the "Cordelier trio." Re-elected to the Convention he voted for the death of Louis XVI., and opposed the proposal to prosecute the authors of the massacre of September, "because among them there are heroes of Jemmapes." Some of his sayings are well known, such as that Christ was the first "*sans-culotte*." Compromised in the falsification of a decree suppressing the India Company and in a plot to bribe certain members of the Convention, especially Fabre d'Eglantine and C. Bazire, he was arrested, brought before the Revolutionary Tribunal, and was condemned and executed at the same time as the Dantonists, who protested against being associated with such a "*fripon*."

CHABOT, GEORGES ANTOINE, known as CHABOT DE L'ALLIER (1758–1819), French jurist and statesman, was president of the tribunal of Montluçon when he was elected as a deputy *suppléant* to the National Convention. A member of the council of the Ancients, then of the Tribunate, he was president of the latter when the peace of Amiens was signed. He had a resolution adopted, tending to give Napoleon Bonaparte the consulship for life; and in 1804 supported the proposal to establish a hereditary monarchy. Napoleon named him inspector-general of the law schools, then judge of the court of cassation. He published various legal works, *e.g. Tableau de la législation ancienne sur les successions et de la législation nouvelle établie par le code civil* (Paris, 1804), and *Questions transitoires sur le code Napoléon* (Paris, 1809).

CHABOT, PHILIPPE DE, SEIGNEUR DE BRION, COUNT OF CHARNY AND BUZANÇAIS (*c.* 1492–1543), admiral of France. The Chabot family was one of the oldest and most powerful in Poitou. Philippe was a cadet of the Jarnac branch. He was a companion of Francis I. as a child, and on that king's accession was loaded with honours and estates. After the battle of Pavia he was made admiral of France and governor of Burgundy (1526), and shared with Anne de Montmorency the direction of affairs. He was at the height of his power in 1535, and

commanded the army for the invasion of the states of the duke of Savoy; but in the campaigns of 1536 and 1537 he was eclipsed by Montmorency, and from that moment his influence began to wane. He was accused by his enemies of peculation, and condemned on the 10th of February 1541 to a fine of 1,500,000 livres, to banishment, and to the confiscation of his estates. Through the good offices of Madam d'Étampes, however, he obtained the king's pardon almost immediately (March 1541), was reinstated in his posts, and regained his estates and even his influence, while Montmorency in his turn was disgraced. But his health was affected by these troubles, and he died soon afterwards on the 1st of June 1543. His tomb in the Louvre, by an unknown sculptor, is a fine example of French Renaissance work. It was his nephew, Guy Chabot, seigneur de Jarnac, who fought the famous duel with François de Vivonne, seigneur de la Châtaigneraie, in 1547, at the beginning of the reign of Henry II.

The main authorities for Chabot's life are his MS. correspondence in the Bibliothèque Nationale, Paris, and contemporary memoirs. See also E. de Barthélemy, "Chabot de Brion," in the *Revue des questions historiques* (vol. xx. 1876); Martineau, "L'Amiral Chabot," in the *Positions des thèses de l'École des Chartes* (1883).

CHABRIAS (4th century B.C.), a celebrated Athenian general. In 388 B.C. he defeated the Spartans at Aegina and commanded the fleet sent to assist Evagoras, king of Cyprus, against the Persians. In 378, when Athens entered into an alliance with Thebes against Sparta, he defeated Agesilaus near Thebes. On this occasion he invented a manœuvre, which consisted in receiving a charge on the left knee, with shields resting on the ground and spears pointed against the enemy. In 376 he gained a decisive victory over the Spartan fleet off Naxos, but, when he might have destroyed the Spartan fleet, remembering the fate of the generals at Arginusae, he delayed to pick up the bodies of his dead. Later, when the Athenians changed sides and joined the Spartans, he repulsed Epaminondas before the walls of Corinth. In 366, together with Callistratus, he was accused of treachery in advising the surrender of Oropus to the Thebans. He was acquitted, and soon after he accepted a command under Tachos, king of Egypt, who had revolted against Persia. But on the outbreak of the Social War (357) he joined Chares in the command of the Athenian fleet. He lost his life in an attack on the island of Chios.

See Cornelius Nepos, *Chabrias*; Xenophon, *Hellenica*, v. 1-4; Diod. Sic. xv. 29-34; and C. Rehdantz, *Vitae Iphicratis, Chabriae, et Timothei* (1845); art. DELIAN LEAGUE, section B, and authorities there quoted.

CHABRIER, ALEXIS EMMANUEL (1841–1894), French composer, was born at Ambert, Pay de Dôme, on the 18th of January 1841. At first he only cultivated music as an amateur, and it was not until 1879 that he threw up an administration appointment in order to devote himself entirely to the art. He had two years previously written an *opéra bouffe* entitled *L'Étoile*, which was performed at the Bouffes Parisiens. In 1881 he was appointed chorus-master of the concerts then recently established by Lamoureux. In 1883 he composed the brilliant orchestral rhapsody entitled *España*, the themes of which he had jotted down when travelling in Spain. His opera *Gwendoline* was brought out with considerable success at Brussels on the 10th of April 1886, and was given later at the Paris Grand Opéra. The following year 1887, *Le Roi malgré lui*, an opera of a lighter description, was produced in Paris at the Opéra Comique, its run being interrupted by the terrible fire by which this theatre was destroyed. His last opera, *Briseis*, was left unfinished, and performed in a fragmentary condition at the Paris Opéra, after the composer's death in Paris on the 13th of September 1894. Chabrier was also the author of a set of piano pieces entitled *Pièces pittoresques*, *Valses romantiques*, for two pianos, a fantasia for horn and piano, &c. His great admiration for Wagner asserted itself in *Gwendoline*, a work which, in spite of inequalities due to want of experience, is animated by a high artistic ideal, is poetically conceived, and shows considerable harmonic originality, besides a thorough mastery over the treatment of the orchestra. The characteristics of *Le Roi malgré lui* have been well summed up by M. Joncières when he alludes to "cette verve inépuisable, ces rythmes endiablés, cette exubérance de gaieté et de vigueur, à laquelle venait se joindre la note mélancolique et émue." Chabrier's premature death prevented him from giving the full measure of his worth.

CHACMA, the Hottentot name of the Cape baboon, *Papio porcarius*, a species inhabiting the mountains of South Africa as far north as the Zambezi. Of the approximate size of an English mastiff, this powerful baboon is blackish grey in colour with a tinge of green due to the yellow rings on most of the hairs. Unlike most of its tribe, it is a good climber; and where wooded cliffs are not available, will take up its quarters in tall trees. Chacmas frequently strip orchards and fruit-gardens, break and devour ostrich eggs, and kill lambs and kids for the sake of the milk in their stomachs.

CHACO, a territory of northern Argentina, part of a large district known as the Gran Chaco, bounded N. by the territory of Formosa, E. by Paraguay and Corrientes, S. by Santa Fé, and W. by Santiago del Estero and Salta. The Bermejo river forms its northern boundary, and the Paraguay and Paraná rivers its eastern; these rivers are its only means of communication. Pop. (1895) 10,422; (1904, est.) 13,937; area, 52,741 sq. m. The northern part consists of a vast plain filled with numberless lagoons; the southern part is slightly higher and is covered with dense forests, occasionally broken by open grassy spaces. Its forests contain many species of trees of great economic value; among them is the *quebracho*, which is exported for the tannin which it contains. The capital, Resistencia, with an estimated population of 3500 in 1904, is situated on the Paraná river opposite the city of Corrientes. There is railway communication between Santa Fé and La Sabana, an insignificant timber-cutting village on the southern frontier. In the territory there are still several tribes of uncivilized Indians, who occasionally raid the neighbouring settlements of Santa Fé.

CHACONNE (Span. *chacona*), a slow dance, introduced into Spain by the Moors, now obsolete. It resembles the Passacaglia. The word is used also of the music composed for this dance—a slow stately movement in $\frac{3}{4}$ time. Such a movement was often introduced into a sonata, and formed the conventional finale to an opera or ballet until the time of Gluck.

CHAD [CEADDA], **SAINT** (d. 672), brother of Cedd, whom he succeeded as abbot at Lastingham, was consecrated bishop of the Northumbrians by Wine, the West Saxon bishop, at the request of Oswio in 664. On the return of Wilfrid from France, where he had been sent to be consecrated to the same see, a dispute of course arose, which was settled by Theodore in favour of Wilfrid after three years had passed. Chad thereupon retired to Lastingham, whence with the permission of Oswio he was summoned by Wulfhere of Mercia to succeed his bishop Jaruman, who died 667. Chad built a monastery at Barrow in Lincolnshire and fixed his see at Lichfield. He died after he had held his bishopric in Mercia two and a half years, and was succeeded by Wynfrith. Bede gives a beautiful character of Chad.

See Bede's *Hist. Eccl.* edited by C. Plummer, iii. 23, 24, 28; iv. 2, 3 (Oxford, 1896); Eddius, *Vita Wilfridi*, xiv., xv. edited by J. Raine, Rolls Series (London, 1879).

CHAD, a lake of northern Central Africa lying between 12° 50′ and 14° 10′ N. and 13° and 15° E. The lake is situated about 850 ft. above the sea in the borderland between the fertile and wooded regions of the Sudan on the south and the arid steppes which merge into the Sahara on the north. The area of the lake is shrinking owing to the progressive desiccation of the country, Saharan climate and conditions replacing those of the Sudan. The drying-up process has been comparatively rapid since the middle of the 19th century, a town which in 1850 was on the southern margin of the lake being in 1905 over 20 m. from it. On the west the shore is perfectly flat, so that a slight rise in the water causes the inundation of a considerable area—a fact not without its influence on the estimates made at varying periods as to the size of the lake. Around the north-west and north shores is a continuous chain of gently sloping sand-hills covered with bush. This region abounds in big game and birds

are plentiful. In the east, the country of Kanem, the desiccation has been most marked. Along this coast is a continuous chain of islands running from north-west to south-east. But what were islands when viewed by Overweg in 1851, formed in 1903 part of the mainland and new islands had arisen in the lake. They are generally low, being composed of sand and clay, and lie from 5 to 20 m. from the shore, which throughout its eastern side nowhere faces open water. The channels between the islands do not exceed 2 m. in width. Two principal groups are distinguished, the Kuri archipelago in the south, and the Buduma in the north. The inhabitants of the last-named islands were noted pirates until reduced to order by the French. The coast-line is, in general, undefined and marshy, and broken into numerous bays and peninsulas. It is also, especially on the east, lined by lagoons which communicate with the lake by intricate channels. The lake is nowhere of great depth, and about midway numerous mud-banks, marshes, islands and dense growths of aqueous plants stretch across its surface. Another stretch of marsh usually cuts off the northernmost part of the lake from

the central sections. The open water varies in depth from 3 ft. in the north-west to over 20 in the south, where desiccation is less apparent. Fed by the Shari (*q.v.*) and other rivers, the lake has no outlet and its area varies according to the season. The flood water brought down by the Shari in December and January causes the lake to rise to a maximum of 24 ft., the water spreading over low-lying ground, left dry again in May or June. But after several seasons of heavy rainfall the waters have remained for years beyond their low-water level. Nevertheless the secular shrinking goes on, the loss by evaporation and percolation exceeding the amount of water received; whilst, on the average, the rainfall is diminishing. In 1870 the lake rose to an exceptional height, but since then, save in 1897, there has been only the normal seasonal rise. The prevalent north-east wind causes at times a heavy swell on the lake. Fish abound in its waters, which are sweet, save at low-level, when they become brackish. The lagoons are believed to act as purifying pans in which the greater part of the salt in the water is precipitated. In the south-west end of the lake the water is yellow, caused by banks of clay; elsewhere it is clear.

The southern basin of Chad is described under the Shari, which empties its waters into the lake about the middle of the southern shore, forming a delta of considerable extent. Beyond the south-east corner of the lake is a depression known as the Bahr-el-Ghazal (not to be confounded with the Nile affluent of the same name). This depression is the termination of what is in all probability the bed of one of the dried-up Saharan rivers. Coming from the Tibesti highlands the Bahr-el-Ghazal has a south-westerly trend to Lake Chad. Near the lake the valley was formerly swampy, and at high-water the lake overflowed into it. There was also at one time communication between the Shari and the Bahr-el-Ghazal, so that the water of the first-named stream reached Chad by way of the Bahr-el-Ghazal. There is now neither inlet nor outlet to the lake in this direction, the mouth of the Ghazal having become a fertile millet field. There is still, however, a distinct current from the Shari delta to the east end of the lake—known to the natives, like the depression beyond, as the Bahr-el-Ghazal—indicative of the former overflow outlet.

Besides the Shari, the only important stream entering Lake Chad is the Waube or Yo (otherwise the Komadugu Yobe), which rises near Kano, and flowing eastward enters the lake on its western side 40 m. north of Kuka. In the rains the Waube carries down a considerable body of water to the lake.

Lake Chad is supposed to have been known by report to Ptolemy, and is identified by some writers with the Kura lake of the middle ages. It was first seen by white men in 1823 when it was reached by way of Tripoli by the British expedition under Dr Walter Oudney, R.N., the other members being Captain Hugh Clapperton and Major (afterwards Lieut.-Colonel) Dixon Denham. By them the lake was named Waterloo. In 1850 James Richardson, accompanied by Heinrich Barth and Adolf Overweg, reached the lake, also via Tripoli, and Overweg was the first European to navigate its waters (1851). The lake was visited by Eduard Vogel (1855) and by Gustav Nachtigal (1870), the last-named investigating its hydrography in some detail. In 1890–1893 its shores were divided by treaty between Great Britain, France and Germany. The first of these nations to make good its footing in the region was France. A small steamer, brought from the Congo by Emile Gentil, was in 1897 launched on the Shari, and reaching the Chad, navigated the southern part of the lake. Communication between Algeria and Lake Chad by way of the Sahara was opened, after repeated failures, by the French explorer F. Foureau in 1899–1900. At the same time a French officer, Lieut. Joalland, reached the lake from the middle Niger, continuing his journey round the north end to Kanem. A British force under Colonel T. L. N. Morland visited the lake at the beginning of 1902, and in May of the same year the Germans first reached it from Cameroon. In 1902–1903 French officers under Colonel Destenave made detailed surveys of the south-eastern and eastern shores and the adjacent islands. In 1903 Captain E. Lenfant, also a French officer, succeeded in reaching the lake (which he circumnavigated) via the Benue, proving the existence of water communication between the Shari and the Niger. In 1905 Lieut. Boyd Alexander, a British officer, further explored the lake, which then contained few stretches of open water. The lake is bordered W. and S.W. by Bornu, which is partly in the British protectorate of Nigeria and partly in the German protectorate of Cameroon. Bagirmi to the S.E. of the lake and Kanem to the N.E. are both French possessions. The north and north-west shores also belong to France. One of the ancient trade routes across the Sahara—that from Tripoli to Kuka in Bornu—strikes the lake at its north-west corner, but this has lost much of its former importance.

See the works of Denham, Clapperton, Barth and Nachtigal cited in the biographical notices; *Geog. Journal*, vol. xxiv. (1904); Capt. Tilho in *La Géographie* (March 1906); Boyd Alexander, *From the Niger to the Nile*, vol. i. (London, 1907); A. Chevalier, *Mission Chari-Lac Tchad 1902–1904* (Paris, 1908); E. Lenfant, *La Grande Route du Tchad* (Paris, 1905); H. Freydenberg, *Étude sur le Tchad et le bassin du Chari* (Paris, 1908).

CHADDERTON, an urban district of Lancashire, England, within the parliamentary borough of Oldham (*q.v.*). Pop. (1901) 24,892. Cotton and chemical works, and the coal-mines of the neighbourhood, employ the large industrial population.

CHADERTON, LAURENCE (?1536–1640), Puritan divine, was born at Lees Hall, in the parish of Oldham, Lancashire, probably in September 1536, being the second son of Edmund Chaderton,

a gentleman of an ancient and wealthy family, and a zealous Catholic. Under the tuition of Laurence Vaux, a priest, he became an able scholar. In 1564 he entered Christ's College, Cambridge, where, after a short time, he formally adopted the reformed doctrines and was in consequence disinherited by his father. In 1567 he was elected a fellow of his college, and subsequently was chosen lecturer of St Clement's church, Cambridge, where he preached to admiring audiences for many years. He was a man of moderate views, though numbering among his friends extremists like Cartwright and Perkins. So great was his reputation that when Sir Walter Mildmay founded Emmanuel College in 1584 he chose Chaderton for the first master, and on his expressing some reluctance, declared that if he would not accept the office the foundation should not go on. In 1604 Chaderton was appointed one of the four divines for managing the cause of the Puritans at the Hampton Court conference; and he was also one of the translators of the Bible. In 1578 he had taken the degree of B.D., and in 1613 he was created D.D. At this period he made provision for twelve fellows and above forty scholars in Emmanuel College. Fearing that he might have a successor who held Arminian doctrines, he resigned the mastership in favour of John Preston, but survived him, and lived also to see the college presided over successively by William Sancroft (or Sandcroft) and Richard Holdsworth. He died on the 13th of November 1640 at the age of about 103, preserving his bodily and mental faculties to the end.

Chaderton published a sermon preached at St Paul's Cross about 1580, and a treatise of his *On Justification* was printed by Anthony Thysius, professor of divinity at Leiden. Some other works by him on theological subjects remain in manuscript.

CHADWICK, SIR EDWIN (1800–1890), English sanitary reformer, was born at Longsight, near Manchester, on the 24th of January 1800. Called to the bar without any independent means, he sought to support himself by literary work, and his essays in the *Westminster Review* (mainly on different methods of applying scientific knowledge to the business of government) introduced him to the notice of Jeremy Bentham, who engaged him as a literary assistant and left him a handsome legacy. In 1832 he was employed by the royal commission appointed to inquire into the operation of the poor laws, and in 1833 he was made a full member of that body. In conjunction with Nassau W. Senior he drafted the celebrated report of 1834 which procured the reform of the old poor law. His special contribution was the institution of the union as the area of administration. He favoured, however, a much more centralized system of administration than was adopted, and he never ceased to complain that the reform of 1834 was fatally marred by the rejection of his views, which contemplated the management of poor-law relief by salaried officers controlled from a central board, the boards of guardians acting merely as inspectors. In 1834 he was appointed secretary to the poor law commissioners. Finding himself unable to administer in accordance with his own views an act of which he was largely the author, his relations with his official chiefs became much strained, and the disagreement led, among other causes, to the dissolution of the poor law commission in 1846. Chadwick's chief contribution to political controversy was his constant advocacy of entrusting certain departments of local affairs to trained and selected experts, instead of to representatives elected on the principle of local self-government. While still officially connected with the poor law he had taken up the question of sanitation in conjunction with Dr Southwood Smith, and their joint labours produced a most salutary improvement in the public health. His report on "The Sanitary Condition of the Labouring Population" (1842) is a valuable historical document. He was a commissioner of the Board of Health from its establishment in 1848 to its abolition in 1854, when he retired upon a pension, and occupied the remainder of his life in voluntary contributions to sanitary and economical questions. He died at East Sheen, Surrey, on the 6th of July 1890. He had been made K.C.B. in 1889.

See a volume on *The Evils of Disunity in Central and Local Administration . . . and the New Centralization for the People*, by Edwin Chadwick (1885); also *The Health of Nations, a Review of the Works of Edwin Chadwick, with a Biographical Introduction*, by Sir B. W. Richardson (1887).

CHAEREMON, Athenian dramatist of the first half of the 4th century B.C. He is generally considered a tragic poet. Aristotle (*Rhetoric*, iii. 12) says his works were intended for reading, not for representation. According to Suidas, he was also a comic poet, and the title of at least one of his plays (*Achilles Slayer of Thersites*) seems to indicate that it was a satyric drama. His *Centaurus* is described by Aristotle (*Poet.* i. 12) as a rhapsody in all kinds of metres. The fragments of Chaeremon are distinguished by correctness of form and facility of rhythm, but marred by a florid and affected style reminiscent of Agathon. He especially excelled in descriptions (irrelevantly introduced) dealing with such subjects as flowers and female beauty. It is not agreed whether he is the author of three epigrams in the Greek Anthology (Palatine vii. 469, 720, 721) which bear his name.

See H. Bartsch, *De Chaeremone Poëta tragico* (1843); fragments in A. Nauck, *Fragmenta Tragicorum Graecorum*.

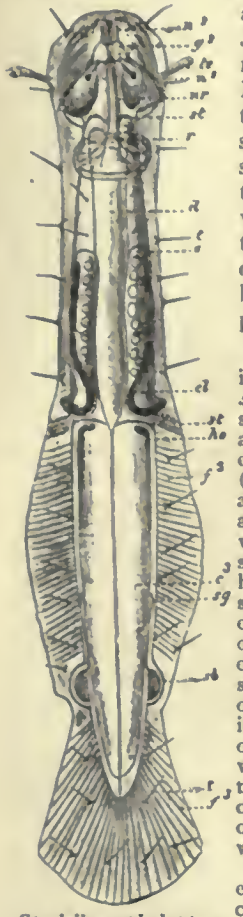
CHAEREMON, of Alexandria (1st century A.D.), Stoic philosopher and grammarian. He was superintendent of the portion of the Alexandrian library that was kept in the temple of Serapis, and as custodian and expounder of the sacred books (ἱερογραμματεύς, sacred scribe) belonged to the higher ranks of the priesthood. In A.D. 49 he was summoned to Rome, with Alexander of Aegae, to become tutor to the youthful Nero. He was the author of a *History of Egypt*; of works on *Comets*, *Egyptian Astrology*, and *Hieroglyphics*; and of a grammatical treatise on *Expletive Conjunctions* (συνδεσμοὶ παραπληρωματικοί). Chaeremon was the chief of the party which explained the Egyptian religious system as a mere allegory of the worship of nature. His books were not intended to represent the ideas of his Egyptian contemporaries; their chief object was to give a description of the sanctity and symbolical secrets of ancient Egypt. He can hardly be identical with the Chaeremon who accompanied (*c.* 26 B.C.; Strabo xvii. p. 806) Aelius Gallus, praefect of Egypt, on a journey into the interior of the country.

Fragments in C. Müller, *Fragmenta Historicorum Graecorum*, iii. 495-499.

CHAERONEIA, or CHAERONEA, an ancient town of Boeotia, said by some to be the Homeric Arne, situated about 7 m. W. of Orchomenus. Until the 4th century B.C. it was a dependency of Orchomenus, and at all times it played but a subordinate part in Boeotian politics. Its importance lay in its strategic position near the head of the defile which presents the last serious obstacle to an invader in central Greece. Two great battles were fought on this site in antiquity. In 338 B.C. Philip II. and Alexander of Macedon were confronted by a confederate host from central Greece and Peloponnese under the leadership of Thebes and Athens, which here made the last stand on behalf of Greek liberty. A hard-fought conflict, in which the Greek infantry displayed admirable firmness, was decided in favour of Philip through the superior organization of his army. In 86 B.C. the Roman general L. Cornelius Sulla defeated the army of Mithradates VI., king of Pontus, near Chaeroneia. The latter's enormous numerical superiority was neutralized by Sulla's judicious choice of ground and the steadiness of his legionaries; the Asiatics after the failure of their attack were worn down and almost annihilated. Chaeroneia is also notable as the birthplace of Plutarch, who returned to his native town in old age, and was held in honour by its citizens for many successive generations. Pausanias (ix. 40) mentions the divine honours accorded at Chaeroneia to the sceptre of Agamemnon, the work of Hephaestus (cf. *Iliad*, ii. 101). The site of the town is partly occupied by the village of Kapraena; the ancient citadel was known as the Petrachus, and there is a theatre cut in the rock. A colossal seated lion a little to the S.E. of the site marks the grave of the Boeotians who fell fighting against Philip; this lion was found broken to pieces; the tradition that it was blown up by Odysseus Androutsos is incorrect (see Murray, *Handbook for Greece*, ed. 5, 1884, p. 409). It has now been restored and re-erected (1905).

AUTHORITIES.—Thucydides iv. 76; Diodorus xvi. 85-86; Plutarch, *Alexander*, ch. 9; *Sulla*, chs. 16-19; Appian, *Mithradatica*, chs. 42-45; W. M. Leake, *Travels in Northern Greece* (London, 1835), ii. 112-117, 192-201; B. V. Head, *Historia Numorum* (Oxford, 1887), p. 292; J. Kromayer, *Antike Schlachtfelder in Griechenland* (Berlin, 1903), pp. 127-195; G. Sotiriades in *Athen. Mitteil.* 1903, pp. 301 ff.; 1905, p. 120; 1906, p. 396; Ἐφημ. Ἀρχαιολ., 1908, p. 65.

CHAETOGNATHA, the name given by R. Leuckhart to a small group of transparent and for the most part pelagic organisms, whose position in the animal kingdom is a very isolated one. Only three genera, *Sagitta*, *Spadella* and *Krohnia*, are recognised, and the number of species is small. Nevertheless these animals exist in extraordinary quantities, so that at certain seasons and under certain conditions the surface of the sea seems almost stiff with the incredible multitude of organisms which pervade it. Rough seas, &c., cause them to seek safety in dropping into deeper water. Deep-sea forms also occur, but in spite of this the group is essentially pelagic.



Spadella cephaloptera (Busch).
St, Septa dividing body-cavity transversely.
g^2, Cerebral ganglia.
n^1, Commissure uniting this with ventral ganglion (not shown in fig.).
n^2, Nerve uniting cerebral ganglia with small ganglia on head.
nr, Olfactory nerve.
d, Alimentary canal.
r, Olfactory organ.
te, Tentacle.
t, Tactile hairs springing from surface of body.
e, Ovary.
el, Oviduct.
ho, Testes.
sg, Vas deferens. [fins.
$f^1 f^2$, Lateral and caudal
sb, Seminal pouch.

The eyes are indicated as black dots behind the cerebral ganglia.

As a rule the body is some 1 to 2 or 3 cm. in length, though some species are larger, by 4 or 5 mm. in breadth, and it is shaped something like a torpedo with side flanges and a slightly swollen, rounded head. It can be divided into three regions—(i.) head, (ii.) trunk, and (iii.) tail, separated from one another by two transverse septa. The almost spherical head is covered by a hood which can be retracted; it bears upon its side a number of sickle-shaped, chitinous hooks and one or more short rows of low spines—both of these features are used in characterizing the various species. A pair of eyes lie dorsally and behind them is a closed circlet, often pulled out into various shapes, of modified epidermis, to which an olfactory function has been attributed. The interior of the head is filled up with masses of muscle fibres which are mainly occupied with moving the sickle-shaped hooks. The trunk contains a spacious body-cavity filled during the breeding season by the swollen ovaries, and the same is true of the tail if we substitute testes for ovaries.

The skin consists of a transparent cuticle excreted by the underlying ectoderm, the cells of which though usually one-layered may be heaped up into several layers in the head; beneath this is a basement membrane, and then a layer of longitudinal muscle fibres which are limited inside by a layer of peritoneal cells. The muscles are striated and arranged in four quadrants, two dorso-lateral and two ventro-lateral, an arrangement which recalls that of the Nematoda, whilst in their histology they somewhat resemble the muscles of the Oligochaeta. Along each side of the body stretches a horizontal fin and a similar flange surrounds the tail. Into these fins, which are largely cuticular and strengthened by radiating bars, a single layer of ectoderm cells projects.

The mouth, a longitudinal slit, opens on to the ventral surface of the head. It leads into a straight alimentary canal whose walls consist of a layer of ciliated cells ensheathed in a thin layer of peritoneal cells. There is no armature, and no glands, and the whole tract can only be divided into an oesophagus and an intestine. The latter runs with no twists or coils straight to the anus, which is situated at the junction of the trunk with the tail. A median mesentery running dorso-ventrally supports the alimentary canal and is continued behind it into the tail, thus dividing the body cavity into two lateral halves.

There are no specialized circulatory, respiratory or excretory organs.

The nervous system consists of a cerebral ganglion in the head, a conspicuous ventral ganglion in the trunk, and of lateral commissures uniting these ganglia on each side. The whole of this system has retained its primitive connexion with the ectoderm. The cerebral ganglion also gives off a nerve on each side to a pair of small ganglia, united by a median commissure, which have sunk into and control the muscles of the head. As in other animals there is a minute but extensive nervous plexus, which permeates the whole body and takes its origin from the chief ganglia. In addition to the eyes and the olfactory circle on the head scattered tactile papillae are found on the ectoderm.

Chaetognatha are hermaphrodite. The ovaries are attached to the side walls of the trunk region; between them and the body wall lie the two oviducts whose inner and anterior end is as described as closed, their outer ends opening one on each side of the anus, where the trunk joins the tail. According to Miss N. M. Stevens the so-called oviduct acts only as a "sperm-duct" or receptaculum seminis. The spermatozoa enter it and pass through its walls and traverse a minute duct formed of two accessory cells, and finally enter the ripe ovum. Temporary oviducts are formed between the "sperm-duct" and the germinal epithelium at each oviposition. A number of ova ripen simultaneously. The two testes lie in the tail and are formed by lateral proliferations of the living peritoneal cells. These break off and, lying in the coelomic fluid, break up into spermatozoa. They pass out through short vasa deferentia with internal ciliated funnels, sometimes an enlargement on their course—the seminal vesicles—and a minute external pore situated on the side of the tail.

With hardly an exception the transparent eggs are laid into the sea and float on its surface. The development is direct and there is no larval stage. The segmentation is complete; one side of the hollow blastosphere invaginates and forms a gastrula. The blastopore closes, a new mouth and a new anus subsequently arising. The archenteron gives off two lateral pouches and thus becomes trilobed. The middle lobe forms the alimentary canal; it closes behind and opens to the exterior anteriorly and so makes the mouth. The two lateral lobes contain the coelom; each separates off in front a segment which forms the head and presumably then divides again to form anteriorly the trunk, and posteriorly the tail regions. An interesting feature of the development of Chaetognaths is that, as in some insects, the cells destined to form the reproductive organs are differentiated at a very early period, being apparent even in the gastrula stage.

The great bulk of the group is pelagic, as the transparent nature of all their tissues indicates. They move by flexing their bodies. *Spadella cephaloptera* is, however, littoral and oviposits on sea-weed, and the "Valdivia" brought home a deep-sea species.

The three genera are differentiated as follows:—

Sagitta M. Slabber, with two pairs of lateral fins. This genus was named as long ago as 1775.

Krohnia P. Langerhans, with one lateral fin on each side, extending on to the tail.

Spadella P. Langerhans, with a pair of lateral fins on the tail and a thickened ectodermic ridge running back on each side from the head to the anterior end of the fin.

The group is an isolated one and should probably be regarded as a separate phylum. It has certain histological resemblances with the Nematoda and certain primitive Annelids, but little stress must be laid on these. The most that can be said is that the Chaetognaths begin life with three segments, a feature they share with such widely-differing groups as the Brachiopoda, the Echinoderma and the Enteropneusta, and probably Vertebrata generally.

See O. Hertwig, *Die Chaetognathen, eine Monographie* (Jena, 1880); B. J. Grassi, *Chetognathi: Flora u. Fauna d. Golfes von Neapel* (1883); S. Strodtman, *Arch. Naturg.* lviii., 1892; N. M. Stevens, *Zool. Jahrb. Anat.* xviii., 1903, and xxi., 1905. (A. E. S.)

CHAETOPODA (Gr. χαίτη, hair, πούς, foot), a zoological class, including the majority of the Annelida (*q.v.*), and indeed, save for the Echiuroidea (*q.v.*), co-extensive with that group as usually accepted. They are divisible into the Haplodrili (*q.v.*) or Archiannelida, the Polychaeta containing the marine worms, the Oligochaeta or terrestrial and fresh-water annelids (see EARTHWORM), the Hirudinea or leeches (see LEECH), and a small group of parasitic worms, the Myzostomida (*q.v.*).

The distinctive characters of the class Chaetopoda as a whole are partly embodied in the name. They possess (save for certain Archiannelida, most Hirudinea, and other very rare exceptions) setae or chaetae implanted in epidermal pits. The setae are implanted metamerically in accordance with the metamerism of the body, which consists of a prostomium followed by a number of segments. The number of segments in an individual is frequently more or less definite. The anterior end of body always shows some "cephalization." The internal organs are largely repeated metamerically, in correspondence with the external metamerism. Thus the body cavity is divided into a sequence of chambers by transverse septa; and even among the Hirudinea,

where this condition is usually not to be observed, there is embryological evidence that the existing state of affairs is derived from this. Commonly the nephridia are strictly paired a single pair to each segment, while the branches of the blood vascular system are similarly metameric. The alimentary canal is nearly always a straight tube running from the mouth, which is surrounded by the first segment of the body and overhung by the prostomium, to the anus, which is then either surrounded by the last segment of the body or opens dorsally a little way in front of this.

The Class as a Whole.—The Chaetopoda are with but few exceptions (Myzostomida in part, *Sternaspis*) elongated worms, flattened or, more usually, cylindrical, and bilaterally symmetrical. The body consists of a number of exactly similar or closely similar segments, which are never fused and metamorphosed, as in the Arthropoda, to form specialized regions of the body. It is, however, always possible to recognize a head, which consists at least of the peristomial segment with a forward projection of the same, the prostomium. A thorax also is sometimes to be distinguished from an abdomen. Where locomotive appendages (the parapodia of the Polychaeta) exist, they are never jointed, as always in the Arthropoda; nor are they modified anteriorly to form jaws, as in that group.

The prostomium overhangs the mouth, and is often of considerable size and, as a rule, quite distinct from the segment following, being

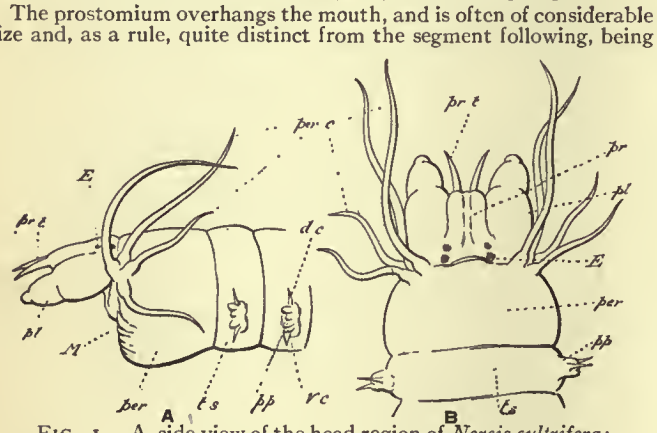


Fig. 1.—A, side view of the head region of *Nereis cultrifera*; B, dorsal view of the same.

E, Eye.	*pl*, Prostomial palp.
M, Mouth.	*pp*, Parapodium.
d.c, Dorsal cirrus.	*pr*, Prostomium.
per, Peristomium, probably equal to two segments,	*pr.t*, Prostomial tentacle.
	t.s, Trunk segment.
per.c, Peristomial cirri.	*v.c*, Ventral cirrus.

separated by an external groove, and containing, at least temporarily, the brain, which always arises there. Its cavity also is at first independent of the coelom though later invaded by the latter. In any case the cavity of the prostomium is single, and not formed, as is the cavity of the segments of the body, by paired coelomic chambers. It has, however, been alleged that this cavity is formed by a pair of mesoblastic somites (N. Kleinenberg), in which case there is more reason for favouring the view that would assign an equality between the prostomium and the (in that case) other segments of the body. The peculiar prostomium of *Tomopteris* is described below. The body-wall of the Chaetopoda consists of a "dermo-muscular" tube which is separated from the gut by the coelom and its peritoneal walls, except in most leeches. A single layer of epidermic cells, some of which are glandular, forms the outer layer. Rarely are these ciliated, and then only in limited tracts. They secrete a cuticle which never approaches in thickness the often calcified cuticle of Arthropods. Below this is a circular, and below that again a longitudinal, layer of muscle fibres. These muscles are not striated, as they are in the Arthropoda.

Setae.—These chitinous, rod-like, rarely squat and then hook-like structures are found in the majority of the Chaetopoda, being absent only in certain Archiannelida, most leeches, and a very few Oligochaeta. They exist in the Brachiopoda (which are probably not unrelated to the Chaetopoda), but otherwise are absolutely distinctive of the Chaetopods. The setae are invariably formed each within an epidermic cell, and they are sheathed in involutions of the epidermis. Their shape and size varies greatly and is often of use in classification. The setae are organs of locomotion, though their large size and occasionally jagged edges in some of the Polychaeta suggest an aggressive function. They are disposed in two groups on either side, corresponding in the Polychaeta to the parapodia; the two bundles are commonly reduced among the earthworms to two pairs of setae or even to a single seta. On the other hand, in certain Polychaeta the bundles of setae are so extensive that they nearly form a complete circle surrounding the body; and in the Oligochaet genus *Perichaeta* (=*Pheretima*), and some allies, there is actually a complete circle of setae in each segment broken only by minute gaps, one dorsal, the other ventral.

Coelom.—The Chaetopoda are characterized by a spacious coelom, which is divided into a series of chambers in accordance with the general metamerism of the body. This is the typical arrangement, which is exhibited in the majority of the Polychaeta and Oligochaeta; in these the successive chambers of the coelom are separated by the intersegmental septa, sheets of muscle fibres extending from the body wall to the gut and thus forming partitions across the body. The successive cavities are not, however, completely closed from each other; there is some communication between adjoining segments, and the septa are sometimes deficient here and there. Thus in the Chaetopoda the perivisceral cavity is coelomic; in this respect the group contrasts with the Arthropoda and Molluscs, where the perivisceral cavity is, mainly at least, part of the vascular or haemal system, and agrees with the Vertebrata. The coelom is lined throughout by cells, which upon the intestine become large and loaded with excretory granules, and are known as chloragogen cells. Several forms of cells float freely in the fluid of the coelom. In another sense also the coelom is not a closed cavity, for it communicates in several ways with the external medium. Thus, among the Oligochaeta there are often a series of dorsal pores, or a single head pore, present also among the Polychaeta (in *Ammochares*). In these and other Chaetopods the coelom is also put into indirect relations with the outside world by the nephridia and by the gonad ducts. In these features, and in the fact that the gonads are local proliferations of the coelomic epithelium, which have undergone no further changes in the simpler forms, the coelom of this group shows in a particularly clear fashion the general characters of the coelom in the higher Metazoa. It has been indeed largely upon the conditions characterizing the Chaetopoda that the conception of the coelom in the Coelomocoela has been based.

Among the simpler Chaetopoda the coelom retains the character of a series of paired chambers, showing the above relations to the exterior and to the gonads. There are, however, further complications in some forms. Especially are these to be seen in the more modified Oligochaeta and in the much more modified Hirudinea. In the Polychaeta, which are to be regarded as structurally simpler forms than the two groups just referred to, there is but little subdivision of the coelom of the segments, indeed a tendency in the reverse direction, owing to the suppression of septa. Among the Oligochaeta the dorsal vessel in *Dinodrilus* and *Megascolides* is enclosed in a separate coelomic chamber which may or may not communicate with the main coelomic cavity. To this pericardial coelom is frequently added a gonocoel enclosing the gonads and the funnels of their ducts. This condition is more fully dealt with below in the description of the Oligochaeta. The division and, indeed, partial suppression of the coelom culminates in the leeches, which in this, as in some other respects, are the most modified of Annelids.

Nervous System.—In all Chaetopods this system consists of cerebral ganglia connected by a circumoesophageal commissure with a ventral ganglionated cord. The plan of the central nervous system is therefore that of the Arthropoda. Among the Archiannelida, in *Aeolosoma* and some Polychaetes, the whole central nervous system remains imbedded in the epidermis. In others, it lies in the coelom, often surrounded by a special and occasionally rather thick sheath. The cerebral ganglia constitute an archicerebrum for the most part, there being no evidence that, as in the Arthropoda, a movement forward of post-oral ganglia has taken place. In the leeches, however, there seems to be the commencement of the formation of a syncerebrum. In the latter, the segmentally arranged ganglia are more sharply marked off from the connectives than in other Chaetopods, where nerve cells exist along the whole ventral chain, though more numerous in segmentally disposed swellings.

Vascular System.—In addition to the coelom, another system of fluid-holding spaces lies between the body wall and the gut in the Chaetopoda. This is the vascular or haemal system (formerly and unnecessarily termed pseudhaemal). With a few exceptions among the Polychaeta the vascular system is always present among the Chaetopoda, and always consists of a system of vessels with definite walls, which rarely communicate with the coelom. It is in fact typically a closed system. The larger trunks open into each other either directly by cross branches, or a capillary system is formed. There are no lacunar blood spaces with ill-defined or absent walls except for a sinus surrounding the intestine, which is at least frequently present. The principal trunks consist of a dorsal vessel lying above the gut, and a ventral vessel below the gut but above the nervous cord. These two vessels in the Oligochaeta are united in the anterior region of the body by a smaller or greater number of branches which surround the oesophagus and are, some of them at least, contractile and in that case wider than the rest. The dorsal vessel also communicates with the ventral vessel indirectly by the intestinal sinus, which gives off branches to both the longitudinal trunks, and by tegementary vessels and capillaries which supply the skin and the nephridia. In the smaller and simpler forms the capillary networks are much reduced, but the dorsal and ventral vessels are usually present. The former, however, is frequently

developed only in the anterior region of the body where it emerges from the peri-intestinal blood sinus. On the other hand, additional longitudinal trunks are sometimes developed, the chief one of which is a supra-intestinal vessel lying below the dorsal vessel and closely adherent to the walls of the œsophagus in which region it appears. The capillaries sometimes (in many leeches and Oligochaeta) extend into the epidermis itself. Usually they do not extend outwards of the muscular layers of the body wall. The main trunks of the vascular system often possess valves at the origin of branches which regulate the direction of the blood flow. Among many Oligochaeta the dorsal blood-vessel is partly or entirely a double tube, which is a retention of a character shown by F. Vezhdovský to exist in the embryo of certain forms. The blood in the Chaetopoda consists of a plasma in which float a few corpuscles. The plasma is coloured red by haemoglobin: it is sometimes (in *Sabella* and a few other Polychaeta) green, which tint is due to another respiratory pigment. The plasma may be pink (*Magelona*) or yellow (*Aphrodite*) in which cases the colour is owing to another pigment. In *Aeolosoma* it is usually colourless. The vascular system is in the majority of Chaetopods a closed system. It has been asserted (and denied) that the cellular rod which is known as the "Heart-body" (*Herzkörper*), and is to be found in the dorsal vessel of many Oligochaeta and Polychaeta, is formed of cells which are continuous with the chloragogen cells, thus implying the existence of apertures of communication with the coelom. The statement has been often made and denied, but it now seems to have been placed on a firm basis (E. S. Goodrich), that among the Hirudinea the coelom, which is largely broken up into narrow tubes, may be confluent with the tubes of the vascular system. This state of affairs has no antecedent improbability about it, since in the Vertebrata the coelom is unquestionably confluent with the haemal system through the lymphatic vessels. Finally, there are certain Polychaeta, *e.g.* the *Capitellidae*, in which the vascular system has vanished altogether, leaving a coelom containing haemoglobin-impregnated corpuscles. It has been suggested (E. Ray Lankester) that this condition has been arrived at through some such intermediate stage as that offered by Polychaet *Magelona*. In this worm the ventral blood-vessel is so swollen as to occupy nearly the whole of the available coelom. Carry the process but a little farther and the coelom disappears and its place is taken by a blood space or haemocoel. It has been held that the condition shown in certain leeches tend to prove that the coelom and haemocoel are primitively one series of spaces which have been gradually differentiated. The facts of development, however, prove their distinctness, though those same facts do not speak clearly as to the true nature of the blood system. One view of the origin of the latter (largely based upon observations upon the development of *Polygordius*) sees in the blood system a persistent blastocoel. F. Vezhdovský has lately seen reasons for regarding the blood system as originating entirely from the hypoblast by the secretion of fluid, the blood, from particular intestinal cells and the consequent formation of spaces through pressure, which become lined with these cells.

Nephridia and Coelomoducts.—The name "Nephridium" was originally given by Sir E. Ray Lankester to the members of a series of tubes, proved in some cases to be excretory in nature, which exist typically to the number of a single pair in most of the segments of the Chaetopod body, and open each by a ciliated orifice into the coelom on the one hand, and by a pore on to the exterior of the body on the other. In its earlier conception, this view embraced as homologous organs (so far as the present group is concerned) not only the nephridia of Oligochaeta and Hirudinea, which are obviously closely similar, but the wide tubes with an intercellular lumen and large funnels of certain Polychaeta, and (though with less assurance) the gonad ducts in Oligochaeta and Hirudinea. The function of nitrogenous excretion was not therefore a necessary part of the view—though it may be pointed out that there are grounds for believing that the gonad ducts are to some extent also organs of excretion (see below). Later, the investigations of E. Meyer and E. S. Goodrich, endorsed by Lankester, led to the opinion that under the general morphological conception of "nephridium" were included two distinct sets of organs, viz. nephridia and coelomoducts. The former (represented by, *e.g.* the "segmental organs" of *Lumbricus*) have been asserted to be "ultimately, though not always, actually traceable to the ectoderm"; the latter (represented by, *e.g.* the oviduct of *Lumbricus*) are parts of the coelomic wall itself, which have grown out to the exterior. The nephridia, in fact, on this view, are *ectodermic ingrowths*, the coelomoducts *coelomic outgrowths*. The cavity of the former has nothing to do with coelom. The cavity of the latter is coelom.

The embryological facts upon which this view has been based, however, have been differently interpreted. According to C. O. Whitman the entire nephridial system (in the leech *Clepsine*) is formed by the differentiation of a continuous epiblastic band on each side. The exact opposite is maintained by R. S. Bergh (for *Lumbricus* and *Criodrilus*), whose figures show a derivation of the entire nephridium from mesoblast, and an absence of any connexion between successive nephridia by any continuous band, epiblastic or mesoblastic. A midway position is taken up by Wilson, who asserts the mesoblastic formation of the funnel, but also asserts the presence of a continuous band of epiblast from which certainly the terminal vesicle of the nephridium, and doubtfully the glandular part of the tube is derived. Vezhdovský's figures of *Rhynchelmis* agree with those of Bergh in showing the backward growth of the nephridium from the funnel cell. There are thus substantial reasons for believing that the nephridium grows backwards from a funnel as does the coelomoduct. It is therefore by no means certain that so profound a difference embryologically can be asserted to exist between the excretory nephridia and the ducts leading from the coelom to the exterior, which are usually associated with the extrusion of the genital products among the Chaetopoda.

There are, however, anatomical and histological differences to be seen at any rate at the extremes between the undoubted nephridia of Goodrich, Meyer and Lankester, and the coelomoducts of the same authors.

1. *Nephridia.*—Excretory organs which are undisputed nephridia are practically universal among the Oligochaeta, Hirudinea and Archiannelida, and occur in many Polychaeta. Their total absence has been asserted definitely only in *Paranais littoralis*. Usually these

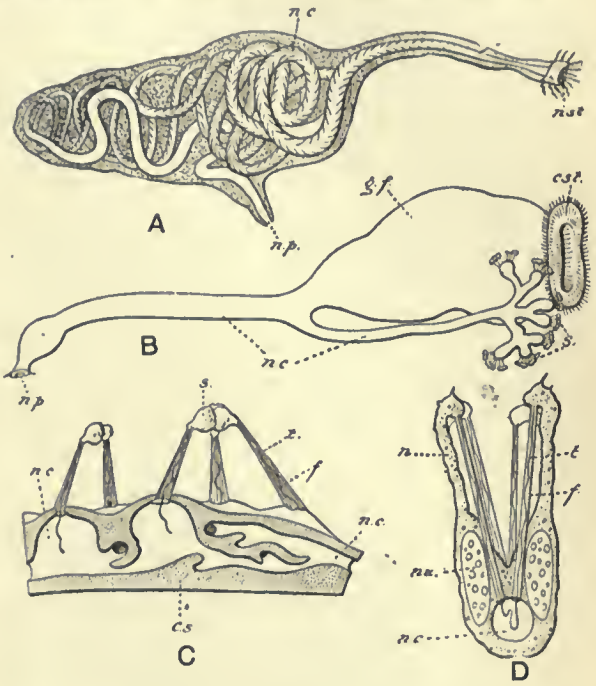


FIG. 2 (from Goodrich).

A, Diagram of the nephridium of *Nereis diversicolor*.
B, Diagram of the nephridium of *Alciope*, into which opens the large genital funnel (coelomostome).
C, Small portion of the nephridium of *Glycera siphonostoma*, showing the canal cut through, and the solenocytes on the outer surface.
D, Optical section of a branch of the nephridium of *Nephthys scolopendroides*.

c.s, Cut surface.
cst, Coelomostome.
f, Flagellum.
g.f, Genital funnel.
n, Neck of solenocyte.
n.c, Nephridial canal.
n.p, Nephridiopore.
nst, Nephridiostome.
nu, Nucleus of solenocyte.
s, Solenocytes.
t, Tube.

organs are present to the number of a single pair per somite, and are commonly present in the majority of the segments of the body, failing often among the Oligochaeta in a varying number of the anterior segments. They are considerably reduced in number in certain Polychaeta. Essentially, a nephridium is a tube, generally very long and much folded upon itself, composed of a string of cells placed end to end in which the continuous lumen is excavated. Such cells are termed "drain pipe" cells. Frequently the lumen is branched and may form a complicated anastomosing network in these cells. Externally, the nephridium opens by a straight part of the tube, which is often very wide, and here the intracellular lumen becomes intercellular. Rarely the nephridium does not communicate with the coelom; in such cases the nephridium ends in a single cell, like the "flame cell" of a Platyhelminth worm, in which there is a lumen blocked at the coelomic end by a tuft of fine cilia projecting into the lumen. This is so with *Aeolosoma* (Vezhdovský). The condition is interesting as a persistence of the conditions obtaining in the provisional nephridia of *e.g. Rhynchelmis*, which afterwards become by an enlargement and opening up of the funnel the permanent nephridia of the adult worm. In some Polychaets (*e.g. Glycera*, see fig. 2) there are many of these flame cells to a single nephridium which are specialized in form, and have been termed "solenocytes" (Goodrich). They are repeated in *Polygordius*, and are exactly

to be compared with similarly-placed cells in the nephridia of *Amphioxus*.

More usually, and indeed in nearly every other case among the Oligochaeta and Hirudinea, the coelomic aperture of the nephridium consists of several cells, ciliated like the nephridium itself for a greater or less extent, forming a funnel. The funnel varies greatly in size and number of its component cells. There are so many differences of detail that no line can be drawn between the one-celled funnel of *Aeolosoma* and the extraordinarily large and folded funnel of the posterior nephridia in the Oligochaete *Thamnodrilus*. In the last-mentioned worm the funnels of the anterior nephridia are small and but few celled; it is only the nephridia in and behind the 17th segment of the body which are particularly large and with a sinuous margin, which recall the funnels of the gonad ducts (*i.e.* coelomoducts).

Among the Polychaeta the nephridium of *Nereis* (see fig. 2) is like that of the Oligochaeta and Hirudinea in that the coiled glandular tube has an intracellular duct which is ciliated in the same way in parts. The Polychaeta, however, present us with another form of nephridium seen, for example, in *Arenicola*, where a large funnel leads into a short and wide excretory tube whose lumen is intercellular. In the young stages of this worm which have been investigated by W. B. Benham, the tube, though smaller, and with a but little pronounced funnel, has still an intercellular duct. That these organs in Polychaeta serve for the removal of the generative products to the exterior is proved not only by the correspondence in number to them of the gonads, but by actual observation of the generative products in transit. This form of nephridia leads to the shorter but essentially similar organs in the Polychaete *Sternaspis*, and to those of the Echinoidea (*q.v.*) and of the Gephyrea (*q.v.*).

Though the paired arrangement of the nephridia is the prevalent one in the Chaetopoda, there are many examples, among the Oligochaeta, of species and genera in which there are several, even many, nephridia in each segment of the body, which may or may not be connected among themselves, but have in any case separate orifices on to the exterior.

2. *Coelomoducts.*—In this category are included (by Goodrich and Lankester) the gonad ducts of the Oligochaeta, certain funnels without any aperture to the exterior, that have been detected in *Nereis*, &c., funnels with wide and short ducts attached to nephridia in other Polychaeta, gonad ducts in the *Capitellidae*, the gonad ducts of the leeches. In all these cases we have a duct which has a usually wide, always intercellular, lumen, generally, if not always, ciliated, which opens directly into the coelom on the one hand and on to the exterior of the body on the other. These characters are plain in all the cases cited, excepting only the leeches which will be considered separately.

There is not a great deal of difference between most of these structures and true nephridia. It is not clear, for example, to which category it is necessary to refer the excretory organs of *Arenicola*, or *Polynoe*. Both series of organs consist essentially of a ciliated tube leading from the coelom to the exterior. Both series of organs grow back centrifugally from the funnel. In both the cavity originally or immediately continuous with the coelom appears first in the funnel and grows backwards. In some cases, *e.g.* oviducts of Oligochaeta, sperm ducts of *Phreoryctes*, the coelomoducts occupy, like the nephridia, two segments, the funnel opening into that in front of the segment which carries the external pore. It is by no means certain that a hard and fast line can be drawn between intra- and intercellular lumina. Finally, in function there are some points of likeness. The gonad ducts of *Lumbricus*, &c., must perform one function of nephridia; they must convey to the exterior some of the coelomic fluid with its disintegrated products of waste. There is no possibility that sperm and ova can escape by these tubes not in company with coelomic fluid. In the case of many Oligochaeta where there is no vascular network surrounding the nephridium, this function must be the chief one of those glands, the more elaborate process of excretion taking place in the case of nephridia surrounded by a rich plexus of blood capillaries. A consideration of the mode of development and appearance of the coelomoducts that have thus far been enumerated (with the possible exception of those of the leeches) seems to show that there is a distinct though varying relation between them and the nephridia. It has been shown that in *Tubifex*, and some other aquatic Oligochaeta, the genital segments are at first provided with nephridia, and that these disappear on the appearance of the generative ducts, which are coelomoducts. In *Lumbricus* the connexion is a little closer; the funnel of the nephridium, in the segments in which the funnels of the gonad ducts are to be developed, persists and is continuous with the gonad duct funnels on their first appearance. In the development of the Acanthodrilid earthworm *Octochaetus* (F. E. Beddard) the funnels of the pronephridia disappear except in the genital segments, where they seem to be actually converted into the genital funnels. At the least there is no doubt that the genital funnels are developed precisely where the nephridial funnels formerly existed. If the genital funnels are not wholly or partly formed out of the nephridial funnels they have replaced them. In the genital segments of *Eudrilus* the nephridia are present, but the funnels have not been found though they are obvious in other segments. Here also the genital funnels have either replaced or been formed out of nephridial funnels. In *Haplotaxis heterogyne* (W. B. Benham) the sperm ducts are hardly to be distinguished from nephridia; they are sinuous tubes with an intra-cellular duct. But the funnel is large and thus differs from the funnels of the nephridia in adjoining segments. Here again the nephridial funnel seems to have been converted into or certainly replaced by a secondarily developed funnel. This example is similar to cases among the Polychaeta where a true nephridium is provided with a large funnel, a coelomostome, according to the nomenclature of Lankester. The whole organ, having, as is thought but not known, this double origin, is termed a nephromixium. The various facts, however, seem to be susceptible of another interpretation. It may be pointed out that the several examples described recall a phenomenon which is not uncommon and is well known to anatomists. That is the replacement of an organ by, sometimes coupled with its partial conversion into, a similar or slightly different organ performing the same or an analogous function. Thus the postcaval vein of the higher vertebrata is partly a new structure altogether, and is partly formed out of the pre-existing posterior cardinals. The more complete replacements, such as the nephridia of the genital segment of *Tubifex* by a subsequently formed genital duct, may be compared with the succession of the nesonephros to the pronephros in vertebrates, and of the metanephros to the mesonephros in the higher vertebrates. It might be well to term these structures, mostly serving as gonad ducts, which have an undoubted resemblance to nephridia, and for the most part an undoubted connexion with nephridia, "Nephrodinia," to distinguish them from another category of "ducts" which are communications between the coelom and the exterior, and which have no relation whatever to nephridia or to the organs just discussed. For these latter, the term coelomoducts might well be reserved. To this category belong certain sacs and pouches in many, perhaps most, genera of the Oligochaeta family, *Eudrilidae*, and possibly the gonad ducts in the Hirudinea. As an example of the former it has been shown (Beddard) that a large median sac in *Lybiodrilus* is at first freely open to the coelom, that it later becomes shut off from the same, that it then acquires an external orifice, and, finally, that it encloses the ovary or ovaries, between which and the exterior a passage is thus effected. To this category will belong the oviducts in Teleostean fishes and probably the gonad ducts in several groups of invertebrates.

POLYCHAETA.—This group may be thus defined and the definition contrasted and compared with those of the other divisions of the Chaetopoda. Setae always present and often very large, much varied in form and very numerous, borne by the dorsal and ventral parapodia (when present). The prostomium and the segments generally often bear processes sensory and branchial. Eyes often present and comparatively complicated in structure. Clitellum not present as a definite organ, as in Oligochaeta. The anus is mostly terminal, and there are no anterior and posterior suckers. Nervous system often imbedded in the epidermis. Vascular system generally present forming a closed system of tubes. Alimentary canal rarely coiled, occasionally with glands which are simple caeca and sometimes serve as air reservoirs; jaws often present and an eversible pharynx. Nephridia sometimes of the type of those of the Oligochaeta; in other cases short, wide tubes with a large funnel serving also entirely or in part as gonad ducts. Frequently reduced in number of pairs; rarely (*Capitellidae*) more than one pair per segment. Gonads not so restricted in position as in Oligochaets, and often more abundant; the individuals usually unisexual. No specialized system of spermathecae, sperm reservoirs, and copulatory apparatus, as in Oligochaeta; development generally through a larval form; reproduction by budding also occurs. Marine (rarely fresh-water) in habit.

The Polychaeta contrast with the Oligochaeta by the great variety of outward form and by the frequency of specialization of different regions of the body. The head is always recognizable and much more conspicuous than in other Chaetopoda. As in the Oligochaeta the peristomial segment is often without setae; but this character is not by any means so constant as in the Oligochaeta. The prostomium bears often processes, both dorsal and ventral, which in the Sabellids are split into the circle of branchial plumes, which surround or nearly surround the mouth in those tube-dwelling Annelids. *Tomopteris* is remarkable for the fact that the hammer-shaped prostomium has paired ventral processes each with a single seta. It is held, however, that these are a pair of parapodia which have shifted forwards. The presence of parapodia distinguish this from other groups of Chaetopoda. Typically, the parapodium consists of two processes of the body on each side, each of which bears a bundle of setae; these two divisions of the "limb" are termed

respectively notopodium and neuropodium. The notopodium may be rudimentary or absent and the entire parapodium reduced to the merest ridge or even completely unrepresented. Naturally, it is among the free living forms that the parapodium is best developed, and least developed among the tubicolous Polychaeta. To each division of the parapodium belongs typically a long tentacle, the cirrus, which may be defective upon one or other of the notopodium or neuropodium, and may be developed into an arborescent gill or into a flat scale-like process, the elytron (in *Polynoe*, &c.). There are other gills developed in addition to those which represent the cirri.

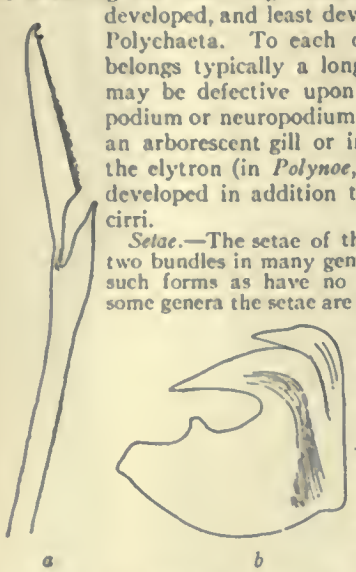


FIG. 3.—*a*, Bristle of *Pionosyllis Malmgreni*; *b*, Hook of *Terebella*.

Setae.—The setae of the Polychaeta are disposed in two bundles in many genera, but in only one bundle in such forms as have no notopodium (*e.g. Syllis*). In some genera the setae are in vertical rows, and in certain *Capitellidae* these rows so nearly meet that an arrangement occurs reminiscent of the continuous circle of setae in the perichaetous Oligochaeta. The setae vary much in form and are often longer and stronger than in the Oligochaetes. Jointed setae and very short hooks or "uncini" (see fig. 3) are among the most remarkable forms. Simple bifid setae, such as those of Oligochaetes, are also present in certain forms.

Among the burrowing and tubicolous forms it is not uncommon for the body to be distinguishable into two or more regions; a "thorax," for example, is sharply marked off from an "abdomen" in the Sabellids. In these forms the bundles of setae are either capilliform or uncinate, and the dorsal setae of the thorax are like the ventral setae of the abdomen. It is a remarkable and newly-ascertained fact that in regeneration (in *Potamilla*) the thorax is not replaced by the growth of uninjured thoracic segments; but that the anterior segments of the abdomen take on the same characters, the setae dropping out and being replaced in accordance with the plan of the setae in the thorax of uninjured worms. Among the Oligochaeta the sexually mature worm is distinguished from the immature worm by the clitellum and by the development of genital setae. Among the Polychaeta the sexual worm is often more marked from the asexual form, so much so that these latter have been placed in different species or even genera. The alteration in form does not only affect structures used in generation; but the form of the parapodia, &c., alter. There are even dimorphic forms among the Syllids where the sexes are, as in many Polychaets, separate.

Nephridia.—The nephridia of the Polychaeta have been generally dealt with above in considering the nephridial system of the Chaetopoda as a whole. They contrast with those of the Oligochaeta and Hirudinea by reason of their frequently close association with the gonads, the same organ sometimes serving the two functions of excretion and conveyance of the ova and spermatozoa out of the body. On the hypothesis that such a form as *Dinophilus* (see Haplodrili) has preserved the characters of the primitive Chaetopod more nearly than any existing Polychaet or Oligochaet, it is clear that the nephridia in the Oligochaeta have preserved the original features of those organs more nearly than most Polychaeta. Thus *Nereis* among the latter worms, from the resemblance which its excretory system bears to that of the Oligochaeta, may be made the starting-point of a series. In this worm the paired nephridia exist in most of the segments of the body, and their form (see fig. 2) is much like that of the nephridia in the *Enchytraeidae*. The funnel, which is not large, appears to open, as a rule at least, into the segment in front of that which bears the external orifice. Quite independent of these are certain large dorsally situate funnel-like folds of the coelomic epithelium, ciliated, but of which no duct has been discovered leading to the exterior. It is possible that we have here gonad ducts distinct from nephridia which at the time of sexual maturity do open on to the exterior.

In *Polynoe* the nephridia are short tubes with a slightly folded funnel whose lumen is intercellular, and this intercellular lumen is characteristic of the Polychaetes as contrasted with leeches and Oligochaetes. Among the Terebelloidea there is a remarkable differentiation of the nephridia into two series. One set lies in front of the diaphragm, which is the most anterior and complete septum, the rest having disappeared or being much less developed. The anterior nephridia, of which there are one to three pairs, contrast with the posterior series by their small funnels and large size, the posterior nephridia having a large funnel followed by a short tube. In *Chaetozone setosa* the anterior nephridia occupy five segments. There is usually a gap between the two series, several segments being without nephridia. It seems that the posterior nephridia are mainly gonad ducts, and the gonads are developed in close association with the funnels. The same arrangement is found in some other Polychaetes; for instance, in *Sabellaria* there is a single pair of large anterior nephridia, which open by a common pore, followed after an interval by large-funnelled and short nephridia. This differentiation is not, however, peculiar to the Polychaetes; for in several Oligochaetes the anterior nephridia are of large size, and opening as they do into the buccal cavity clearly play a different function to those which follow. In *Thamnodrilus*, as has been pointed out, there are two series of nephridia which resemble those of the Terebelloidea in the different sizes of their funnels. In *Lanice conchilega* the posterior series of nephridia are connected by a thick longitudinal duct, which seems to be seen in its most reduced form in *Owenia*, where a duct on each side runs in the epidermis, being in parts a groove, and receives one short tubular nephridium only and occupies only one segment. This connexion of successive nephridia (in *Lanice*) has its counterpart in *Allolobophora*, *Lybiodrilus*, and apparently in the Lumbriculids *Teleuscolex* and *Styloscolex*, among the Oligochaeta. Among the *Capitellidae*, which in several respects resemble the Oligochaeta, wide and short gonad ducts coexist in the same segments with nephridia, the latter being narrower and longer. It is noteworthy that in this family only among the Polychaeta, the nephridia are not restricted to a single pair in each segment; so that the older view that the gonad ducts are metamorphosed nephridia is not at variance with the anatomical facts which have been just stated.

Alimentary Canal.—The alimentary canal of Polychaetes is usually a straight tube running from the anterior mouth to the posterior anus. But in some forms, *e.g. Sternaspis*, the gut is coiled. In others, again, *e.g. Cobangia*, the anus is anterior and ventral. A gizzard is present in a few forms. The buccal cavity is sometimes armed with jaws. The oesophagus is provided often with caeca which in Syllids and *Hesionidae* have been found to contain air, and possibly therefore perform the function of the fish's air-bladder. In other Polychaetes one or more pairs of similar outgrowths are glandular. The intestine is provided with numerous branched caeca in *Aphrodite*.

Reproduction.—As is the case with the Oligochaeta, the Polychaeta furnish examples of species which multiply asexually by budding. There is a further resemblance between the two orders of Chaetopoda in that this budding is not a general phenomenon, but confined to a few forms only. Budding, in fact, among the Polychaetes is limited to the family *Syllidae*. In the Oligochaetes it is only the families *Aeolosomatidae* and *Naididae* that show the same phenomenon. It has been mentioned that in the Nereids a sexual form occurs which differs structurally from the asexual worms, and was originally placed in a separate genus, *Heteronereis*; hence the name "Heteronereid" for the sexual worm. In *Syllis* there is also a "Heterosyllid" form in which the gonads are limited to a posterior region of the body which is further marked off from the anterior non-sexual segments by the oak-like setae. In some Syllids this posterior region separates off from the rest, producing a new head; thus a process of fission occurs which has been termed schizogamy. A similar life history distinguishes certain Sabellid worms, *e.g. Filigrana*. Among the Syllids this simple state of affairs is further complicated. In *Autolytus* there is, to begin with, a conversion of the posterior half of the body to form a sexual zooid. But before this separates off a number of other zooids are formed from a zone of budding which appears between the two first-formed individuals. Ultimately, a chain of sexual zooids is thus formed. A given stock only produces zooids of one sex. In *Myrianida* there is a further development of this process. The conversion of the posterior end of the simple individual into a sexual region is dispensed with; but from a preanal budding segment a series of sexual buds are produced. The well-known Syllid, discovered during the voyage of the "Challenger," shows a modification of this form of budding. Here, however, the buds are lateral, though produced from a budding

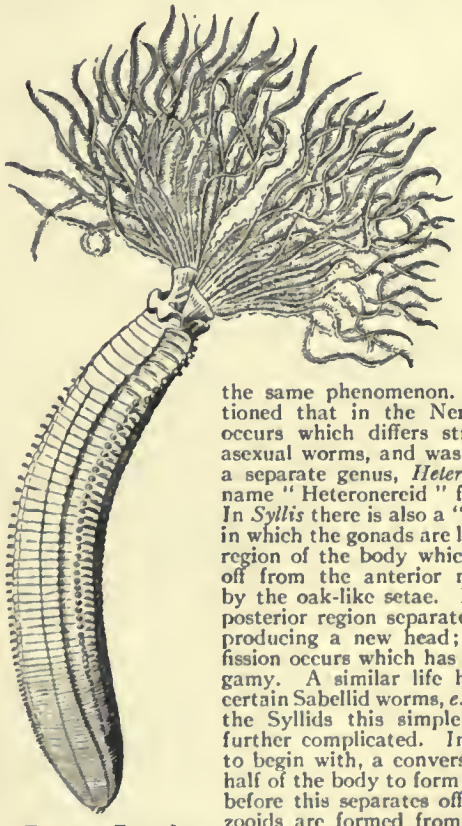


FIG. 4.—*Dasychone infracta*, Kr. (After Malmgren.)

zone, and they themselves produce other buds, so that a ramifying colony is created.

Quite recently, another mode of budding has been described in *Trypanosyllis gemmipara*, where a crowd of some fifty buds arising symmetrically are produced at the tail end of the worm. In some Syllids, such as *Pionosyllis gestans*, the ova are attached to the body

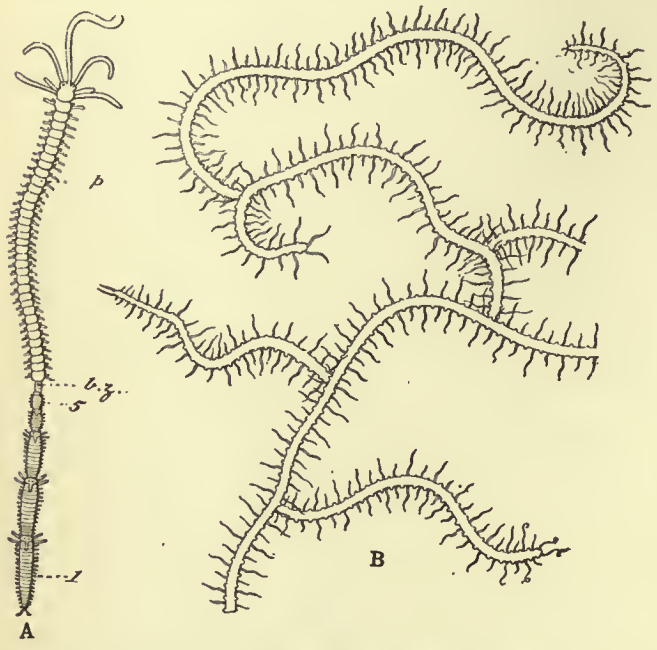


FIG. 5.—A, *Autolytus* (after Mensch) with numerous buds. B, Portion of a colony of *Syllis ramosa* (from M'Intosh). *b.z*, Budding zone; *p*, anterior region of the parent worm; 1-5, buds.

of the parent in a regular line, and develop in situ; this process, which has been attributed to budding, is an "external gestation," and occurs in a number of species.

As is very frequently the case with marine forms, as compared with their fresh-water and terrestrial allies, the Polychaeta differ from the Oligochaeta and Hirudinea in possessing a free living

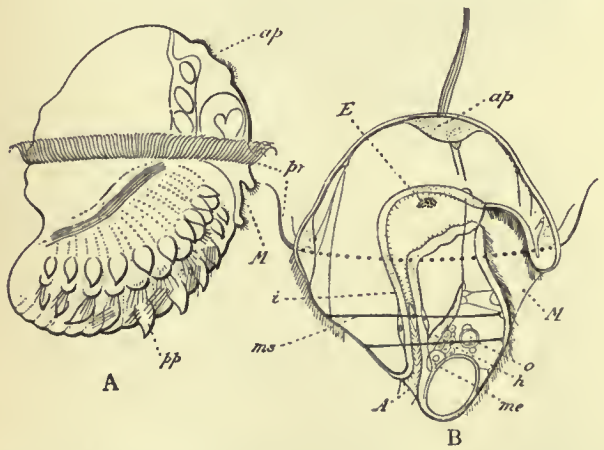


FIG. 6.—A, Side view of the larva of *Lopadorhynchus* (from Kleinenberg), showing the developing trunk region. B, Side view of the trochophore larva of *Eupomatus uncinatus* (from Hatschek).

A, Anus.
E, Eye.
M, Mouth.
ap. Apical organ.
h, "Head kidney."
i, Intestine.
me, Mesoblast.
ms, Larval muscle.
o, Otocyst.
pp, Parapodium.
pr, Praeoral ciliated ring, or prototroch.

larval form which is hatched at an early stage in development. This larva is termed the Trochosphere larva, and typically (as it is held) is an egg-shaped larva with two bands of cilia, one preoral and one postoral, with an apical nervous plate surmounted by a tuft of longer cilia, and with a simple bent alimentary canal, with lateral mouth and posterior anus, between which and the ectoderm is a spacious cavity (blastocoel) traversed by muscular strands and often containing a larval kidney. The segmentation is of the mesoblast to begin with, and appears later behind the mouth, the part anterior to this becoming the prostomium of the adult. The chief modifications of this form are seen in the *Mitraria* larva of *Ammochares* with only the preoral band, which is much folded and which has provisional and long setae; the atrochous larva, where the covering of cilia is uniform and not split into bands; and the polytrochous larva where there are several bands surrounding the body. There are also other modifications.

Classification.—The older arrangement of the Polychaeta into Errantia or free living and Tubicola or tube-dwelling forms will hardly fit the much increased knowledge of the group. W. B. Benham's division into Phanerocephala in which the prostomium is plain, and Crytocephala in which the prostomium is hidden by the peristomium adopted by Sedgwick, can only be justified by the character used; for the Terebellids, though phanerocephalous, have many of the features of the Sabellids. It is perhaps safer to subdivide the Order into 6 Suborders (in the number of these following Benham, except in combining the Sabelliformia and Hermelliformia). Of these 6, the two first to be considered are very plainly separable and represent the extremes of Polychaete organization. (1) *Nereidiformia.*—"Errant" Polychaetes with well-marked prostomium possessing tentacles and palps with evident and locomotor parapodia, supported (with few exceptions) by strong spines, the aciculi; muscular pharynx usually armed with jaws; septa and nephridia regularly metameric and similar throughout body; free living and predaceous. (2) *Cryptocephala.*—Tube-dwelling with body divided into thorax and abdomen marked by the setae, which are reversed in position in the neuropodium and notopodium respectively in the two regions. Parapodia hardly projecting; palps of prosomium forming branched gills; no pharynx or eversible buccal region; no septa in thorax, septa in abdomen regularly disposed. Nephridia in two series; large, anterior nephridia followed by small, short tubes in abdomen. The remaining groups are harder to define, with the exception of the (3) *Capitelliformia*, which are mud-living worms of an "oligochaetous" appearance, and with some affinities to that order. The peristomium has no setae, and the setae generally are hair-like or uncinate, often forming almost complete rings. The genital ducts are limited to one segment (the 8th in *Capitella capitata*), and there are genital setae on this and the next

FIG. 7.—*Nereis pelagica*. L. (After Oersted.)

FIG. 8.—*Sabella vesiculosa*, Mont. (After Montagu.)

FIG. 9. *Arenicola marina*, L.

segment. In other forms genital ducts and nephridia coexist in the same segment. The nephridia are sometimes numerous in each segment. There is no blood system, and the coelomic corpuscles contain

haemoglobin. (4) *Terebelliformia.* These worms are in some respects like the Sabellids (Cryptocephala). The parapodia, as in the Capitellidae, are hardly developed. The buccal region is unarmed and not eversible. The prostomium has many long filaments which recall the gills of the Sabellids, &c. The nephridia are specialized into two series, as in the last-mentioned worms. (5) *Spioniformia* (including *Chaetopterus*, *Spio*, &c.) and (6) *Scoleciformia* (*Arenicola*, *Chloraema*, *Sternaspis*) are the remaining groups. In both, the nephridia are all alike; there are no jaws; the prostomium rarely has processes. The body is often divisible into regions.

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OLIGOCHAETA.—As contrasted with the other subdivisions of the Chaetopoda, the Oligochaeta may be thus defined. Setae very rarely absent (genus *Achaeta*) and as a rule not so large or so numerous in each segment as in the Polychaeta, and different in shape. Eyes rarely present and then rudimentary. Prostomium generally small, sometimes prolonged, but never bearing tentacles or processes. Appendages of body reduced to branchiae, present only in four species, and to the ventral copulatory appendages of *Alma* and *Criodrilus*. Clitellum always present, extending over two (many limicolous forms) to forty-five segments (*Alma*). Segments of body numerous and not distinctive of species, being irregular and not fixed in numbers. In terrestrial forms dorsal pores are usually present; in aquatic forms a head pore only. Anus nearly always terminal, rarely dorsal, at a little distance from end of body. Suckers absent. Nervous system rarely (*Aeolosoma*) in continuity with epidermis. Vascular system always present, forming a closed system, more complicated in the larger forms than in the aquatic genera. Several specially large contractile trunks in the anterior segments uniting the dorsal and ventral vessels. Nephridia generally paired, often very numerous in each segment, in the form of long, much-coiled tubes with intracellular lumen. Gonads limited in number of pairs, testes and ovaries always present in the same individual. Special sacs developed from the intersegmental septa lodge the developing ova and sperm. Special gonad ducts always present. Male ducts often open on to exterior through a terminal chamber which is variously specialized, and sometimes with a penis.

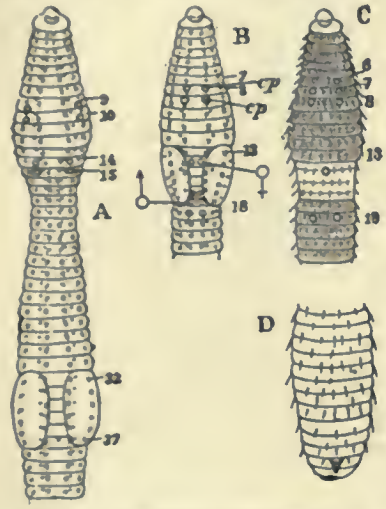


FIG. 10.—Diagrams of various Earthworms, to illustrate external characters. A, B, C, anterior segments from the ventral surface; D, hinder end of body of *Urochaeta*.

A, *Lumbricus*: 9, 10, segments containing spermathecae, the orifices of which are indicated; 14, segment bearing oviducal pores; 15, segment bearing male pores; 32, 37, first and last segments of clitellum.

B, *Acanthodrilus*: *cp*, orifices of spermathecae; ♀, oviducal pores; ♂, male pores; on 17th and 19th segments are the apertures of the atria.

C, *Perichaeta*: the spermathecal pores are between segments 6 and 7, 7 and 8, 8 and 9, the oviducal pores upon the 14th and the male pores upon the 18th segment.

In all the figures the nephridial pores are indicated by dots and the setae by strokes.

Generative pores usually paired, sometimes single and median. Spermathecae nearly always present. Alimentary canal straight, often with appended glands of complicated or simpler structure; no jaws. Eggs deposited in a cocoon after copulation. Development direct. Reproduction by budding also occurs. Freshwater (rarely marine) and terrestrial.

The Oligochaeta show a greater variety of size than any other group of the Chaetopoda. They range from a millimetre or so (smaller species of *Aeolosoma*) to 6 ft. or even rather more (*Microchaeta rappi*, &c.) in length.

Setae.—The setae, which are always absent from the peristomial segment, are also sometimes absent from a greater number of the anterior segments of the body, and have completely disappeared in *Achaeta cameranoi*. When present they are either arranged in four bundles of from one to ten or even more setae, or are disposed in continuous lines completely encircling each segment of the body. This latter arrangement characterizes many genera of the family *Megascolicidae* and one genus (*Periscolex*) of the *Glossoscolicidae*. It has been shown (Bourne) that the "perichaetous" condition is probably secondary, inasmuch as in worms which are, when adult, "perichaetous" the setae develop in pairs so that the embryo passes through a stage in which it has four bundles of setae, two to each bundle, the prevalent condition in the group. Rarely there is an irregular disposition of the setae which are not paired, though the total number is eight to a segment (fig. 10), *e.g. Pontoscolex*. The varying forms of the setae are illustrated in fig. 11.

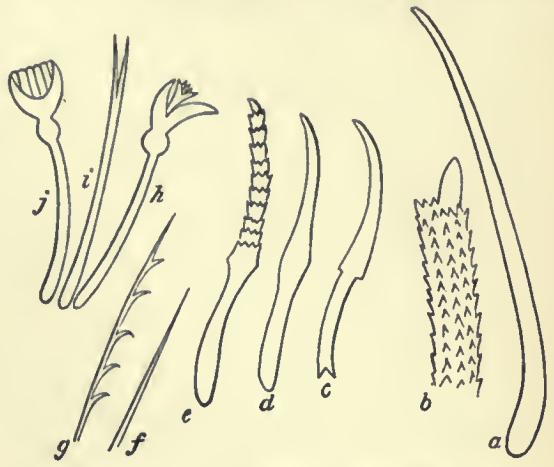


FIG. 11.—Setae of *Oligochaeta*.

a, Penial seta of *Perichaeta ceylonica*.
b, Extremity of penial seta of *Acanthodrilus* (after Horst).
c, Seta of *Urochaeta* (Perier).
d, Seta of *Lumbricus*.
e, Seta of *Criodrilus*.
f, *g*, Setae of *Bohemilla comata*.
h, *i*, *j*, Setae of *Psammoryctes barbatus* (*f* to *j* after Vezhdovský).

Structure.—The body wall consists of an epidermis which secretes a delicate cuticle and is only ciliated in *Aeolosoma*, and in that genus only on the under surface of the prostomium. The epidermis contains numerous groups of sense cells; beneath the epidermis there is rarely (*Kynotus*) an extensive connective tissue dermis. Usually the epidermis is immediately followed by the circular layer of muscles, and this by the longitudinal coat. Beneath this again is a distinct peritoneum lining the coelom, which appears to be wanting as a special layer in some Polychaetes (Benham, Gilson). The muscular layers are thinner in the aquatic forms, which possess only a single row of longitudinal fibres, or (*Enchytraeidae*) two layers. In the earthworms, on the other hand, this coat is thick and composed of many layers.

The clitellum consists of a thickening of the epidermis, and is of two forms among the Oligochaeta. In the aquatic genera the epidermis comes to consist entirely of glandular cells, which are, however, arranged in a single layer. In the earthworms, on the other hand, the epidermis becomes specialized into several layers of cells, all of which are glandular. It is therefore obviously much thicker than the clitellum in the limicolous forms. The position of the clitellum, which is universal in occurrence, varies much as does the number of component segments. As a rule—to which, however, there are exceptions—the clitellum consists of two or three segments only in the small aquatic Oligochaeta, while in the terrestrial forms it is as a general rule, to which again there are exceptions, a more extensive, sometimes much more extensive, region.

In the Oligochaeta there is a closer correspondence between external metamerism and the divisions of the coelom than is apparent in some Chaetopods. The external segments are usually definable by the setae; and if the setae are absent, as in the anterior segments

of several *Geoscolicidae*, the nephridiopores indicate the segments; to each segment corresponds internally a chamber of the coelom which is separated from adjacent segments by transverse septa, which are only unrecognizable in the genus *Aeolosoma* and in the head region of other Oligochaeta. In the latter case, the numerous bands of muscle attaching the pharynx to the parietes have obliterated the regular partition by means of septa.

Nephridia.—The nephridia in this group are invariably coiled tubes with an intracellular lumen and nearly invariably open into the coelom by a funnel. There are no renal organs with a wide intercellular lumen, such as occur in the Polychaeta, nor is there ever any permanent association between nephridia and ducts connected with the evacuation of the generative products, such as occur in *Alciope*, *Saccocirrus*, &c. In these points the Oligochaeta agree with the Hirudinea. They also agree in the general structure of the nephridia. It has been ascertained that the nephridia of Oligochaeta are preceded in the embryo by a pair of delicate and sinuous tubes, also found in the Hirudinea and Polychaeta, which are larval excretory organs. It is not quite certain whether these are to be regarded as the remnant of an earlier excretory system, replaced among the Oligochaeta by the subsequently developed paired structures, or whether these "head kidneys" are the first pair of nephridia precociously developed. The former view has been extensively held, and it is supported by the fact that in *Octochaetus* the first segment of the body has a pair of nephridia which is exactly like those which follow, and, like them, persists. On the other hand, in most Oligochaeta the first segment has in the adult no nephridium, and in the case of *Octochaetus* the existence of a "head kidney" antedating the subsequently developed nephridia of the first and other segments has neither been seen nor proved to be absent. In any case the nephridia which occupy the segments of the body generally are first of all represented by paired structures, the "pronephridia," in which the funnel is composed of but one cell, which is flagellate. This stage has at any rate been observed in *Rhynchelmis* and *Lumbricus* (in its widest sense) by Vezhdovský. It is further noticeable that in *Rhynchelmis* the covering of vesicular cells which clothes the drain-pipe cells of the adult nephridium is cut off from the nephridial cells themselves and is not a peritoneal layer surrounding the nephridium. Thus the nephridia, in this case at least, are a part of the coelom and are not shut off from it by a layer of peritoneum, as are other organs which lie in it, *e.g.* the gut. A growth both of the funnel, which becomes multicellular, and of the rest of the nephridium produces the adult nephridia of the genera mentioned. The paired disposition of these organs is the prevalent one among the Oligochaeta, and occurs in all of twelve out of the thirteen families into which the group is divided.

Among the *Megascolicidae*, however, which in number of genera and species nearly equals the remaining families taken together, another form of the excretory system occurs. In the genera *Pheretima*, *Megascolex*, *Dichogaster*, &c., each segment contains a large number of nephridia, which, on account of the fact that they are necessarily smaller than the paired nephridia of *e.g. Lumbricus*, have been termed micronephridia, as opposed to meganephridia; there is, however, no essential difference in structure, though micronephridia are not uncommonly (*e.g. Megascolides*, *Octochaetus*) unprovided with funnels. It is disputed whether these micronephridia are or are not connected together in each segment and from segment to segment. In any case they have been shown in three genera to develop by the growth and splitting into a series of original paired pronephridia. A complex network, however, does occur in *Lybiodrilus* and certain other *Eudrilidae*, where the paired nephridia possess ducts leading to the exterior which ramify and anastomose on the thickness of the body wall. The network is, however, of the duct of the nephridium, possibly ectodermic in origin, and does not affect the glandular tubes which remain undivided and with one coelomic funnel each.

The Oligochaeta are the only Chaetopods in which undoubted nephridia may possess a relationship with the alimentary canal. Thus, in *Octochaetus multiporus* a large nephridium opens anteriorly into the buccal cavity, and numerous nephridia in the same worm evacuate their contents into the rectum. The anteriorly-opening and usually very large nephridia are not uncommon, and have been termed "peptonephridia."

Gonads and Gonad Ducts.—The Oligochaeta agree with the leeches and differ from most Polychaeta in that they are hermaphrodite. There is no exception to this generalization. The gonads are, moreover, limited and fixed in numbers, and are practically invariably attached to the intersegmental septa, usually to the front septum of a segment, more rarely to the posterior septum. The prevalent number of testes is one pair in the aquatic genera and two pairs in earthworms. But there are exceptions; thus a species of *Lamprodrilus* has four pairs of testes. The ovaries are more usually one pair, but two are sometimes present. The segments occupied by the gonads are fixed, and are for earthworms invariably X, XI, or one of them for the testes, and XIII for the ovaries. The position varies in the aquatic Oligochaeta. The Oligochaeta contrast with the Polychaeta in the general presence of outgrowths of the septa in the genital segments, which are either close to, or actually involve, the gonads, and into which may also open the funnels of the gonad ducts. These sacs contain the developing sperm cells or eggs, and are with very few exceptions universal in the group. The testes are more commonly thus involved than are the ovaries. It is indeed only among the *Eudrilidae* that the enclosure of the ovaries in septal sacs is at all general. Recently the same thing has been recorded in a few species of *Pheretima* (=*Perichaeta*), but details are as yet wanting. We can thus speak in these worms of *gonocoels*, *i.e.* coelomic cavities connected only with the generative system. These cavities communicate with the exterior through the gonad ducts, which have nothing to do with them, but whose coelomic funnels are taken up by them in the course of their growth. There are, however, in the *Eudrilidae*, as already mentioned, sacs envolving the ovaries which bore their own way to the exterior, and thus may be termed coelomoducts. These sacs are dealt with later under the description of the spermathecae, which function they appear to perform. The gonad ducts are male and female, and open opposite to or, rarely, alongside of the gonads, whose products they convey to the exterior. The oviducts are always short trumpet-shaped tubes and are sometimes reduced (*Enchytraeidae*) to merely the external orifices. It is possible, however, that those oviducts belong to a separate morphological category, more comparable to the dorsal pores and to abdominal pores in some fishes. The sperm ducts are usually longer than the oviducts; but in Limicolae both series of tubes opening by the funnel into one segment and on to the exterior in the following segment. While the oviducts always open directly on to the exterior, it is the rule for the sperm ducts to open on to the exterior near to or through certain terminal chambers, which have been variously termed atrium and prostate, or spermiducal gland. The distal extremity of this apparatus is sometimes eversible as a penis. Associated with these glands are frequently to be found bundles or pairs of long and variously modified setae which are termed penial setae, to distinguish them from other setae sometimes but not always associated with rather similar glands which are found anteriorly to these, and often in the immediate neighbourhood of the spermathecae; the latter are spoken of as genital setae.

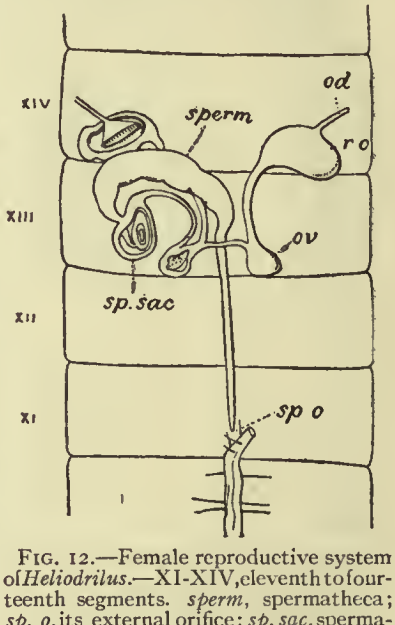


FIG. 12.—Female reproductive system of *Heliodrilus*.—XI-XIV, eleventh to fourteenth segments. *sperm*, spermatheca; *sp. o*, its external orifice; *sp. sac*, spermathecal sac; *ov*, sac containing ovary; *r.o*, egg sac; *od*, oviduct.

Spermathecae. — These structures appear to be absolutely distinctive of the Oligochaeta, unless the sacs which contain sperm and open in common with the nephridia of *Saccocirrus* (see HAPLODRILI) are similar. Spermathecae are generally present in the Oligochaeta and are absent only in comparatively few genera and species. Their position varies, but is constant for the species, and they are rarely found behind the gonads. They are essentially spherical, pear-shaped or oval sacs opening on to the exterior but closed at the coelomic end. In a few *Enchytraeidae* and *Lumbriculidae* the spermathecae open at the distal extremity into the oesophagus, which is a fact difficult of explanation. Among the aquatic Oligochaeta and many earthworms (the families *Lumbricidae*, *Geoscolicidae* and a few other genera) the spermathecae are simple structures, as has been described. In the majority of the *Megascolicidae* each sac is provided with one or more diverticula, tubular or oval in form, of a slightly different histological character in the lining epithelium, and in them is invariably lodged the sperm.

The spermathecae are usually paired structures, one pair to each of the segments where they occur. In many *Geoscolicidae*, however, and certain *Lumbricidae* and *Perichaetidae*, there are several, even a large number, of pairs of very small spermathecae to each of the segments which contain them.

In the *Eudrilidae* there are spermathecae of different morphological value. In figs. 12 and 13 are shown the spermathecae of the genera *Hyperiodrilus* and *Heliodrilus*, which are simple sacs ending blindly as in other earthworms, but of which there is only one median opening in the thirteenth segment or in the eleventh. In *Heliodrilus* the blind extremity of the spermatheca is enclosed in a coelomic sac which is in connexion with the sacs envolving the ovaries and oviducts. In *Hyperiodrilus* the whole spermatheca is thus included in a corresponding sac, which is of great extent. In such other genera of the family as have been examined, the true spermatheca has entirely disappeared, and the sac which contains it in *Hyperiodrilus* alone remains. This sac has been already referred to as a coelomoduct. Its orifice on to the exterior is formed by an involution

(as it appears) of the epidermis, and that it performs the function of a spermatheca is shown by its containing spermatozoa, or, in *Stuhlmannia*, a spermatophore. In *Polytoreutus*, also, spermatophores have been found in these spermathecal sacs. We have thus the replacement of a spermatheca, corresponding to those of the remaining families of Oligochaeta, and derived, as is believed, from the epidermis, by a structure performing the same function, but derived from the mesoblastic tissues, and with a cavity which is coelom.

Alimentary Canal.—The alimentary canal is always a straight tube, and the anus, save in the genera *Criodrilus* and *Dero*, is completely terminal. A buccal cavity, a pharynx, an oesophagus and an intestine are always distinguishable. Commonly among the terrestrial forms there is a gizzard, or two gizzards, or a larger number, in the oesophageal region. There is no armed protrusible pharynx, such as exists in some other Chaetopods. This may be associated with mud-eating habits; but it is not wholly certain that this is the case; for in *Chaetogaster* and *Agriodrilus*, which are predaceous worms, there is no protrusible pharynx, though in the latter the oesophagus is thickened through its extent with muscular fibres. The oesophagus is often furnished with glandular diverticula, the "glands of Morren," which are often of complex structure through the folding of their walls. Among the purely aquatic families such structures are very rare, and are represented by two caeca in the genus *Limnodriloides*. It is a remarkable fact, not yet understood, that in certain *Enchytraeidae* and *Lumbriculidae* the spermathecae open into the oesophagus as well as on to the exterior. The only comparable fact among other worms is the Laurer's canal or genito-intestinal canal in the Trematoda. The intestine is usually in the higher forms provided with a typhlosole, in which, in *Pontoscolex*, runs a ciliated canal or canals communicating with the intestine. It is possible that this represents the syphon or supplementary intestine of *Capitellidae*, which has been shown to develop as a groving of the intestine ultimately cut off from it. The intestine has a pair of caeca or two or three pairs (but all lie in one segment) in the genus *Pheretima* and in one species of *Rhinodrilus*. In *Typhoeus* and *Megascolex* there are complex glands appended to the intestine.

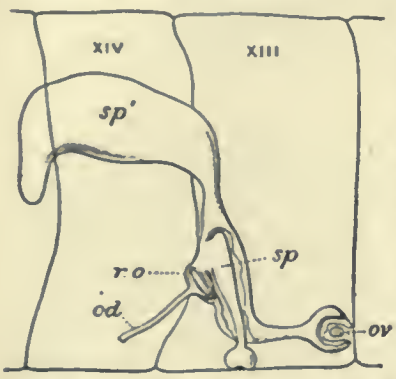


FIG. 13.—Female reproductive system of *Hyperiodrilus*.—XIII, XIV, thirteenth and fourteenth segments.

sp, Spermatheca. *ov*, Ovary.
sp', Spermathecal sac involving the last. *r.o*, Egg sac. *od*, Oviduct.

In *Benhamia caecifera* and at least one other earthworm there are numerous caeca, one pair to each segment.

Classification.—The classifications of Adolf Eduard, Grube and Claparède separated into two subdivisions the aquatic and the terrestrial forms. This scheme, opposed by many, has been reinstated by Sedgwick. The chief difficulty in this scheme is offered by the Moniligastridae, which in some degree combine the characters of both the suborders, into neither of which will they fit accurately. The following arrangement is a compromise:—

Group I. *Aphaneura.*—This group is referred by A. Sedgwick to the Archiannelida. It is, however, though doubtless near to the base of the Oligochaetous series, most nearly allied in the reproductive system to the Oligochaeta. It contains but one family, *Aeolosomatidae*. There are three pairs of spermathecae situated in segments III-V, a testis in V and an ovary in VI. There are a clitellum and sperm ducts which though like nephridia have a larger funnel and a less complexly wound duct. This family consists of only one well-known genus, *Aeolosoma*, which contains several species. They are minute worms with coloured oil drops (green, olive green or orange) contained in the epidermis. The nervous system is embedded in the epidermis, and the pairs of ganglia are separated as in *Serpula*, &c.; each pair has a longish commissure between its two ganglia. The intersegmental septa are absent save for the division of the first segment. The large prostomium is ciliated ventrally. The setae are either entirely capillary or there are in addition some sigmoid setae even with bifid free extremities. This genus also propagates asexually, like *Ctenodrilus*, which may possibly belong to the same family. Asexual reproduction universal.

Group II. *Limicolae.*—With a few exceptions the Limicolae are, as the name denotes, aquatic in habit. They are small to moderate-sized Oligochaeta, with a smaller number of segments than in the Terricolae. The alimentary canal is simple and a gizzard or oesophageal diverticula rarely developed. The vascular system is simple with as a rule direct communication between dorsal and ventral vessels in each segment. Nerve cord lies in coelom; brain in first segment or prostomium in many forms. Clitellum generally only two or three segments and more anterior in position than in Terricolae. Nephridia always paired and without plexus of blood capillaries. Spermatheca rarely with diverticula; sperm ducts as a rule occupying two segments only, usually opening by means of an atrium. Sperm sacs generally occupying a good many segments and with simple interior undivided by a network of trabeculae. Ova large and with much yolk. Asexual reproduction only in Naids. Egg sacs as large or nearly so as sperm sacs. Testes and ovaries always free. The following families constitute the group, viz. *Naididae*, *Enchytraeidae*, *Tubificidae*, *Lumbriculidae*, *Phreoryctidae*, *Phreodrilidae*, *Alluroididae*, the latter possibly not referable to this group.

Group III. *Moniligastres.*—Moderate-sized to very large Oligochaeta, terrestrial in habit, with the appearance of Terricolae. Generative organs anterior in position as in Limicolae. Sperm ducts and atria as in Limicolae; egg sacs large; body wall thick; vascular system and nephridia as in Terricolae. Only one family, *Moniligastridae*.

Group IV. *Terricolae.*—Earthworms, rarely aquatic in habit. Of small to very large size. Clitellum commonly extensive and more posterior in position than in other groups. Vascular system complicated without regular connexion between dorsal and ventral vessels, except in anterior segments. Nephridia as a rule with abundant vascular supply. Testes, and occasionally ovaries, enclosed in sacs. Sperm sacs generally limited to one or two segments with interior subdivided by trabeculae. Sperm ducts traverse several segments on their way to exterior. They open in common with, or near to, or, more rarely, into, glands which are not certainly comparable to the atria of the Limicolae. Egg sacs minute and functionless (?). Eggs minute with little yolk. Nephridia sometimes very numerous in each segment. Spermathecae often with diverticula.

Earthworms are divided into the following families, viz. *Megascolicidae*, *Geoscolicidae*, *Eudrilidae*, *Lumbricidae*.

As an appendix to the Oligochaeta, and possibly referable to that group, though their systematic position cannot at present be determined with certainty, are to be placed the *Bdellodrilidae* (*Discodrilidae* auct.), which are small parasites upon crayfish. These worms lay cocoons like the Oligochaeta and leeches, and where they depart from the structure of the Oligochaeta agree with that of leeches. The body is composed of a small and limited number of segments (not more than fourteen), and there is a sucker at each end of the body. There are no setae and apparently only two pairs of nephridia, of which the anterior pair open commonly by a common pore on the third segment after the head, whose segments have not been accurately enumerated. The intervening segments contain the genitalia, which are on the Oligochaeta plan in that the gonads are independent of their ducts and that there are special spermathecae, one pair. The male ducts are either one pair or two pairs, which open by a common and complicated efferent terminal apparatus furnished with a protrusible penis. The ganglia are crowded at the posterior end of the body as in leeches, and there is much tendency to the obliteration of the coelom as in that group. *Pterodrilus* and *Cirrodrilus* bear a few, or circles of, external processes which may be branchiae; *Bdellodrilus* and *Astacobdella* have none. The vascular system is as in the lower Oligochaeta. There are two chitinous jaws in the buccal cavity, a dorsal and a ventral, which are of specially complicated structure in *Cirrodrilus*.

LITERATURE.—F. E. Beddard, *A Monograph of the Oligochaeta* (Oxford, 1895), also *Quart. Journ. Micr. Sci.*, 1886–1895, and *Proc. Zool. Soc.*, 1885–1906; W. B. Benham, *Quart. Journ. Micr. Sci.*, 1886–1905; W. Michaelsen, "Oligochaeta" in *Das Tierreich*, 1900, and *Mitth. Mus.* (Hamburg, 1890–1906); A. G. Bourne, *Quart. Journ. Micr. Sci.*, 1894; H. J. Moore, *Journ. Morph.*, 1895; F. Vezhdovský, *System d. Oligochaeten* (Prague, 1884), and *Entwicklungsgeschichtliche Untersuchungen*; and numerous papers by the above and by G. Eisen, E. Perrier, D. Rosa, R. Horst, L. Cognetti, U. Pierantoni, W. Baldwin Spencer, H. Ude, &c., and embryological memoirs by R. S. Bergh, E. B. Wilson, N. Kleinenberg, &c.

HIRUDINEA.—The leeches are more particularly to be compared with the Oligochaeta, and the following definition embraces the main features in which they agree and disagree with that group. Setae are only present in the genus *Acanthobdella*. Eyes are present, but hardly so complex as in certain genera of Polychaetes. The appendages of the body are reduced to branchiae, present in certain forms. A clitellum is present. The segments of body are few (not more than thirty-four) and fixed in number. The anus is dorsal. One or two (anterior and posterior) suckers always present. Nervous system always in coelom. Coelom generally reduced to a system of tubes, sometimes communicating with vascular system; in *Acanthobdella* and *Ozobranchus* a series of metamerically arranged chambers as in Oligochaeta. Nephridia always paired, rarely (*Pontobdella*) forming a network communicating from segment to segment; lumen of nephridia always intracellular, funnels pervious or impervious. Alimentary

canal sometimes with protrusible proboscis; never with gizzard or oesophageal glands; intestine with caeca as a rule. Jaws often present. Testes several pairs, rarely one pair, continuous with sperm ducts; ovaries, one pair, continuous with oviducts; generative pores single and median. No separate spermathecae or septal chambers for the development of the ova and sperm. Eggs deposited in a cocoon. Development direct. No asexual generation. Fresh-water, marine and terrestrial. Parasitic or carnivorous.

In external characters the Hirudinea are unmistakable and not to be confused with other Annelids, except perhaps with the *Bdellodrilidae*, which resemble them in certain particulars. The absence of setae—save in *Acanthobdella*, where five of the anterior segments possess each four pairs of setae with reserve setae placed close behind them (fig. 14), and the presence of an anterior and posterior sucker, produce a looping mode of progression similar to that of a Geometrid larva. The absence of setae and the great secondary annulation render the mapping of the segments a subject of some difficulty. The most reliable test appears to be the nerve ganglia, which are more distinct from the intervening connectives than in other Annelids.

In the middle of the body, where the limits of the somites can be checked by a comparison with the arrangement of the nephridia and the gonads, and where the ganglia are quite distinct and separated by long connectives, each ganglion is seen to consist of six masses of cells enclosed by capsules and to give off three nerves on each side. This corresponds to the usual presence (in the *Rhynchobdellidae*) of three annuli to each segment. Anteriorly and posteriorly separate ganglia have fused. The brain consists not only of a group of six capsules corresponding to the archicerebrum of the Oligochaeta, but of a further mass of cells surrounding and existing below the alimentary canal, which can be analysed into five or six more separate ganglia. The whole mass lies in the seventh or eighth segment. At the posterior end of the body there are likewise seven separate ganglia partially fused to form a single ganglionic mass, which innervates the segments lying behind the anus and corresponding to the posterior sucker. So that a leech in which only twenty-seven segments are apparent by the enumeration of the annuli, separate ganglia, nephridia, lines of sensillae upon the body, really possesses an additional seven lying behind that which is apparently the last of the series and crowded together into a minute space. The annuli into which segments are externally divided are so deeply incised as to render it impossible to distinguish, as can be readily done in the Oligochaeta as a rule, the limits of an annulus from that of a true segment. As remarked, the prevalent number of annuli to a segment is three in the *Rhynchobdellidae*. But in that group (*Cystobranchus*) there may be as many as eight annuli. In the *Gnathobdellidae* the prevailing number of annuli to a segment is five; but here again the number is often increased, and *Trocheta* has no less than eleven. The reason for this excessive annulation has been seen in the limited number of segments (thirty-four) of which the body is composed, which are laid down early and do not increase. In the Oligochaeta, on the other hand, there is growth of new segments. It is important to notice that the metameric plan of growth of Chaetopods is still preserved.

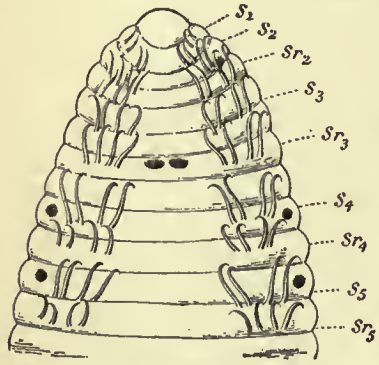


FIG. 14.—*Acanthobdella*, from the ventral surface, showing the five sets of setae (S_1 to S_5) and the replacing setae (*Sr*) behind them. The three pairs of pigmented spots show the position of the eyes on the dorsal surface. (After Kovalevsky.)

The nephridia are like those of the Oligochaeta in general structure; that is to say, they consist of drain-pipe cells which are placed end to end and are perforated by their duct. The internal funnel varies in the same way as in the Oligochaeta in the number of cells which form it. In *Clepsine* (*Glossiphonia*) there are only three cells, and in *Nephelis* five to eight cells. In *Hirudo* the funnel is not pervious and is composed of a large number of cells. Externally, the nephridium opens by a vesicle, as in many Oligochaetes whose lumen is intercellular. In *Pontobdella* and *Branchellion* the nephridia form a network extending from segment to segment, but there is only one pair of funnels in each segment. Slight differences in form have been noted between nephridia of different segments; but the Hirudinea do not show the marked differentiation that is to be seen in some other Chaetopods; nor do the nephridia ever acquire any relations to the alimentary canal.

Coelom.—The coelom of the Hirudinea differs in most genera from that of the Oligochaeta and Polychaeta. The difference is that it is broken up into a complex sinus system. The least modified type is shown by *Acanthobdella*, a leech, parasitic upon fishes, in which transverse sections (see figs. 15 and 16) show the gut, the nervous system, &c., lying in a spacious chamber which is the coelom. This coelom is lined by peritoneal cells and is divided into a series of metameres by septa which correspond to the segmentation of the

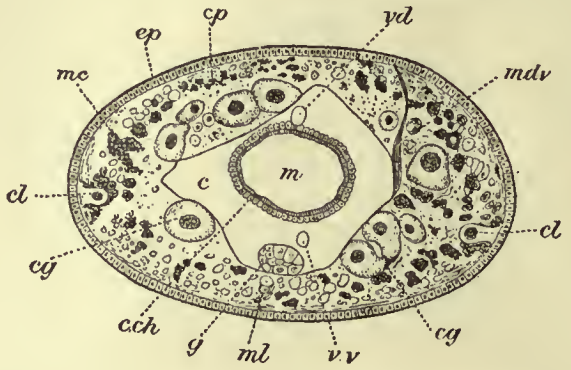


FIG 15.—Section of *Acanthobdella* (after Kovalevsky).

c, Coelom.
c.ch, Coelomic epithelium (yellow-cells).
cg, Glandular cells.
cl, Muscle cells of lateral line.
cp, Pigment cells.
ep, Ectoderm.
g, Nerve cord.
m, Intestine.
mc, Circular muscle.
ml, Longitudinal muscle.
vd, Dorsal vessel.
vv, Ventral vessel.

body, the arrangement being thus precisely like that of typical Chaetopoda. Moreover, upon the intestine the coelomic cells are modified into chloragogen cells. In *Acanthobdella* the testes are, however, not contained in the general coelom, and the nephridia lie in the septa. It is remarkable, in view of the spaciousness of the coelom, that the funnels of the latter have not been seen. *Ozobranchus* possesses a coelom which is less typically chaetopodous than that of *Acanthobdella*, but more so than in other leeches. There is a spacious cavity surrounding the gut and containing also blood-vessels, and to some extent the generative organs, and the nervous cord. Furthermore, in the mid region of the body this coelom is broken up by metamerically arranged septa, as in *Acanthobdella*. These septa are, however, rather incomplete and are not fastened to the gut; and, as in *Acanthobdella*, the nephridia are embedded

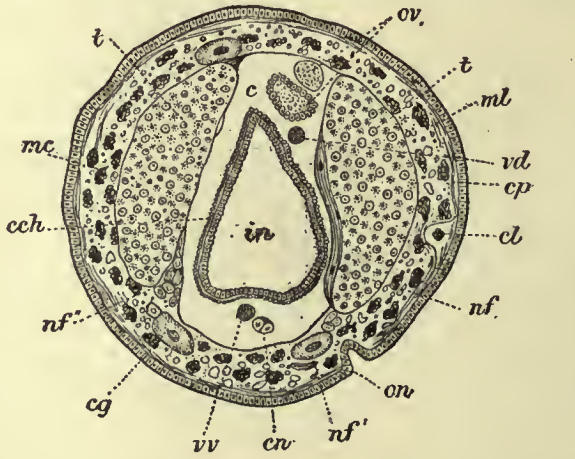


FIG. 16.—Section of *Acanthobdella* (after Kovalevsky). Identical letters as in fig. 2; in addition, *cn*, nerve cord; *in*, intestine; *nf*, parts of nephridium; *on*, external opening of nephridium; *ov*, ova; *t*, testis.

in them. In addition to the median lacuna there are two lateral lacunae, one upon each side. These regions of the coelom end at the ends of the body and communicate with each other by means of a branched system of coelomic sinuses, which are in places very fine tubes. Neither in this genus nor in the last is there any communication between coelom and vascular system. In *Clepsine* (*Glossiphonia*) there is a further breaking up of the coelom. The median lacuna no longer exists, but is represented by a dorsal and ventral sinus. The former lodges the dorsal, the latter the ventral, blood-vessel. The gut has no coelomic space surrounding it. A complex

network places these sinuses and the lateral sinuses in communication. Here also the blood system has no communication with the sinus system of the coelom. In *Hirudo* and the *Gnathobdellidae* there is only one system of cavities which consist of four principal longitudinal trunks, of which the two lateral are contractile, which communicate with a network ramifying everywhere, even among the cells of the epidermis. The network is partly formed out of pigmented cells which are excavated and join to form tubes, the so-called botryoidal tissue, not found among the *Rhynchobdellidae* at all. It seems clear from the recent investigations of A. G. Bourne and E. S. Goodrich that the vascular system and the coelom are in communication (as in vertebrates by means of the lymph system). On the other hand, it has been held that in these leeches there is no vascular system at all and that the entire system of spaces is coelom. In favour of regarding the vascular system as totally absent, is the fact that the median coelomic channels contain no dorsal and ventral vessel. In favour of seeing in the lateral trunks and their branches a vascular system, is the contractility of the former, and the fact of the intrusion of the latter into the epidermis, matched among the Oligochaeta, where undoubted blood capillaries perforate the epidermis. A further fact must be considered in deciding this question, which is the discovery of ramifying coelomic tubes, approaching close to, but not entering, the epidermis in the Polychaete *Arenicola*. These tubes are lined by flattened epithelium and often contain blood capillaries; they communicate with the coelom and are to be regarded as prolongation of it into the thickness of the body wall.

Gonads and Gonad Ducts.—The gonads and their ducts in the Hirudinea invariably form a closed system of cavities entirely shut off from the coelom in which they lie. There is thus a broad resemblance to the *Eudrilidae*, to which group of Oligochaeta the Hirudinea are further akin by reason of the invariably unpaired condition of the generative apertures, and the existence of a copulatory apparatus (both of which characters, however, are present occasionally in other Oligochaeta).

The testes are more numerous than the ovaries, of which latter there are never more than one pair. The testes vary in numbers of pairs. Four (*Ozobranchus*) to six (*Glossiphonia*) or ten (*Philaemon*) are common numbers. In *Acanthobdella*, however, the testes of each side of the body have grown together to form a continuous band, which extends in front of external pore. Each testis communicates by means of an efferent duct with a common collecting duct of its side of the body, which opens on to the exterior by means of a protrusible penis, and to which is sometimes appended a seminal vesicle. The efferent ducts are ciliated, and there is a patch of cilia at the point where they communicate with the cavity of each testis. The ovaries are more extensive in some forms (*e.g. Ozobranchus*) than in others, where they are small rounded bodies. The two ducts continuous with the gonads open by a common vagina on to the exterior behind the male pores. This "vagina" is sometimes of exaggerated size. Thus, in *Philaemon pungens* (Lambert) it has the form of a large sac, into which open by a single orifice the conjoined oviducts. From this vagina arises a narrow duct leading to the exterior. In *Ozobranchus* the structures in question are still more complicated. The two long ovarian sacs communicate with each other by a transverse bridge before uniting to form the terminal canal. Into each ovarian sac behind the transverse junction opens a slender tube, which is greatly coiled, and, in its turn, opens into a spherical "spermathecal sac." From this an equally slender tube proceeds, which joins its fellow of the opposite side, and the two form a thick, walled tube, which opens on to the exterior within the bursa copulatrix through which the penis protrudes. These two last-mentioned types show features which can be, as it seems, matched in the Eudrilidae.

The gonads develop (O. Bürger) in coelomic spaces close to nephridial funnels, which have, however, no relation to the gonad ducts. The ovaries are solid bodies, of which the outer layer becomes separated from the plug of cells lying within; thus a cavity is formed which is clearly coelom. This cavity and its walls becomes prolonged to form the oviducts. A stage exactly comparable to the stage in the leeches, where the ovary is surrounded by a closed sac, has been observed in *Eudrilus*. In this Annelid later the sac in question joins its fellow, passing beneath the nerve cord exactly as in the leech, and also grows out to reach the exterior. The sole difference is therefore that in *Eudrilus* the ovarian sac gives rise to a tube which bifurcates, one branch meeting a corresponding branch of the other ovary of the pair, while the second branch reaches the exterior. In the leech the two branches are fused into one. We have here clearly a case of a true coelomoduct performing the function of an oviduct in both leeches and *Eudrilidae*. The facts just referred to suggest further comparisons between the Hirudinea and *Eudrilidae*. The large sacs which have been termed vagina are suggestive of the large coelomic spermathecae in Eudrilids, a comparison which needs, however, embryological data, not at present forthcoming, for its justification. It is at least clear that in *Ozobranchus* this comparison is justifiable; but only probable, or perhaps possible, in the case of *Philaemon*. In the former, the duct, leading from the ovarian sac, and swelling along its course into the spherical sac, the "spermatheca," is highly suggestive of the oviduct and receptaculum of the *Eudrilidae*.

The testes during development become hollowed out and are prolonged into the vasa efferentia. These ducts therefore have not their exact counterparts in the Oligochaeta, unless we are to assume that they collectively are represented by the seminal vesicles of earthworms and the vasa deferentia. It is to be noted that the Hirudinea differ from the Oligochaeta in that the male pore is in advance of the gonads (except in *Acanthobdella*, which here, as in so many points, approximates to the Oligochaeta), whereas in Oligochaeta that pore is behind the gonads (again with an exception, *Allurus*).

Classification.—The Hirudinea may be divided into three families:—

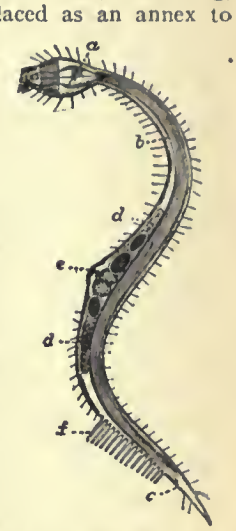
(i.) *Rhynchobdellidae.*—A protrusible proboscis exists, but there are no jaws. The blood is colourless. *Pontobdella*, *Glossiphonia*, &c.

(ii.) *Gnathobdellidae.*—A proboscis absent, but jaws usually present. Blood coloured red with haemoglobin. *Hirudo*, *Nephelis*, &c.

(iii.) *Acanthobdellidae.*—Proboscis present, but short. Paired setae of Oligochaetous pattern present in anterior segments. Blood red. *Acanthobdella*.

LITERATURE.—A. O. Kovalevsky, *Bull. Imp. Sci.* (St Petersburg, November 1896) (*Acanthobdella*); A. G. Bourne, *Quart. Journ. Micr. Sci.*, 1884; A. Oka, *Zeitschr. wiss. Zool.*, 1894; E. S. Goodrich, *Quart. Journ. Micr. Sci.*, 1899; W. E. Castle, *Bull. Mus. Comp. Zool.*, 1900; A. M. Lambert, *Proc. Roy. Soc.* (Victoria, 1897); C. O. Whitman, *Journ. Morph.*, 1889 and 1891; O. Bürger, *Zeitschr. wiss. Zool.*, 1902, and other memoirs by the above, and by St V. Apáthy, R. Blanchard, H. Bolsius, A. Dendy, R. S. Bergh, &c. (F. E. B.)

CHAETOSOMATIDA, a small group of minute, free-living, aquatic organisms which are usually placed as an annex to the Nematoda. Indeed Mechnikov, to whom we owe much of our knowledge of these forms, calls them "creeping Nematoda." They are usually found amongst seaweed in temperate seas, but they are probably widely distributed; some are fresh-water. The genus *Chaetosoma*, with the two species *Ch. claparedii* and *Ch. ophicephalum* and the genus *Tristicochaeta*, have swollen heads. The third genus *Rhabdogaster* has no such distinct head, though the body may be swollen anteriorly. The mouth is terminal and anterior and surrounded by a ring of spicules or a half-ring of hooks. Scattered hairs cover the body. Just in front of the anus there is in *Chaetosoma* a double, and in *Tristicochaeta* a triple row of about fifteen stout cylindrical projections upon which the animals creep. The females are a little larger than the males; in *Ch. claparedii* the former attain a length of 1·5 mm., the latter of 1·12 mm. The mouth opens into an oesophagus which passes into an intestine; this opens by a ventral anus situated a little in front of the posterior end. The testis is single, and its duct opens with the anus, and is provided with a couple of spicules. The ovary is double, and the oviducts open by a median ventral pore about the middle of the body; in this region there is a second swelling both in *Chaetosoma* and in *Rhabdogaster*. The last-named form is in the female 0·36 mm. in length. In it the hairs are confined to the dorsal middle line and the creeping setae are hooked, of a finer structure than in *Chaetosoma*, and situated so far forward that the vagina opens amongst them. *Ch. ophicephalum* has been taken in the English Channel.



From *Cambridge Natural History*, vol. ii. "Worms," by permission of Macmillan & Co., Ltd.

Mature female of *Chaetosoma claparedii*, ×57. (From Mechnikov.) *a*, Oesophagus; *b*, intestine; *c*, anus; *d*, ovary; *e*, generative pore; *f*, ventral bristles.

See E. Mechnikov, *Zeitschr. wiss. Zool.* xvii., 1867, p. 537; Panceri, *Atti Acc. Napoli*, vii., 1878, p. 7. (A. E. S.)

CHAFER, a word used in modern speech to distinguish the beetles of the family *Scarabaeidae*, and more especially those species which feed on leaves in the adult state. The word is derived from the O. Eng. *ceafor*, and it is interesting to note that the cognate Ger. *Käfer* is applied to beetles of all kinds. For the characters of the *Scarabaeidae* see COLEOPTERA. This family includes a large number of beetles, some of which feed on

dung and others on vegetable tissues. The cockchafers and their near allies belong to the subfamily *Melolonthinae*, and the rose-chafers to the *Cetoniinae*; in both the beetles eat leaves, and their grubs spend a long life underground devouring roots. In Britain the Melolonthines that are usually noted as injurious are the two species of cockchafer (*Melolontha vulgaris* and *M. hippocastani*), large heavy beetles with black pubescent prothorax, brown elytra and an elongated pointed tail-process; the summer-chafer (*Rhizotrogus solstitialis*), a smaller pale brown chafer; and the still smaller garden-chafer or "cockerbundy" (*Phyllopertha horticola*), which has a dark green prothorax and brown elytra. Of the Cetoniines, the beautiful metallic green rose-chafer, *Cetonia aurata*, sometimes causes damage, especially in gardens. The larvae of the chafers are heavy, soft-skinned grubs, with hard brown heads provided with powerful mandibles, three pairs of well-developed legs, and a swollen abdomen. As they grow, the larvae become strongly flexed towards the ventral surface, and lie curled up in their earthen cells, feeding on roots. The larval life lasts several years, and in hard frosts the grubs go deep down away from the surface. Pupation takes place in the autumn, and though the perfect insect emerges from the cuticle very soon afterwards, it remains in its underground cell for several months, not making its way to the upper air until the ensuing summer. After pairing, the female crawls down into the soil to lay her eggs. The grubs of chafers, when turned up by the plough, are greedily devoured by poultry, pigs and various wild birds. When the beetles become so numerous as to call for destruction, they are usually shaken off the trees where they rest on to sheets or tarred boards. On the continent of Europe chafers are far more numerous than in the United Kingdom, and the rural governments in France give rewards for their destruction. D. Sharp states that in the department of Seine-inférieure 867,173,000 cockchafers and 647,000,000 larvae were killed in the four years preceding 1870.

The anatomy of *Melolontha* is very fully described in a classical memoir by H. E. Strauss-Dürckheim (Paris, 1828). (G. H. C.)

CHAFF (from the A.S. *ceaf*, allied to the O. High Ger. *cheva*, a husk or pod), the husks left after threshing grain, and also hay and straw chopped fine as food for cattle; hence, figuratively, the refuse or worthless part of anything. The colloquial use of the word, to chaff, in the sense of to banter or to make fun of a person, may be derived from this figurative sense, or from "to chafe," meaning to vex or irritate.

CHAFFARINAS, or ZAFFARINES, a group of islands belonging to Spain off the north coast of Morocco, near the Algerian frontier, 2½ m. to the north of Cape del Agna. The largest of these isles, Del Congreso, is rocky and hilly. It has a watch-house on the coast nearest to Morocco. Isabella II., the central island, contains several batteries, barracks and a penal convict settlement. The Spanish government has undertaken the construction of breakwaters to unite this island with the neighbouring islet of El Rey, with a view to enclose a deep and already sheltered anchorage. This roadstead affords a safe refuge for many large vessels. The Chaffarinas, which are the *Tres Insulae* of the Romans and the *Zafrān* of the Arabs, were occupied by Spain in 1848. The Spanish occupation anticipated by a few days a French expedition sent from Oran to annex the islands to Algeria. The population of the islands is under 1000.

CHAFFEE, ADNA ROMANZA (1842–), American general, was born at Orwell, Ohio, on the 14th of April 1842. At the outbreak of the Civil War he entered the United States cavalry as a private, and he rose to commissioned rank in 1863, becoming brevet captain in 1865. He remained in the army after the war and took part with distinction in many Indian campaigns. His promotion was, however, slow, and he was at the age of fifty-six still a lieutenant-colonel of cavalry. But in 1898, at the outbreak of the Spanish-American War, he was made brigadier-general and soon afterwards major-general of volunteers. In the Cuban campaign he won particular distinction, and the victory of the Americans in the action of El Caney was in large measure due to his careful personal reconnaissances of the ground to be attacked and to the endurance of his own brigade. After reverting for a time to the rank of brigadier-general, he was made a major-general U.S.V. again in 1900 and was appointed to command the United States contingent in China. He took a brilliant and successful part in the advance on Peking and the relief of the Legations. In 1901 he became a major-general in the regular army, and in 1901–1902 commanded the Division of the Philippines. In 1902–1903 he commanded the Department of the East, and from 1904 to 1906 was chief of the general staff of the army. In 1904 he received the rank of lieutenant-general in the United States army, being the first enlisted man of the regular army to attain this, the highest rank in the service. He was retired at his own request on the 1st of February 1906, after more than forty years' service.

CHAFFINCH (*Fringilla coelebs*), the common English name of a bird belonging to the family *Fringillidae* (see FINCH), and distinguished, in the male sex, by the deep greyish blue of its crown feathers, the yellowish green of its rump, the white of the wing coverts, so disposed as to form two conspicuous bars, and the reddish brown passing into vinous red of the throat and breast. The female is drab, but shows the same white markings as the male, and the young males resemble the females until after the first autumn moult, when they gradually assume the plumage of their sex. The chaffinch breeds early in the season, and its song may often be heard in February. Its nest, which is a model of neatness and symmetry, it builds on trees and bushes, preferring such as are overgrown with moss and lichens. It is chiefly composed of moss and wool, lined internally with grass, wool, feathers, and whatever soft material the locality affords. The outside consists of moss and lichens, and according to Selby, "is always accordant with the particular colour of its situation." When built in the neighbourhood of towns the nest is somewhat slovenly and untidy, being often composed of bits of dirty straw, pieces of paper and blackened moss; in one instance, near Glasgow, the author of the *Birds of the West of Scotland* found several postage-stamps thus employed. It lays four or five eggs of a pale purplish buff, streaked and spotted with purplish red. In spring the chaffinch is destructive to early flowers, and to young radishes and turnips just as they appear above the surface; in summer, however, it feeds principally on insects and their larvae, while in autumn and winter its food consists of grain and other seeds. On the continent of Europe the chaffinch is a favourite song-bird, especially in Germany, where great attention is paid to its training.

CHAFING-DISH (from the O. Fr. *chaufer*, to make warm), a kind of portable grate heated with charcoal, and used for cooking or keeping food warm. In a light form, and heated over a spirit lamp, it is also used for cooking various dainty dishes at table. The employment of the chafing-dish for the latter purpose has been largely restored in modern cookery.

CHAGOS, a group of atolls in the Indian Ocean, belonging to Britain, disposed in circular form round the Chagos bank, in 4° 44′ to 7° 39′ S., and 70° 55′ to 72° 52′ E. The atolls on the south and east side of the bank, which has a circumference of about 270 m., have disappeared through subsidence; a few—Egmont, Danger, Eagle, and Three Brothers—still remain on the east side, but most of the population (about 700) is centred on Diego Garcia, which lies on the south-east side, and is nearly 13 m. long by 6 m. wide. The lagoon, which is enclosed by two coral barriers and accessible to the largest vessels on the north side, forms one of the finest natural harbours in the world. The group, which has a total land area of 76 sq. m., is dependent for administrative purposes on Mauritius, and is regularly visited by vessels from that colony. The only product is cocoa-nut oil, of which about 106,000 gallons are annually exported. The French occupied the islands in 1791 from Mauritius, and the oil industry (from which the group is sometimes called the Oil Islands) came into the hands of French Creoles.

CHAGRES, a village of the Republic of Panama, on the Atlantic coast of the Isthmus, at the mouth of the Chagres river, and about 8 m. W. of Colon. It has a harbour from 10 to 12 ft. deep, which is difficult to enter, however, on account of bars at its mouth. The port was discovered by Columbus in

1502, and was opened for traffic with Panama, on the Pacific coast, by way of the Chagres river, in the 16th century. With the decline of Porto Bello in the 18th century Chagres became the chief Atlantic port of the Isthmus, and was at the height of its importance during the great rush of gold-hunters across the Isthmus to California in 1849 and the years immediately following. With the completion of the Panama railway in 1855, however, travel was diverted to Colon, and Chagres soon became a village of miserable huts, with no evidence of its former importance. On a high rock at the mouth of the river stands the castle of Lorenzo, which was destroyed by Sir Henry Morgan when he captured the town in 1671, but was rebuilt soon afterwards by the Spaniards. Chagres was again captured in 1740 by British forces under Admiral Edward Vernon.

CHAIN (through the O. Fr. *chaine*, *chæne*, &c., from Lat. *catena*), a series of links of metal or other material so connected together that the whole forms a flexible band or cord. Chains are used for a variety of purposes, such as fastening, securing, or connecting together two or more objects, supporting or lifting weights, transmitting mechanical power, &c.; or as an ornament to serve as a collar, as a symbol of office or state, or as part of the insignia of an order of knighthood; or as a device from which to hang a jewelled or other pendant, a watch, &c. (see COLLAR). Ornamental chains are made with a great variety of links, but those intended for utilitarian purposes are mostly of two types. In stud chains a stud or brace is inserted across each link to prevent its sides from collapsing inwards under strain, whereas in open link chains the links have no studs. The addition of studs is reckoned to increase the load which the chain can safely bear by 50%. Small chains of the open-link type are to a great extent made by machinery. For larger sizes the smith cuts off a length of iron rod of suitable diameter, forms it while hot to the shape of the link by repeated blows of his hammer, and welds together the two ends of the link, previously slipped inside its fellow, by the aid of the same tool; in some cases the bending is done in a mechanical press and the welding under a power hammer (see also CABLE). Weldless chains are also made; in A. G. Strathern's process, for instance, cruciform steel bars are pressed, while hot, into links, each without join and engaging with its neighbours. Chains used for transmitting power are known as pitch-chains; the chain of a bicycle (*q.v.*) is an example.

From the use of the chain as employed to bind or fetter a prisoner or slave, comes the figurative application to anything which serves as a constraining or restraining force; and from its series of connected links, to any series of objects, events, arguments, &c., connected by succession, logical sequence or reasoning. Specific uses are for a measuring line in land-surveying, consisting of 100 links, *i.e.* iron rods, 7·92 in. in length, making 22 yds. in all, hence a lineal measure of that length; and, as a nautical term, for the contrivance by which the lower shrouds of a mast are extended and secured to the ship's sides, consisting of dead-eyes, chain-plates, and chain-wale or "channel."

CHAIR (in. Mid. Eng. *chære*, through O. Fr. *chaëre* or *chaiere*, from Lat. *cathedra*, later *caledra*, Gr. *καθέδρα*, seat, cf. "cathedral"; the modern Fr. form *chaise*, a chair, has been adopted in English with a particular meaning as a form of carriage; *chaire* in French is still used of a professorial or ecclesiastical "chair," or *cathedra*), a movable seat, usually with four legs, for a single person, the most varied and familiar article of domestic furniture. The chair is of extreme antiquity, although for many centuries and indeed for thousands of years it was an appanage of state and dignity rather than an article of ordinary use. "The chair" is still extensively used as the emblem of authority in the House of Commons and in public meetings. It was not, in fact, until the 16th century that it became common anywhere. The chest, the bench and the stool were until then the ordinary seats of everyday life, and the number of chairs which have survived from an earlier date is exceedingly limited; most of such examples are of ecclesiastical or seigneurial origin. Our knowledge of the chairs of remote antiquity is derived almost entirely from monuments, sculpture and paintings. A few actual examples exist in the British Museum, in the Egyptian museum at Cairo, and elsewhere. In ancient Egypt they appear to have been of great richness and splendour. Fashioned of ebony and ivory, or of carved and gilded wood, they were covered with costly stuffs and supported upon representations of the legs of beasts of the chase or the figures of captives. An arm-chair in fine preservation found in a tomb in the Valley of the Kings is astonishingly similar, even in small details, to that "Empire" style which followed Napoleon's campaign in Egypt. The earliest monuments of Nineveh represent a chair without a back but with tastefully carved legs ending in lions' claws or bulls' hoofs; others are supported by figures in the nature of caryatides or by animals. The earliest known form of Greek chair, going back to five or six centuries before Christ, had a back but stood straight up, front and back. On the frieze of the Parthenon Zeus occupies a square seat with a bar-back and thick turned legs; it is ornamented with winged sphinxes and the feet of beasts. The characteristic Roman chairs were of marble, also adorned with sphinxes; the curule chair was originally very similar in form to the modern folding chair, but eventually received a good deal of ornament.

The most famous of the very few chairs which have come down from a remote antiquity is the reputed chair of St Peter in St Peter's at Rome. The wooden portions are much decayed, but it would appear to be Byzantine work of the 6th century, and to be really an ancient *sedia gestatoria*. It has ivory carvings representing the labours of Hercules. A few pieces of an earlier oaken chair have been let in; the existing one, Gregorovius says, is of acacia wood. The legend that this was the curule chair of the senator Pudens is necessarily apocryphal. It is not, as is popularly supposed, enclosed in Bernini's bronze chair, but is kept under triple lock and exhibited only once in a century. Byzantium, like Greece and Rome, affected the curule form of chair, and in addition to lions' heads and winged figures of Victory and dolphin-shaped arms used also the lyre-back which has been made familiar by the pseudo-classical revival of the end of the 18th century. The chair of Maximian in the cathedral of Ravenna is believed to date from the middle of the 6th century. It is of marble, round, with a high back, and is carved in high relief with figures of saints and scenes from the Gospels—the Annunciation, the Adoration of the Magi, the flight into Egypt and the baptism of Christ. The smaller spaces are filled with carvings of animals, birds, flowers and foliated ornament. Another very ancient seat is the so-called "Chair of Dagobert" in the Louvre. It is of cast bronze, sharpened with the chisel and partially gilt; it is of the curule or faldstool type and supported upon legs terminating in the heads and feet of animals. The seat, which was probably of leather, has disappeared. Its attribution depends entirely upon the statement of Suger, abbot of St Denis in the 12th century, who added a back and arms. Its age has been much discussed, but Viollet-le-Duc dated it to early Merovingian times, and it may in any case be taken as the oldest faldstool in existence. To the same generic type belongs the famous abbots' chair of Glastonbury; such chairs might readily be taken to pieces when their owners travelled. The *faldisterium* in time acquired arms and a back, while retaining its folding shape. The most famous, as well as the most ancient, English chair is that made at the end of the 13th century for Edward I., in which most subsequent monarchs have been crowned. It is of an architectural type and of oak, and was covered with gilded *gesso* which long since disappeared.

Passing from these historic examples we find the chair monopolized by the ruler, lay or ecclesiastical, to a comparatively late date. As the seat of authority it stood at the head of the lord's table, on his dais, by the side of his bed. The seigneurial chair, commoner in France and the Netherlands than in England, is a very interesting type, approximating in many respects to the episcopal or abbatial throne or stall. It early acquired a very high back and sometimes had a canopy. Arms were invariable, and the lower part was closed in with panelled or carved front and sides—the seat, indeed, was often hinged and

sometimes closed with a key. That we are still said to sit "in" an arm-chair and "on" other kinds of chairs is a reminiscence of the time when the lord or seigneur sat "in his chair." These throne-like seats were always architectural in character, and as Gothic feeling waned took the distinctive characteristics of Renaissance work. It was owing in great measure to the Renaissance that the chair ceased to be an appanage of state, and became the customary companion of whomsoever could afford to buy it. Once the idea of privilege faded the chair speedily came into general use, and almost at once began to reflect the fashions of the hour. No piece of furniture has ever been so close an index to sumptuary changes. It has varied in size, shape and sturdiness with the fashion not only of women's dress but of men's also. Thus the chair which was not, even with its arms purposely suppressed, too ample during the several reigns of some form or other of hoops and farthingale, became monstrous when these protuberances disappeared. Again, the costly laced coats of the dandy of the 18th and early 19th centuries were so threatened by the ordinary form of seat that a "conversation chair" was devised, which enabled the buck and the ruffler to sit with his face to the back, his valuable tails hanging unimpeded over the front. The early chair almost invariably had arms, and it was not until towards the close of the 16th century that the smaller form grew common.

The majority of the chairs of all countries until the middle of the 17th century were of oak without upholstery, and when it became customary to cushion them, leather was sometimes employed; subsequently velvet and silk were extensively used, and at a later period cheaper and often more durable materials. Leather was not infrequently used even for the costly and elaborate chairs of the faldstool form—occasionally sheathed in thin plates of silver—which Venice sent all over Europe. To this day, indeed, leather is one of the most frequently employed materials for chair covering. The outstanding characteristic of most chairs until the middle of the 17th century was massiveness and solidity. Being usually made of oak, they were of considerable weight, and it was not until the introduction of the handsome Louis XIII. chairs with cane backs and seats that either weight or solidity was reduced. Although English furniture derives so extensively from foreign and especially French and Italian models, the earlier forms of English chairs owed but little to exotic influences. This was especially the case down to the end of the Tudor period, after which France began to set her mark upon the British chair. The squat variety, with heavy and sombre back, carved like a piece of panelling, gave place to a taller, more slender, and more elegant form, in which the framework only was carved, and attempts were made at ornament in new directions. The stretcher especially offered opportunities which were not lost upon the cabinet-makers of the Restoration. From a mere uncompromising cross-bar intended to strengthen the construction it blossomed, almost suddenly, into an elaborate scroll-work or an exceedingly graceful semicircular ornament connecting all four legs, with a vase-shaped knob in the centre. The arms and legs of chairs of this period were scrolled, the splats of the back often showing a rich arrangement of spirals and scrolls. This most decorative of all types appears to have been popularized in England by the cavaliers who had been in exile with Charles II. and had become familiar with it in the north-western parts of the European continent. During he reign of William and Mary these charming forms degenerated into something much stiffer and more rectangular, with a solid, more or less fiddle-shaped splat and a cabriole leg with pad feet. The more ornamental examples had cane seats and ill-proportioned cane backs. From these forms was gradually developed the Chippendale chair, with its elaborately interlaced back, its graceful arms and square or cabriole legs, the latter terminating in the claw and ball or the pad foot. Hepplewhite, Sheraton and Adam all aimed at lightening the chair, which, even in the master hands of Chippendale, remained comparatively heavy. The endeavour succeeded, and the modern chair is everywhere comparatively slight. Chippendale and Hepplewhite between them determined what appears to be the final form of the chair, for since their time practically no new type has lasted, and in its main characteristics the chair of the 20th century is the direct derivative of that of the later 18th.

The 18th century was, indeed, the golden age of the chair, especially in France and England, between which there was considerable give and take of ideas. Even Diderot could not refrain from writing of them in his *Encyclopédie*. The typical Louis Seize chair, oval-backed and ample of seat, with descending arms and round-reeded legs, covered in Beauvais or some such gay tapestry woven with Boucher or Watteau-like scenes, is a very gracious object, in which the period reached its high-water mark. The Empire brought in squat and squabby shapes, comfortable enough no doubt, but entirely destitute of inspiration. English Empire chairs were often heavier and more sombre than those of French design. Thenceforward the chair in all countries ceased to attract the artist. The *art nouveau* school has occasionally produced something of not unpleasing simplicity; but more often its efforts have been frankly ugly or even grotesque. There have been practically no novelties, with the exception perhaps of the basket-chair and such like, which have been made possible by modern command over material. So much, indeed, is the present indebted to the past in this matter that even the revolving chair, now so familiar in offices, has a pedigree of something like four centuries (see also SEDAN-CHAIR). (J. P.-B.)

CHAISE (the French for "chair," through a transference from a "sedan-chair" to a wheeled vehicle), a light two- or four-wheeled carriage with a movable hood or "calash"; the "post-chaise" was the fast-travelling carriage of the 18th and early 19th centuries. It was closed and four-wheeled for two or four horses and with the driver riding postillion.

CHAKRATA, a mountain cantonment in the Dehra Dun district of the United Provinces of India, on the range of hills overlooking the valleys of the Jumna and the Tons, at an elevation of 7000 ft. It was founded in 1866 and first occupied in April 1869.

CHALCEDON, more correctly CALCHEDON (mod. *Kadikeui*), an ancient maritime town of Bithynia, in Asia Minor, almost directly opposite Byzantium, south of Scutari. It was a Megarian colony founded on a site so obviously inferior to that which was within view on the opposite shore, that it received from the oracle the name of "the City of the Blind." In its early history it shared the fortunes of Byzantium, was taken by the satrap Otanes, vacillated long between the Lacedaemonian and the Athenian interests, and was at last bequeathed to the Romans by Attalus III. of Pergamum (133 B.C.). It was partly destroyed by Mithradates, but recovered during the Empire, and in A.D. 451 was the seat of the Fourth General Council. It fell under the repeated attacks of the barbarian hordes who crossed over after having ravaged Byzantium, and furnished an encampment to the Persians under Chosroes, *c.* 616–626. The Turks used it as a quarry for building materials for Constantinople. The site is now occupied by the village of Kadikeui ("Village of the Judge"), which forms the tenth "cercle" of the municipality of Constantinople. Pop. about 33,000, of whom 8000 are Moslems. There is a large British colony with a church, and also Greek and Armenian churches and schools, and a training college for Roman Catholic Armenians. To the S. are the ruins of Panteichion (mod. *Pendik*), where Belisarius is said to have lived in retirement.

See J. von Hammer, *Constantinopolis* (Pesth, 1822); Murray's *Handbook for Constantinople* (London, 1900).

CHALCEDON, COUNCIL OF, the fourth ecumenical council of the Catholic Church, was held in 451, its occasion being the Eutychian heresy and the notorious "Robber Synod" (see EUTYCHES and EPHESUS, COUNCIL OF), which called forth vigorous protests both in the East and in the West, and a loud demand for a new general council, a demand that was ignored by the Eutychian Theodosius II., but speedily granted by his successor, Marcian, a "Flavianist." In response to the imperial summons, five to six hundred bishops, all Eastern, except the Roman legates and two Africans, assembled in Chalcedon on the

8th of October 451. The bishop of Rome claimed for his legates the right to preside, and insisted that any act that failed to receive their approval would be invalid. The first session was tumultuous; party feeling ran high, and scurrilous and vulgar epithets were bandied to and fro. The acts of the Robber Synod were examined; fraud, violence and coercion were charged against it; its entire proceedings were annulled, and, at the third session, its leader, Dioscurus, was deposed and degraded. The emperor requested a declaration of the true faith; but the sentiment of the council was opposed to a new symbol. It contented itself with reaffirming the Nicene and Constantinopolitan creeds and the Ephesine formula of 431, and accepting, only after examination, the Christological statement contained in the *Epistola Dogmatica* of Leo I. (*q.v.*) to Flavianus. Thus the council rejected both Nestorianism and Eutychianism, and stood upon the doctrine that Christ had two natures, each perfect in itself and each distinct from the other, yet perfectly united in one person, who was at once both God and man. With this statement, which was formally subscribed in the presence of the emperor, the development of the Christological doctrine was completed, but not in a manner to obviate further controversy (see MONOPHYSITES and MONOTHELITES).

The remaining sessions, vii.–xvi., were occupied with matters of discipline, complaints, claims, controversies and the like. Canons were adopted, thirty according to the generally received tradition, although the most ancient texts contain but twenty-eight, and, as Hefele points out, the so-called twenty-ninth and thirtieth are properly not canons, but repetitions of proposals made in a previous session.

The most important enactments of the council of Chalcedon were the following: (1) the approval of the canons of the first three ecumenical councils and of the synods of Ancyra, Neo-Caesarea, Changra, Antioch and Laodicea; (2) forbidding trade, secular pursuits and war to the clergy, bishops not even being allowed to administer the property of their dioceses; (3) forbidding monks and nuns to marry or to return to the world; likewise forbidding the establishment of a monastery in any diocese without the consent of the bishop, or the disestablishment of a monastery once consecrated; (4) punishing with deposition an ordination or clerical appointment made for money; forbidding "absolute ordination" (*i.e.* without assignment to a particular charge), the translation of clerics except for good cause, the enrolment of a cleric in two churches at once, and the performance of sacerdotal functions outside of one's diocese without letters of commendation from one's bishop; (5) confirming the jurisdiction of bishops over all clerics, regular and secular alike, and punishing with deposition any conspiracy against episcopal authority; (6) establishing a gradation of ecclesiastical tribunals, viz. bishop, provincial synod, exarch of the diocese, patriarch of Constantinople (obviously the council could not here have been legislating for the entire church); forbidding clerics to be running to Constantinople with complaints, without the consent of their respective bishops; (7) confirming the possession of rural parishes to those who had actually administered them for thirty years, providing for the adjudication of conflicting claims, and guaranteeing the integrity of metropolitan provinces; (8) confirming the third canon of the second ecumenical council, which accorded to Constantinople equal privileges (ἴσα πρεσβεῖα) with Rome, and the second rank among the patriarchates, and, in addition, granting to Constantinople patriarchal jurisdiction over Pontus, Asia and Thrace.

The Roman legates, who were absent (designedly?) when this famous twenty-eighth canon was adopted, protested against it, but in vain, the imperial commissioners deciding in favour of its regularity and validity. Leo I., although he recognized the council as ecumenical and confirmed its doctrinal decrees, rejected canon xxviii. on the ground that it contravened the sixth canon of Nicaea and infringed the rights of Alexandria and Antioch. In what proportion zeal for the ancient canons and the rights of others, and jealous fear of encroachment upon his own jurisdiction, were mixed in the motives of Leo, it would be interesting to know. The canon was universally received in the East, and was expressly confirmed by the Quinisext Council, 692 (see CONSTANTINOPLE, COUNCILS OF).

The emperor Marcian approved the doctrinal decrees of the council and enjoined silence in regard to theological questions. Eutyches and Dioscurus and their followers were deposed and banished. But harmony was not thus to be restored; hardly had the council dissolved when the church was plunged into the Monophysite controversy.

See Mansi vi. pp. 529-1102, vii. pp. 1-868; Hardouin ii. pp. 1-772; Hefele (2nd ed.) ii. pp. 394-578 (English translation, iii. pp. 268-464); also extended bibliographies in Herzog-Hauck, *Realencyklopädie*, 3rd ed., *s.v.* "Eutyches" (by Loofs) and *s.v.* "Nestorianer" (by Kessler). (T. F. C.)

CHALCEDONY, or CALCEDONY (sometimes called by old writers cassidoine), a variety of native silica, often used as an ornamental stone. The present application of the term is comparatively modern. The "chalcedonius" of Pliny was quite a different mineral, being a green stone from the copper-mines of Chalcedon, in Asia Minor, whence the name. There has been some confusion between chalcedony and the ancient "carcedonia," a stone which seems to have been a carbuncle from Africa, brought by way of Carthage (Καρχηδών). Our chalcedony was probably included by the ancients among the various kinds of jasper and agate, especially the varieties termed "leucachates" and "cerachates."

By modern mineralogists the name chalcedony is restricted to those kinds of silica which occur not in distinct crystals like ordinary quartz, but in concretionary, mammillated or stalactitic forms, which break with a fine splintery fracture, and display a delicate fibrous structure. Chalcedony may be regarded as a micro-crystalline form of quartz. It is rather softer and less dense than crystallized quartz, its hardness being about 6·5 and its specific gravity 2·6, the difference being probably due to the presence of a small amount of opaline silica between the fibres. Chalcedony is a translucent substance of rather waxy lustre, presenting great variety of colours, though usually white, grey, yellow or brown. A rare blue chalcedony is sometimes polished under the name of "sapphirine"—a term applied also to a distinct mineral (an aluminium-magnesium silicate) from Greenland.

Chalcedony occurs as a secondary mineral in volcanic rocks, representing usually the silica set free by the decomposition of various silicates, and deposited in cracks, forming veins, or in vesicular hollows, forming amygdales. Its occurrence gives the name to Chalcedony Park, Arizona. It is found in the basalts of N. Ireland, the Faroe Isles and Iceland: it is common in the traps of the Deccan in India, and in volcanic rocks in Uruguay and Brazil. Certain flat oval nodules from a decomposed lava (augite-andesite) in Uruguay present a cavity lined with quartz crystals and enclosing liquid (a weak saline solution), with a movable air-bubble, whence they are called "enhydros" or water-stones. Very fine examples of stalactitic chalcedony, in whimsical forms, have been yielded by some of the Cornish copper-mines. The surface of chalcedony is occasionally coated with a delicate bluish bloom. A chalcedonic deposit in the form of concentric rings, on fossils and fragments of limestone in S. Devon, is known as "orbicular silica" or "beekite," having been named after Dr Henry Beeke, dean of Bristol, who first directed attention to such deposits. Certain pseudomorphs of chalcedony after datolite, from Haytor in Devonshire, have received the name of "haytorite." Optical examination of many chalcedonic minerals by French mineralogists has shown that they are aggregates of various fibrous crystalline bodies differing from each other in certain optical characters, whence they are distinguished as separate minerals under such names as calcedonite, pseudocalcedonite, quartzine, lutecite and lussatite. Many coloured and variegated chalcedonies are cut and polished as ornamental stones, and are described under special headings. Chalcedony has been in all ages the commonest of the stones used by the gem-engraver.

See AGATE, BLOODSTONE, CARNELIAN, CHRYSOPRASE, HELIOTROPE, MOCHA STONE, ONYX, SARD and SARDONYX. (F. W. R.*)

CHALCIDICUM, in Roman architecture, the vestibule or portico of a public building opening on to the forum; as in the basilica of Eumactria at Pompeii, and the basilica of Constantine at Rome, where it was placed at one end.

CHALCIS, the chief town of the island of Euboea in Greece, situated on the strait of the Euripus at its narrowest point. The name is preserved from antiquity and is derived from the Greek χαλκός (copper, bronze), though there is no trace of any mines in the neighbourhood. Chalcis was peopled by an Ionic stock which early developed great industrial and colonizing activity. In the 8th and 7th centuries it founded thirty townships on the peninsula of Chalcidice, and several important cities in Sicily (*q.v.*). Its mineral produce, metal-work, purple and pottery not only found markets among these settlements, but were distributed over the Mediterranean in the ships of Corinth and Samos. With the help of these allies Chalcis engaged the rival league of its neighbour Eretria (*q.v.*) in the so-called Lelantine War, by which it acquired the best agricultural district of Euboea and became the chief city of the island. Early in the 6th century its prosperity was broken by a disastrous war with the Athenians, who expelled the ruling aristocracy and settled a cleruchy on the site. Chalcis subsequently became a member of both the Delian Leagues. In the Hellenistic period it gained inportance as a fortress by which the Macedonian rulers controlled central Greece. It was used by kings Antiochus III. of Syria (192) and Mithradates VI. of Pontus (88) as a base for invading Greece. Under Roman rule Chalcis retained a measure of commercial prosperity; since the 6th century A.D. it again served as a fortress for the protection of central Greece against northern invaders. From 1209 it stood under Venetian control; in 1470 it passed to the Ottomans, who made it the seat of a pasha. In 1688 it was successfully held against a strong Venetian attack. The modern town has about 10,000 inhabitants, and maintains a considerable export trade which received an impetus from the establishment of railway connexion with Athens and Peiraeus (1904). It is composed of two parts—the old walled town towards the Euripus, called the Castro, where the Jewish and Turkish families who have remained there mostly dwell; and the more modern suburb that lies outside it, which is chiefly occupied by the Greeks. A part of the walls of the Castro and many of the houses within it were shaken down by the earthquake of 1894; part has been demolished in the widening of the Euripus. The most interesting object is the church of St Paraskeve, which was once the chief church of the Venetians; it dates from the Byzantine period, though many of its architectural features are Western. There is also a Turkish mosque, which is now used as a guard-house.

AUTHORITIES.—Strabo vii. fr. 11, x. p. 447; Herodotus v. 77; Thucydides i. 15; *Corpus Inscr. Atticarum*, iv. (1) 27a, iv. (2) 10, iv. (2) p. 22; W. M. Leake, *Travels in Northern Greece* (London, 1835), ii. 254-270; E. Curtius in *Hermes*, x. (1876), p. 220 sqq.; A. Holm, *Lange Fehde* (Berlin, 1884); H. Dondorff, *De Rebus Chalcidensium* (Göttingen, 1869); for coinage, B. V. Head, *Historia Numorum* (Oxford, 1887), pp. 303-5; and art. NUMISMATICS: *Greek* § Euboea.

CHALCONDYLES[1] (or CHALCOCONDYLAS), **LAONICUS,** the only Athenian Byzantine writer. Hardly anything is known of his life. He wrote a history, in ten books, of the period from 1298–1463, describing the fall of the Greek empire and the rise of the Ottoman Turks, which forms the centre of the narrative, down to the conquest of the Venetians and Mathias, king of Hungary, by Mahommed II. The capture of Constantinople he rightly regarded as an historical event of far-reaching importance, although the comparison of it to the fall of Troy is hardly appropriate. The work incidentally gives a quaint and interesting sketch of the manners and civilization of England, France and Germany, whose assistance the Greeks sought to obtain against the Turks. Like that of other Byzantine writers, Chalcondyles' chronology is defective, and his adherence to the old Greek geographical nomenclature is a source of confusion. For his account of earlier events he was able to obtain information from his father, who was one of the most prominent men in Athens during the struggles between the Greek and Frankish nobles. His model is Thucydides (according to Bekker, Herodotus); his language is tolerably pure and correct, his style simple and clear. The text, however, is in a very corrupt state.

Editio princeps, ed. J. B. Baumbach (1615); in Bonn *Corpus Scriptorum Hist. Byz.* ed. I. Bekker (1843); Migne, *Patrologia Graeca*, xlix. There is a French translation by Blaise de Vigenère (1577, later ed. by Artus Thomas with valuable illustrations on Turkish matters); see also F. Gregorovius, *Geschichte der Stadt Athen im Mittelalter*, ii. (1889); Gibbon, *Decline and Fall*, ch. 66; C. Krumbacher, *Geschichte der byzantinischen Litteratur* (1897). There is a biographical sketch of Laonicus and his brother in Greek by Antonius Calosynas, a physician of Toledo, who lived in the latter part of the 16th century (see C. Hopf, *Chroniques gréco-romanes*, 1873).

His brother, DEMETRIUS CHALCONDYLES (1424–1511), was born in Athens. In 1447 he migrated to Italy, where Cardinal Bessarion gave him his patronage. He became famous as a teacher of Greek letters and the Platonic philosophy; in 1463 he was made professor at Padua, and in 1479 he was summoned by Lorenzo de' Medici to Florence to fill the professorship vacated by John Argyropoulos. In 1492 he removed to Milan, where he died in 1511. He was associated with Marsilius Ficinus, Angelus Politianus, and Theodorus Gaza, in the revival of letters in the western world. One of his pupils at Florence was the famous John Reuchlin. Demetrius Chalcondyles published the editio princeps of Homer, Isocrates, and Suidas, and a Greek grammar (*Erotemata*) in the form of question and answer.

See H. Hody, *De Graecis illustribus* (1742); C. Hopf, *Chroniques gréco-romanes* (1873); E. Legrand, *Bibliographie hellénique*, i. (1885).

CHALDAEA. The expressions "Chaldaea" and "Chaldaeans" are frequently used in the Old Testament as equivalents for "Babylonia" and "Babylonians." Chaldaea was really the name of a country, used in two senses. It was first applied to the extreme southern district, whose ancient capital was the city of *Bīt Yakīn*, the chief seat of the renowned Chaldaean rebel Merodach-baladan, who harassed the Assyrian kings Sargon and Sennacherib. It is not as yet possible to fix the exact boundaries of the original home of the Chaldaeans, but it may be regarded as having been the long stretch of alluvial land situated at the then separate mouths of the Tigris and Euphrates, which rivers now combine to flow into the Persian Gulf in the waters of the majestic *Shatt el 'Arab*.

The name "Chaldaea," however, soon came to have a more extensive application. In the days of the Assyrian king Rammānirāri III. (812–783 B.C.), the term *mat Kaldū* covered practically all Babylonia. Furthermore, Merodach-baladan was called by Sargon II. (722–705 B.C.) "king of the land of the Chaldaeans" and "king of the land of Bīt Yakīn" after the old capital city, but there is no satisfactory evidence that Merodach-baladan had the right to the title "Babylonian." The racial distinction between the Chaldaeans and the Babylonians proper seems to have existed until a much later date, although it is almost certain that the former were originally a Semitic people. That they differed from the Arabs and Aramaeans is also seen from the distinction made by Sennacherib (705–681 B.C.) between the Chaldaeans and these races. Later, during the period covering the fall of Assyria and the rise of the Neo-Babylonian empire, the term *mat Kaldū* was not only applied to all Babylonia, but also embraced the territory of certain foreign nations who were later included by Ezekiel (xxiii. 23) under the expression "Chaldaeans."

As already indicated, the Chaldaeans were most probably a Semitic people. It is likely that they first came from Arabia, the supposed original home of the Semitic races, at a very early date along the coast of the Persian Gulf and settled in the neighbourhood of Ur ("Ur of the Chaldees," Gen. xi. 28), whence they began a series of encroachments, partly by warfare and partly by immigration, against the other Semitic Babylonians. These aggressions after many centuries ended in the Chaldaean supremacy of Nabopolassar and his successors (*c.* 626 ff.), although there is no positive proof that Nabopolassar was

[1] A shortened form of Chalcocondyles, from χαλκός, copper, and κόνδυλος, knuckle.

purely Chaldaean in blood. The sudden rise of the later Babylonian empire under Nebuchadrezzar, the son of Nabopolassar, must have tended to produce so thorough an amalgamation of the Chaldaeans and Babylonians, who had theretofore been considered as two kindred branches of the same original Semite stock, that in the course of time no perceptible differences existed between them. A similar amalgamation, although in this case of two peoples originally racially distinct, has taken place in modern times between the Manchu Tatars and the Chinese. It is quite evident, for example, from the Semitic character of the Chaldaean king-names, that the language of these Chaldaeans differed in no way from the ordinary Semitic Babylonian idiom which was practically identical with that of Assyria. Consequently, the term "Chaldaean" came quite naturally to be used in later days as synonymous with "Babylonian." When subsequently the Babylonian language went out of use and Aramaic took its place, the latter tongue was wrongly termed "Chaldee" by Jerome, because it was the only language known to him used in Babylonia. This error was followed until a very recent date by many scholars.

The derivation of the name "Chaldaean" is extremely uncertain. Peter Jensen has conjectured with slight probability that the Chaldaeans were Semitized Sumerians, *i.e.* a non-Semitic tribe which by contact with Semitic influences had lost its original character. There seems to be little or no evidence to support such a view. Friedrich Delitzsch derived the name "Chaldaean" = *Kasdîm* from the non-Semitic Kaššites who held the supremacy over practically all Babylonia during an extended period (*c.* 1783–1200 B.C.). This theory seems also to be extremely improbable. It is much more likely that the name "Chaldaean" is connected with the Semitic stem *kasādu* (conquer), in which case *Kaldi-Kašdi*, with the well-known interchange of *l* and *š*, would mean "conquerors." It is also possible that *Kašdu-Kaldu* is connected with the proper name Chesed, who is represented as having been the nephew of Abraham (Gen. xxii. 22). There is no connexion whatever between the Black Sea peoples called "Chaldaeans" by Xenophon (*Anab.* vii. 25) and the Chaldaeans of Babylonia.

In Daniel, the term "Chaldaeans" is very commonly employed with the meaning "astrologers, astronomers," which sense also appears in the classical authors, notably in Herodotus, Strabo and Diodorus. In Daniel i. 4, by the expression "tongue of the Chaldaeans," the writer evidently meant the language in which the celebrated Babylonian works on astrology and divination were composed. It is now known that the literary idiom of the Babylonian wise men was the non-Semitic Sumerian; but it is not probable that the late author of Daniel (*c.* 168 B.C.) was aware of this fact.

The word "Chaldaean" is used in Daniel in two senses. It is applied as elsewhere in the Old Testament as a race-name to the Babylonians (Dan. iii. 8, v. 30, ix. 1); but the expression is used oftener, either as a name for some special class of magicians, or as a term for magicians in general (ix. 1). The transfer of the name of the people to a special class is perhaps to be explained in the following manner. As just shown, "Chaldaean" and "Babylonian" had become in later times practically synonymous, but the term "Chaldaean" had lived on in the secondary restricted sense of "wise men." The early *Kaldi* had seized and held from very ancient times the region of old Sumer, which was the centre of the primitive non-Semitic culture. It seems extremely probable that these Chaldaean Semites were so strongly influenced by the foreign civilization as to adopt it eventually as their own. Then, as the Chaldaeans soon became the dominant people, the priestly caste of that region developed into a Chaldaean institution. It is reasonable to conjecture that southern Babylonia, the home of the old culture, supplied Babylon and other important cities with priests, who from their descent were correctly called "Chaldaeans." This name in later times, owing to the racial amalgamation of the Chaldaeans and Babylonians, lost its former national force, and became, as it occurs in Daniel, a distinctive appellation of the Babylonian priestly class. It is possible, though not certain, that the occurrence of the word *kalû* (priest) in Babylonian, which has no etymological connexion with *Kaldû*, may have contributed paronomastically towards the popular use of the term "Chaldaeans" for the Babylonian Magi. (See also ASTROLOGY.)

LITERATURE.—Delattre, *Les Chaldéens jusqu'à la fond. de l'emp. de Nebuch.* (1889); Winckler, *Untersuchungen zur altor. Gesch.* (1889), pp. 49 ff.; *Gesch. Bab. u. Assyr.* (1892), pp. 111 ff.; Prince, *Commentary on Daniel* (1899), pp. 59-61; see also BABYLONIA AND ASSYRIA and SUMER AND SUMERIAN. (J. D. PR.)

CHALDEE, a term sometimes applied to the Aramaic portions of the biblical books of Ezra and Daniel or to the vernacular paraphrases of the Old Testament (see TARGUM). The explanation formerly adopted and embodied in the name Chaldee is that the change took place in Babylon. That the so-called Biblical Chaldee, in which considerable portions of the books of Ezra and Daniel are written, was really the language of Babylon was supposed to be clear from Dan. ii. 4, where the Chaldaeans are said to have spoken to the king in Aramaic. But the cuneiform inscriptions show that the language of the Chaldaeans was Assyrian; and an examination of the very large part of the Hebrew Old Testament written later than the exile proves conclusively that the substitution of Aramaic for Hebrew as the vernacular of Palestine took place very gradually. Hence scholars are now agreed that the term "Chaldee" is a misnomer, and that the dialect so called is really the language of the South-Western Arameans, who were the immediate neighbours of the Jews (W. Wright, *Comparative Grammar of the Semitic Languages*, p. 16). (See SEMITIC LANGUAGES.)

CHALICE (through a central O. Fr. form of the Lat. *calix, calicis*, cup), a drinking-vessel of the cup or goblet form, now only used of the cup used in the celebration of the Eucharist (*q.v.*). For the various forms which the "chalice" so used has taken, see DRINKING-VESSELS and PLATE. When, in the eucharistic service, water is mixed with the wine, the "chalice" is known as the "mixed chalice." This has been customary both in the Eastern and Western Churches from early times. The Armenian Church does not use the "mixed chalice." It was used in the English Church before the Reformation. According to the present law of the English Church, the mixing of the water with wine is lawful, if this is not done as part of or during the services, *i.e.* if it is not done ceremonially (*Martin* v. *Mackonochie*, 1868, L.R. 2 P.C. 365; *Read* v. *Bp. of Lincoln*, 1892, A.C. 664).

CHALIER, JOSEPH (1747–1793), French Revolutionist. He was destined by his family for the church, but entered business, and became a partner in a firm at Lyons for which he travelled in the Levant, in Italy, Spain and Portugal. He was in Paris in 1789, and entered into relations with Marat, Camille Desmoulins and Robespierre. On his return to Lyons, Chalier was the first to be named member of the municipal bureau. He organized the national guard, applied the civil constitution of the clergy, and regulated the finances of the city so as to tax the rich heavily and spare the poor. Denounced to the Legislative Assembly by the directory of the department of Rhone-et-Loire for having made a nocturnal domiciliary perquisition, he was sent to the bar of the Assembly, which approved of his conduct. In the election for mayor of Lyons, in November 1792, he was defeated by a Royalist. Then Chalier became the orator and leader of the Jacobins of Lyons, and induced the other revolutionary clubs and the commune of his city to arrest a great number of Royalists in the night of the 5th and 6th of February 1793. The mayor, supported by the national guard, opposed this project. Chalier demanded of the Convention the establishment of a revolutionary tribunal and the levy of a revolutionary army at Lyons. The Convention refused, and the anti-revolutionary party, encouraged by this refusal, took action. On the 29th and 30th of May 1793 the sections rose; the Jacobins were dispossessed of the municipality and Chalier arrested. On the 15th of July, in spite of the order of the Convention, he was brought before the criminal tribunal of the Rhone-et-Loire, condemned to death, and guillotined the next day. The Terrorists paid a veritable worship to his memory, as to a martyr of Liberty.

See N. Wahl, "Étude sur Chalier," in *Revue historique*, t. xxxiv.; and *Les Premières Années de la Révolution à Lyon* (Paris, 1894).

CHALK, the name given to any soft, pulverulent, pure white limestone. The word is an old one, having its origin in the Saxon *cealc*, and the hard form "kalk" is still in use amongst the country folk of Lincolnshire. The German *Kalk* comprehends all forms of limestone; therefore a special term, *Kreide*, is employed for chalk—French *craie*. From being used as a common name, denoting a particular material, the word was subsequently utilized by geologists as an appellation for the *Chalk formation*; and so prominent was this formation in the eyes of the earlier workers that it imposed its name upon a whole system of rocks, the Cretaceous (Lat. *creta*, chalk), although this rock itself is by no means generally characteristic of the system as a whole.

The Chalk formation, in addition to the typical chalk material —*creta scriptoria*—comprises several variations; argillaceous kinds—*creta marga* of Linnaeus—known locally as malm, marl, clunch, &c.; and harder, more stony kinds, called rag, freestone, rock, hurlock or harrock in different districts. In certain parts of the formation layers of nodular flints (*q.v.*) abound; in parts, it is inclined to be sandy, or to contain grains of glauconite which was originally confounded with another green mineral, chlorite, hence the name "chloritic marl" applied to one of the subdivisions of the chalk. In its purest form chalk consists of from 95 to 99% of calcium carbonate (carbonate of lime); in this condition it is composed of a mass of fine granular particles held together by a somewhat feeble calcareous cement. The particles are mostly the broken tests of foraminifera, along with the débris of echinoderm and molluscan shells, and many minute bodies, like coccoliths, of somewhat obscure nature.

The earliest attempts at subdivision of the Chalk formation initiated by Wm. Phillips were based upon lithological characters, and such a classification as "Upper Chalk with Flints," "Lower Chalk without Flints," "Chalk marl or Grey chalk," was generally in use in England until W. Whitaker established the following order in 1865:—

Upper Chalk, with flints
Lower Chalk { chalk rock; chalk with few flints; chalk without flints
Chalk Marl { Totternhoe stone; ,, marl

In France, a similar system of classification was in vogue, the subdivisions being *craie blanche*, *craie tufan*, *craie chloritée*, until 1843 when d'Orbigny proposed the term *Senonien* for the Upper Chalk and *Turonien* for the Lower; later he divided the *Turonien*, giving the name *Cénomanien* to the lower portion. The subdivisions of d'Orbigny were based upon the fossil contents and not upon the lithological characters of the rocks. In 1876 Prof. Ch. Barrois showed how d'Orbigny's classification might be applied to the British chalk rocks; and this scheme has been generally adopted by geologists, although there is some divergence of opinion as to the exact position of the base line of the Cenomanian.

The accompanying table shows the classification now adopted in England, with the zonal fossils and the continental names of the substages:—

Zonal fossils used in Britain.	Stages.	N. France and Belgium.	S.E. and S. France.
A. *Ostrea lunata* (Norfolk); *Belemnitella mucronata*; *Actinocamax quadratus* = *Inoceramus lingua* in Yorkshire; *Marsupites testudinarium* { *Marsupites*, *Uintacrinus* }	Danian? (Trimingham); Upper Chalk Senonian *Craie blanche*	Flint-bearing chalk. (See table in article CRETACEOUS SYSTEM.)	Marls, sandstones and limestones (not chalky) with *Hippurites*.
B. *Micraster cor-anguinum*; ,, *cor-testudinarium*; *Holaster planus*, Chalk rock			
Terebratulina gracilis; *Rhynchonella Cuvieri*, Melbourne rock	Middle Chalk Turonian *Craie marneuse*		
Actinocamax plenus; *Holaster subglobosus*, Totternhoe stone; *Schloenbachia varians.*	Lower Chalk, Chalk Marl and Cambridge Greensand Cenomanian *Craie glauconieuse*	Marly chalk.	

Since Prof. Barrois introduced the zonal system of subdivision (C. Evans had used a similar scheme six years earlier), our knowledge of the English chalk has been greatly increased by the work of Jukes-Browne and William Hill, and particularly by the laborious studies of Dr A. W. Rowe. Instead of employing the mixed assemblage of animals indicated as zone fossils in the table, A. de Grossouvre proposed a scheme for the north of France based upon ammonite faunas alone, which he contended would be of more general applicability (*Recherches sur la Craie Supérieure*, Paris, 1901).

The Upper Chalk has a maximum thickness in England of about 1000 ft., but post-cretaceous erosion has removed much of it in many districts. It is more constant in character, and more typically chalky than the lower stages; flints are abundant, and harder nodular beds are limited to the lower portions, where some of the compact limestones are known as "chalk rock." The thickness of the Middle Chalk varies from about 100 to 240 ft.; flints become scarcer in descending from the upper to the lower portions. The whole is more compact than the upper stage, and nodular layers are more frequent—the "chalk rock" of Dorset and the Isle of Wight belong to this stage. At the base is the hard "Melbourne rock." The thickness of the Lower Chalk in England varies from 60 to 240 ft. This stage includes part of the "white chalk without flints," the "chalk marl," and the "grey chalk." The Totternhoe stone is a hard freestone found locally in this stage. The basement bed in Norfolk is a pure limestone, but very frequently it is marly with grains of sand and glauconite, and often contains phosphatic nodules; this facies is equivalent to the "Cambridge Greensand" of some districts and the "chloritic marl" of others. In Devonshire the Lower Chalk has become thin sandy calcareous series.

The chalk can be traced in England from Flamborough Head in Yorkshire, in a south-westerly direction, to the coast of Dorset; and it not only underlies the whole of the S.E. corner, where it is often obscured by Tertiary deposits, but it can be followed across the Channel into northern France. Rocks of the same age as the chalk are widespread (see CRETACEOUS SYSTEM); but the variety of limestone properly called by this name is almost confined to the Anglo-Parisian basin. Some chalk occurs in the great Cretaceous deposits of Russia, and in Kansas, Iowa, Nebraska and S. Dakota in the United States. Hard white chalk occurs in Ireland in Antrim, and on the opposite shore of Scotland in Mull and Morven.

Economic Products of the Chalk.—Common chalk has been frequently used for rough building purposes, but the more important building stones are "Beer stone," from Beer Head in Devonshire, "Sutton stone" from a little north of Beer, and the "Totternhoe stone." It is burned for lime, and when mixed with some form of clay is used for the manufacture of cement; chalk marl has been used alone for this purpose. As a manure, it has been much used as a dressing for clayey land. Flints from the chalk are used for road metal and concrete, and have been employed in building as a facing for walls. Phosphatic nodules for manure have been worked from the chloritic marl and Cambridge Greensand, and to some extent from the Middle Chalk. The same material is worked at Ciply in Belgium and Picardy in France. Chalk is employed in the manufacture of carbonate of soda, in the preparation of carbon dioxide, and in many other chemical processes; also for making paints, crayons and tooth-powder. *Whiting* or *Spanish white*, used to polish glass and metal, is purified chalk prepared by triturating common chalk with a large quantity of water, which is then decanted and allowed to deposit the finely-divided particles it holds in suspension.

Chalk Scenery.—Where exposed at the surface, chalk produces rounded, smooth,

grass-covered hills as in the Downs of southern England and the Wolds of Yorkshire and Lincolnshire. The hills are often intersected by clean-cut dry valleys. It forms fine cliffs on the coast of Kent, Yorkshire and Devonshire.

Chalk is employed medicinally as a very mild astringent either alone or more usually with other astringents. It is more often used, however, for a purely mechanical action, as in the preparation hydrargyrum cum creta. As an antacid its use has been replaced by other drugs.

Black chalk or *drawing slate* is a soft carbonaceous schist, which gives a black streak, so that it can be used for drawing or writing. *Brown chalk* is a kind of umber. *Red chalk* or *reddle* is an impure earthy variety of haematite. *French chalk* is a soft variety of steatite, a hydrated magnesium silicate.

The most comprehensive account of the British chalk is contained in the *Memoirs of the Geological Survey of the United Kingdom*, "The Cretaceous Rocks of Britain," vol. ii. 1903, vol. iii. 1904 (with bibliography), by Jukes-Browne and Hill. See also "The White Chalk of the English Coast," several papers in the *Proceedings of the Geologists' Association*, London, (1) Kent and Sussex, xvi. 1900, (2) Dorset, xvii., 1901, (3) Devon, xviii., 1903, (4) Yorkshire, xviii., 1904. (J. A. H.)

CHALKHILL, JOHN (fl. 1600?), English poet. Two songs by him are included in Izaak Walton's *Compleat Angler*, and in 1683 appeared "Thealma and Clearchus. A Pastoral History in smooth and easie Verse. Written long since by John Chalkhill, Esq., an Acquaintant and Friend of Edmund Spencer" (1683), with a preface written five years earlier by Walton. Another poem, "Alcilia, Philoparthens Loving Follie" (1595, reprinted in vol. x. of the *Jahrbuch des deutschen Shakespeare-Vereins*), was at one time attributed to him. Nothing further is known of the poet, but a person of his name occurs as one of the coroners for Middlesex in the later years of Queen Elizabeth's reign. Professor Saintsbury, who included *Thealma and Clearchus* in vol. ii. of his *Minor Poets of the Caroline Period* (Oxford, 1906), points out a marked resemblance between his work and that of William Chamberlayne.

CHALKING THE DOOR, a Scottish custom of landlord and tenant law. In former days the law was that "a burgh officer, in presence of witnesses, chalks the most patent door forty days before Whit Sunday, having made out an execution of 'chalking,' in which his name must be inserted, and which must be subscribed by himself and two witnesses." This ceremony now proceeds simply on the verbal order of the proprietor. The execution of chalking is a warrant under which decree of removal will be pronounced by the burgh court, in virtue of which the tenant may be ejected on the expiration of a charge of six days.

CHALLAMEL, JEAN BAPTISTE MARIUS AUGUSTIN (1818–1894), French historian, was born in Paris on the 18th of March 1818. His writings consist chiefly of popular works, which enjoyed great success. The value of some of his books is enhanced by numerous illustrations, *e.g. Histoire-musée de la Révolution française*, which appeared in 50 numbers in 1841–1842 (3rd ed., in 72 numbers, 1857–1858); *Histoire de la mode en France; la toilette des femmes depuis l'époque gallo-romaine jusqu'à nos jours* (1874, with 12 plates; new ed., 1880, with 21 coloured plates). His *Mémoires du peuple française* (1865–1873) and *La France et les Français à travers les siècles* (1882) at least have the merit of being among the first books written on the social history of France. In this sense Challamel was a pioneer, of no great originality, it is true, but at any rate of fairly wide information. He died on the 20th of October 1894.

CHALLEMEL-LACOUR, PAUL AMAND (1827–1896), French statesman, was born at Avranches on the 19th of May 1827. After passing through the École Normale Supérieure he became professor of philosophy successively at Pau and at Limoges. The *coup d'état* of 1851 caused his expulsion from France for his republican opinions. He travelled on the continent, and in 1856 settled down as professor of French literature at the Polytechnic of Zürich. The amnesty of 1859 enabled him to return to France, but a projected course of lectures on history and art was immediately suppressed. He now supported himself by his pen, and became a regular contributor to the reviews. On the fall of the Second Empire in September 1870 the government of national defence appointed him prefect of the department of the Rhone, in which capacity he had to suppress the Communist rising at Lyons. Resigning his post on the 5th of February 1871, he was in January 1872 elected to the National Assembly, and in 1876 to the Senate. He sat at first on the Extreme Left; but his philosophic and critical temperament was not in harmony with the recklessness of French radicalism, and his attitude towards political questions underwent a steady modification, till the close of his life saw him the foremost representative of moderate republicanism. During Gambetta's lifetime, however, Challemel-Lacour was one of his warmest supporters, and he was for a time editor of Gambetta's organ, the *République française*. In 1879 he was appointed French ambassador at Bern, and in 1880 was transferred to London; but he lacked the suppleness and command of temper necessary to a successful diplomatist. He resigned in 1882, and in February 1883 became minister of foreign affairs in the Jules Ferry cabinet, but retired in November of the same year. In 1890 he was elected vice-president of the Senate, and in 1893 succeeded Jules Ferry as its president. His influence over that body was largely due to his clear and reasoned eloquence, which placed him at the head of contemporary French orators. In 1893 he also became a member of the French Academy. He distinguished himself by the vigour with which he upheld the Senate against the encroachments of the chamber, but in 1895 failing health forced him to resign, and he died in Paris on the 26th of October 1896. He published a translation of A. Heinrich Ritter's *Geschichte der Philosophie* (1861); *La Philosophie individualiste: étude sur Guillaume de Humboldt* (1864); and an edition of the works of Madame d'Épinay (1869).

In 1897 appeared Joseph Reinach's edition of the *Œuvres oratoires de Challemel-Lacour*.

CHALLENGE (O. Fr. *chalonge, calenge*, &c., from Lat. *calumnia*, originally meaning trickery, from *calvi*, to deceive, hence a false accusation, a "calumny"), originally a charge against a person or a claim to anything, a defiance. The term is now particularly used of an invitation to a trial of skill in any contest, or to a trial by combat as a vindication of personal honour (see DUEL), and, in law, of the objection to the members of a jury allowed in a civil action or in a criminal trial (see JURY).

"CHALLENGER" EXPEDITION. The scientific results of several short expeditions between 1860 and 1870 encouraged the council of the Royal Society to approach the British government, on the suggestion of Sir George Richards, hydrographer to the admiralty, with a view to commissioning a vessel for a prolonged cruise for oceanic exploration. The government detailed H.M.S. "Challenger," a wooden corvette of 2306 tons, for the purpose. Captain (afterwards Sir) George Nares was placed in command, with a naval crew; and a scientific staff was selected by the society with Professor (afterwards Sir) C. Wyville Thomson as director. The staff included Mr (afterwards Sir) John Murray and Mr H. N. Moseley, biologists; Dr von Willemoes-Suhm, Commander Tizard, and Mr J. Y. Buchanan, chemist and geologist. A complete scheme of instructions was drawn up by the society. The "Challenger" sailed from Portsmouth in December 1872. For nearly a year the work of the expedition lay in the Atlantic, which was crossed several times. Teneriffe, the Bermudas, the Azores, Madeira, the Cape Verd Islands, Bahia and Tristan da Cunha were successively visited, and in October 1873 the ship reached Cape Town. Steering then south-east and east she visited the various islands between 45° and 50° S., and reached Kerguelen Island in January 1874. She next proceeded southward about the meridian of 80° E. She was the first steamship to cross the Antarctic circle, but the attainment of a high southerly latitude was not an object of the voyage, and early in March the ship left the south polar regions and made for Melbourne. Extensive researches were now made in the Pacific. The route led by New Zealand, the Fiji Islands, Torres Strait, the Banda Sea, and the China Sea to Hong Kong. The western Pacific was then explored northward to Yokohama, after which the "Challenger" struck across the ocean by Honolulu and Tahiti to Valparaiso. She then coasted

southward, penetrated the Straits of Magellan, touched at Montevideo, recrossed the Atlantic by Ascension and the Azores, and reached Sheerness in May 1876. This voyage is without parallel in the history of scientific research. The "*Challenger*" *Report* was issued in fifty volumes (London, 1880–1895), mainly under the direction of Sir John Murray, who succeeded Wyville Thomson in this work in 1882. Specialists in every branch of science assisted in its production. The zoological collections alone formed the basis for the majority of the volumes; the deep-sea soundings and samples of the deposits, the chemical analysis of water samples, the meteorological, water-temperature, magnetic, geological, and botanical observations were fully worked out, and a summary of the scientific results, narrative of the cruise and indices were also provided.

See also Lord G. Campbell, *Log Letters from the "Challenger,"* (1876); W. J. J. Spry, *Cruise of H.M.S. "Challenger"* (1876); Sir C. Wyville Thomson, *Voyage of the "Challenger," The Atlantic, Preliminary Account of General Results* (1877); J. J. Wild, *At Anchor; Narrative of Experiences afloat and ashore during the Voyage of H.M.S. "Challenger"* (1878); H. N. Moseley, *Notes by a Naturalist on the "Challenger"* (1879).

CHALLONER, RICHARD (1691–1781), English Roman Catholic prelate, was born at Lewes, Sussex, on the 29th of September 1691. After the death of his father, who was a rigid Dissenter, his mother, left in poverty, lived with some Roman Catholic families. Thus it came about that he was brought up as a Roman Catholic, chiefly at the seat of Mr Holman at Warkworth, Northamptonshire, where the Rev. John Gother, a celebrated controversialist, officiated as chaplain. In 1704 he was sent to the English College at Douai, where he was ordained a priest in 1716, took his degrees in divinity, and was appointed professor in that faculty. In 1730 he was sent on the English mission and stationed in London. The controversial treatises which he published in rapid succession attracted much attention, particularly his *Catholic Christian Instructed* (1737), which was prefaced by a witty reply to Dr Conyers Middleton's *Letters from Rome, showing an Exact Conformity between Popery and Paganism.* Middleton is said to have been so irritated that he endeavoured to put the penal laws in force against his antagonist, who prudently withdrew from London. In 1741 Challoner was raised to the episcopal dignity at Hammersmith, and nominated co-adjutor with right of succession to Bishop Benjamin Petre, vicar-apostolic of the London district, whom he succeeded in 1758. He resided principally in London, but was obliged to retire into the country during the "No Popery" riots of 1780. He died on the 12th of January 1781, and was buried at Milton, Berkshire. Bishop Challoner was the author of numerous controversial and devotional works, which have been frequently reprinted and translated into various languages. He compiled the *Garden of the Soul* (1740 ?), which continues to be the most popular manual of devotion among English-speaking Roman Catholics, and he revised an edition of the Douai version of the Scriptures (1749–1750), correcting the language and orthography, which in many places had become obsolete. Of his historical works the most valuable is one which was intended to be a Roman Catholic antidote to Foxe's well-known martyrology. It is entitled *Memoirs of Missionary Priests and other Catholicks of both Sexes who suffered Death or Imprisonment in England on account of their Religion, from the year 1577 till the end of the reign of Charles II.* (2 vols. 1741, frequently reprinted). He also published anonymously, in 1745, the lives of English, Scotch and Irish saints, under the title of *Britannia Sancta*, an interesting work which has, however, been superseded by that of Alban Butler.

For a complete list of his writings see J. Gillow's *Bibl. Dict. of Eng. Cath.* i. 452-458; Barnard, *Life of R. Challoner* (1784); Flanagan, *History of the Catholic Church in England* (1857); there is also a critical history of Challoner by Rev. E. Burton.

CHALMERS, ALEXANDER (1759–1834), Scottish writer, was born in Aberdeen on the 29th of March 1759. He was educated as a doctor, but gave up this profession for journalism, and he was for some time editor of the *Morning Herald.* Besides editions of the works of Shakespeare, Beattie, Fielding, Johnson, Warton, Pope, Gibbon, Bolingbroke, he published *A General Biographical Dictionary* in 32 vols.(1812–1817); a *Glossary to Shakspeare* (1797); an edition of Steevens's Shakespeare (1809); and the *British Essayists*, beginning with the *Tatler* and ending with the *Observer*, with biographical and historical prefaces and a general index. He died in London on the 19th of December 1834.

CHALMERS, GEORGE (1742–1825), Scottish antiquarian and political writer, was born at Fochabers, a village in the county of Moray, in 1742. His father, James Chalmers, was a grandson of George Chalmers of Pittensear, a small estate in the parish of Lhanbryde, now St Andrews-Lhanbryde, in the same county, possessed by the main line of the family from about the beginning of the 17th to the middle of the 18th century. After completing the usual course at King's College, Aberdeen, young Chalmers studied law in Edinburgh for several years. Two uncles on the father's side having settled in America, he visited Maryland in 1763, with the view, it is said, of assisting to recover a tract of land of some extent about which a dispute had arisen, and was in this way induced to commence practice as a lawyer at Baltimore, where for a time he met with much success. Having, however, espoused the cause of the Royalist party on the breaking out of the American War of Independence, he found it expedient to abandon his professional prospects in the New World, and return to his native country. For the losses he had sustained as a colonist he received no compensation, and several years elapsed before he obtained an appointment that placed him in a state of comfort and independence.

In the meantime Chalmers applied himself with great diligence and assiduity to the investigation of the history and establishment of the English colonies in North America; and enjoying free access to the state papers and other documents preserved among what were then termed the plantation records, he became possessed of much important information. His work entitled *Poliiical Annals of the present United Colonies from their Settlement to the Peace of 1763*, 4to, London, 1780, was to have formed two volumes; but the second, which should have contained the period between 1688 and 1763, never appeared. The first volume, however, is complete in itself, and traces the original settlement of the different American colonies, and the progressive changes in their constitutions and forms of government as affected by the state of public affairs in the parent kingdom. Independently of its value as being compiled from original documents, it bears evidence of great research, and has been of essential benefit to later writers. Continuing his researches, he next gave to the world *An Estimate of the Comparative Strength of Britain during the Present and Four Preceding Reigns*, London, 1782, which passed through several editions. At length, in August 1786, Chalmers, whose sufferings as a Royalist must have strongly recommended him to the government of the day, was appointed chief clerk to the committee of privy council on matters relating to trade, a situation which he retained till his death in 1825, a period of nearly forty years. As his official duties made no great demands on his time, he had abundant leisure to devote to his favourite studies,—the antiquities and topography of Scotland having thenceforth special attractions for his busy pen.

Besides biographical sketches of Defoe, Sir John Davies, Allan Ramsay, Sir David Lyndsay, Churchyard and others, prefixed to editions of their respective works, Chalmers wrote a life of Thomas Paine, the author of the *Rights of Man*, which he published under the assumed name of Francis Oldys, A.M., of the University of Pennsylvania; and a life of Ruddiman, in which considerable light is thrown on the state of literature in Scotland during the earlier part of the last century. His life of Mary, Queen of Scots, in two 4to vols., was first published in 1818. It is founded on a MS. left by John Whitaker, the historian of Manchester; but Chalmers informs us that he found it necessary to rewrite the whole. The history of that ill-fated queen occupied much of his attention, and his last work, *A Detection of the Love-Letters lately attributed in Hugh Campbell's work to Mary Queen of Scots*, is an exposure of an attempt to represent as genuine some fictitious letters said to have passed between Mary and Bothwell,

which had fallen into deserved oblivion. In 1797 appeared his *Apology for the Believers in the Shakespeare Papers which were exhibited in Norfolk Street*, followed by other tracts on the same subject. These contributions to the literature of Shakespeare are full of curious matter, but on the whole display a great waste of erudition, in seeking to show that papers which had been proved forgeries might nevertheless have been genuine. Chalmers also took part in the Junius controversy, and in *The Author of Junius Ascertained, from a Concatenation of Circumstances amounting to Moral Demonstration*, Lond. 1817, 8vo, sought to fix the authorship of the celebrated letters on Hugh Boyd. In 1824 he published *The Poetical Remains of some of the Scottish Kings, now first collected*; and in the same year he edited and presented as a contribution to the Bannatyne Club *Robene and Makyne and the Testament of Cresseid, by Robert Henryson*. His political writings are equally numerous. Among them may be mentioned *Collection of Treaties between Great Britain and other Powers*, Lond. 1790, 2 vols. 8vo; *Vindication of the Privileges of the People in respect to the Constitutional Right of Free Discussion*, &c., Lond. 1796, 8vo, published anonymously; *A Chronological Account of Commerce and Coinage in Great Britain from the Restoration till 1810*, Lond. 1810, 8vo; *Opinions of Eminent Lawyers on various points of English Jurisprudence, chiefly concerning the Colonies, Fisheries, and Commerce of Great Britain*, Lond. 1814, 2 vols. 8vo; *Comparative Views of the State of Great Britain before and since the War*, Lond. 1817, 8vo.

But Chalmers's greatest work is his *Caledonia*, which, however, he did not live to complete. The first volume appeared in 1807, and is introductory to the others. It is divided into four books, treating successively of the Roman, the Pictish, the Scottish and the Scoto-Saxon periods, from 80 to 1306 A.D. In these we are presented, in a condensed form, with an account of the people, the language and the civil and ecclesiastical history, as well as the agricultural and commercial state of Scotland during the first thirteen centuries of our era. Unfortunately the chapters on the Roman period are entirely marred by the author's having accepted as genuine Bertram's forgery *De Situ Britanniae*; but otherwise his opinions on controverted topics are worthy of much respect, being founded on a laborious investigation of all the original authorities that were accessible to him. The second volume, published in 1810, gives an account of the seven south-eastern counties of Scotland—Roxburgh, Berwick, Haddington, Edinburgh, Linlithgow, Peebles and Selkirk—each of them being treated of as regards name, situation and extent, natural objects, antiquities, establishment as shires, civil history, agriculture, manufactures and trade, and ecclesiastical history. In 1824, after an interval of fourteen years, the third volume appeared, giving, under the same headings, a description of the seven south-western counties—Dumfries, Kirkcudbright, Wigtown, Ayr, Lanark, Renfrew and Dumbarton. In the preface to this volume the author states that the materials for the history of the central and northern counties were collected, and that he expected the work would be completed in two years, but this expectation was not destined to be realized. He had also been engaged on a history of Scottish poetry and a history of printing in Scotland. Each of them he thought likely to extend to two large quarto volumes, and on both he expended an unusual amount of enthusiasm and energy. He had also prepared for the press an elaborate history of the life and reign of David I. In his later researches he was assisted by his nephew James, son of Alexander Chalmers, writer in Elgin.

George Chalmers died in London on the 31st of May 1825. His valuable and extensive library he bequeathed to his nephew, at whose death in 1841 it was sold and dispersed. Chalmers was a member of the Royal and Antiquarian Societies of London, an honorary member of the Antiquarian Society of Scotland, and a member of other learned societies. In private life he was undoubtedly an amiable man, although the dogmatic tone that disfigures portions of his writings procured him many opponents. Among his avowed antagonists in literary warfare the most distinguished were Malone and Steevens, the Shakespeare editors; Mathias, the author of the *Pursuits of Literature*; Dr Jamieson, the Scottish lexicographer; Pinkerton, the historian; Dr Irving, the biographer of the Scottish poets; and Dr Currie of Liverpool. But with all his failings in judgment Chalmers was a valuable writer. He uniformly had recourse to original sources of information; and he is entitled to great praise for his patriotic and self-sacrificing endeavours to illustrate the history, literature and antiquities of his native country. (J. M'D.)

CHALMERS, GEORGE PAUL (1836–1878), Scottish painter, was born at Montrose, and studied at Edinburgh. His landscapes are now more valued than the portraits which formed his earlier work. The best of these are "The End of the Harvest" (1873), "Running Water" (1875), and "The Legend" (in the National Gallery, Edinburgh). He became an associate (1867) and a full member (1871) of the Scottish Academy.

CHALMERS, JAMES (1841–1901), Scottish missionary to New Guinea, was born at Ardrishaig in Argyll. After serving in the Glasgow City Mission he passed through Cheshunt College, and, being accepted by the London Missionary Society, was appointed to Rarotonga in the South Pacific in 1866. Here the natives gave him the well-known name "Tamate." After ten years' service, especially in training native evangelists, he was transferred to New Guinea. In addition to his enthusiastic but sane missionary work, Chalmers did much to open up the island, and, with his colleague W. G. Lawes, gave valuable aid in the British annexation of the south-east coast of the island. On the 8th of April 1901, in company with a brother missionary, Oliver Tomkins, he was killed by cannibals at Goaribari Island. R. L. Stevenson has left on record his high appreciation of Chalmers's character and work.

Chalmers's *Autobiography and Letters* were edited by Richard Lovett in 1902, who also wrote a popular life called *Tamate*.

CHALMERS, THOMAS (1780–1847), Scottish divine, was born at Anstruther in Fifeshire, on the 17th of March 1780. At the age of eleven he was entered as a student at St Andrews, where he devoted himself almost exclusively to mathematics. In January 1799 he was licensed as a preacher of the Gospel by the St Andrews presbytery. In May 1803, after attending further courses of lectures in Edinburgh, and acting as assistant to the professor of mathematics at St Andrews, he was ordained as minister of Kilmany in Fifeshire, about 9 m. from the university town, where he continued to lecture. His mathematical lectures roused so much enthusiasm that they were discontinued by order of the authorities, who disliked the disturbance of the university routine which they involved. Chalmers then opened mathematical classes on his own account which attracted many students; at the same time he delivered a course of lectures on chemistry, and ministered to his parish at Kilmany. In 1805 he became a candidate for the vacant professorship of mathematics at Edinburgh, but was unsuccessful. In 1808 he published an *Inquiry into the Extent and Stability of National Resources*, a contribution to the discussion created by Bonaparte's commercial policy. Domestic bereavements and a severe illness then turned his thoughts in another direction. At his own request the article on Christianity was assigned to him in Dr Brewster's *Edinburgh Encyclopaedia*, and in studying the credentials of Christianity he received a new impression of its contents. His journal and letters show how he was led from a sustained effort to attain the morality of the Gospel to a profound spiritual revolution. After this his ministry was marked by a zeal which made it famous. The separate publication of his article in the *Edinburgh Encyclopaedia*, and contributions to the *Edinburgh Christian Instructor* and the *Eclectic Review*, enhanced his reputation as an author. In 1815 he became minister of the Tron Church, Glasgow, in spite of determined opposition to him in the town council on the ground of his evangelical teaching. From Glasgow his repute as a preacher spread throughout the United Kingdom. A series of sermons on the relation between the discoveries of astronomy and the Christian revelation was published in January 1817, and within a year nine editions and 20,000 copies were in circulation. When he visited London Wilberforce wrote, "all the world is wild about Dr Chalmers."

In Glasgow Chalmers made one of his greatest contributions

to the life of his own time by his experiments in parochial organization. His parish contained about 11,000 persons, and of these about one-third were unconnected with any church. He diagnosed this evil as being due to the absence of personal influence, spiritual oversight, and the want of parochial organizations which had not kept pace in the city, as they had done in rural parishes, with the growing population. He declared that twenty new churches, with parishes, should be erected in Glasgow, and he set to work to revivify, remodel and extend the old parochial economy of Scotland. The town council consented to build one new church, attaching to it a parish of 10,000 persons, mostly weavers, labourers and factory workers, and this church was offered to Dr Chalmers that he might have a fair opportunity of testing his system.

In September 1819 he became minister of the church and parish of St John, where of 2000 families more than 800 had no connexion with any Christian church. He first addressed himself to providing schools for the children. Two school-houses with four endowed teachers were established, where 700 children were taught at the moderate fees of 2s. and 3s. per quarter. Between 40 and 50 local Sabbath schools were opened, where more than 1000 children were taught the elements of secular and religious education. The parish was divided into 25 districts embracing from 60 to 100 families, over each of which an elder and a deacon were placed, the former taking oversight of their spiritual, the latter of their physical needs. Chalmers was the mainspring of the whole system, not merely superintending the visitation, but personally visiting all the families, and holding evening meetings, when he addressed those whom he had visited. This parochial machinery enabled him to make a singularly successful experiment in dealing with the problem of poverty. At this time there were not more than 20 parishes north of the Forth and Clyde where there was a compulsory assessment for the poor, but the English method of assessment was rapidly spreading. Chalmers believed that compulsory assessment ended by swelling the evil it was intended to mitigate, and that relief should be raised and administered by voluntary means. His critics replied that this was impossible in large cities. When he undertook the management of the parish of St John's, the poor of the parish cost the city £1400 per annum, and in four years, by the adoption of his method, the pauper expenditure was reduced to £280 per annum. The investigation of all new applications for relief was committed to the deacon of the district, and every effort was made to enable the poor to help themselves. When once the system was in operation it was found that a deacon, by spending an hour a week among the families committed to his charge, could keep himself acquainted with their character and condition.

In 1823, after eight years of work at high pressure, he was glad to accept the chair of moral philosophy at St Andrews, the seventh academic offer made to him during his eight years in Glasgow. In his lectures he excluded mental philosophy and included the whole sphere of moral obligation, dealing with man's duty to God and to his fellow-men in the light of Christian teaching. Many of his lectures are printed in the first and second volumes of his published works. In ethics he made contributions to the science in regard to the place and functions of volition and attention, the separate and underived character of the moral sentiments, and the distinction between the virtues of perfect and imperfect obligation. His lectures kindled the religious spirit among his students, and led some of them to devote themselves to missionary effort. In November 1828 he was transferred to the chair of theology in Edinburgh. He then introduced the practice of following the lecture with a viva voce examination on what had been delivered. He also introduced text-books, and came into stimulating contact with his people; perhaps no one has ever succeeded as he did by the use of these methods in communicating intellectual, moral and religious impulse to so many students.

These academic years were prolific also in a literature of various kinds. In 1826 he published a third volume of the *Christian and Civic Economy of Large Towns*, a continuation of work begun at St John's, Glasgow. In 1832 he published a *Political Economy*, the chief purpose of which was to enforce the truth that the right economic condition of the masses is dependent on their right moral condition, that character is the parent of comfort, not vice versa. In 1833 appeared a treatise on *The Adaptation of External Nature to the Moral and Intellectual Constitution of Man*. In 1834 Dr Chalmers was elected fellow of the Royal Society of Edinburgh, and in the same year he became corresponding member of the Institute of France; in 1835 Oxford conferred on him the degree of D.C.L. In 1834 he became leader of the evangelical section of the Scottish Church in the General Assembly. He was appointed chairman of a committee for church extension, and in that capacity made a tour through a large part of Scotland, addressing presbyteries and holding public meetings. He also issued numerous appeals, with the result that in 1841, when he resigned his office as convener of the church extension committee, he was able to announce that in seven years upwards of £300,000 had been contributed, and 220 new churches had been built. His efforts to induce the Whig government to assist in this effort were unsuccessful.

In 1841 the movement which ended in the Disruption was rapidly culminating, and Dr Chalmers found himself at the head of the party which stood for the principle that "no minister shall be intruded into any parish contrary to the will of the congregation" (see FREE CHURCH OF SCOTLAND). Cases of conflict between the church and the civil power arose in Auchterarder, Dunkeld and Marnoch; and when the courts made it clear that the church, in their opinion, held its temporalities on condition of rendering such obedience as the courts required, the church appealed to the government for relief. In January 1843 the government put a final and peremptory negative on the church's claims for spiritual independence. On the 18th of May 1843 470 clergymen withdrew from the general assembly and constituted themselves the Free Church of Scotland, with Dr Chalmers as moderator. He had prepared a sustentation fund scheme for the support of the seceding ministers, and this was at once put into successful operation. On the 30th of May 1847, immediately after his return from the House of Commons, where he had given evidence as to the refusal of sites for Free Churches by Scottish landowners, he was found dead in bed.

Dr Chalmers' action throughout the Free Church controversy was so consistent in its application of Christian principle and so free from personal or party animus, that his writings are a valuable source for argument and illustration on the question of Establishment. "I have no veneration," he said to the royal commissioners in St Andrews, before either the voluntary or the non-intrusive controversies had arisen, "for the Church of Scotland *qua* an establishment, but I have the utmost veneration for it *qua* an instrument of Christian good." He was transparent in character, chivalrous, kindly, firm, eloquent and sagacious; his purity of motive and unselfishness commanded absolute confidence; he had originality and initiative in dealing with new and difficult circumstances, and great aptitude for business details.

During a life of incessant activity Chalmers scarcely ever allowed a day to pass without its modicum of composition; at the most unseasonable times, and in the most unlikely places, he would occupy himself with literary work. His writings occupy more than 30 volumes. He would have stood higher as an author had he written less, or had he indulged less in that practice of reiteration into which he was constantly betrayed by his anxiety to impress his ideas upon others. As a political economist he was the first to unfold the connexion that subsists between the degree of the fertility of the soil and the social condition of a community, the rapid manner in which capital is reproduced (see Mill's *Political Economy*, i. 94), and the general doctrine of a limit to all the modes by which national wealth may accumulate. He was the first also to advance that argument in favour of religious establishments which meets upon its own ground the doctrine of Adam Smith, that religion like other things should be left to the operation of the natural law of supply and demand. In the department of natural theology and the Christian evidences he ably advocated that

method of reconciling the Mosaic narrative with the indefinite antiquity of the globe which William Buckland (1784–1856) advanced in his Bridgewater Treatise, and which Dr Chalmers had previously communicated to him. His refutation of Hume's objection to the truth of miracles is perhaps his intellectual *chef-d'œuvre*. The distinction between the laws and dispositions of matter, as between the ethics and objects of theology, he was the first to indicate and enforce, and he laid great emphasis on the superior authority as witnesses for the truth of Revelation of the Scriptural as compared with the Extra-Scriptural writers, and of the Christian as compared with the non-Christian testimonies. In his *Institutes of Theology*, no material modification is attempted on the doctrines of Calvinism, which he received with all simplicity of faith as revealed in the Divine word, and defended as in harmony with the most profound philosophy of human nature and of the Divine providence.

For biographical details see Dr W. Hanna's *Memoirs* (Edinburgh, 4 vols., 1849–1852); there is a good short *Life* by Mrs Oliphant (1893). (W. Ha.; D. Mn.)

CHALONER, SIR THOMAS (1521–1565), English statesman and poet, was the son of Roger Chaloner, mercer of London, a descendant of the Denbighshire Chaloners. No details are known of his youth except that he was educated at both Oxford and Cambridge. In 1540 he went, as secretary to Sir Henry Knyvett, to the court of Charles V., whom he accompanied in his expedition against Algiers in 1541, and was wrecked on the Barbary coast. In 1547 he joined in the expedition to Scotland, and was knighted, after the battle of Musselburgh, by the protector Somerset, whose patronage he enjoyed. In 1549 he was a witness against Dr Bonner, bishop of London; in 1551 against Stephen Gardiner, bishop of Winchester; in the spring of the latter year he was sent as a commissioner to Scotland, and again in March 1552. In 1553 he went with Sir Nicholas Wotton and Sir William Pickering on an embassy to France, but was recalled by Queen Mary on her accession. In spite of his Protestant views, Chaloner was still employed by the government, going to Scotland in 1555–1556, and providing carriages for troops in the war with France, 1557–1558. In 1558 he went as Elizabeth's ambassador to the emperor Ferdinand at Cambrai, from July 1559 to February 1559/60 he was ambassador to King Philip at Brussels, and in 1561 he went in the same capacity to Spain. His letters are full of complaints of his treatment there, but it was not till 1564, when in failing health, that he was allowed to return home. He died at his house in Clerkenwell on the 14th of October 1565. He acquired during his years of service three estates, Guisborough in Yorkshire, Steeple Claydon in Buckinghamshire, and St Bees in Cumberland. He married (1) Joan, widow of Sir Thomas Leigh; and (2) Etheldreda, daughter of Edward Frodsham, of Elton, Cheshire, by whom he had one son, Sir Thomas Chaloner (1561–1615), the naturalist. Chaloner was the intimate of most of the learned men of his day, and with Lord Burghley he had a life-long friendship. Throughout his busy official life he occupied himself with literature, his Latin verses and his pastoral poems being much admired by his contemporaries. Chaloner's "Howe the Lorde Mowbray . . . was . . . banyshed the Realme," printed in the 1559 edition of William Baldwin's *Mirror for Magistrates* (repr. in vol. ii. pt. 1 of Joseph Haslewood's edition of 1815), has sometimes been attributed to Thomas Churchyard. His most important work, *De Rep. Anglorum instauranda libri decem*, written while he was in Spain, was first published by William Malim (1579, 3 pts.), with complimentary Latin verses in praise of the author by Burghley and others. Chaloner's epigrams and epitaphs were also added to the volume, as well as *In laudem Henrici octavi . . . carmen Panegericum*, first printed in 1560. Amongst his other works are *The praise of folie, Moriae encomium* . . . by Erasmus . . . Englished by Sir Thomas Chaloner, Knight (1549, ed. Janet E. Ashbee, 1901); *A book of the Office of Servantes* (1543), translated from Gilbert Cognatus; and *An homilie of Saint John Chrysostome* . . . Englished by T. C. (1544).

See "The Chaloners, Lords of the Manor of St Bees," by William Jackson, in *Transactions of the Cumberland Assoc. for the Advancement of Literature and Science*, pt. vi. pp. 47-74, 1880–1881.

CHÂLONS-SUR-MARNE, a town of north-eastern France, capital of the department of Marne, 107 m. E. of Paris on the main line of the Eastern railway to Nancy, and 25 m. S.S.E. of Reims. Pop. (1906) 22,424. Châlons is situated in a wide level plain principally on the right bank of the Marne, its suburb of Marne, which contains the railway stations of the Eastern and Est-État railways, lying on the left bank. The town proper is bordered on the west by the lateral canal of the Marne, across which lies a strip of ground separating it from the river itself. Châlons is traversed by branches of the canal and by small streams, and its streets are for the most part narrow and irregular, but it is surrounded by ample avenues and promenades, the park known as the Jard, in the south-western quarter, being especially attractive. Huge barracks lie to the north and east. There are several interesting churches in the town. The cathedral of St Étienne dates chiefly from the 13th century, but its west façade is in the classical style and belongs to the 17th century. There are stained-glass windows of the 13th century in the north transept. Notre-Dame, of the 12th and 13th centuries, is conspicuous for its four Romanesque towers, two flanking the apse; the other two, surmounted by tall lead spires, flanking the principal façade. The churches of St. Alpin, St Jean and St Loup date from various periods between the 11th and the 17th centuries. The hôtel-de-ville (1771), facing which stands a monument to President Carnot; the prefecture (1759–1764), once the residence of the intendants of Champagne; the college, once a Jesuit establishment; and a training college which occupies the Augustinian abbey of Toussaints (16th and 17th centuries), are noteworthy civil buildings. The houses of Châlons are generally ill-built of timber and plaster, or rough-cast, but some old mansions, dating from the 15th to the 16th centuries, remain. The church of Ste Pudentienne, on the left bank of the river, is a well-known place of pilgrimage. The town is the seat of a bishop and a prefect, and headquarters of the VI. army corps; it has tribunals of first instance and of commerce, a chamber of commerce, a board of trade-arbitrators, a museum, a library, training colleges, a higher ecclesiastical seminary, a communal college and an important technical school. The principal industry is brewing, which is carried on in the suburb of Marne. Galleries of immense length, hewn in a limestone hill and served by lines of railway, are used as store-houses for beer. The preparation of champagne, the manufacture of boots and shoes, brushes, wire-goods and wall-paper also occupy many hands. There is trade in cereals.

Châlons-sur-Marne occupies the site of the chief town of the Catalauni, and some portion of the plains which lie between it and Troyes was the scene of the defeat of Attila in the conflict of 451. In the 10th and following centuries it attained great prosperity as a kind of independent state under the supremacy of its bishops, who were ecclesiastical peers of France. In 1214 the militia of Châlons served at the battle of Bouvines; and in the 15th century the citizens maintained their honour by twice (1430 and 1434) repulsing the English from their walls. In the 16th century the town sided with Henry IV., king of France, who in 1589 transferred thither the parlement of Paris, which shortly afterwards burnt the bulls of Gregory XIV. and Clement VIII. In 1856 Napoleon III. established a large camp, known as the Camp of Châlons, about 16 m. north of the town by the railway to Reims. It was situated in the immediate neighbourhood of Grand Mourmelon and Petit Mourmelon, and occupied an area of nearly 30,000 acres. The "Army of Châlons," formed by Marshal MacMahon in the camp after the first reverses of the French in 1870, marched thence to the Meuse, was surrounded by the Germans at Sedan, and forced to capitulate. The camp is still a training-centre for troops.

About 5 m. E. of Châlons is L'Epine, where there is a beautiful pilgrimage church (15th and 16th centuries, with modern restoration) with a richly-sculptured portal. In the interior there is a fine choir-screen, an organ of the 16th century, and an ancient and much-venerated statue of the Virgin.

CHALON-SUR-SAÔNE, a town of east-central France, capital of an arrondissement in the department of Saône-et-Loire,

81 m. N. of Lyons by the Paris-Lyon railway. Pop. (1906) 26,538. It is a well-built town, with fine quays, situated in an extensive plain on the right bank of the Saône at its junction with the Canal du Centre. A handsome stone bridge of the 15th century, decorated in the 18th century with obelisks, connects it with the suburb of St Laurent on an island in the river. The principal building is the church of St Vincent, once the cathedral. It dates mainly from the 12th to the 15th centuries, but the façade is modern and unpleasing. The old bishop's palace is a building of the 15th century. The church of St Pierre, with two lofty steeples, dates from the late 17th century. Chalon preserves remains of its ancient ramparts and a number of old houses. The administrative buildings are modern. An obelisk was erected in 1730 to commemorate the opening of the canal. There is a statue of J. N. Niepce, a native of the town. Chalon is the seat of a sub-prefect and a court of assizes, and there are tribunals of first instance and commerce, a branch of the Bank of France, a chamber of commerce, communal colleges for boys and girls, a school of drawing, a public library and a museum. Chalon ranks next to Le Creusot among the manufacturing towns of Burgundy; its position at the junction of the Canal du Centre and the Saône, and as a railway centre for Lyons, Paris, Dôle, Lons-le-Saunier and Roanne, brings it a large transit trade. The founding and working of copper and iron is its main industry; the large engineering works of Petit-Creusot, a branch of those of Le Creusot, construct bridges, tug-boats and torpedo-boats; distilleries, glass-works, chemical works, straw-hat manufactories, oil-works, tile-works and sugar refineries also occupy many hands. Wine, grain, iron, leather and timber are among the many products for which the town is an entrepôt. About 2 m. east of Chalon is St Marcel (named after the saint who in the 2nd century preached Christianity at Chalon), which has a church of the 12th century, once belonging to a famous abbey.

Chalon-sur-Saône is identified with the ancient *Cabillonum*, originally an important town of the Aedui. It was chosen in the 6th century by Gontram, king of Burgundy, as his capital; and it continued till the 10th to pay for its importance by being frequently sacked. The bishopric, founded in the 4th century, was suppressed at the Revolution. In feudal times Chalon was the capital of a countship. In 1237 it was given in exchange for other fiefs in the Jura by Jean le Sage, whose descendants nevertheless retained the title. Hugh IV., duke of Burgundy, the other party to the exchange, gave the citizens a communal charter in 1256. In its modern history the most important event was the resistance offered to a division of the Austrian army in 1814.

CHALUKYA, the name of an Indian dynasty which ruled in the Deccan from A.D. 550 to 750, and again from 973 to 1190. The Chalukyas themselves claimed to be Rajputs from the north who imposed their rule on the Dravidian inhabitants of the Deccan tableland, and there is some evidence for connecting them with the Chapas, a branch of the foreign Gurjaras. The dynasty was founded by a chief named Pulakesin I., who mastered the town of Vatapi (now Badami, in the Bijapur district) about 550. His sons extended their principality east and west; but the founder of the Chalukya greatness was his grandson Pulakesin II., who succeeded in 608 and proceeded to extend his rule at the expense of his neighbours. In 609 he established as his viceroy in Vengi his brother Kubja Vishnuvardhana, who in 615 declared his independence and established the dynasty of Eastern Chalukyas, which lasted till 1070. In 620 Pulakesin defeated Harsha (*q.v.*), the powerful overlord of northern India, and established the Nerhudda as the boundary between the South and North. He also defeated in turn the Chola, Pandya and Kerala kings, and by 630 was beyond dispute the most powerful sovereign in the Deccan. In 642, however, his capital was taken and he himself killed by the Pallava king Narasimhavarman. In 655 the Chalukya power was restored by Pulakesin's son Vikramaditya I.; but the struggle with the Pallavas continued until, in 740, Vikramaditya II. destroyed the Pallava capital. In 750 Vikramaditya's son, Kirtivarman Chalukya, was overthrown by the Rashtrakutas.

In 973, Taila or Tailapa II. (d. 995), a scion of the royal Chalukya race, succeeded in overthrowing the Rashtrakuta king Kakka II., and in recovering all the ancient territory of the Chalukyas with the exception of Gujarat. He was the founder of the dynasty known as the Chalukyas of Kalyani. About A.D. 1000 a formidable invasion by the Chola king Rajaraja the Great was defeated, and in 1052 Somesvara I., or Ahamavalla (d. 1068), the founder of Kalyani, defeated and slew the Chola Rajadhiraja. The reign of Vikramaditya VI., or Vikramanka, which lasted from 1076 to 1126, formed another period of Chalukya greatness. Vikramanka's exploits against the Hoysala kings and others, celebrated by the poet Bilhana, were held to justify him in establishing a new era dating from his accession. With his death, however, the Chalukya power began to decline. In 1156 the commander-in-chief Bijjala (or Vijjana) Kalachurya revolted, and he and his sons held the kingdom till 1183. In this year Somesvara IV. Chalukya recovered part of his patrimony, only to succumb, about 1190, to the Yadavas of Devagiri and the Hoysalas of Dorasamudra. Henceforth the Chalukya rajas ranked only as petty chiefs.

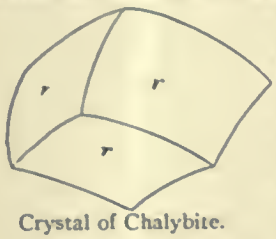
See J. F. Fleet, *Dynasties of the Kanarese Districts*; Prof. R. G. Bhandarker, "Early History of the Deccan," in the *Bombay Gazetteer* (1896), vol. i. part ii.; Vincent A. Smith, *Early Hist. of India* (Oxford, 1908), pp. 382 ff.

CHALYBÄUS, HEINRICH MORITZ (1796–1862), German philosopher, was born at Pfaffroda in Saxony. For some years he taught at Dresden, and won a high reputation by his lectures on the history of philosophy in Germany. In 1839 he became professor in Kiel University, where, with the exception of one brief interval, when he was expelled with several colleagues because of his German sympathies, he remained till his death. His first published work, *Historische Entwickelung der spekulativen Philosophie von Kant bis Hegel* (1837, 5th ed. 1860), which still ranks among the best expositions of modern German thought, has been twice translated into English, by A. Tulk (London, 1854), and by A. Edersheim (Edinburgh, 1854). His chief works are *Entwurf eines Systems der Wissenschaftslehre* (Kiel, 1846) and *System der spekulativen Ethik* (2 vols., 1850). He opposed both the extreme realism of Herbart and what he regarded as the one-sided idealism of Hegel, and endeavoured to find a mean between them, to discover the ideal or formal principle which unfolds itself in the real or material world presented to it. His *Wissenschaftslehre*, accordingly, divides itself into (1) *Principlehre*, or theory of the one principle; (2) *Vermittelungslehre*, or theory of the means by which this principle realizes itself; and (3) *Teleologie*. The most noticeable point is the position assigned by Chalybäus to the "World Ether," which is defined as the infinite in time and space, and which, he thinks, must be posited as necessarily coexisting with the Infinite Spirit or God. The fundamental principle of the *System der Ethik* is carried out with great strength of thought, and with an unusually complete command of ethical material.

See J. E. Erdmann, *Grundriss der Gesch. d. Philos.* ii. 781-786; K. Prantl, in *Allgem. deutsch. Biog.*

CHALYBITE, a mineral species consisting of iron carbonate ($FeCO_3$) and forming an important ore of iron. It was early known as spathose iron, spathic iron or steel ore. F. S. Beudant in 1832 gave the name siderose (from *σίδηρος*, iron), which was modified by W. Haidinger in 1845 to siderite. Chalybite (from *χάλυψ*, *χάλυβος*, Lat. *chalybs*, steel) is of slightly later date, having been given by E. F. Glocker in 1847. The name siderite is in common use, but it is open to objection since it had earlier been applied to several other species, and is also now used as a group name for meteoric irons. Chalybite crystallizes in the rhombohedral system and is isomorphous with calcite; like this it possesses perfect cleavages parallel to the faces of the primitive rhombohedron, the angles between which are 73° 0′. Crystals are usually rhombohedral in habit, and the primitive rhombohedron *r* {100} is a common form, the faces being often curved as represented in the figure. Acute rhombohedra in combination with the basal pinacoid are also frequent, giving crystals of octahedral aspect. The mineral often occurs in cleavable

masses with a coarse or fine granular texture; also in botryoidal or globular (sphaerosiderite) and oolitic forms. When compact and mixed with much clay and sand it constitutes the well-known clay ironstone. Chalybite is usually yellowish-grey or brown in colour; it is translucent and has a vitreous lustre. Hardness 3½; sp. gr. 3·8. The double refraction ($\omega-\epsilon=0\cdot241$) is stronger than that of calcite. When pure it contains 48·2% of iron, but this is often partly replaced isomorphously by manganese, magnesium or calcium: the varieties known as oligon-spar or oligonite, sideroplesite and siderodote contain these elements respectively in large amount. These varieties form a passage to ankerite (*q.v.*) and mesitite, and all are referred to loosely as brown-spar.



Crystal of Chalybite.

Chalybite is a common gangue mineral in metalliferous veins, and well-crystallized specimens are found with ores of copper, lead, tin, &c., in Cornwall, the Harz, Saxony and many other places. It also occurs alone as large masses in veins and beds in rocks of various kinds. The clay ironstone so extensively worked as an ore of iron occurs as nodules and beds in the Coal Measures of England and the United States, and the oolitic iron ore of the Cleveland district in Yorkshire forms beds in the Lias. The mineral is occasionally found as concretionary masses (sphaerosiderite) in cavities in basic igneous rocks such as dolerite. (L. J. S.)

CHAMBA, a native state of India, within the Punjab, amid the Himalayas, and lying on the southern border of Kashmir. It has an area of 3216 sq. m. Pop. (1901) 127,834. The sanatorium of Dalhousie, though within the state, is attached to the district of Gurdaspur. Chamba is entirely mountainous; in the east and north, and in the centre, are snowy ranges. The valleys in the west and south are fertile. The chief rivers are the Chandra and Ravi. The country is much in favour with sportsmen. The principal crops are rice, maize and millet. Mineral ores of various kinds are known, but unworked. Trade is chiefly in forest produce. The capital of the state is Chamba (pop. 6000), situated above the gorge of the Ravi. External communications are entirely by road. The state was founded in the 6th century, and, though sometimes nominally subject to Kashmir and afterwards tributary to the Mogul empire, always practically maintained its independence. Its chronicles are preserved in a series of inscriptions, mostly engraved on copper. It first came under British influence in 1846, when it was declared independent of Kashmir. The line of the rajas of Chamba was founded in the 6th century A.D. by Marut, of an ancient family of Rajputs. In 1904 Bhuri Singh, K.C.S.I., C.I.E., an enlightened and capable ruler, succeeded.

CHAMBAL, a river of India, one of the principal tributaries of the Jumna. Rising amid the summits of the Vindhya mountains in Malwa, it flows north, and after being joined by the Chambla and Sipra, passes through the gorges of the Mokandarra hills. After receiving the waters of the Kali-Sind, Parbati and Banas, its principal confluents, the Chambal becomes a great river, enters the British district of Etawah, and joins the Jumna 40 m. below Etawah town, its total length being 650 m.

CHAMBERLAIN, JOSEPH (1836–), British statesman, eldest son of Joseph Chamberlain, master of the Cordwainers' Company, was born at Camberwell Grove, London, on the 8th of July 1836. His father was a well-to-do man of business, a Unitarian in religion and a Liberal in politics. Young Chamberlain was educated at Canonbury from 1845 to 1850, and at University College school, London, from 1850 to 1852. After two years in his father's office in London, he was sent to Birmingham to join his cousin Joseph Nettlefold in a screw business in which his father had an interest; and by degrees, largely owing to his own intelligent management, this business became very successful. Nettlefold & Chamberlain employed new methods of attracting customers, and judiciously amalgamated rival firms with their own so as to reduce competition, with the result that in 1874, after twenty-two years of commercial life, Mr Chamberlain was able to retire with an ample fortune. Meanwhile he had in 1861 married his first wife, Miss Harriet Kenrick (she died in 1863), and had gradually come to take an increasingly important part in the municipal and political life of Birmingham. He was a constant speaker at the Birmingham and Edgbaston Debating Society; and when in 1868 the Birmingham Liberal Association was reorganized, he became one of its leading members. In 1869 he was elected chairman of the executive council of the new National Education League, the outcome of Mr George Dixon's movement for promoting the education of the children of the lower classes by paying their school fees, and agitating for more accommodation and a better national system. In the same year he was elected a member of the town council, and married his second wife—a cousin of his first—Miss Florence Kenrick (d. 1875).

In 1870 he was elected a member of the first school board for Birmingham; and for the next six years, and especially after 1873, when he became leader of a majority and chairman, he actively championed the Nonconformist opposition to denominationalism. He was then regarded as a Republican—the term signifying rather that he held advanced Radical opinions, which were construed by average men in the light of the current political developments in France, than that he really favoured Republican institutions. His programme was "free Church, free land, free schools, free labour." At the general election of 1874 he stood as a parliamentary candidate for Sheffield, but without success. Between 1869 and 1873 he was a prominent advocate in the Birmingham town council of the gospel of municipal reform preached by Mr Dawson, Dr Dale and Mr Bunce (of the *Birmingham Post*); and in 1873 his party obtained a majority, and he was elected mayor, an office he retained until June 1876. As mayor he had to receive the prince and princess of Wales on their visit in June 1874, an occasion which excited some curiosity because of his reputation as a Republican; but those who looked for an exhibition of bad taste were disappointed, and the behaviour of the Radical mayor satisfied the requirements alike of *The Times* and of *Punch*.

The period of his mayoralty was one of historic importance in the growth of modern Birmingham. New municipal buildings were erected, Highgate Park was opened as a place of recreation, the free library and art gallery were developed. But the great work carried through by Mr Chamberlain for Birmingham was the municipalization of the supply of gas and water, and the improvement scheme by which slums were cleared away and forty acres laid out in new streets and open spaces. The prosperity of modern Birmingham dates from 1875 and 1876, when these admirably administered reforms were initiated, and by his share in them Mr Chamberlain became not only one of its most popular citizens but also a man of mark outside. An orator of a business-like, straightforward type, cool and hard-hitting, his spare figure, incisive features and single eye-glass soon made him a favourite subject for the caricaturist; and in later life his aggressive personality, and the peculiarly irritating effect it had on his opponents, made his actions and speeches the object of more controversy than was the lot of any other politician of his time. His hobby for orchid-growing at his house "Highbury" near Birmingham also became famous. In private life his loyalty to his friends, and his "genius for friendship" (as John Morley said) made a curious contrast to his capacity for arousing the bitterest political hostility. It may be added here that the interest taken by him in Birmingham remained undiminished during his life, and he was largely instrumental in starting the Birmingham University (1900), of which he became chancellor. His connexion with Birmingham University was indeed peculiarly appropriate to his character as a man of business; but in spite of his representing a departure among men of the front rank in politics from the "Eton and Oxford" type, his general culture sometimes surprised those who did not know him. In later life Oxford and Cambridge gave him their doctors' degrees; and in 1897 he was made lord rector of Glasgow

University (delivering an address on "Patriotism" at his installation).

In 1876 Mr Dixon resigned his seat in parliament, and Mr Chamberlain was returned for Birmingham in his place unopposed, as John Bright's colleague. He made his maiden speech in the House of Commons on the 4th of August 1876, on Lord Sandon's Education Bill. At this period, too, he paid much attention to the question of licensing reform, and in 1876 he examined the Gothenburg system in Sweden, and advocated a solution of the problem in England on similar lines. During 1877 the new federation of Liberal Associations which became known as the "Caucus" was started under Mr Chamberlain's influence in Birmingham—its secretary, Mr Schnadhorst, quickly making himself felt as a wire-puller of exceptional ability; and the new organization had a remarkable effect in putting life into the Liberal party, which since Mr Gladstone's retirement in 1874 had been much in need of a stimulus. When the general election came in 1880, Mr Schnadhorst's powers were demonstrated in the successes won under his auspices. The Liberal party numbered 349, against 243 Conservatives and 60 Irish Nationalists; and the Radical section of the Liberal party, led by Mr Chamberlain and Sir Charles Dilke, was recognized by Mr Gladstone by his inclusion of the former in his cabinet as president of the Board of Trade, and the appointment of the latter as under secretary for foreign affairs. In his new capacity Mr Chamberlain was responsible for carrying such important measures as the Bankruptcy Act 1883, and the Patents Act. Another bill which he had much at heart, on merchant shipping, had to be abandoned, and a royal commission substituted, but the subsequent legislation in 1888–1894 owed much to his efforts. The Franchise Act of 1884 was also one in which he took a leading part as a champion of the opinions of the labouring class. At this time he took the current advanced Radical views of both Irish and foreign policy, hating "coercion," disliking the occupation of Egypt, and prominently defending the Transvaal settlement after Majuba. Both before and after the defeat of Mr Gladstone's government on the Budget in June 1885, he associated himself with what was known as the "Unauthorized Programme," *i.e.* free education, small holdings, graduated taxation and local government. In June 1885 he made a speech at Birmingham, treating the reforms just mentioned as the "ransom" that property must pay to society for the security it enjoys—for which Lord Iddesleigh called him "Jack Cade"; and he continually urged the Liberal party to take up these Radical measures. At the general election of November 1885 Mr Chamberlain was returned for West Birmingham. The Liberal strength generally was, however, reduced to 335 members, though the Radical section held their own; and the Irish vote became necessary to Mr Gladstone if he was to command a majority. In December it was stated that Mr Gladstone intended to propose Home Rule for Ireland, and in January Lord Salisbury's ministry was defeated on the Address, on an amendment moved by Mr Chamberlain's Birmingham henchman, Mr Jesse Collings (b. 1831), embodying the "three acres and a cow" of the Radical programme. Unlike Lord Hartington (afterwards duke of Devonshire) and other Liberals, who declined to join Mr Gladstone in view of the altered attitude he was adopting towards Ireland, Mr Chamberlain entered the cabinet as president of the Local Government Board (with Mr Jesse Collings as parliamentary secretary), but on the 15th of March 1886 he resigned, explaining in the House of Commons (8th April) that, while he had always been in favour of the largest possible extension of local government to Ireland consistently with the integrity of the empire and the supremacy of parliament, and had therefore joined Mr Gladstone when he believed that this was what was intended, he was unable to consider that the scheme communicated by Mr Gladstone to his colleagues maintained those limitations. At the same time he was not irreconcilable, and he invited Mr Gladstone even then to modify his bill so as to remove the objections made to it. This indecisive attitude did not last long, and the split in the party rapidly widened. At Birmingham Mr Chamberlain was supported by the "Two Thousand," but deserted by the "Caucus" and Mr Schnadhorst. In May the Radicals who followed Mr Bright and Mr Chamberlain, and the Whigs who took their cue from Lord Hartington, decided to vote against the second reading of the Home Rule Bill, instead of allowing it to be taken and then pressing for modifications in committee, and on 7th June the bill was defeated by 343 to 313, 94 Liberal Unionists—as they were generally called—voting against the government. Mr Chamberlain was the object of the bitterest attacks from the Gladstonians for his share in this result; he was stigmatized as "Judas," and open war was proclaimed by the Home Rulers against the "dissentient Liberals"—the description used by Mr Gladstone. The general election, however, returned to parliament 316 Conservatives, 78 Liberal Unionists, and only 276 Gladstonians and Nationalists, Birmingham returning seven Unionist members. When the House met in August, it was decided by the Liberal Unionists, under Lord Hartington's leadership, that their policy henceforth was essentially to combine with the Tories to keep Mr Gladstone out. The old Liberal feeling still prevailing among them was too strong, however, for their leaders to take office in a coalition ministry. It was enough for them to be able to tie down the Conservative government to such measures as were not offensive to Liberal Unionist principles. It still seemed possible, moreover, that the Gladstonians might be brought to modify their Home Rule proposals, and in January 1887 a Round Table conference (suggested by Mr Chamberlain) was held between Mr Chamberlain, Sir G. Trevelyan, Sir William Harcourt, Mr Morley and Lord Herschell. But no *rapprochement* was effected, and reconciliation became daily more and more difficult. The influence of Liberal Unionist views upon the domestic legislation of the government was steadily bringing about a more complete union in the Unionist party, and destroying the old lines of political cleavage. Before 1892 Mr Chamberlain had the satisfaction of seeing Lord Salisbury's ministry pass such important acts, from a progressive point of view, as those dealing with Coal Mines Regulation, Allotments, County Councils, Housing of the Working Classes, Free Education and Agricultural Holdings, besides Irish legislation like the Ashbourne Act, the Land Act of 1891, and the Light Railways and Congested Districts Acts. In October 1887 Mr Chamberlain, Sir L. Sackville West and Sir Charles Tupper were selected by the government as British plenipotentiaries to discuss with the United States the Canadian fisheries dispute, and a treaty was arranged by them at Washington on the 15th of February 1888. The Senate refused to ratify it; but a protocol provided for a *modus vivendi* pending ratification, giving American fishing vessels similar advantages to those contemplated in the treaty; and on the whole Mr Chamberlain's mission to America was accepted as a successful one in maintaining satisfactory relations with the United States. He returned to England in March 1888, and was presented with the freedom of the borough of Birmingham. The visit also resulted, in November 1888, in his marriage with his third wife, Miss Endicott, daughter of the United States secretary of war in President Cleveland's first administration.

At the general election of 1892 Mr Chamberlain was again returned, with an increased majority, for West Birmingham; but the Unionist party as a whole came back with only 315 members against 355 Home Rulers. In August Lord Salisbury's ministry was defeated; and on the 13th of February 1893 Mr Gladstone introduced his second Home Rule Bill, which was eventually read a third time on the 1st of September. During the eighty-two days' discussion in the House of Commons Mr Chamberlain was the life and soul of the opposition, and his criticisms had a vital influence upon the attitude of the country when the House of Lords summarily threw out the bill. His chief contribution to the discussions during the later stages of the Gladstone and Rosebery ministries was in connexion with Mr Asquith's abortive Employers' Liability Bill, when he foreshadowed the method of dealing with this question afterwards carried out in the Compensation Act of 1897. Outside parliament he was busy formulating proposals for old age pensions, which had a prominent place in the Unionist programme of 1895. In

that year, on the defeat of Lord Rosebery, the union of the Unionists was sealed by the inclusion of the Liberal Unionist leaders in Lord Salisbury's ministry; and Mr Chamberlain became secretary of state for the colonies. There had been much speculation as to what his post would be, and his nomination to the colonial office, then considered one of secondary rank, excited some surprise; but Mr Chamberlain himself realized how important that department had become. He carried with him into the ministry his close Birmingham municipal associates, Mr Jesse Collings (as under secretary of the home office), and Mr J. Powell-Williams (1840–1904) as financial secretary to the war office. Mr Chamberlain's influence in the Unionist cabinet was soon visible in the Workmen's Compensation Act and other measures. This act, though in Sir Matthew White Ridley's charge as home secretary, was universally and rightly associated with Mr Chamberlain; and its passage, in the face of much interested opposition from highly-placed, old-fashioned conservatives and capitalists on both sides, was principally due to his determined advocacy. Another "social" measure of less importance, which formed part of the Chamberlain programme, was the Small Houses Acquisition Act of 1899; but the problem of old age pensions was less easily solved. This subject had been handed over in 1893 to a royal commission, and further discussed by a select committee in 1899 and a departmental committee in 1900, but both of these threw cold water on the schemes laid before them—a result which, galling enough to one who had made so much play with the question in the country, offered welcome material to his opponents for electioneering recrimination, as year by year went by between 1895 and 1900 and nothing resulted from all the confident talk on the subject in which Mr Chamberlain had indulged when out of office. Eventually it was the Liberal and not the Unionist party that carried an Old Age Pensions scheme through parliament, during the 1908 session, when Mr Chamberlain was *hors de combat*.

From January 1896 (the date of the Jameson Raid) onwards South Africa demanded the chief attention of the colonial secretary (see South Africa, and for details Transvaal). In his negotiations with President Kruger one masterful temperament was pitted against another. Mr Chamberlain had a very difficult part to play, in a situation dominated by suspicion on both sides, and while he firmly insisted on the rights of Great Britain and of British subjects in the Transvaal, he was the continual object of Radical criticism at home. Never has a statesman's personality been more bitterly associated by his political opponents with the developments they deplored. Attempts were even made to ascribe financial motives to Mr Chamberlain's actions, and the political atmosphere was thick with suspicion and scandal. The report of the Commons committee (July 1897) definitely acquitted both Mr Chamberlain and the colonial office of any privity in the Jameson Raid, but Mr Chamberlain's detractors continued to assert the contrary. Opposition hostility reached such a pitch that in 1899 there was hardly an act of the cabinet during the negotiations with President Kruger which was not attributed to the personal malignity and unscrupulousness of the colonial secretary. The elections of 1900 (when he was again returned, unopposed, for West Birmingham) turned upon the individuality of a single minister more than any since the days of Mr Gladstone's ascendancy, and Mr Chamberlain, never conspicuous for inclination to turn his other cheek to the smiter, was not slow to return the blows with interest.

Apart from South Africa, his most important work at this time was the successful passing of the Australian Commonwealth Act (1900), in which both tact and firmness were needed to settle certain differences between the imperial government and the colonial delegates.

Mr Chamberlain's tenure of the office of colonial secretary between 1895 and 1900 must always be regarded as a turning-point in the history of the relations between the British colonies and the mother country. His accession to office was marked by speeches breathing a new spirit of imperial consolidation, embodied either in suggestions for commercial union or in more immediately practicable proposals for improving the "imperial estate"; and at the Diamond Jubilee of 1897 the visits of the colonial premiers to London emphasized and confirmed the new policy, the fruits of which were afterwards seen in the cordial support given by the colonies in the Boer War. Even in what Mr Chamberlain called his "Radical days" he had never supported the "Manchester" view of the value of a colonial empire; and during the Gladstone ministry of 1882–1885 Mr Bright had remarked that the junior member for Birmingham was the only Jingo in the cabinet—meaning, no doubt, that he objected to the policy of *laissez-faire* and the timidity of what was afterwards known as "Little Englandism." While he was still under Mr Gladstone's influence these opinions were kept in subordination; but Mr Chamberlain was always an imperial federationist, and from 1887 onwards he constantly gave expression to his views on the desirability of drawing the different parts of the empire closer together for purposes of defence and commerce. In 1895 the time for the realization of these views had come; and Mr Chamberlain's speeches, previously remarkable chiefly for debating power and directness of argument, were now dominated by a new note of constructive statesmanship, basing itself on the economic necessities of a world-wide empire. Not the least of the anxieties of the colonial office during this period was the situation in the West Indies, where the cane-sugar industry was being steadily undermined by the European bounties given to exports of continental beet; and though the government restricted themselves to attempts at removing the bounties by negotiation and to measures for palliating the worst effects in the West Indies, Mr Chamberlain made no secret of his repudiation of the Cobden Club view that retaliation would be contrary to the doctrines of free trade, and he did his utmost to educate public opinion at home into understanding that the responsibilities of the mother country are not merely to be construed according to the selfish interests of a nation of consumers. As regards foreign affairs, Mr Chamberlain more than once (and particularly at Leicester on 30th November 1899) indicated his leanings towards a closer understanding between the British empire, the United States and Germany,—a suggestion which did not save him from an extravagant outburst of German hostility during the Boer War. The unusually outspoken and pointed expression, however, of his disinclination to submit to Muscovite duplicity or to "pin-pricks" or "unmannerliness" from France was criticized on the score of discretion by a wider circle than that of his political adversaries.

During the progress of the Boer War from 1899 to 1902, Mr Chamberlain, as the statesman who had represented the cabinet in the negotiations which led to it, remained the object of constant attacks from his Radical opponents—the "little Englanders" and "Pro-Boers," as he called them—and he was supported by the Imperialist and Unionist party with at least equal ardour. But as colonial secretary, except in so far as his consistent support of Lord Milner and his enthusiastic encouragement of colonial assistance were concerned, he naturally played only a subordinate part during the carrying out of the military operations. Among domestic statesmen he was felt, however, to be the backbone of the party in power. He was the hero of the one side, just as he was the bugbear of the other. On the 13th of February 1902 he was presented with an address in a gold casket by the city corporation, and entertained at luncheon at the Mansion House, an honour not unconnected with the strong feeling recently aroused by his firm reply (at Birmingham, January 11) to some remarks made by Count von Bülow, the German chancellor, in the Reichstag (January 8), reflecting the offensive allegations current in Germany against the conduct of the army in South Africa. Mr Chamberlain's speech, in answer to what had been intended as a contemptuous rebuke, was universally applauded. His own imperialism was intensified by the way in which England's difficulties resulted in calling forth colonial assistance and so cementing the bonds of empire. The domestic crisis, and the sharp cleavage between parties at home, had driven the bent of his mind and policy further and further away from the purely municipal and national ideals which he had followed so keenly before he became colonial minister. The

problems of empire engrossed him, and a new enthusiasm for imperial projects arose in the Unionist party under his inspiration. No English statesman probably has ever been, at different times in his career, so able an advocate of absolutely contradictory policies, and his opponents were not slow to taunt him with quotations from his earlier speeches. As the war drew to its end, new plans for imperial consolidation were maturing in his brain. Subsidiary points of utility, such as the formation of the London and Liverpool schools of tropical medicine from 1899 onwards, were taken up by him with characteristic vigour. But the next step was to prove a critical one indeed for the loyalty of the party which had so far been unanimous in his favour.

The settlement after the war was full of difficulties, financial and others, in South Africa. When Mr Arthur Balfour succeeded Lord Salisbury as prime minister in July 1902, Mr Chamberlain agreed to serve loyally under him, and the friendship between the two leaders was indeed one of the most marked features of the political situation. In November 1902 it was arranged that Mr Chamberlain should go out to South Africa, and it was hoped, not without reason, that his personality would effect more good than any ordinary official negotiations. At the time the best results appeared to be secured. He went from place to place in South Africa (December 26–February 25); arranged with the leading Transvaal financiers that in return for support from the British government in raising a Transvaal loan they would guarantee a large proportion of a Transvaal debt of £30,000,000, which should repay the British treasury so much of the cost of the war; and when he returned in March 1903, satisfaction was general in the country over the success of his mission. But meantime two things had happened. He had looked at the empire from the colonial point of view, in a way only possible in a colonial atmosphere; and at home some of his colleagues had gone a long way, behind the scenes, to destroy one of the very factors on which the question of a practical scheme for imperial commercial federation seemed to hinge. In the budget of 1902 a duty of a shilling a quarter on imported corn had been reintroduced. This small tax was regarded as only a registration duty. Even by free-trade ministers like Gladstone it had been left up to 1869 untouched, and its removal by Robert Lowe (Lord Sherbrooke) had since then been widely regarded as a piece of economic pedantry. Its reimposition, officially supported for the sake of necessary revenue in war-time, and cordially welcomed by the Unionist party, had justified itself, as they contended, in spite of the criticisms of the Opposition (who raised the cry of the "dear loaf"), by proving during the year to have had no general or direct effect on the price of bread. And the more advanced Imperialists, as well as the more old-fashioned protectionists (like Mr Chaplin) who formed an integral body of the Conservative party, had looked forward to this tax being converted into a differential one between foreign and colonial corn, so as to introduce a scheme of colonial preference and commercial consolidation between the colonies and the mother country. In South Africa—as in any other British colony, since all of them were accustomed to tariffs of a protectionist nature, and the idea of a preference (already started by Canada) was fairly popular—Mr Chamberlain had found this view well established. The agitation in England against the tax had now blown over. The Unionist rank and file were committed to its support,—many even advocating its increase to two shillings at least. But Mr Ritchie, the chancellor of the exchequer, having a surplus in prospect and taxation to take off, carried the cabinet in favour of again remitting this tax on corn. Mr Chamberlain himself had proposed only to take it off as regards colonial, and not foreign corn,—thus inaugurating a preferential system. But a majority of the cabinet supported Mr Ritchie. The remission of this tax, after all the conviction with which its restoration had been supported a year before, was very difficult for the party itself to stomach, and on any ground it was a distasteful act, loyally as the party followed their leaders. But to those who had looked to it as providing a lever for a gradual change in the established fiscal system, the *volte-face* was a bitter blow, and at once there began, though not at first openly, a split between the more rigid free-traders—advocates of cheap food and free imports—and those who desired to use the opportunities of a tariff, of however moderate a kind, for attaining national and imperial and not merely revenue advantages. This idea, which had for some time been floating in Mr Chamberlain's mind (see especially his speech at Birmingham of May 16, 1902), now took full possession of it. For the moment he remained in the cabinet, but the seed of dissension was sown. The first public intimation of his views was given in a speech to his constituents at Birmingham (May 15, 1903), when he outlined a plan for raising more money by a rearranged tariff, partly to obtain a preferential system for the empire and partly to produce funds for social reform at home. On May 28th in the House of Commons he spoke on the same subject, and declared "if you are to give a preference to the colonies, you must put a tax on food." Considered in the light of after events, this putting the necessity of food-taxes in the forefront was decidedly injudicious; but imperialist conviction and enthusiasm were more conspicuous than electioneering tact in the launching of Mr Chamberlain's new scheme.

The movement grew quickly, its supporters including a number of the cleverest younger politicians and journalists in the Unionist party. The idea of tariff reform—to broaden the basis of taxation, to introduce a preference, and to stimulate home industries and increase employment—took firm root; and the political economists of the party—Prof. W. Cunningham, Prof. W. Ashley and Prof. W. A. S. Hewins, in particular—brought effective criticism to bear on the one-sided "free trade" in vogue. The first demand was for inquiry. The country was still bearing an income-tax of elevenpence in the pound; it appeared that the old sources of revenue were inadequate; and meanwhile the statistics of trade, it was argued, showed that the English free-import system hampered English trade while providing the foreigner with a free market. Mr Chamberlain and his supporters argued that since 1870 certain other countries (Germany and the United States), with protective tariffs, had increased their trade in much larger proportion, while English trade had only been maintained by the increased business done with British colonies. A scientific inquiry into the facts was needed. By the Opposition, who now found themselves the defenders of conservatism in the established fiscal policy of the country, this whole argument was scouted; but for a time the demand merely for inquiry, and the production of figures, gave no sufficient occasion for dissension among Unionists, even when, like Sir M. Hicks Beach, they were convinced free-importers on purely economic grounds; and Mr Balfour (*q.v.*), as premier, managed to hold his colleagues and party together by taking the line that particular opinions on economic subjects should not be made a test of party loyalty. The Board of Trade was set to work to produce fiscal Blue-books, and hum-drum politicians who had never shown any genius for figures suddenly blossomed out into arithmeticians of the deepest dye. The Tariff Reform League was founded in order to further Mr Chamberlain's policy, holding its inaugural meeting on July 21st; and it began to take an active part in issuing leaflets and in work at by-elections. Discussion proceeded hotly on the merits of a preferential tariff, and on August 15th a manifesto appeared against it signed by fourteen professors or lecturers on political economy, including Mr Leonard Courtney, Professor Edgeworth, Professor Marshall, Professor Bastable, Professor Smart, Professor J. S. Nicholson, Professor Gonner, Mr Bowley, Mr E. Cannan and Mr L. R. Phelps,—men of admitted competence, yet, after all, of no higher authority than the economists supporting Mr Chamberlain, such as Dr Cunningham and Professor Ashley.

Meanwhile, the death of Lord Salisbury (August 22) removed a weighty figure from the councils of the Unionist party. The cabinet met several times at the beginning of September, and the question of their attitude towards the fiscal problem became acute. The public had its first intimation of impending events in the appearance on September 16th of Mr Balfour's *Economic*

Notes on Insular Free Trade, which had been previously circulated as a cabinet memorandum. The next day appeared the Board of Trade Fiscal Blue-book. And on the 18th the resignations were announced, not only of the more rigid free-traders in the cabinet, Mr Ritchie and Lord George Hamilton, but also of Mr Chamberlain. Letters in cordial terms were published, which had passed between Mr Chamberlain (September 9) and Mr Balfour (September 16). Mr Chamberlain pointed out that he was committed to a preferential scheme involving new duties on food, and could not remain in the government without prejudice while it was excluded from the party programme; remaining loyal to Mr Balfour and his general objects, he could best promote this course from outside, and he suggested that the government might confine its policy to the "assertion of our freedom in the case of all commercial relations with foreign countries." Mr Balfour, while reluctantly admitting the necessity of Mr Chamberlain's taking a freer hand, expressed his agreement in the desirability of a closer fiscal union with the colonies, but questioned the immediate practicability of any scheme; he was willing to adopt fiscal reform so far as it covered retaliatory duties, but thought that the exclusion of taxation of food from the party programme was in existing circumstances necessary, so long as public opinion was not ripe. At the same time he welcomed the fact that Mr Chamberlain's son, Mr Austen Chamberlain, was ready to remain a member of the government. Mr Austen Chamberlain (b. 1863) accordingly became the new chancellor of the exchequer; he was already in the cabinet as postmaster-general, having previously made his mark as civil lord of the admiralty (1895–1900), and financial secretary to the treasury (1900–1902).

From the turning-point of Mr Chamberlain's resignation, it is not necessary here to follow in detail the discussions and dissensions in the party as a whole in its relations with the prime minister (see BALFOUR, A. J.). It is sufficient to say that while Mr Balfour's sympathetic "send off" appeared to indicate his inclination towards Mr Chamberlain's programme, if only further support could be gained for it, his endeavour to keep the party together, and the violent opposition which gathered against Mr Chamberlain's scheme, combined to make his real attitude during the next two years decidedly obscure, both sections of the party—free-traders and tariff reformers—being induced from time to time to regard him as on their side. The tariff reform movement itself was now, however, outside the purely official programme, and Mr Chamberlain (backed by a majority of the Unionist members) threw himself with impetuous ardour into a crusade on its behalf, while at the same time supporting Mr Balfour in parliament, and leaving it to him to decide as to the policy of going to the country when the time should be ripe. In his own words, he went in front of the Unionist army as a pioneer, and if his army was attacked he would go back to it; in no conceivable circumstances would he allow himself to be put in any sort of competition, direct or indirect, with Mr Balfour, his friend and leader, whom he meant to follow (October 6).

On October 6th he opened his campaign with a speech at Glasgow. Analysing the trade statistics as between 1872 and 1902, he insisted that British progress involved a relative decline compared with that of protectionist foreign countries like Germany and the United States; Great Britain exported less and less of manufactured goods, and imported more and more; the exports to foreign countries had decreased, and it was only the increased exports to the colonies that maintained the British position. This was the outcome of the working of a one-sided free-trade system. Now was the time, and it might soon be lost, for consolidating British trade relations with the colonies. If the mother country and her daughter states did not draw closer, they would inevitably drift apart. A further increase of £26,000,000 a year in the trade with the colonies might be obtained by a preferential tariff, and this meant additional employment at home for 166,000 workmen, or subsistence for a population of a far larger number. His positive proposals were: (1) no tax on raw materials; (2) a small tax on food other than colonial, *e.g.* two shillings a quarter on foreign corn but excepting maize, and 5% on meat and dairy produce excluding bacon; (3) a 10% general tariff on imported manufactured goods. To meet any increased cost of living, he proposed to reduce the duties on tea, sugar and other articles of general consumption, and he estimated that his scheme would in no case increase a workingman's expenditure, and in most cases would reduce it. "The colonies," he said, "are prepared to meet us; in return for a very moderate preference, they will give us a substantial advantage in their markets." This speech, delivered with characteristic vigour and Imperialistic enthusiasm, was the type of others which followed in quick succession during the year. At Greenwich next day he emphasized the necessity of retaliating against foreign tariffs—"I never like being hit without striking back." The practice of "dumping" must be fairly met; if foreign goods were brought into England to undersell British manufacturers, either the Fair Wages Clause and the Factory Acts and the Compensation Act would have to be repealed, or the workmen would have to take lower wages, or lose their work. "Agriculture has been practically destroyed, sugar has gone, silk has gone, iron is threatened, wool is threatened, cotton will go! How long are you going to stand it?" On October 20th he spoke at Newcastle, on the 21st at Tynemouth, on the 27th at Liverpool, insisting that free-trade had never been a working-class measure and that it could not be reconciled with trade-unionism; on November 4th at Birmingham, on the 20th at Cardiff, on the 21st at Newport, and on December 16th at Leeds. In all these speeches he managed to point his argument by application to local industries. In the Leeds speech he announced that, with a view to drawing up a scientific model tariff, a non-political commission of representative experts would be appointed under the auspices of the Tariff Reform League to take evidence from every trade; it included many heads of businesses, and Mr Charles Booth, the eminent student of social and industrial London, with Sir Robert Herbert as chairman, and Professor W. A. S. Hewins as secretary. The name of "Tariff Commission," given to this voluntary and unofficial body, was a good deal criticized, but though flouted by the political free-traders it set to work in earnest, and accumulated a mass of evidence as to the real facts of trade, which promised to be invaluable to economic inquirers. On January 18th, 1904, Mr Chamberlain ended his series of speeches by a great meeting at the Guildhall, in the city of London, the key-note being his exhortation to his audience to "think imperially."

All this activity on Mr Chamberlain's part represented a great physical and intellectual feat on the part of a man now sixty-seven years of age; but his bodily vigour and comparatively youthful appearance were essential features of his personality. Nothing like this campaign had been known in the political world since Mr Gladstone's Midlothian days; and it produced a great public impression, stirring up both supporters and opponents. Free-trade unionists like Lord Goschen and Lord Hugh Cecil, and the Liberal leaders—for whom Mr Asquith became the principal spokesman, though Lord Rosebery's criticisms also had considerable weight—found new matter in Mr Chamberlain's speeches for their contention that any radical change in the traditional English fiscal policy, established now for sixty years, would only result in evil. The broad fact remained that while Mr Chamberlain's activity gathered round him the bulk of the Unionist members and an enthusiastic band of economic sympathizers, the country as a whole remained apathetic and unconvinced. One reason was the intellectual difficulty of the subject and the double-faced character of all arguments from statistics, which were either incomprehensible or disputable; another was the fact that substantially this was a political movement, and that tariff reform was, after all, only one in a complexity of political issues, most of which during this period were being interpreted by the electorate in a sense hostile to the Unionist party. Mr Chamberlain had relied on his personal influence, which from 1895 to 1902 had been supreme; but his own resignation, and the course of events, had since 1903 made his personality less authoritative, and new interests—such as the opposition to the Education Act, to the heavy taxation, and to Chinese labour in the

Transvaal, and indignation over the revelations concerned with the war—were monopolizing attention, to the weakening of his hold on the public. The revival in trade, and the production of new statistics which appeared to stultify Mr Chamberlain's prophecies of progressive decline, enabled the free-trade champions to reassure their audiences as to the very foundation of his case, and to represent the whole tariff reform movement as no less unnecessary than risky. Moreover, the split in the Unionist party brought the united Liberal party in full force into the field, and at last the country began to think that the danger of Irish Home Rule was practically over, and that a Liberal majority might be returned to power in safety, with the prospect of providing an alternative government which would assure commercial repose (Lord Rosebery's phrase), relief from extravagant expenditure, and—as the working-classes were led to believe—a certain amount of labour legislation which the Tory leaders would never propose. On the other hand the colonies took a great interest in the new movement, though without putting any such pressure on the home public as Mr Chamberlain might have expected. At the opening of 1904 he was officially invited by Mr Deakin, the prime minister of the Commonwealth, to pay a visit to Australia, in order to expound his scheme, being promised an enthusiastic welcome "as the harbinger of commercial reciprocity between the mother country and her colonies." Mr Chamberlain, however, declined; his work at home was too pressing.

From the end of Mr Chamberlain's series of expository speeches on his scheme of tariff reform, onwards during the various fiscal debates and discussions of 1904, it is unnecessary to follow events in detail. The scheme was now before the country, and Mr Chamberlain was anxious to take its verdict. Time was not on his side at his age, and if he had to be beaten at one election he was anxious to get rid of the other issues which would encumber the popular vote, and to press on to a second when he would be on the attacking side. But he would make no move which would embarrass Mr Balfour in parliament, and adhered to his promise of loyalty. The result was a long drawn out interval, while the government held on and its supporters became more embittered over their differences. Mr Chamberlain needed a rest, and was away in Italy and Egypt from March to May, and again in November. He made three important speeches at Welbeck (August 4), at Luton (October 5), and at Limehouse (December 15), but he had nothing substantial to add to his case, and the party situation continued in all its embarrassments. Mr Balfour's introduction of his promise (at Edinburgh on October 3) to convene an imperial conference after the general election if the Unionists came back to power, in order to discuss a scheme for fiscal union, represented an academic rather than a practical advance, since the by-elections showed that the Unionists were certain to be defeated. The one important new development concerned the Liberal-Unionist organization. In January some correspondence was published between Mr Chamberlain and the duke of Devonshire, dating from the previous October, as to difficulties arising from the central Liberal-Unionist organization subsidizing local associations which had adopted the programme of tariff reform. The duke objected to this departure from neutrality, and suggested that it was becoming "impossible with any advantage to maintain under existing circumstances the existence of the Liberal-Unionist organization." Mr Chamberlain retorted that this was a matter for a general meeting of delegates to decide; if the duke was outvoted he might resign his presidency; for his own part he was prepared to allow the local associations to be subsidized impartially, so long as they supported the government, but he was not prepared for the violent disruption, which the duke apparently contemplated, of an association so necessary to the success of the Unionist cause. The duke was in a difficult position as president of the organization, since most of the local associations supported Mr Chamberlain, and he replied that the differences between them were vital, and he would not be responsible for dividing the association into sections, but would rather resign. Mr Chamberlain then called a general meeting on his own responsibility in February, when a new constitution was proposed; and in May, at the annual meeting of the Liberal-Unionist council, the free-food Unionists, being in a minority, retired, and the association was reorganized under Mr Chamberlain's auspices, Lord Lansdowne and Lord Selborne (both of them cabinet ministers) becoming vice-presidents. On July 14th the reconstituted Liberal-Unionist organization held a great demonstration in the Albert Hall, and Mr Chamberlain's success in ousting the duke of Devonshire and the other free-trade members of the old Liberal-Unionist party, and imposing his own fiscal policy upon the Liberal-Unionist caucus, was now complete.

During the spring and summer of 1905 Mr Chamberlain's more active supporters were in favour of forcing a dissolution by leaving the government in a minority, but he himself preferred to leave matters to take their course, so long as the prime minister was content to be publicly identified with the policy of eventually fighting on tariff reform lines. Speaking at the Albert Hall in July Mr Chamberlain pushed somewhat further than before his "embrace" of Mr Balfour; and in the autumn, when foreign affairs no longer dominated the attention of the government, the crisis rapidly came to a head. In reply to Mr Balfour's appeal for the sinking of differences (Newcastle, November 14), Mr Chamberlain insisted at Bristol (November 21) on the adoption of his fiscal policy; and Mr Balfour resigned on December 4, on the ground that he no longer retained the confidence of the party. At the crushing Unionist defeat in the general election which followed in January 1906, Mr Chamberlain was triumphantly returned for West Birmingham, and all the divisions of Birmingham returned Chamberlainite members. Amid the wreck of the party—Mr Balfour and several of his colleagues themselves losing their seats—he had the consolation of knowing that the tariff reformers won the only conspicuous successes of the election. But he had no desire to set himself up as leader in Mr Balfour's place, and after private negotiations with the ex-prime minister, a common platform was arranged between them, on which Mr Balfour, for whom a seat was found in the City of London, should continue to lead the remnant of the party. The formula was given in a letter from Mr Balfour of February 14th (see BALFOUR, A. J.) which admitted the necessity of making fiscal reform the first plank in the Unionist platform, and accepted a general tariff on manufactured goods and a small duty on foreign corn as "not in principle objectionable."

It may be left to future historians to attempt a considered judgment on the English tariff reform movement, and on Mr Chamberlain's responsibility for the Unionist *débâcle* of 1906. But while his enemies taunted him with having twice wrecked his party—first the Radical party under Mr Gladstone, and secondly the Unionist party under Mr Balfour—no well-informed critic doubted his sincerity, or failed to recognize that in leaving the cabinet and embarking on his fiscal campaign he showed real devotion to an idea. In championing the cause of imperial fiscal union, by means involving the abandonment of a system of taxation which had become part of British orthodoxy, he followed the guidance of a profound conviction that the stability of the empire and the very existence of the hegemony of the United Kingdom depended upon the conversion of public opinion to a revision of the current economic doctrine. There were doubtless miscalculations at the outset as to the resistance to be encountered. But from the purely party point of view he was entitled to say that he followed the path of loyalty to Mr Balfour which he had marked out from the moment of his resignation, and that he persistently refused to be put in competition with him as leader. Even in the absence of the new issue, defeat was foredoomed for Mr Balfour's administration by the ordinary course of political events; and it might fairly be claimed that "Chinese slavery," "passive resistance," and labour irritation at the Taff Vale judgment (see TRADE UNIONS) were mainly responsible for the Unionist collapse. Time alone would show whether the system of free imports could be permanently reconciled with British imperial policy or commercial prosperity. It remained the fact that Mr Chamberlain staked an already established position on his refusal to compromise with his

convictions on a question which appeared to him of vital and immediate importance.

Mr Chamberlain's own activity in the political field was cut short in the middle of the session of 1906 by a serious attack of gout, which was at first minimized by his friends, but which, it was gradually discovered, had completely crippled him. Though encouragement was given to the idea that he might return to the House of Commons, where he continued to retain his seat for Birmingham, he was quite incapacitated for any public work; and this invalid condition was protracted throughout 1907, 1908 and 1909. But he remained in the background as the inspirer and adviser of the Tariff Reformers. The cause made continuous headway at by-elections, and though the general election of January 1910 gave the Unionists no majority it saw them returned in much increased strength, which was chiefly due to the support obtained for tariff reform principles. Mr Chamberlain himself was returned unopposed for West Birmingham again. (H. Ch.)

CHAMBERLAIN, JOSHUA LAWRENCE (1828–), American soldier and educationalist, was born at Brewer, Maine, on the 8th of September 1828. He graduated at Bowdoin College in 1852, and at the Bangor Theological Seminary in 1855, and was successively tutor in logic and natural theology (1855–1856), professor of rhetoric and oratory (1856–1861), and professor of modern languages (1861–1865), at Bowdoin. In 1862 he entered the Federal army as lieutenant-colonel of the 20th Maine Infantry. His military career was marked by great personal bravery and energy and intrepidity as a leader. He was six times wounded, and participated in all the important battles in the East from Antietam onwards, including Fredericksburg, Chancellorsville, Gettysburg, the Wilderness, Cold Harbor, Petersburg and Five Forks. For his conduct at Petersburg, where he was severely wounded, he was promoted to be brigadier-general of volunteers. He was breveted major-general of volunteers on the 29th of March 1865, and led the Federal advance in the final operations against General R. E. Lee. In 1893 he received a Congressional medal of honour "for daring heroism and great tenacity in holding his position on the Little Round Top and carrying the advance position on the Great Round Top at the Battle of Gettysburg." After the war he was again professor of rhetoric and oratory at Bowdoin in 1865–1866, and in 1867–1870 was governor of Maine, having been elected as a Republican. From 1871 to 1883 he was president of Bowdoin College, and during 1874–1879 was professor of mental and moral philosophy also. Appointed in 1880 by Alonzo Garcelon, the retiring governor, to protect the property and institutions of the state until a new governor should be duly qualified, and acting as major-general of the state militia, Chamberlain did much to avert possible civil war, at a time of great political excitement and bitter partisan feeling. (See MAINE: *History*.) In 1883–1885 he was a lecturer on political science and public law at Bowdoin, and in 1900 became surveyor of customs for the district of Portland, Maine. He published *Maine, Her Place in History* (1877), and edited *Universities and Their Sons* (6 vols., 1898).

CHAMBERLAIN, SIR NEVILLE BOWLES (1820–1902), British field marshal, was the third son of Sir Henry Chamberlain, first baronet, consul-general and chargé d'affaires in Brazil, and was born at Rio on the 10th of January 1820. He entered the Indian army in 1837, served as a subaltern in the first Afghan War (1839–42), and was wounded on six occasions. He was attached to the Governor-General's Bodyguard at the battle of Maharajpur, in the Gwalior campaign of 1843, was appointed military secretary to the governor of Bombay in 1846, and honorary aide-de-camp to the governor-general of India in 1847. He served on the staff throughout the Punjab campaign of 1848–49, and was given a brevet majority. In 1850 he was appointed commandant of the Punjab military police, and in 1852 military secretary to the Punjab government. Promoted lieut.-colonel in 1854, he was given the command of the Punjab Frontier Force with rank of brigadier-general, and commanded in several expeditions against the frontier tribes. In the Indian Mutiny he succeeded Colonel Chester as adjutant-general of the Indian army, and distinguished himself at the siege of Delhi, where he was severely wounded. He was rewarded with a brevet-colonelcy, the appointment of A.D.C. to the queen, and the C.B. He was reappointed to the command of the Punjab Frontier Force in 1858, and commanded in the Umbeyla campaign (1863), in which he was severely wounded. He was now made major-general for distinguished service and a K.C.B. He was made K.C.S.I. in 1866, lieut.-general in 1872, G.C.S.I. in 1873, G.C.B. in 1875, and general in 1877. From 1876 to 1881 he was commander-in-chief of the Madras army, and in 1878 was sent on a mission to the amir of Afghanistan, whose refusal to allow him to enter the country precipitated the second Afghan War. He was for some time acting military member of the council of the governor-general of India. He retired in 1886, was made a field marshal in 1900, and died on the 18th of February 1902.

An excellent biography by G. W. Forrest appeared in 1909.

CHAMBERLAIN (O. Fr. *chamberlain, chamberlenc*, Mod. Fr. *chambellan*, from O. H. Ger. *Chamarling, Chamarlinc*, whence also the Med. Lat. *cambellanus, camerlingus, camerlengus*; Ital. *camerlingo*; Span. *camerlengo*, compounded of O. H. Ger. *Chamara, Kamara* [Lat. *camera*, "chamber"], and the Ger. suffix *-ling*), etymologically, and also to a large extent historically, an officer charged with the superintendence of domestic affairs. Such were the chamberlains of monasteries or cathedrals, who had charge of the finances, gave notice of chapter meetings, and provided the materials necessary for the various services. In these cases, as in that of the apostolic chamberlain of the Roman see, the title was borrowed from the usage of the courts of the western secular princes. A royal chamberlain is now a court official whose function is in general to attend on the person of the sovereign and to regulate the etiquette of the palace. He is the representative of the medieval *camberlanus, cambellanus*, or *cubicularius*, whose office was modelled on that of the *praefectus sacri cubiculi* or *cubicularius* of the Roman emperors. But at the outset there was another class of chamberlains, the *camerarii, i.e.* high officials charged with the administration of the royal treasury (*camera*). The *camerarius* of the Carolingian emperors was the equivalent of the *hordere* or *thesaurarius* (treasurer) of the Anglo-Saxon kings; he develops into the *Erzkämmerer* (*archicamerarius*) of the Holy Roman Empire, an office held by the margraves of Brandenburg, and the *grand chambrier* of France, who held his *chamberie* as a fief. Similarly in England after the Norman conquest the *hordere* becomes the chamberlain. This office was of great importance. Before the Conquest he had been, with the marshal, the principal officer of the king's court; and under the Norman sovereigns his functions were manifold. As he had charge of the administration of the royal household, his office was of financial importance, for a portion of the royal revenue was paid, not into the exchequer, but in *camera regis*. In course of time the office became hereditary and titular, but the complexities of the duties necessitated a division of the work, and the office was split up into three: the hereditary and sinecure office of *magister camerarius* or lord great chamberlain (see LORD GREAT CHAMBERLAIN), the more important domestic office of *camerarius regis*, king's chamberlain or lord chamberlain (see LORD CHAMBERLAIN), and the chamberlains (*camerarii*) of the exchequer, two in number, who were originally representatives of the chamberlain at the exchequer, and afterwards in conjunction with the treasurer presided over that department. In 1826 the last of these officials died, when by an act passed forty-four years earlier they disappeared.

In France the office of *grand chambrier* was early overshadowed by the *chamberlains* (*cubicularii, cambellani*, but sometimes also *camerarii*), officials in close personal attendance on the king, men at first of low rank, but of great and ever-increasing influence. As the office of *grand chambrier*, held by great feudal nobles seldom at court, became more and more honorary, the chamberlains grew in power, in numbers and in rank, until, in the 13th century, one of them emerges as a great officer of state, the *chambellan de France* or *grand chambellan* (also *magister cambellanorum, mestre chamberlenc*), who at times shares with the *grand chambrier* the revenues derived from certain

trades in the city of Paris (see *Regestum Memoralium Camerae computorum*, quoted in du Cange, s. *Camerarius*). The honorary office of *grand chambrier* survived till the time of Henry II., who was himself the last to hold it before his accession; that of *grand chambellan*, which in its turn soon became purely honorary, survived till the Revolution. Among the prerogatives of the *grand chambellan* which survived to the last not the least valued was the right to hand the king his shirt at the ceremonial levée. The offices of *grand chambellan*, *premier chambellan*, and *chambellan* were revived by Napoleon, continued under the Restoration, abolished by Louis Philippe, and again restored by Napoleon III.

In the papal Curia the apostolic chamberlain (Lat. *camerarius*, Ital. *camerlingo*) occupies a very important position. He is at the head of the treasury (*camera thesauraria*) and, in the days of the temporal power, not only administered the papal finances but possessed an extensive civil and criminal jurisdiction. During a vacancy of the Holy See he is at the head of the administration of the Roman Church. The office dates from the 11th century, when it superseded that of archdeacon of the Roman Church, and the close personal relations of the *camerarius* with the pope, together with the fact that he is the official guardian of the ceremonial vestments and treasures, point to the fact that he is also the representative of the former *vestararius* and *vice-dominus*, whose functions were merged in the new office, of which the idea and title were probably borrowed from the usage of the secular courts of the West (Hinschius, *Kirchenrecht*, i. 405, &c.). There are also attached to the papal household (*famiglia pontificia*) a large number of chamberlains whose functions are more or less ornamental. These are divided into several categories: privy chamberlains (*camerieri segreti*), chamberlains, assistant and honorary chamberlains. These are gentlemen of rank and belong to the highest class of the household (*famiglia nobile*).

In England the modern representatives of the *cubicularii* are the gentlemen and grooms of the bed-chamber, in Germany the *Kammerherr* (*Kämmerer*, from *camerarius*, in Bavaria and Austria) and *Kammerjunker*. The insignia of their office is a gold key attached to their coats behind.

Many corporations appoint a chamberlain. The most important in England is the chamberlain of the corporation of the city of London, who is treasurer of the corporation, admits persons entitled to the freedom of the city, and, in the chamberlain's court, of which he and the vice-chamberlain are judges, exercises concurrent jurisdiction with the police court in determining disputes between masters and apprentices. Formerly nominated by the crown, since 1688 he has been elected annually by the liverymen. He has a salary of £2000 a year. Similarly in Germany the administration of the finances of a city is called the *Kämmerei* and the official in charge of it the *Kämmerer*.

See also STATE, GREAT OFFICERS OF; HOUSEHOLD, ROYAL; Du Cange, *Glossarium*, s. "Camerarius" and "Cambellanus"; Père Anselme (Pierre de Guibours), *Hist. généalogique et chronologique de la maison royale de France*, &c. (9 vols., 3rd ed., 1726–1733); A. Luchaire, *Manuel des institutions françaises* (Paris, 1892); W. R. Anson, *Law and Custom of the Constitution* (Oxford, 1896); Hinschius, *Kirchenrecht*, i. 405 (Berlin, 1869).

CHAMBERLAYNE, WILLIAM (1619–1679), English poet, was born in 1619. Nothing is known of his history except that he practised as a physician at Shaftesbury in Dorsetshire, and fought on the Royalist side at the second battle of Newbury. He died on the 11th of July 1679. His works are: *Pharonnida* (1659), a verse romance in five books; *Love's Victory* (1658), a tragi-comedy, acted under another title in 1678 at the Theatre Royal; *England's Jubilee* (1660), a poem in honour of the Restoration. A prose version of *Pharonnida*, entitled *Eromena*, or the *Noble Stranger*, appeared in 1683. Southey speaks of him as "a poet to whom I am indebted for many hours of delight." *Pharonnida* was reprinted by S. W. Singer in 1820, and again in 1905 by Prof. G. Saintsbury in *Minor Poets of the Caroline Period* (vol. i.). The poem is loose in construction, but contains some passages of great beauty.

CHAMBERS, EPHRAIM (d. 1740), English encyclopaedist, was born at Kendal, Westmorland, in the latter part of the 17th century. He was apprenticed to a globe-maker in London, but having conceived the plan of his Cyclopaedia, or *Universal Dictionary of Arts and Sciences*, he devoted himself entirely to it. The first edition appeared by subscription in 1728, in two vols. fol., and dedicated to the king (see ENCYCLOPAEDIA). The *Encyclopédie* of Diderot and d'Alembert owed its inception to a French translation of Chambers's work. In addition to the *Cyclopaedia*, Chambers wrote for the *Literary Magazine* (1735–1736), and translated the *History and Memoirs of the Royal Academy of Sciences at Paris* (1742), and the *Practice of Perspective* from the French of Jean Dubreuil. He died on the 15th of May 1740.

CHAMBERS, GEORGE (1803–1840), English marine painter, born at Whitby, Yorkshire, was the son of a seaman, and for several years he pursued his father's calling. While at sea he was in the habit of sketching the different classes of vessels. His master, observing this, gratified him by cancelling his indentures, and thus set him free to follow his natural bent. Chambers then apprenticed himself to an old woman who kept a painter's shop in Whitby, and began by house-painting. He also took lessons of a drawing-master, and found a ready sale for small and cheap pictures of shipping. Coming afterwards to London, he was employed by Thomas Horner to assist in painting the great panorama of London for the Colosseum (the exhibition building in Regent's Park, demolished towards 1860), and he next became scene-painter at the Pavilion theatre. In 1834 he was elected an associate, and in 1836 a full member, of the Water-colour Society. His best works represent naval battles. Two of these—the "Bombardment of Algiers in 1836," and the "Capture of Porto Bello"—are in Greenwich hospital. Not long before his death he was introduced to William IV., and his professional prospects brightened; but his constitution, always frail, gave way, and he died on the 28th of October 1840.

A *Life*, by John Watkins, was published in 1841.

CHAMBERS, ROBERT (1802–1871), Scottish author and publisher, was born at Peebles on the 10th of July 1802. He was sent to the local schools, and gave evidence of unusual literary taste and ability. A small circulating library in the town, and a copy of the *Encyclopaedia Britannica* which his father had purchased, furnished him with stores of reading of which he eagerly availed himself. Long afterwards he wrote of his early years—"Books, not playthings, filled my hands in childhood. At twelve I was deep, not only in poetry and fiction, but in encyclopaedias." Robert had been destined for the church, but this design had to be abandoned for lack of means. The family removed to Edinburgh in 1813, and in 1818 Robert began business as a bookstall-keeper in Leith Walk. He was then only sixteen, and his whole stock consisted of a few old books belonging to his father. In 1819 his elder brother William had begun a similar business, and the two eventually united as partners in the publishing firm of W. & R. Chambers. Robert Chambers showed an enthusiastic interest in the history and antiquities of Edinburgh, and found a most congenial task in his *Traditions of Edinburgh* (2 vols., 1824), which secured for him the approval and the personal friendship of Sir Walter Scott. A *History of the Rebellions in Scotland from 1638 to 1745* (5 vols., 1828) and numerous other works followed.

In the beginning of 1832 William Chambers started a weekly publication under the title of *Chambers's Edinburgh Journal* (known since 1854 as *Chambers's Journal of Literature, Science and Arts*), which speedily attained a large circulation. Robert was at first only a contributor. After fourteen numbers had appeared, however, he was associated with his brother as joint-editor, and his collaboration contributed more perhaps than anything else to the success of the *Journal*.

Among the other numerous works of which Robert was in whole or in part the author, the *Biographical Dictionary of Eminent Scotsmen* (4 vols., Glasgow, 1832–1835), the *Cyclopaedia of English Literature* (1844), the *Life and Works of Robert Burns* (4 vols., 1851), *Ancient Sea Margins* (1848), the *Domestic Annals of Scotland* (3 vols., 1859–1861) and the *Book of Days* (2 vols.,

1862–1864) were the most important. *Chambers's Encyclopaedia* (1859–1868), with Dr Andrew Findlater as editor, was carried out under the superintendence of the brothers (see ENCYCLOPAEDIA). The *Cyclopaedia of English Literature*[1] contains a series of admirably selected extracts from the best authors of every period, "set in a biographical and critical history of the literature itself." For the *Life of Burns* he made diligent and laborious original investigations, gathering many hitherto unrecorded facts from the poet's sister, Mrs Begg, to whose benefit the whole profits of the work were generously devoted. Robert Chambers was a scientific geologist, and availed himself of tours in Scandinavia and Canada for the purpose of geological exploration. The results of his travels were embodied in *Tracings of the North of Europe* (1851) and *Tracings in Iceland and the Faroe Islands* (1856). His knowledge of geology was one of the principal grounds on which the authorship of the *Vestiges of the Natural History of Creation* (2 vols., 1843–1846) was eventually assigned to him. The book was published anonymously. Robert Chambers was aware of the storm that would probably be raised at the time by a rational treatment of the subject, and did not wish to involve his firm in the discredit that a charge of heterodoxy would bring with it. The arrangements for publication were made through Alexander Ireland of Manchester, and the secret was so well kept that such different names as those of Prince Albert and Sir Charles Lyell were coupled with the book. Ireland in 1884 issued a 12th edition, with a preface giving an account of its authorship, which there was no longer any reason for concealing. The *Book of Days* was Chambers's last publication, and perhaps his most elaborate. It was a miscellany of popular antiquities in connexion with the calendar, and it is supposed that his excessive labour in connexion with this book hastened his death, which took place at St Andrews on the 17th of March 1871. Two years before, the university of St Andrews had conferred upon him the degree of doctor of laws, and he was elected a member of the Athenaeum club in London. It is his highest claim to distinction that he did so much to give a healthy tone to the cheap popular literature which has become so important a factor in modern civilization.

His brother, WILLIAM CHAMBERS (1800–1883) was born at Peebles, on the 16th of April 1800. He was the financial genius of the publishing firm. He laid the city of Edinburgh under the greatest obligations by his public spirit and munificence. As lord provost he procured the passing in 1867 of the Improvement Act, which led to the reconstruction of a great part of the Old Town, and at a later date he proposed and carried out, largely at his own expense, the restoration of the noble and then neglected church of St Giles, making it in a sense "the Westminster Abbey of Scotland." This service was fitly acknowledged by the offer of a baronetcy, which he did not live to receive, dying on the 20th of May 1883, three days before the reopening of the church. He was the author of a history of St Giles's, of a memoir of himself and his brother (1872), and of many other useful publications. On his death in 1883 Robert Chambers (1832–1888), son of Robert Chambers, succeeded as head of the firm, and edited the *Journal* until his death. His eldest son, Charles Edward Stuart Chambers (b. 1859), became editor of the *Journal* and chairman of W. & R. Chambers, Limited.

See also *Memoir of Robert Chambers, with Autobiographic Reminiscences of William Chambers* (1872), the 13th ed. of which (1884) has a supplementary chapter; Alexander Ireland's preface to the 12th ed. (1884) of the *Vestiges of Creation*; the *Story of a Long and Busy Life* (1884), by William Chambers; and some discriminating appreciation in James Payn's *Some Literary Recollections* (1884), chapter v. The *Select Writings of Robert Chambers* were published in 7 vols. in 1847, and a complete list of the works of the brothers is added to *A Catalogue of Some of the Rarer Books . . . in the Collection of C. E. S. Chambers* (Edinburgh, 1891).

CHAMBERS, SIR WILLIAM (1726–1796), British architect, was the grandson of a rich merchant who had financed the armies of Charles XII., but was paid in base money, and whose son remained in Sweden many years endeavouring to obtain redress. In 1728 the latter returned to England and settled at Ripon, where William, who was born in Stockholm, was educated. At the age of sixteen he became supercargo to the Swedish East India Company, and voyaging to Canton made drawings of Chinese architecture, furniture and costume which served as basis for his *Designs for Chinese Buildings*, &c. (1757). Two years later he quitted the sea to study architecture seriously, and spent a long time in Italy, devoting special attention to the buildings of classical and Renaissance architects. He also studied under Clérisseau in Paris, with whom and with the sculptor Wilton he lived at Rome. In 1755 he returned to England with Cipriani and Wilton, and married the beautiful daughter of the latter. His first important commission was a villa for Lord Bessborough at Roehampton, but he made his reputation by the grounds he laid out and the buildings he erected at Kew between 1757 and 1762 for Augusta, princess dowager of Wales. Some of them have since been demolished, but the most important, the pagoda, still survives. The publication in a handsome volume of the designs for these buildings assured his position in the profession. He was employed to teach architectural drawing to the prince of Wales (George III.), and gained further professional distinction in 1759 by the publication of his *Treatise of Civil Architecture*. He began to exhibit with the Society of Artists in 1761 at Spring Gardens, and was one of the original members and treasurer of the Royal Academy when it was established in 1768. In 1772 he published his *Dissertation on Oriental Gardening*, which attempted to prove the inferiority of European to Chinese landscape gardening. As a furniture designer and internal decorator he is credited with the creation of that "Chinese Style" which was for a time furiously popular, although Thomas Chippendale (*q.v.*) had published designs in that manner at a somewhat earlier date. It is not unreasonable to count the honours as divided, since Chippendale unquestionably adapted and altered the Chinese shapes in a manner better to fit them for European use. To the rage for every possible form of *chinoiserie*, for which he is chiefly responsible, Sir William Chambers owed much of his success in life. He became architect to the king and queen, comptroller of his majesty's works, and afterwards surveyor-general. In 1775 he was appointed architect of Somerset House, his greatest monument, at a salary of £2000 a year. He also designed town mansions for Earl Gower at Whitehall and Lord Melbourne in Piccadilly, built Charlemont House, Dublin, and Duddingston House near Edinburgh. He designed the market house at Worcester, was employed by the earl of Pembroke at Wilton, by the duke of Marlborough at Blenheim, and by the duke of Bedford in Bloomsbury. The state coach of George III., his constant patron, was his work; it is now in the Victoria and Albert Museum. Although his practice was mainly Classic, he made Gothic additions to Milton Abbey in Dorset. Sir William Chambers achieved considerable distinction as a designer of furniture. In addition to his work in the Chinese style and in the contemporary fashions, he was the author of what is probably the most ambitious and monumental piece of furniture ever produced in England. This was a combined bureau, dressing-case, jewel-cabinet and organ, made for Charles IV., king of Spain, in 1793. These combination pieces were in the taste of the time, and the effort displays astonishing ingenuity and resource. The panels were painted by W. Hamilton, R.A., with representations of the four seasons, night and morning, fire and water, Juno and Ceres, together with representations of the Golden Fleece and the Immaculate Conception. The organ, in the domed top, is in a case decorated with ormolu and Wedgwood. This remarkable achievement, which possesses much sober elegance, formed part of the loan collection of English furniture at the Franco-British Exhibition in London in 1908. Sir William Chambers numbered among his friends Dr Johnson, Goldsmith, Sir Joshua Reynolds, David Garrick and Dr Burney.

CHAMBERS (the Fr. *chambre*, from Lat. *camera*, a room), a term used generally of rooms or apartments, but especially in law of the offices of a lawyer or the semi-private rooms in which judges or judicial officers deal with questions of practice and

[1] A new and enlarged edition of this work, edited by the Rev. David Patrick, appeared in 1903.

other matters not of sufficient importance to be dealt with in court. It is a matter of doubt at what period the practice of exercising jurisdiction "in chambers" commenced in England; there is no statutory sanction before 1821, though the custom can be traced back to the 17th century. An act of 1821 provided for sittings in chambers between terms, and an act of 1822 empowered the sovereign to call upon the judges by warrant to sit in chambers on as many days in vacation as should seem fit, while the Law Terms Act 1830 defined the jurisdiction to be exercised at chambers. The Judges' Chambers Act 1867 was the first act, however, to lay down proper regulations for chamber work, and the Judicature Act 1873 preserved that jurisdiction and gave power to increase it as might be directed or authorized by rules of court to be thereafter made. (See CHANCERY; KING'S BENCH, COURT OF.)

CHAMBERSBURG, a borough and the county-seat of Franklin county, Pennsylvania, U.S.A., at the confluence of Conococheague Creek and Falling Spring, 52 m. S.W. of Harrisburg. Pop. (1890) 7863; (1900) 8864, of whom 769 were negroes; (1906, est.) 9658. It is served by the Cumberland Valley and the Western Maryland railways, and is connected by electric lines with Greencastle, Waynesboro, Caledonia, a beautiful park in the Pennsylvania timber reservation, on South Mountain, 12 m. east of Chambersburg, and Pen Mar, a summer resort, on South Mountain, near the boundary line between Pennsylvania and Maryland. Chambersburg is built on an elevated site in the broad and fertile Cumberland Valley, and commands a fine view of the distant hills and dales. The borough is the seat of Chambersburg Academy, a preparatory school; Penn Hall, a school for girls; and Wilson College, a Presbyterian institution for women, opened in 1870. The Wilson College campus, the former estate of Colonel A. K. McClure (b. 1828), a well-known journalist, was laid out by Donald G. Mitchell ("Ik Marvel"), who was an enthusiastic landscape gardener. The shops of the Cumberland Valley railway are at Chambersburg, and among the borough's manufactures are milling machinery, boilers, engines, hydraulic presses, steam-hammers, engineering and bridge supplies, hosiery, shoes, gloves, furniture, flour, paper, leather, carriages and agricultural implements; the total value of its factory product in 1905 was $1,085,185. The waterworks and the electric-lighting plant are owned and operated by the municipality. A settlement was founded here in 1730 by Benjamin Chambers, in whose honour the borough was named, and who, immediately after General Edward Braddock's defeat in 1755, built a stone fort and surrounded it with a stockade for the protection of the community from the Indians. Chambersburg was laid out in 1764 and was incorporated as a borough in 1803. On the 30th of July 1864 Chambersburg was occupied by a Confederate cavalry force under General McCausland (acting under General Jubal A. Early's orders), who, upon the refusal of the citizens to pay $100,000 for immunity, burned a large part of the borough.

CHAMBÉRY, a city of France, capital of the department of Savoie, pleasantly situated in a fertile district, between two hills, on the rivers Leysse and Albane, 79 m. by rail S.S.W. of Geneva. Pop. (1906) town, 16,852; commune, 23,027. The town is irregularly built, and has only two good streets—the Place Saint-Léger and the Rue de Boigne, the latter being named after General Benoît Boigne (1741–1830), who left a fortune of 3,400,000 francs (accumulated in India) to the town. The principal buildings are the cathedral, dating from the 14th and 15th centuries; the Hôtel-Dieu, founded in 1647; the castle, a modern building serving as the prefecture, and preserving only a great square tower belonging to the original structure; the palace of justice, the theatre, the barracks, and the covered market, which dates from 1863. Several of the squares are adorned with fountains; the old ramparts of the city, destroyed during the French Revolution, have been converted into public walks; and various promenades and gardens have been constructed. Chambéry is the seat of an archbishop (raised to that dignity from a bishopric in 1817) and of a superior tribunal. It has also a Jesuit college, a royal academical society, a society of agriculture and commerce, a public library with 60,000 volumes, a museum (antiquities and paintings), a botanic garden, and many charitable institutions. It manufactures silk-gauze, lace, leather and hats, and has a considerable trade in liqueurs, wine, lead, copper and other articles. Overlooking the town on the north is the Rocher de Lémenc, which derives its name from the *Lemincum* of the Romans; and in the vicinity is Les Charmettes, for some time (1736–1740) the residence of Rousseau.

The origin of Chambéry is unknown, but its lords are mentioned for the first time in 1029. In 1232 it was sold to the count of Savoy, Thomas I., who bestowed several important privileges on the inhabitants. As capital of the duchy of Savoy, it has passed through numerous political vicissitudes. Between 1536 and 1713 it was several times occupied by the French; in 1742 it was captured by a Franco-Spanish army; and in 1792 it was occupied by the Republican forces, and became the capital of the department of Mont Blanc. Restored to the house of Savoy by the treaties of Vienna and Paris, it was again surrendered to France in 1860. Among the famous men whom it has given to France, the most important are Vaugelas (1585–1650), Saint-Réal (1639–1692), and the brothers Joseph (1754–1821) and Xavier (1763–1852) de Maistre.

CHAMBORD, HENRI CHARLES FERDINAND MARIE DIEUDONNÉ, COMTE DE (1820–1883), the "King Henry V." of the French legitimists, was born in Paris on the 29th of September 1820. His father was the duc de Berry, the elder son of the comte d'Artois (afterwards Charles X.); his mother was the princess Caroline Ferdinande Louise of Naples. Born seven months after the assassination of his father, he was hailed as the "enfant du miracle," and was made the subject of one of Lamartine's most famous poems. He was created duc de Bordeaux, and in 1821, as the result of a subscription organized by the government, received the château of Chambord. He was educated by tutors inspired by detestation of the French Revolution and its principles, and from the duc de Damas in particular imbibed those ideas of divine right and of devotion to the Church to which he always remained true. After the revolution of July, Charles X. vainly endeavoured to save the Bourbon cause by abdicating in his favour and proclaiming him king under the title of Henry V. (August 2, 1830). The comte de Chambord accompanied his grandfather into exile, and resided successively at Holyrood, Prague, and Görz. In 1841, during an extensive tour through Europe, he broke his leg—an accident that resulted in permanent lameness. The death of his grandfather, Charles X., in 1836, and of his uncle, the duc d'Angoulême, in 1844, left him the last male representative of the elder branch of the Bourbon family; and his marriage with the archduchess Maria Theresa, eldest daughter of the duke of Modena (November 7, 1846), remained without issue. The title to the throne thus passed to the comte de Paris, as representative of the Orleans branch of the house of Bourbon, and the history of the comte de Chambord's life is largely an account of the efforts made to unite the Royalist party by effecting a reconciliation between the two princes. Though he continued to hold an informal court, both on his travels and at his castle of Frohsdorf, near Vienna, yet he allowed the revolution of 1848 and the *coup d'état* of 1851 to pass without any decisive assertion of his claims. It was the Italian war of 1859, with its menace to the pope's independence, that roused him at last to activity. He declared himself ready "to pay with his blood for the triumph of a cause which was that of France, the Church, and God himself." Making common cause with the Church, the Royalists now began an active campaign against the Empire. On the 9th of December 1866 he addressed a manifesto to General Saint-Priest, in which he declared the cause of the pope to be that of society and liberty, and held out promises of retrenchment, civil and religious liberty, "and above all honesty." Again, on the 4th of September 1870, after the fall of the Empire, he invited Frenchmen to accept a government "whose basis was right and whose principle was honesty," and promised to drive the enemy from French soil. These vague phrases, offered as a panacea to a nation fighting for its life, showed conclusively his want of all political genius; they had as little effect on the French as his

protest against the bombardment of Paris had on the Germans. Yet fortune favoured him. The elections placed the Republican party in a minority in the National Assembly; the abrogation of the law of exile against the royal family permitted him to return to his castle of Chambord; and it was thence that on the 5th of July 1871 he issued a proclamation, in which for the first time he publicly posed as king, and declared that he would never abandon the white standard of the Bourbons, "the flag of Henry IV., Francis I., and Joan of Arc," for the tricolour of the Revolution. He again quitted France, and answered the attempts to make him renounce his claims in favour of the comte de Paris by the declaration (January 25, 1872) that he would never abdicate. In the following month he held a great gathering of his adherents at Antwerp, which was the cause of serious disturbances. A constitutional programme, signed by some 280 members of the National Assembly, was presented for his acceptance, but without result. The fall of Thiers in May 1873, however, offered an opportunity to the Royalists by which they hastened to profit. The comte de Paris and the prince de Joinville journeyed to Frohsdorf, and were formally reconciled with the head of the family (August 5). The Royalists were united, the premier (the duc de Broglie) an open adherent, the president (MacMahon) a benevolent neutral. MM. Lucien Brun and Chesnelong were sent to interview the comte de Chambord at Salzburg, and obtain the definite assurances that alone were wanting. They returned with the news that he accepted the principles of the French Revolution and the tricolour flag. But a letter to Chesnelong, dated Salzburg, 27th of October, declared that he had been misunderstood: he would give no guarantees; he would not inaugurate his reign by an act of weakness, nor become "le roi légitime de la Révolution." "Je suis le pilote nécessaire," he added, "le seul capable de conduire le navire au port, parce que j'ai mission et autorité pour cela." This outspoken adherence to the principle of divine right did credit to his honesty, but it cost him the crown. The duc de Broglie carried the septennate, and the Republic steadily established itself in popular favour. A last effort was made in the National Assembly in June 1874 by the duc de la Rochefoucauld-Bisaccia, who formally moved the restoration of the monarchy. The comte de Chambord on the 2nd of July issued a fresh manifesto, which added nothing to his former declarations. The motion was rejected by 272 to 79, and on the 25th of February 1875 the Assembly definitely adopted the Republic as the national form of government. From this time the comte de Chambord, though continuing to publish letters on political affairs, made no further effort to regain the throne. He died at Frohsdorf on the 24th of August 1883.

See *Manifestes et programmes politiques de M. le comte de Chambord, 1848–1873* (1873), and *Correspondance de la famille royale et principalement de Mgr. le comte de Chambord avec le comte de Bouillé* (1884). Of the enormous literature relating to him, mention may be made of *Henri V et la monarchie traditionnelle* (1871), *Le Comte de Chambord étudié dans ses voyages et sa correspondance* (1880), and *Henri de France*, by H. de Pène (1885). (H. Sy.)

CHAMBORD, a village of central France, in the department of Loir-et-Cher, on the left bank of the Cosson, 10 m. E. by N. of Blois by road. The village stands in the park of Chambord, which is enclosed by a wall 21 m. in circumference. The celebrated château (see ARCHITECTURE: *Renaissance Architecture in France*) forms a parallelogram flanked at the angles by round towers and enclosing a square block of buildings, the façade of which forms the centre of the main front. The profusion of turrets, pinnacles, and dormer windows which decorates the roof of this, the chief portion of the château, constitutes the main feature of the exterior, while in the interior are a well-preserved chapel of the 16th century and a famous double staircase, the construction of which permits two people to ascend and descend respectively without seeing one another. There are 440 apartments, containing pictures of the 17th century and souvenirs of the comte de Chambord. The château was originally a hunting-box of the counts of Blois, the rebuilding of which was begun by Francis I. in 1526, and completed under Henry II. It was the residence of several succeeding monarchs, and under Louis XIV. considerable alterations were made. In the same reign Molière performed *Monsieur de Pourceaugnac* and *Le Bourgeois gentilhomme* for the first time in the theatre. Stanislaus, king of Poland, lived at Chambord, which was bestowed by his son-in-law, Louis XV., upon Marshal Saxe. It was given by Napoleon to Marshal Berthier, from whose widow it was purchased by subscription in 1821, and presented to the duc de Bordeaux, the representative of the older branch of the Bourbons, who assumed from it the title of comte de Chambord. On his death in 1883 it came by bequest into the possession of the family of Parma.

CHAMBRE ARDENTE (Fr. "burning chamber"), the term for an extraordinary court of justice in France, mainly held for the trials of heretics. The name is perhaps an allusion to the fact that the proceedings took place in a room from which all daylight was excluded, the only illumination being from torches, or there may be a reference to the severity of the sentences in *ardente*, suggesting the burning of the prisoners at the stake. These courts were originated by the Cardinal of Lorraine, the first of them meeting in 1535 under Francis I. The *Chambre Ardente* co-operated with an inquisitorial tribunal also established by Francis I., the duty of which was to discover cases of heresy and hand them over for final judgment to the *Chambre Ardente*. The reign of Henry II. of France was particularly infamous for the cruelties perpetrated by this court on the Huguenots. The marquise de Brinvilliers (*q.v.*) and her associates were tried in the *Chambre Ardente* in 1680. The court was abolished in 1682.

See N. Weiss, *La Chambre Ardente* (Paris, 1889), and F. Ravaisson, *Archives de la Bastille* (Paris, 1866–1884, 16 vols.).

CHAMELEON, the common name of one of the three suborders of Lacertilia or lizards. The chief genus is *Chamaeleon*, containing most of the fifty to sixty species of the whole group, and with the most extensive range, all through Africa and Madagascar into Arabia, southern India and Ceylon. The Indian species is *Ch. calcaratus*; the dwarf chameleon of South Africa is *Ch. pumilus*; the giant of the whole tribe, reaching a total length of 2 ft., is *Ch. parsoni* of Madagascar. The commonest species in the trade is *Ch. vulgaris* of North Africa, introduced into southern Andalusia. A few queer genera, with much stunted tail, *e.g. Rhampholeon*, in tropical Africa and *Brookesia* in Madagascar are the most aberrant. The common chameleon is the most typical. The head is raised into a pyramidal crest far beyond the occiput, there is no outer ear, nor a drum-cavity. The limbs are very long and slender, and the digits form stout grasping bundles; on the hand the first three form an inner bundle, opposed to the remaining two; on the foot the inner bundle is formed by the first and second toe, the outer by the other three toes. The tail is prehensile, by being rolled downwards; it is not brittle and cannot be renewed. The eyeballs are large, but the lids are united into one concentric fold, leaving only the small pupil visible. The right and left eyes are incessantly moved separately from each other and literally in every direction, up and down, forwards and straight backwards, producing the most terrible squinting. Chameleons alone of all reptiles can focus their eyes upon one spot, and conformably they alone possess a retinal *macula centralis*, or spot of acutest, binocular vision. The tongue has attained an extraordinary development. It is club-shaped, covered with a sticky secretion, and based upon a very narrow root, which is composed of extremely elastic fibres and telescoped over the much elongated, style-shaped, copular piece of the hyoid. The whole apparatus is kept in a contracted state like a spring in a tube. When the spring is released, so to speak, by filling the apparatus with blood and by the play of the hyoid muscles, the heavy thick end shoots out upon the insect prey and is withdrawn by its own elasticity.

Left Forefoot of *Chamaeleon o'shaughenesii*, outer view.

The whole act is like a flash. An ordinary chameleon can shoot a fly at the distance of fully 6 in., and it can manage even a big sphinx moth.

Another remarkable feature is their changing of colour. This proverbial power is greatly exaggerated. They cannot assume in succession all the colours of the rainbow, nor are the changes quick. The common chameleon may be said to be greenish grey, changing to grass-green or to dull black, with or without maroon red, or brown, lateral series of patches. At night the same specimen assumes as a rule a more or less uniform pale straw-colour. After it has been watched for several months, when all its possibilities seem exhausted, it will probably surprise us by a totally new combination, for instance, a black garb with many small yellow specks, or green with many black specks. Pure red and blue are not in the register of this species, but they are rather the rule upon the dark green ground colour of the South African dwarf chameleon. The changes are partly under control of the will, partly complicated reflex actions, intentionally adaptive to the physical and psychical surroundings. The mechanism is as follows. The cutis contains several kinds of specialized cells in many layers, each filled with minute granules of guanine. The upper cells are the smallest, most densely filled with crystals, and cause the white colour by diffusion of direct light; near the Malpighian layer the cells are charged with yellow oil drops; the deeper cells are the largest, tinged light brown, and acting as a turbid medium they cause a blue colour, which, owing to the superimposed yellow drops, reaches our eye as green; provided always that there is an effective screen at the back, and this is formed by large chromatophores which lie at the bottom and send their black pigment half-way up, or on to the top of the layers of guanine and oil containing cells. When all the pigment is shifted towards the surface, as near the epidermis as possible, the creature looks black; when the black pigment is withdrawn into the basal portions of the chromatophores the skin appears yellow.

The lungs are very capacious, and end in several narrow blind sacs which extend far down into the body cavity, so that not only the chest but the whole body can be blown up. This happens when the animals hiss and fight, as they often do. But when they know themselves discovered, they make themselves as thin as possible by compressing the chest and belly vertically by means of their peculiarly elongated ribs. The whole body is then put into such a position that it presents only its narrow edge to the enemy, and with the branch of the tree or shrub interposed. They are absolutely arboreal, but they hibernate in the ground.

The usual mode of propagation is by eggs, which are oval, numerous, provided with a calcareous shell, and buried in humus, whence they are hatched about four months later. But a few species, *e.g.* the dwarf chameleon, are viviparous.

Chameleons are insectivorous. They prefer locusts, grasshoppers and lepidoptera, but are also fond of flies and mealworms. They are notoriously difficult to keep in good health. They want not only warmth, but sunshine, and they must have water, which they lick up in drops from the edges of wet leaves whenever they have a chance. The silliness of the fable that they live on air is shown by the fact that they usually die in an absolutely emaciated and parched condition after three or four months' starvation. (H. F. G.)

In astronomy, "Chamaeleon" is a constellation situated near the south pole and surrounded by the constellations of Octans, Mensa, Piscis volans, Carina (Nauta), Musca and Apus. In chemistry, "chameleon mineral" is a name applied to the green mass which is obtained when pyrolusite (manganese dioxide) is fused with nitre, since a solution in water assumes a purple tint on exposure to the air; this change is due to the oxidation of the manganate, which is first formed, to a permanganate.

CHAMFER, CHAMPFER or CHAUMFER (Fr. *chanfrein*; possibly from Lat. *cantus*, corner, and *frangere*, to break), an architectural term; when the edge or arris of any work is cut off at an angle of 45° in a small degree, it is said to be "chamfered," while it would be "canted" if on a large scale. The chamfer is much used in medieval work, and is sometimes plain, sometimes hollowed out and sometimes moulded. Chamfers are sometimes "stopped" by a bead or some moulding, but when cut short by a slope they are generally known as "stop chamfer."

CHAMFORT, SEBASTIEN ROCH NICOLAS (1741–1794), French man of letters, was born at a little village near Clermont in Auvergne in 1741. He was, according to a baptismal certificate found among his papers, the son of a grocer named Nicolas. A journey to Paris resulted in the boy's obtaining a bursary at the Collège des Grassins. He worked hard, although he wrote later in one of his most contemptuous epigrams—"*Ce que j'ai appris je ne le sais plus; le peu que je sais je l'ai deviné.*" His college career ended, Chamfort assumed the dress of a *petit abbé*. "*C'est un costume, et non point un état,*" he said; and to the principal of his college who promised him a benefice, he replied that he would never be a priest, inasmuch as he preferred honour to honours—"*j'aime l'honneur et non les honneurs.*" About this time he assumed the name of Chamfort.

For some time he contrived to exist by teaching and as a booksellers' hack. His good looks and ready wit, however, soon brought him into notice; but though endowed with immense strength—"Hercule sous la figure d'Adonis," Madame de Craon called him—he lived so hard that he was glad of the chance of doing a "cure" at Spa when the Belgian minister in Paris, M. van Eyck, took him with him to Germany in 1761. On his return to Paris he produced a comedy, *La Jeune Indienne* (1764), which was performed with some success, and this was followed by a series of "epistles" in verse, essays and odes. It was not, however, until 1769, when he won the prize of the French Academy for his *Éloge* on Molière, that his literary reputation was established.

Meanwhile he had lived from hand to mouth, mainly on the hospitality of people who were only too glad to give him board and lodging in exchange for the pleasure of the conversation for which he was famous. Thus Madame Helvétius entertained him at Sèvres for some years. In 1770 another comedy, *Le Marchand de Smyrne*, brought him still further into notice, and he seemed on the road to fortune, when he was suddenly smitten with a horrible disease. His distress was relieved by the generosity of a friend, who made over to him a pension of 1200 livres charged on the *Mercure de France*. With this assistance he was able to go to the baths of Contrexéville and to spend some time in the country, where he wrote an *Éloge* on La Fontaine which won the prize of the Academy of Marseilles (1774). In 1775, while taking the waters at Barèges, he met the duchesse de Grammont, sister of Choiseul, through whose influence he was introduced at court. In 1776 his poor tragedy, *Mustapha et Zeangir*, was played at Fontainebleau before Louis XVI. and Marie Antoinette; the king gave him a further pension of 1200 livres, and the prince de Condé made him his secretary. But he was a Bohemian naturally and by habit, the restraints of the court irked him, and with increasing years he was growing misanthropical. After a year he resigned his post in the prince's household and retired into solitude at Auteuil. There, comparing the authors of old with the men of his own time, he uttered the famous *mot* that proclaims the superiority of the dead over the living as companions; and there too he presently fell in love. The lady, attached to the household of the duchesse du Maine, was forty-eight years old, but clever, amusing, a woman of the world; and Chamfort married her. They left Auteuil, and went to Vaucouleurs, where in six months Madame Chamfort died. Chamfort lived in Holland for a time with M. de Narbonne, and returning to Paris received in 1781 the place at the Academy left vacant by the death of La Curne de Sainte-Palaye, the author of the *Dictionnaire des antiquités françaises*. In 1784, through the influence of Calonne, he became secretary to the king's sister, Madame Elizabeth, and in 1786 he received a pension of 2000 livres from the royal treasury. He was thus once more attached to the court, and made himself friends in spite of the reach and tendency of his unalterable irony; but he quitted it for ever after an unfortunate and mysterious love affair, and was received into the house of M. de Vaudreuil. Here in 1783 he had met Mirabeau, with whom he remained to the last on terms of intimate friendship,

whom he assisted with money and influence, and one at least of whose speeches—that on the Academies—he wrote.

The outbreak of the Revolution made a profound change in the relations of Chamfort's life. Theoretically he had long been a republican, and he now threw himself into the new movement with almost fanatical ardour, devoting all his small fortune to the revolutionary propaganda. His old friends of the court he forgot. "Those who pass the river of revolutions," he said, "have passed the river of oblivion." Until the 31st of August 1791 he was secretary of the Jacobin club; he became a street orator and entered the Bastille among the first of the storming party. He worked for the *Mercure de France*, collaborated with Ginguené in the *Feuille villageoise*, and drew up for Talleyrand his *Adresse au peuple français*.

With the reign of Marat and Robespierre, however, his uncompromising Jacobinism grew critical, and with the fall of the Girondins his political life came to an end. But he could not restrain the tongue that had made him famous; he no more spared the Convention than he had spared the court. His notorious republicanism failed to excuse the sarcasms he lavished on the new order of things, and denounced by an assistant in the Bibliothèque Nationale, to a share in the direction of which he had been appointed by Roland, he was taken to the Madelonnettes. Released for a moment, he was threatened again with arrest; but he had determined to prefer death to a repetition of the moral and physical restraint to which he had been subjected. He attempted suicide with pistol and with poniard; and, horribly hacked and shattered, dictated to those who came to arrest him the well-known declaration—"*Moi, Sebastien-Roch-Nicolas Chamfort, déclare avoir voulu mourir en homme libre plutôt que d'être reconduit en esclave dans une maison d'arrêt*"—which he signed in a firm hand and in his own blood. He did not die at once, but lingered on until the 13th of April 1794 in charge of a gendarme, for whose wardship he paid a crown a day. To the Abbé Sieyès Chamfort had given fortune in the title of a pamphlet ("*Qu'est-ce que le Tiers-État? Tout. Qu'a-t-il? Rien*"), and to Sieyès did Chamfort retail his supreme sarcasm, the famous "*Je m'en vais enfin de ce monde où il faut que le cœur se brise ou se bronze.*" The maker of constitutions followed the dead wit to the grave.

The writings of Chamfort, which include comedies, political articles, literary criticisms, portraits, letters, and verses, are colourless and uninteresting in the extreme. As a talker, however, he was of extraordinary force. His *Maximes et Pensées*, highly praised by John Stuart Mill, are, after those of La Rochefoucauld, the most brilliant and suggestive sayings that have been given to the modern world. The aphorisms of Chamfort, less systematic and psychologically less important than those of La Rochefoucauld, are as significant in their violence and iconoclastic spirit of the period of storm and preparation that gave them birth as the *Réflexions* in their exquisite restraint and elaborate subtlety are characteristic of the tranquil elegance of their epoch; and they have the advantage in richness of colour, in picturesqueness of phrase, in passion, in audacity. Sainte-Beuve compares them to "well-minted coins that retain their value," and to keen arrows that "*arrivent brusquement et sifflent encore.*"

An edition of his works—*Œuvres complètes de Nicolas Chamfort*—was published at Paris in five volumes in 1824–1825. Selections—*Œuvres de Chamfort*—in one volume, appeared in 1852, with a biographical and critical preface by Arsène Houssaye, reprinted from the *Revue des deux mondes*; and *Œuvres choisies* (2 vols.), with a preface and notes by M. de Lescure (1879). See also Sainte-Beuve, *Causeries du Lundi*.

CHAMIER, FREDERICK (1796–1870), English novelist, was the son of an Anglo-Indian official. In 1809 he entered the navy, and was in active service until 1827. He retired in 1833, and was promoted to be captain in 1856. On his retirement he settled near Waltham Abbey, and wrote several nautical novels on the lines popularized by Marryat, that had considerable success. These were *The Life of a Sailor* (1832), *Ben Brace* (1836), *The Arethusa* (1837), *Jack Adams* (1838), *Tom Bowling* (1841) and *Jack Malcolm's Log* (1846). He wrote a number of other books, and edited and brought down to 1827 James's *Naval History* (1837).

CHAMILLART MICHEL (1652–1721), French statesman, minister of Louis XIV., was born at Paris of a family of the noblesse of recent elevation. Following the usual career of a statesman of his time he became in turn councillor of the parlement of Paris (1676), master of requests (1686), and intendant of the generality of Rouen (January 1689). Affable, of polished manners, modest and honest, Chamillart won the confidence of Madame de Maintenon and pleased the king. In 1690 he was made intendant of finances, and on the 5th of September 1699 the king appointed him controller-general of finances, to which he added on the following 7th of January the ministry of war. From the first Chamillart's position was a difficult one. The deficit amounted to more than 53 million livres, and the credit of the state was almost exhausted. He lacked the great intelligence and energy necessary for the situation, and was unable to moderate the king's warlike tastes, or to inaugurate economic reforms. He could only employ the usual expedients of the time—the immoderate sale of offices, the debasement of the coinage (five times in six years), reduction of the rate of interest on state debts, and increased taxation. He attempted to force into circulation a kind of paper money, *billets de monnaie*, but with disastrous results owing to the state of credit. He studied Vauban's project for the royal tithe and Boisguillebert's proposition for the *taille*, but did not adopt them. In October 1706 he showed the king that the debts immediately due amounted to 288 millions, and that the deficit already foreseen for 1707 was 160 millions. In October 1707 he saw with consternation that the revenue for 1708 was already entirely eaten up by anticipation, so that neither money nor credit remained for 1708. In these conditions Chamillart, who had often complained of the overwhelming burden he was carrying, and who had already wished to retire in 1706, resigned his office of controller-general. Public opinion attributed to him the ruin of the country, though he had tried in 1700 to improve the condition of commerce by the creation of a council of commerce. As secretary of state for war he had to place in the field the army for the War of the Spanish Succession, and to reorganize it three times, after the great defeats of 1704, 1706 and 1708. With an empty treasury he succeeded only in part, and he frankly warned the king that the enemy would soon be able to dictate the terms of peace. He was reproached with having secured the command of the army which besieged Turin (1706) for his son-in-law, the incapable duc de la Feuillade. Madame de Maintenon even became hostile to him, and he abandoned his position on the 10th of June 1709, retiring to his estates. He died on the 14th of April 1721.

Chamillart's papers have been published by G. Esnault, *Michel Chamillart, contrôleur général et secrétaire d'état de la guerre, correspondance et papiers inédits* (2 vols., Paris, 1885); and by A. de Boislisle in vol. 2 of his *Correspondance des contrôleurs généraux* (1883). See D'Auvigny, *Vies des hommes illustres* (1739), tome vi. pp. 288-402; E. Moret, *Quinze années du règne de Louis XIV* (Paris, 1851); and the new edition of the *Mémoires de St-Simon*, by A. de Boislisle.

CHAMINADE, CÉCILE (1861–), French musical composer, was born at Paris on the 8th of August 1861. She studied in Paris, her musical talent being shown at the age of eight by the writing of some church music which attracted Bizet's attention; and at eighteen she came out in public as a pianist. Her own compositions, both songs (in large numbers) and instrumental pieces, were soon produced in profusion: melodious and interesting, and often charming, they became very popular, without being entitled to rank with the greater style of music. Both in Paris and in England Mlle Chaminade and her works became well known at the principal concerts. In 1908 she visited America and was warmly welcomed.

CHAMISSO, ADELBERT VON [Louis Charles Adelaide de] (1781–1838), German poet and botanist, was born at the château of Boncourt in Champagne, France, the ancestral seat of his family, on the 30th of January 1781. Driven from France by the Revolution, his parents settled in Berlin, where in 1796 young Chamisso obtained the post of page-in-waiting to the queen, and in 1798 entered a Prussian infantry regiment as ensign.

His family were shortly afterwards permitted to return to France; he, however, remained behind and continued his career in the army. He had but little education, but now sought distraction from the soulless routine of the Prussian military service in assiduous study. In collaboration with Varnhagen von Ense, he founded in 1803 the *Berliner Musenalmanach*, in which his first verses appeared. The enterprise was a failure, and, interrupted by the war, it came to an end in 1806. It brought him, however, to the notice of many of the literary celebrities of the day and established his reputation as a rising poet. He had become lieutenant in 1801, and in 1805 accompanied his regiment to Hameln, where he shared in the humiliations following the treasonable capitulation of that fortress in the ensuing year. Placed on parole he went to France, where he found that both his parents were dead; and, returning to Berlin in the autumn of 1807, he obtained his release from the service early in the following year. Homeless and without a profession, disillusioned and despondent, he lived in Berlin until 1810, when, through the services of an old friend of the family, he was offered a professorship at the *lycée* at Napoléonville in La Vendée. He set out to take up the post, but drawn into the charmed circle of Madame de Staël, followed her in her exile to Coppet in Switzerland, where, devoting himself to botanical research, he remained nearly two years. In 1812 he returned to Berlin, where he continued his scientific studies. In the summer of the eventful year, 1813, he wrote the prose narrative *Peter Schlemihl*, the man who sold his shadow. This, the most famous of all his works, has been translated into most European languages (English by W. Howitt). It was written partly to divert his own thoughts and partly to amuse the children of his friend Hitzig. In 1815 Chamisso was appointed botanist to the Russian ship "Rurik," which Otto von Kotzebue (son of August von Kotzebue) commanded on a scientific voyage round the world. His diary of the expedition (*Tagebuch*, 1821) affords some interesting glimpses of England and English life. On his return in 1818 he was made custodian of the botanical gardens in Berlin, and was elected a member of the Academy of Sciences, and in 1820 he married. Chamisso's travels and scientific researches restrained for a while the full development of his poetical talent, and it was not until his forty-eighth year that he turned again to literature. In 1829, in collaboration with Gustav Schwab, and from 1832 in conjunction with Franz von Gaudy, he brought out the *Deutsche Musenalmanach*, in which his later poems were mainly published. He died on the 21st of August 1838.

As a scientist Chamisso has not left much mark, although his *Bemerkungen und Ansichten*, published in an incomplete form in O. von Kotzebue's *Entdeckungsreise* (Weimar, 1821) and more completely in Chamisso's *Gesammelte Werke* (1836), and the botanical work, *Übersicht der nutzbarsten und schädlichsten Gewächse in Norddeutschland* (1829) are esteemed for their careful treatment of the subjects with which they deal. As a poet Chamisso's reputation stands high, *Frauen Liebe und Leben* (1830), a cycle of lyrical poems, which was set to music by Schumann, being particularly famous. Noteworthy are also *Schloss Boncourt* and *Salas y Gomez*. In estimating his success as a writer, it should not be forgotten that he was cut off from his native speech and from his natural current of thought and feeling. He often deals with gloomy and sometimes with ghastly and repulsive subjects; and even in his lighter and gayer proudctions there is an undertone of sadness or of satire. In the lyrical expression of the domestic emotions he displays a fine felicity, and he knew how to treat with true feeling a tale of love or vengeance. *Die Löwenbraut* may be taken as a sample of his weird and powerful simplicity; and *Vergeltung* is remarkable for a pitiless precision of treatment.

The first collected edition of Chamisso's works was edited by J. E. Hitzig, 6 vols. (1836); 6th edition (1874); there are also excellent editions by M. Koch (1883) and O. F. Walzel (1892). On Chamisso's life see J. E. Hitzig, "Leben und Briefe von Adelbert von Chamisso" (in the *Gesammelte Werke*); K. Fulda, *Chamisso und seine Zeit* (1881); G. Hofmeister, *Adelbert von Chamisso* (1884); and, for the scientific side of Chamisso's life, E. du Bois-Raymond, *Adelbert von Chamisso als Naturforscher* (1889).

CHAMKANNI, a small Pathan tribe on the Kohat border of the North-West Province of India. They inhabit the western part of the Kurmana Valley in the Orakzai portion of Tirah, but are supposed to be a distinct race. They took part in the frontier risings of 1897, and during the Tirah expedition of that year a brigade under General Gaselee was sent to punish them.

CHAMOIS, the Franco-Swiss name of an Alpine ruminant known in the German cantons as *Gemse*, and to naturalists as *Rupicapra tragus* or *R. rupicapra tragus*. It is the only species of its genus, and typifies a subfamily, *Rupicaprinae*, of hollow-horned ruminants in some degree intermediate between antelopes and goats (see ANTELOPE). About equal in height to a roebuck, and with a short black tail, the chamois is readily distinguishable from all other ruminants by its vertical, backwardly-hooked, black horns, which are common to males and females, although smaller in the latter. Apart from black and white face-markings, and the black tail and dorsal stripe, the prevailing colour of the Alpine chamois is chestnut brown in summer, but lighter and greyer in winter. In the Pyrenees the species is represented by a small race locally known as the izard; a very brightly-coloured form, *R. t. picta*, inhabits the Apennines; the Carpathian chamois is very dark-coloured, and the one from the Caucasus is the representative of yet another race. A thick under-fur is developed in the winter-coat, as in all other ruminants dwelling at high altitudes. Chamois are gregarious, living in herds of 15 or 20, and feeding generally in the morning or evening. The old males, however, live alone except in the rutting season, which occurs in October, when they join the herds, driving off the younger bucks, and engaging in fierce contests with each other, that often end fatally for one at least of the combatants. The period of gestation is twenty weeks, when the female, beneath the shelter generally of a projecting rock, produces one and sometimes two young. In summer they ascend to the limits of perpetual snow, being only exceeded in the loftiness of their haunts by the ibex; and during that season they show their intolerance of heat by choosing such browsing-grounds as have a northern exposure. In winter they descend to the wooded districts that immediately succeed the region of glaciers, and it is there only they can be successfully hunted. Chamois are exceedingly shy; and their senses, especially those of sight and smell, very acute. The herd never feeds without having a sentinel posted on some prominence to give notice of the approach of danger; which is done by stamping on the ground with the forefeet, and uttering a shrill whistling note, thus putting the entire herd on the alert. No sooner is the object of alarm scented or seen than each one seeks safety in the most inaccessible situations, which are often reached by a series of astounding leaps over crevasses, up the faces of seemingly perpendicular rocks, or down the sides of equally precipitous chasms. The chamois will not hesitate, it is said, thus to leap down 20 or even 30 ft., and this it effects with apparent ease by throwing itself forward diagonally and striking its feet several times in its descent against the face of the rock. Chamois-shooting is most successfully pursued when a number of hunters form a circle round a favourite feeding ground, which they gradually narrow; the animals, scenting the hunters to windward, fly in the opposite direction, only to encounter those coming from leeward. Chamois-hunting, in spite of, or perhaps owing to the great danger attending it, has always been a favourite pursuit among the hardy mountaineers of Switzerland and Tirol, as well as of the amateur sportsmen of all countries, with the result that the animal is now comparatively rare in many districts where it was formerly common. Chamois feed in summer on mountain-herbs and flowers, and in winter chiefly on the young shoots and buds of fir and pine trees. They are particularly fond of salt, and in the Alps sandstone rocks containing a saline impregnation are often met with hollowed by the constant licking of these creatures. The skin of the chamois is very soft; made into leather it was the original *shammy*, which is now made, however, from the skins of many other animals. The flesh is prized as venison. (R. L.*)

CHAMOMILE, or CAMOMILE FLOWERS, the *flores anthemidis* of the British Pharmacopoeia, the flower-heads of *Anthemis nobilis* (Nat. Ord. *Compositae*), a herb indigenous to England and western Europe. It is cultivated for medicinal purposes in Surrey, at several places in Saxony, and in France and Belgium,—that grown in England being much more valuable than any of the foreign chamomiles brought into the market. In the wild plant the florets of the ray are ligulate and white, and contain pistils only, those of the disk being tubular and yellow; but under cultivation the whole of the florets tend to become ligulate and white, in which state the flower-heads are said to be double. The flower-heads have a warm aromatic odour, which is characteristic of the entire plant, and a very bitter taste. In addition to a bitter extractive principle, they yield about 2% of a volatile liquid, which on its first extraction is of a pale blue colour, but becomes a yellowish brown on exposure to light. It has the characteristic odour of the flowers, and consists of a mixture of butyl and amyl angelates and valerates. Angelate of potassium has been obtained by treatment of the oil with caustic potash, and angelic acid may be isolated from this by treatment with dilute sulphuric acid. Chamomile is used in medicine in the form of its volatile oil, of which the dose is ½-3 minims. There is an official extract which is never used. Like all volatile oils the drug is a stomachic and carminative. In large doses the infusion is a simple emetic.

Wild chamomile is *Matricaria Chamomilla*, a weed common in waste and cultivated ground especially in the southern counties of England. It has somewhat the appearance of true chamomile, but a fainter scent.

CHAMONIX, a mountain valley in south-east France, its chief village, of the same name, being the capital of a canton of the arrondissement of Bonneville in the department of Haute-Savoie. The valley runs from N.E. to S.W., and is watered by the Arve, which rises in the Mer de Glace. On the S.E. towers the snowclad chain of Mont Blanc, and on the N.W. the less lofty, but rugged chain of the Brévent and of the Aiguilles Rouges. Near the head of the valley is the village of Argentière (4101 ft.), which is connected with Switzerland by "char" (light carriage) roads over the Tête Noire and past Salvan, and by a mule path over the Col de Balme, which joins the Tête Noire route near Trient and then crosses by a "char" road the Col de la Forclaz to Martigny in the Rhone valley. The principal village, Chamonix (3416 ft.), is 6 m. below Argentière by electric railway (which continues via Finhaut to Martigny) and is visited annually by a host of tourists, as it is the best starting-point for the exploration of the glaciers of the Mont Blanc chain, as well as for the ascent of Mont Blanc itself. It is connected with Geneva by a railway (55 m.). In 1906 the population of the village was 806, of the commune 3482.

The valley is first heard of about 1091, when it was granted by the count of the Genevois to the great Benedictine house of St Michel de la Cluse, near Turin, which by the early 13th century established a priory therein. But in 1786 the inhabitants bought their freedom from the canons of Sallanches, to whom the priory had been transferred in 1519. In 1530 the inhabitants obtained from the count of the Genevois the privilege of holding two fairs a year, while the valley was often visited by the civil officials and by the bishops of Geneva (first recorded visit in 1411, while St Francis de Sales came thither in 1606). But travellers for pleasure were long rare. The first party to publish (1744) an account of their visit was that of Dr R. Pococke, Mr W. Windham and other Englishmen who visited the Mer de Glace in 1741. In 1742 came P. Martel and several other Genevese, in 1760 H. B. de Saussure, and rather later Bourrit.

See J. A. Bonnefoy and A. Perrin, *Le Prieuré de Chamonix* (2 vols., Chambéry, 1879 and 1883); A. Perrin, *Histoire de la vallée et du prieuré de Chamonix* (Chambéry, 1887); L. Kurz and X. Imfeld, *Carte de la chaîne du Mont Blanc* (1896; new ed., 1905); L. Kurz, *Climbers' Guide to the Chain of Mont Blanc* (London, 1892); also works referred to under BLANC, MONT. (W. A. B. C.)

CHAMPAGNE, an ancient province of the kingdom of France, bounded N. by Liége and Luxemburg; E. by Lorraine; S. by Burgundy; and W. by Picardy and Isle de France. It now forms the departments of Ardennes, Marne, Aube and Haute Marne, with part of Aisne, Seine-et-Marne, Yonne and Meuse. Its name—in Latin *Campania*, "country of plains"—is derived from the immense plains near Reims, Châlons and Troyes. It was constituted towards the end of the middle ages by joining to the countship of Champagne the ecclesiastical duchies of Reims and Langres, together with the ecclesiastical countship of Châlons. Documents of the 12th and 13th centuries make it possible to determine the territorial configuration of the countship of Champagne with greater accuracy than in the case of any other fief of the crown of France. Formed at random by the acquisitions of the counts of the houses of Vermandois and Blois, Champagne reckoned among its dependencies, from 1152 to 1234, the countship of Blois and Chartres, of which Touraine was a fief, the countship of Sancerre, and various scattered fiefs in the Bourbonnais and in Burgundy. Officially called the "countship of Champagne and Brie" since 1217, this state was formed by the union of the countships of Troyes and Meaux, to which the greater part of the districts embraced in the country known, since the beginning of the middle ages, by the name of Champagne and Brie came in course of time to be attached. Placed under the authority of a single count in 960, the countships of Troyes and Meaux were not again separated after 1125. For the counts of Troyes before the 11th century see TROYES. We confine ourselves here to the counts of Champagne of the house of Blois.

About 1020 Eudes or Odo I. (Odo II., count of Blois) became count of Champagne. He disputed the kingdom of Burgundy with the emperor Conrad, and died in 1037, in a battle near Bar-le-Duc. In 1037 he was succeeded by his younger son, Stephen II. About 1050 Odo II., son of Stephen II., became count. This prince, guilty of murder, found refuge in Normandy, where he received the castle of Aumale. He took part in 1066 in the conquest of England, and became earl of Holderness. About 1063 Theobald (Thibaud) I., count of Blois and Meaux, eldest son of Odo I., became count of Champagne. In 1077 he seized the countships of Vitry and Bar-sur-Aube, left vacant by Simon of Valois, who had retired to a monastery. In 1089 Odo III., second son of Theobald II., became count, and was succeeded about 1093 by his younger brother, Hugh, who became a templar in 1125, and gave up the countship to his suzerain, the count of Blois. In 1125 the countship of Champagne passed to Theobald II. the Great, already count of Blois and Meaux, and one of the most powerful French barons of his time. He was related to the royal house of England, and incurred the displeasure of the king of France, who in 1142 invaded Champagne and burnt the town of Vitry. After Theobald the Great the countship of Blois ceased to be the dominant fief of his house and became the appanage of a younger branch. In 1152 Henry the Liberal, eldest son of Theobald II., became count of Champagne; he married Mary, daughter of Louis VII. of France, and went to the crusade in 1178. He was taken prisoner by the Turks, recovered his liberty through the good offices of the emperor of the East, and died a few days after his return to Champagne. In 1181 his eldest son, Henry II., succeeded him under the tutelage of Mary of France. In 1190 he went to the Holy Land, and became king of Jerusalem in 1192 by his marriage with Isabelle, widow of the marquis of Montferrat. He died in 1197 in his town of Acre from the results of an accident. In 1197 Theobald III., younger son of Henry I., became count, and was succeeded in 1201 by Theobald IV., "le Chansonnier" (the singer), who was the son of Theobald III. and Blanche of Navarre, and was born some days after the death of his father. From 1201 to 1222 he remained under the tutelage of his mother, who governed Champagne with great sagacity. The reign of this prince was singularly eventful. The two daughters of count Henry II. successively claimed the countship, so that Theobald had to combat the claims of Philippa, wife of Erard of Brienne, seigneur of Rameru, from 1216 to 1222, and those of Alix, queen dowager of Cyprus, in 1233 and 1234. In 1226 he followed king Louis VII. to the siege of Avignon, and after the death of that monarch played a prominent part during the reign of St Louis. At first leagued with the malcontent barons, he allowed himself to be gained over by the queen-mother, and

thus came into collision with his old allies. He became king of Navarre in 1234 by the death of his maternal uncle, Sancho VII. but by the onerous treaty which he concluded in that year with the queen of Cyprus he was compelled to cede to the king, in return for a large sum of money, the overlordship of the countships of Blois, Chartres and Sancerre, and the viscounty of Châteaudun. In 1239 and 1240 he took part in an expedition to the Holy Land, probably accompanied St Louis in 1242 in the campaign of Saintonge against the English, and died on the 14th of July 1254 at Pampeluna. If the author of the *Grandes chroniques de France* can be believed, Theobald IV. conceived a passion for Queen Blanche, the mother of St Louis,—a passion which she returned, and which explains the changes in his policy; but this opinion apparently must be relegated to the category of historical fables. The witty and courtly songs he composed place him in the front rank of the poets of that class, in which he showed somewhat more originality than his rivals. In 1254 Theobald V. the Young, eldest son of Theobald IV. and, like his father, king of Navarre, became count of Champagne. He married Isabelle of France, daughter of St Louis, and followed his father-in-law to Tunis to the crusade, dying on his return. In 1270 he was succeeded by Henry III. the Fat, king of Navarre. Henry was succeeded in 1274 by his only daughter, Joan of Navarre, under the tutelage of her mother, Blanche of Artois, and afterwards of Edmund, earl of Lancaster, her mother's second husband. In 1284 she married the heir-presumptive to the throne of France, Philip the Fair, to whom she brought the countship of Champagne as well as the kingdom of Navarre. She became queen of France in 1285, and died on the 4th of April 1305, when her eldest son by King Philip, Louis Hutin, became count of Champagne. He was the last independent count of the province, which became attached to the French crown on his accession to the throne of France in 1314.

The celebrated fairs of Champagne, which flourished in the 12th and 13th centuries, were attended by merchants from all parts of civilized Europe. They were six in number: two at Troyes, two at Provins, one at Lagny-sur-Marne, and one at Bar-sur-Aube. They formed a kind of continuous market, divided into six periods, and passed in turn from Lagny to Bar, from Bar to Provins, from Provins to Troyes, from Troyes to Provins and from Provins to Troyes, to complete the year. It was, in fact, a perpetual fair, which had at once unity and variety, offering to the different parts of the countship the means of selling successively the special productions of their soil or their industry, and of procuring in exchange riches and comforts. These fairs had special legislation; and special magistrates, called "masters of the fairs," had control of the police.

For the wine "champagne" see WINE.

AUTHORITIES.—H. d'Arbois de Jubainville, *Histoire des ducs et des comtes de Champagne* (1859–1866); A. Longnon, *Documents relatifs au comté de Champagne et de Brie* (1901 seq.; vol. i. with map); F. Bourquelot, *Études sur les foires de Champagne* (1865). (A. Lo.)

CHAMPAGNY, JEAN BAPTISTE NOMPÈRE DE (1756–1834), French politician, was born at Roanne, and entered the navy in 1774. He fought through the war in America and resigned in 1787. Elected deputy by the *noblesse* of Forex to the states-general in 1789, he went over to the third estate on the 21st of June and collaborated in the work of the Constituent Assembly, especially occupying himself with the reorganization of the navy. A political career seems to have attracted him little; he remained in private life from 1791 to 1799, when Napoleon named him member of the council of state. From July 1801 to August 1804 he was ambassador of France at Vienna, and directed with great intelligence the incessant negotiations between the two courts. In August 1804 Napoleon made him minister of the interior, and in this position, which he held for three years, he proved an administrator of the first order. In addition to the ordinary charges of his office, he had to direct the recruitment of the army, organize the industrial exhibition of 1808, and to complete the public works undertaken in Paris and throughout France. He was devoted to Napoleon, on whom he lavished adulation in his speeches. In August 1807 the emperor chose him to succeed Talleyrand as minister for foreign affairs. He directed the annexation of the Papal States in April 1808, worked to secure the abdication of Charles IV. of Spain in May 1808, negotiated the peace of Vienna (1809) and the marriage of Napoleon. In April 1811 a quarrel with the emperor led to his retirement, and he obtained the sinecure office of intendant general of the crown. In 1814, after the abdication, the empress sent him on a fruitless mission to the emperor of Austria. Then he went over to the Bourbons. During the Hundred Days he again joined Napoleon. This led to his exclusion by Louis XVIII., but in 1819 he recovered his dignity of peer. He died in Paris in 1834. He had three sons who became men of distinction. François (1804–1882) was a well-known author, who was made a member of the French Academy in 1869. His great work was a history of the Roman empire, in three parts, (1) *Les Césars* (1841–1843, 4 vols.), (2) *Les Antonins* (1863, 3 vols.), (3) *Les Césars du IIIe siècle* (1870, 3 vols.). Napoléon (1806–1872) published a *Traité de la police municipale* in 4 volumes (1844–1861), and was a deputy in the Corps Législatif from 1852 to 1870. Jérome Paul (1809–1886) was also deputy in the Corps Législatif from 1853 to 1870, and was made honorary chamberlain in 1859. He worked at the official publication of the correspondence of Napoleon I.

CHAMPAIGN, a city of Champaign county, Illinois, U.S.A., about 125 m. S. by W. of Chicago, on the head-waters of the Vermilion river. Pop. (1890) 5839; (1900) 9098, of whom 973 were foreign-born; (1906, est.) 11,054. It is served by the Cleveland, Cincinnati, Chicago and St Louis, the Wabash, and the Illinois Central railways (the last having repair shops here), and by the Illinois (electric) Traction System from Danville, Illinois, to St Louis, Missouri. In 1906 the city covered 3·5 sq. m.; it is situated in a rich agricultural region, and has small manufacturing interests. Immediately east of Champaign is the city of Urbana, the county-seat of Champaign county, served by the Wabash and the Cleveland, Cincinnati, Chicago and St Louis railways, with repair shops of the latter. In 1890 the population of Urbana was 3511; in 1900, 5728, of whom 300 were foreign-born. Partly in Urbana and partly in Champaign is the University of Illinois (see ILLINOIS); immediately south of its campus is the 400-acre farm of the university. Each city has a public library, and in Champaign are the Burnham Athenaeum, the Burnham hospital, the Garwood home for old ladies, and several parks, all gifts of former citizens. Champaign was founded in 1855, incorporated as a city in 1860, and re-chartered in 1883. Urbana secured a city charter in 1855.

CHAMPAIGNE, PHILIPPE DE (1602–1674), Belgian painter of the French school, was born at Brussels of a poor family. He was a pupil of J. Fouquières; and, going to Paris in 1621, was employed by N. Du Chesne to paint along with Nicholas Poussin in the palace of the Luxembourg. His best works are to be found at Vincennes, and in the church of the Carmelites at Paris, where is his celebrated Crucifix, a signal perspective success, on one of the vaultings. After the death of Du Chesne, Philippe became first painter to the queen of France, and ultimately rector of the Academy of Paris. As his age advanced and his health failed, he retired to Port Royal, where he had a daughter cloistered as a nun, of whom (along with Catherine Agnès Arnauld) he painted a celebrated picture, now in the Louvre, highly remarkable for its solid unaffected truth. This, indeed, is the general character of his work,—grave reality, without special elevation or depth of character, or charm of warm or stately colour. He produced an immense number of paintings, religious and other subjects as well as portraits, dispersed over various parts of France, and now over the galleries of Europe. Philippe was a good man, indefatigable, earnest and scrupulously religious. He died on the 12th of August 1674.

CHAMPARAN, or CHUMPARUN, a district of British India, in the Patna division of Bengal, occupying the north-west corner of Behar, between the two rivers Gandak and Baghmati and the Nepal hills. It has an area of 3531 sq. m. In 1901 the population was 1,790,463, showing a decrease of 4% in the decade. A broad grass-covered road or embankment defines the Nepal frontier, except where rivers or streams form a natural

boundary. The district is a vast level except in the N. and N.W., where it undulates, and gradually assumes a rugged appearance as it approaches the mountains and forests of Nepal. Wide uncultivated tracts cover its north-western corner; the southern and western parts are carefully cultivated, and teem with an active agricultural population. The principal rivers are the Gandak, navigable all the year round, the Buri Gandak, Panch Nadi, Lalbagia, Koja and Teur. Old beds of rivers intersect Champaran in every direction, and one of these forms a chain of lakes which occupy an area of 139 sq. m. in the centre of the district. Champaran, with the rest of Bengal and Behar, was acquired by the British in 1765. Up to 1866 it remained a subdivision of Saran. In that year it was separated and formed into a separate district. The administrative headquarters are at Motihari (population, 13,730); Bettia is the centre of a very large estate; Segauli, still a small military station, was the scene of a massacre during the Mutiny. Champaran was the chief seat of indigo planting in Behar before the decline of that industry. There are about 40 saltpetre refineries. The district suffered severely from drought in 1866 and 1874, and again in 1897. In the last year a small government canal was opened, and a canal from the Gandak has also been constructed. The district is traversed almost throughout its length to Bettia by the Tirhoot state railway. A considerable trade is conducted with Nepal.

CHAMPEAUX, WILLIAM OF [GULIELMUS CAMPELLENSIS] (*c.* 1070–1121), French philosopher and theologian was born at Champeaux near Melun. After studying under Anselm of Laon and Roscellinus, he taught in the school of the cathedral of Notre Dame, of which he was made canon in 1103. Among his pupils was Abelard. In 1108 he retired into the abbey of St Victor, where he resumed his lectures. He afterwards became bishop of Châlons-sur-Marne, and took part in the dispute concerning investitures as a supporter of Calixtus II., whom he represented at the conference of Mousson. His only printed works are a fragment on the Eucharist (inserted by Jean Mabillon in his edition of the works of St Bernard), and the *Moralia Abbreviata* and *De Origine Animae* (in E. Martène's *Thesaurus novus Anecdotorum*, 1717, vol. 5). In the last of these he maintains that children who die unbaptized must be lost, the pure soul being defiled by the grossness of the body, and declares that God's will is not to be questioned. He upholds the theory of Creatianism (that a soul is specially created for each human being). Ravaisson-Mollien has discovered a number of fragments by him, among which the most important is the *De Essentia Dei et de Substantia Dei*; a *Liber Sententiarum*, consisting of discussions on ethics and Scriptural interpretation, is also ascribed to Champeaux. He is reputed the founder of Realism. For his views and his controversy with Abelard, see SCHOLASTICISM and ABELARD.

See Victor Cousin, introduction to his *Ouvrages inédits d'Abélard* (1836), and *Fragments pour servir à l'histoire de la philosophie* (1865); G. A. Patru, *Wilhelmi Campellensis de natura et de origine rerum placita* (1847); E. Michaud, *Guillaume de Champeaux et les écoles de Paris au XIIe siècle* (2nd ed., 1868); "William of Champeaux and his Times" in *Christian Observer*, lxxii. 843; B. Hauréau, *De la philosophie scolastique* (Paris, 1850); Opuscula in J. P. Migne's *Patrologia*, clxiii.

CHAMPERTY, or CHAMPARTY (Lat. *campi partitio*, O. Fr. *champ parti*), in English law, a bargain between a plaintiff or defendant in a cause and another person, to divide the land (*campum partiri*) or other matter sued for, if they prevail, in consideration of that person carrying on or defending the suit at his own expense. It is a misdemeanour punishable by fine or imprisonment. It differs only from maintenance (*q.v.*), in that the recompense for the service which has been given is always part of the matter in suit, or some profit growing out of it. So an agreement by a solicitor not to charge costs on condition of retaining for himself a share of the sums recovered would be illegal and void. It is not, however, champerty to charge the subject-matter of a suit in order to obtain the means of prosecuting it.

See *Fifth Report of the Criminal Law Commissioners*, pp. 34-9.

CHAMPION (Fr. *champion*, Late Lat. *campio* from *campus*, a field or open space, *i.e.* one "who takes the field" or fights; cf. Ger. *Kampf*, battle, and *Kämpfer*, fighter), in the judicial combats of the middle ages the substitute for a party to the suit disabled from bearing arms or specially exempt from the duty to do so (see WAGER). Hence the word has come to be applied to any one who "champions," or contends on behalf of, any person or cause. In the laws of the Lombards (lib. ii. tit. 56 §§ 38, 39), those who by reason of youth, age or infirmity could not bear arms were allowed to nominate champions, and the same provision was made in the case of women (lib. i. tit. 3 § 6, tit. 16, §2). This was practically the rule laid down in all subsequent legislation on the subject. Thus the *Assize of Jerusalem* (cap. 39) says: "These are the people who may defend themselves through champions; a woman, a sick man, a man who has passed the age of sixty, &c." The clergy, too, whether as individuals or corporations, were represented by champions; in the case of bishops and abbots this function was part of the duties of the *advocatus* (see ADVOCATE). Du Cange gives instances of mercenary champions (*campiones conductitii*), who were regarded as "infamous persons" and sometimes, in case of defeat, were condemned to lose hand or foot. Sometimes championships were "serjeanties," *i.e.* rendered service to lords, churches or cities in consideration of the grant of certain fiefs, or for annual money payments, the champion doing homage to the person or corporation represented by him (*campiones homagii*).

The office of "king's champion" (*campio regis*) is peculiar to England. The function of the king's champion, when the ceremonial of the coronation was carried out in its completeness, was to ride, clad in complete armour, on his right the high constable, on his left the earl marshal, into Westminster Hall during the coronation banquet, and challenge to single combat any who should dispute the king's right to reign. The challenge was thrice repeated by the herald, at the entrance to the hall, in the centre, and at the foot of the dais. On picking up his gauntlet for the third time the champion was pledged by the king in a gilt-covered cup, which was then presented to him as his fee by the king. If he had had occasion to fight, and was victorious, his fee would have been the armour he wore and the horse he rode, the second best in the royal stables; but no such occasion has ever arisen. This picturesque ceremonial was last performed at the coronation of George IV. The office of king's champion is of great antiquity, and its origins are involved in great obscurity. It is said to have been held under William the Conqueror by Robert or Roger Marmion, whose ancestors had been hereditary champions in Normandy. The first authentic record, however is a charter of Henry I., signed by Robert Marmion (*Robertus de Bajucis campio regis*). Of the actual exercise of the office the earliest record dates from the coronation of Richard II. On this occasion the champion, Sir John Dymoke, appeared at the door of the Abbey immediately after the coronation mass, but was peremptorily told to go away and return later; moreover, in his bill presented to the court of claims, he stated that the champion was to ride in the procession before the service, and make his challenge to all the world. This seems to show that the ceremony, as might be expected, was originally performed *before* the king's coronation, when it would have had some significance. The office of king's champion is hereditary, and is now held by the family of Dymoke (*q.v.*).

See Du Cange, *Glossarium*, *s.v.* "Campio"; L. G. Wickham Legg, *English Coronation Records* (Westminster, 1901); J. H. T. Perkins, *The Coronation Book* (London, 1902).

CHAMPIONNET, JEAN ÉTIENNE (1762–1800), French general, enlisted in the army at an early age and served in the great siege of Gibraltar. When the Revolution broke out he took a prominent part in the movement, and was elected by the men of a battalion to command them. In May 1793 he was charged with the suppression of the disturbances in the Jura, which he quelled without bloodshed. Under Pichegru he took part in the Rhine campaign of that year as a brigade commander, and at Weissenburg and in the Palatinate won the warm commendation of Lazare Hoche. At Fleurus his stubborn fighting

in the centre of the field contributed greatly to Jourdan's victory. In the subsequent campaigns he commanded the left wing of the French armies on the Rhine between Neuwied and Düsseldorf, and took a great part in all the successful and unsuccessful expeditions to the Lahn and the Main. In 1798 Championnet was named commander-in-chief of the "army of Rome" which was protecting the infant Roman republic against the Neapolitan court and the British fleet. Nominally 32,000 strong, the army scarcely numbered 8000 effectives, with a bare fifteen cartridges per man. The Austrian general Mack had a tenfold superiority in numbers, but Championnet so well held his own that he ended by capturing Naples itself and there setting up the Parthenopean Republic. But his intense earnestness and intolerance of opposition soon embroiled him with the civilians, and the general was recalled in disgrace. The following year, however, saw him again in the field as commander-in-chief of the "army of the Alps." This, too, was at first a mere paper force, but after three months' hard work it was able to take the field. The campaign which followed was uniformly unsuccessful, and, worn out by the unequal struggle, Championnet died at Antibes on the 9th of January 1800. In 1848 a statue was erected in his honour at Valence.

See A. R. C. de St Albin, *Championnet, ou les Campagnes de Hollande, de Rome et de Naples* (Paris, 1860).

CHAMPLAIN, SAMUEL DE (1567–1635), French explorer, colonial pioneer and first governor of French Canada, was born at Brouage, a small French port on the Bay of Biscay, in 1567. His father was a sea captain, and the boy was early skilled in seamanship and navigation. He entered the army of Henry IV., and served in Brittany under Jean d'Aumont, François de St Luc and Charles de Brissac. When the army of the League was disbanded he accompanied his uncle, who had charge of the ships in which the Spanish allies were conveyed home, and on reaching Cadiz secured (1599) the command of one of the vessels about to make an expedition to the West Indies. He was gone over two years, visiting all the principal ports and pushing inland from Vera Cruz to the city of Mexico. The MS. account of his adventures, *Bref Discours des Choses plus remarquables que Samuel Champlain de Brouage a recognues aux Indes Occidentales*, is in the library at Dieppe. It was not published in French until 1870, although an English translation was printed by the Hakluyt Society in 1859. It contains a suggestion of a Panama Canal, "by which the voyage to the South Sea would be shortened by more than 1500 leagues." In 1603 Champlain made his first voyage to Canada, being sent out by Aymar de Clermont, seigneur de Chastes, on whom the king had bestowed a patent. Champlain at once established friendly relations with the Indians and explored the St Lawrence to the rapids above Montreal. On his return he published an interesting and historically valuable little book, *Des sauvages, ou voyage de Samuel Champlain de Brouage fait en la France Nouvelle.* During his absence de Chastes had died, and his privileges and fur trade monopolies were conferred upon Pierre de Guast, sieur de Monts (1560–1611). With him, in 1604, Champlain was engaged in exploring the coast as far south as Cape Cod, in seeking a site for a new settlement, and in making surveys and charts. They first settled on an island near the mouth of the St Croix river, and then at Port Royal—now Annapolis, N.S.

Meanwhile the Basques and Bretons, asserting that they were being ruined by de Monts' privileges, got his patent revoked, and Champlain returned with the discouraged colonists to Europe. When, however, in modified form, the patent was re-granted to his patron Champlain induced him to abandon Acadia and establish a settlement on the St Lawrence, of the commercial advantages of which, perhaps even as a western route to China and Japan, he soon convinced him. Champlain was placed in command of one of the two vessels sent out. He was to explore and colonize, while the other vessel traded, to pay for the expedition. Champlain fixed on the site of Quebec and founded the first white settlement there in July 1608, giving it its present name. In the spring he joined a war party of Algonquins and Hurons, discovered the great lake that bears his name, and, near the present Ticonderoga, took with his arquebus an important part in the victory which his savage friends obtained over the Iroquois. The Iroquois naturally turned first to the Dutch and then to the English for allies. "Thus did new France rush into collision with the redoubted warriors of the Five Nations. Here was the beginning, and in some measure doubtless the cause, of a long suite of murderous conflicts, bearing havoc and flame to generations yet unborn" (Parkman). Champlain returned to France and again related to Henry IV.—who had previously learned his worth and had pensioned him—his exciting adventures. De Monts failed to secure a renewal of his patent, but resolved to proceed without it. Champlain was again (1611) in Canada, fighting for and against the Indians and establishing a trading post at Mont Royal (see MONTREAL). He was the third white man to descend, and the second to descend successfully, the Lachine Rapids. De Monts, now governor of Paris, was too busy to occupy himself in the waning fortunes of the colony, and left them entirely to his associate. An influential protector was needed; and Champlain prevailed upon Charles de Bourbon, comte de Soissons, to interest himself to obtain from the king the appointment of lieutenant-general in New France. The comte de Soissons died almost immediately, and was succeeded in the office by Henri de Bourbon, prince de Condé, and he, like his predecessors and successors, retained Champlain as lieutenant-governor. "In Champlain alone was the life of New France. By instinct and temperament he was more impelled to the adventurous toils of exploration than to the duller task of building colonies. The profits of trade had value in his eyes only as means to these ends, and settlements were important chiefly as a base of discovery. Two great objects eclipsed all others,—to find a route to the Indies, and to bring the heathen tribes into the embraces of the Church, since, while he cared little for their bodies, his solicitude for their souls knew no bounds" (Parkman).

In 1613 Champlain again crossed the Atlantic and endeavoured to confirm Nicolas de Vignau's alleged discovery of a short route to the ocean by the Ottawa river, a great lake at its source, and another river flowing north therefrom. That year he got as far as Allumette Island in the Ottawa, but two years later, with a "Great War Party" of Indians, he crossed Lake Nipissing and the eastern ends of Lakes Huron and Ontario, and made a fierce but unsuccessful attack on an Onondaga fortified town a few miles south of Lake Oneida. This was the end of his wanderings. He now devoted himself to the growth and strengthening of Quebec. Every year he went to France with this end in view. He was one of the hundred associates of the Company of New France, created by Richelieu to reform abuses and take over all his country's interests in the new world. These ill-defended possessions England now prepared to seize. Three ships were sent out under letters of marque commanded by David, Lewis and Thomas Kirke, and Quebec, already on the verge of starvation, was compelled to surrender (1629). Champlain was taken to England a prisoner, but when Canada was restored to the French he returned (1633) to his post, where he died on the 25th of December 1635. He had married in 1610, Hélène Boullé, then but twelve years old. She did not leave France for Canada, however, until ten years later. After his death she became a nun.

Champlain's complete works in 6 vols. were published under the patronage of the university of Laval in 1870. There is a careful translation of *Champlain's Voyages*, by Professor and Mrs E. G. Bourne in the "Trailmaker" series edited by Prof. J. B. McMaster. See F. Parkman, *Pioneers of France in the New World* (1865); J. Winsor, *Cartier to Frontenac* (1894); N. E. Dionne, *Champlain* (1905). (N. E. D.)

CHAMPLAIN, a lake lying between the states of New York and Vermont, U.S.A., and penetrating for a few miles into Canada. It extends about 130 m. from N. to S., varies from ¼ m. to 1 m. in width for 40 m. from its S. terminus, and then widens until it reaches a maximum width of about 11 m. near Ausable Point. Its area is about 500 sq. m. Its surface is 96 ft. above the sea. In the north part it is generally from 200 to 300 ft. deep; opposite Essex, N.Y., near its middle, the depth

increases to 400 ft.; but farther south it is much less; throughout the greater part of the lake there is a depth of water of more than 100 ft. Since the lake is caused by the ponding of water in a broad irregular valley, the shore line is nearly everywhere much broken, and in the northern portion are several islands, both large and small, most of which belong to Vermont. These islands divide the lake's northern end into two large arms which extend into Canada. From the western arm the Richelieu river flows out, carrying the water of Champlain to the St Lawrence. The waters abound in salmon, salmon-trout, sturgeon and other fish, and are navigated from end to end by large steamboats and vessels of considerable tonnage. The lake was formerly the seat of extensive traffic, especially in lumber, but navigation has greatly decreased; the tonnage entering and clearing at the lake was twice as great in the early '70's as it was thirty years later. The principal ports are Burlington, Vt., and Plattsburg, N.Y. Lake Champlain lies in a valley from 1 to 30 m. wide, between the Green Mountains on the east and the Adirondack Mountains on the west, and the scenery is most picturesque. On the east side is a rather gradual ascent for 20 m. or more from shore to summit, while on the west side the ascent is by a succession of hills, in some places from the water's edge. North of Crown Point low mountains rise 1000 to 1600 ft. above the lake, and behind these are the higher peaks of the Adirondacks, reaching an elevation of more than 5000 ft. Lake George is a tributary on the south, several small streams flow in from each side; the Champlain Canal, 63 m. in length, connects the lake with the Hudson river; and through the Richelieu it has a natural outlet to the north into the St Lawrence.

Lake Champlain was named from Samuel de Champlain, who discovered it in July 1609. The valley is a natural pathway between the United States and Canada, and during the various wars which the English have waged in America it had great strategic importance. In 1731 the French built a fort at Crown Point; in 1756, another at Ticonderoga; and both were important strategic points in the French and Indian War as well as in the American War of Independence. On the 11th of October 1776, the first battle between an American and a British fleet, the battle of Valcour Island, was fought on the lake. Benedict Arnold, the American commander, with a decidedly inferior force, withstood the British under Thomas Pringle for about seven hours, and then during the night escaped through the enemy's line. Although overtaken the next day he again, after a fight of a few hours, made a successful retreat.

At the beginning of the War of 1812 the American naval force on the lake, though very small, was superior to that of the British, but on the 3rd of June 1813 the British captured two American sloops in the narrow channel at the northern end and gained supremacy. Both sides now began to build and equip vessels for a decisive contest; by May 1814 the Americans had regained supremacy, and four months later a British land force of 11,000 men under Sir George Prevost (1767–1816) and a naval force of 16 vessels of about 2402 tons with 937 men and 92 guns under Captain George Downie (d. 1814) confronted an American land force of 1500 men under Brigadier-General Alexander Macomb (1782–1841), strongly entrenched at Plattsburg, and an American naval force (anchored in Plattsburg Bay) of 14 vessels of about 2244 tons with 882 men and 86 guns under Commodore Thomas Macdonough (1783–1825). In the open lake the British naval force should have been the superior, but at anchor in the bay the Americans had a decided advantage. Expecting the British land force to drive the American fleet from its anchorage, Captain Downie, on the 11th of September 1814, began the battle of Lake Champlain. It had continued only fifteen minutes when he was killed; the land force failed to co-operate, and after a severe fight at close range for 2½ hours, during which the British lost about 300 men, the Americans 200 and the vessels of both sides were greatly shattered, the British retreated both by land and by water, abandoning their plan of invading New York.

See C. E. Peet, "Glacial and Post-Glacial History of the Hudson and Champlain Valleys," in vol. xii. of the *Journal of Geology* (Chicago, 1904); P. S. Palmer, *History of Lake Champlain* (Albany, 1866); and Capt. A. T. Mahan, *Sea Power in its Relations to the War of 1812* (2 vols., Boston, 1905).

CHAMPMESLÉ, MARIE (1642–1698), French actress, was born in Rouen of a good family. Her father's name was Desmares. She made her first appearance on the stage at Rouen with Charles Chevillet (1645–1701), who called himself sieur de Champmeslé, and they were married in 1666. By 1669 they were playing in Paris at the Théatre du Marais, her first appearance there being as Venus in Boyer's *Fête de Venus*. The next year, as Hermione in Racine's *Andromaque*, she had a great success at the Hôtel de Bourgogne. Her intimacy with Racine dates from then. Some of his finest tragedies were written for her, but her repertoire was not confined to them, and many an indifferent play—like Thomas Corneille's *Ariane* and *Comte d'Essex*—owed its success to "her natural manner of acting, and her pathetic rendering of the hapless heroine." *Phèdre* was the climax of her triumphs, and when she and her husband deserted the Hôtel de Bourgogne (see BÉJART *ad fin.*), it was selected to open the Comédie Française on the 26th of August 1680. Here, with Mme Guérin as the leading comedy actress, she played the great tragic love parts for more than thirty years, dying on the 15th of May 1698. La Fontaine dedicated to her his novel *Belphégor*, and Boileau immortalized her in verse. Her husband distinguished himself both as actor and playwright, and his *Parisien* (1682) gave Mme Guérin one of her greatest successes.

Her brother, the actor NICOLAS DESMARES (*c.* 1650–1714), began as a member of a subsidized company at Copenhagen, but by her influence he came to Paris and was received in 1685 *sans début*—the first time such an honour had been accorded—at the Comédie Française, where he became famous for peasant parts. His daughter, to whom Christian V. and his queen stood sponsors, CHRISTINE ANTOINETTE CHARLOTTE DESMARES (1682–1753), was a fine actress in both tragedy and soubrette parts. She made her début at the Comédie Française in 1699, in La Grange Chancel's *Oreste et Pylade*, and was at once received as *sociétaire*. She retired in 1721.

CHAMPOLLION, JEAN FRANÇOIS (1790–1832), French Egyptologist, called LE JEUNE to distinguish him from Champollion-Figeac (*q.v.*), his elder brother, was born at Figeac, in the department of Lot, on the 23rd of December 1790. He was educated by his brother, and was then appointed government pupil at the Lyceum, which had recently been founded. His first work (1804) was an attempt to show by means of their names that the giants of the Bible and of Greek mythology were personifications of natural phenomena. At the age of sixteen (1807) he read before the academy of Grenoble a paper in which he maintained that the Coptic was the ancient language of Egypt. He soon after removed to Paris, where he enjoyed the friendship of Langlès, De Sacy and Millin. In 1809 he was made professor of history in the Lyceum of Grenoble, and there published his earlier works. Champollion's first decipherment of hieroglyphics dates from 1821. In 1824 he was sent by Charles X. to visit the collections of Egyptian antiquities in the museums of Turin, Leghorn, Rome and Naples; and on his return he was appointed director of the Egyptian museum at the Louvre. In 1828 he was commissioned to undertake the conduct of a scientific expedition to Egypt in company with Rosellini, who had received a similar appointment from Leopold II., grand duke of Tuscany. He remained there about a year. In March 1831 he received the chair of Egyptian antiquities, which had been created specially for him, in the Collège de France. He was engaged with Rosellini in publishing the results of Egyptian researches at the expense of the Tuscan and French governments, when he was seized with a paralytic disorder, and died at Paris in 1832. Champollion, whose claims were hotly disputed for many years after his death, is now universally acknowledged to have been the founder of Egyptology.

He wrote *L'Égypte sous les Pharaons* (2 vols. 8vo, 1814); *Sur l'écriture hiératique* (1821); *Sur l'écriture démotique*; *Précis du système hiéroglyphique, &c.* (1824); *Panthéon égyptien, ou collection des personnages mythologiques de l'ancienne Égypte* (incomplete);

Monumens de l'Égypte et de la Nubie considérés par rapport à l'histoire, la religion, &c.; *Grammaire égyptienne* (1836), and *Dictionnaire égyptienne* (1841), edited by his brother; *Analyse méthodique du texte démotique de Rosette; Aperçu des résultats historiques de la découverte de l'alphabet hiéroglyphique* (1827); *Mémoires sur les signes employés par les Égyptiens dans leurs trois systèmes graphiques à la notation des principales divisions du temps; Lettres écrites d'Égypte et de Nubie* (1833); and also several letters on Egyptian subjects, addressed at different periods to the duc de Blacas and others.

See H. Hartleben, *Champollion, sein Leben und sein Werk* (2 vols., 1906); also EGYPT: *Language and Writing* (*ad init.*).

CHAMPOLLION-FIGEAC, JACQUES JOSEPH (1778–1867), French archaeologist, elder brother of Jean François Champollion, was born at Figeac in the department of Lot, on the 5th of October 1778. He became professor of Greek and librarian at Grenoble, but was compelled to retire in 1816 on account of the part he had taken during the Hundred Days. He afterwards became keeper of manuscripts at the Bibliothèque Nationale in Paris, and professor of palaeography at the École des Chartes. In 1849 he became librarian of the palace of Fontainebleau. He edited several of his brother's works, and was also author of original works on philological and historical subjects, among which may be mentioned *Nouvelles recherches sur les patois ou idiomes vulgaires de la France* (1809), *Annales de Lagides* (1819) and *Chartes latines sur papyrus du VIe siècle de l'ère chrétienne*. His son AIMÉ (1812–1894) became his father's assistant at the Bibliothèque Nationale, and besides a number of works on historical subjects wrote a biographical and bibliographical study of his family in *Les Deux Champollion* (Grenoble, 1887).

CHANCE (through the O. Fr. *chéance*, from the Late Lat. *cadentia*, things happening, from *cadere*, to fall out, happen; cf. "case"), an accident or event, a phenomenon which has no apparent or discoverable cause; hence an event which has not been expected, a piece of good or bad fortune. From the popular idea that anything of which no assignable cause is known has therefore no cause, chance (Gr. τύχη) was regarded as having a substantial objective existence, being itself the source of such uncaused phenomena. For the philosophic theories relating to this subject see ACCIDENTALISM.

"Chance," in the theory of probability, is used in two ways. In the stricter, or mathematical usage, it is synonymous with probability; *i.e.* if a particular event may occur in n ways in an aggregate of p events, then the "chance" of the particular event occurring is given by the fraction n/p. In the second usage, the "chance" is regarded as the ratio of the number of ways which a particular event may occur to the number of ways in which it may not occur; mathematically expressed, this chance is $n/(p-n)$ (see PROBABILITY). In the English law relating to gaming and wagering a distinction is drawn between games of chance and games of skill (see GAMING AND WAGERING).

CHANCEL (through O. Fr. from Lat. plur. *cancelli*, dim. of *cancer*, grating, lattice, probably connected with an Indo-European root *Kar-*, to bend; cf. circus, curve, &c.), in the earliest and strictest sense that part of a church near the altar occupied by the deacons and sub-deacons assisting the officiating priest, this space having originally been separated from the rest of the church by *cancelli* or lattice work. The word *cancelli* is used in classical Latin of a screen, bar or the like, set to mark off an enclosed space in a building or in an open place. It is thus used of the bar in a court of justice (Cicero, *Verres*, ii. 3 seq.). It is particularly used of the lattice or screen in the ancient basilica, which separated the *bema*, or raised tribunal, from the rest of the building. The use of the name in ecclesiastical buildings is thus natural, for the altar stood in the place occupied by the *bema* in the apse of the basilica. From the screen the term was early transferred to the space *inter cancellos*, *i.e.* the *locus altaris cancellis septus*. This railed-off space is now generally known among Roman Catholics as the "sanctuary," the word chancel being little used. In the Church of England, however, the word chancel survived the Reformation, and is applied, both in the ecclesiastical and the architectural sense, to that part of the church occupied by the principal altar or communion table and by the clergy and singers officiating at the chief services; it thus includes presbytery, chancel proper and choir (*q.v.*), and in this sense, in the case of cathedrals and other large churches, is often used synonymously with choir. In this more inclusive sense the early basilican churches had no chancels, which were a comparatively late development; the *cancelli*, *e.g.* of such a church as San Clemente at Rome are equivalent not to the "chancel screen" of a medieval church but to the "altar rails" that divide off the sanctuary. In churches of the type that grew to its perfection in the middle ages the chancels are clearly differentiated from the nave by structural features: by the raising of the floor level, by the presence of a "chancel arch," and by a chancel or rood screen (see ROOD). The chancel screen might be no more than a low barrier, some 4 ft. high, or a light structure of wood or wrought iron; sometimes, however, they were massive stone screens, which in certain cases were continued on either side between the piers of the choir and (on the European continent) round the east end of the sanctuary, as in the cathedrals of Paris, Bourges, Limoges, Amiens and Chartres. These screens served the purpose, in collegiate and conventual churches, of cutting off the space reserved for the services conducted for and by the members of the chapter or community. For popular services a second high altar was usually set up to the west of the screen, as formerly at Westminster Abbey. In parish churches the screen was set, partly to differentiate the space occupied by the clergy from that reserved for the laity, partly to support the representation of the crucifixion known as the Rood. In these churches, too, the chancel is very usually structurally differentiated by being narrower and, sometimes, less high than the nave.

In the Church of England, the duty of repairing the chancel falls upon the parson by custom, while the repair of the body of the church falls on the parishioners. In particular cases, as in certain London churches, the parishioners also have to repair the chancel. Where there are both a rector and a vicar the repairs are shared between them, and this is also the case where the rector is a lay impropriator. By the rubric of the English Prayer Book "the chancels shall remain as they have done in times past," *i.e.* distinguished from the body of the church by some partition sufficient to separate the two without interfering with the view of the congregation. At the Reformation, and for some time after, this distinction was regarded by the dominant Puritan party as a mark of sacerdotalism, and services were commonly said in other parts of the church, the chancels being closed and disused. The rubric, however, directs that "'Morning and Evening Prayer' shall be used in the accustomed place in the church, chapel or chancel, except it shall be otherwise determined by the Ordinary." Chancel screens, with or without gates, are lawful, but chancellors of dioceses have refused to grant a faculty to erect gates, as unnecessary or inexpedient.

CHANCELLOR (M. Eng. and Anglo-Fr. *canceler*, *chanceler*, Fr. *chancelier*, Lat. *cancellarius*), an official title used by most of the peoples whose civilization has arisen directly or indirectly out of the Roman empire. At different times and in different countries it has stood and stands for very various duties, and has been, and is, borne by officers of various degrees of dignity. The original chancellors were the *cancellarii* of Roman courts of justice, ushers who sat at the *cancelli* or lattice work screens of a "basilica" or law court, which separated the judge and counsel from the audience (see CHANCEL). In the later Eastern empire the *cancellarii* were promoted at first to notarial duties. The barbarian kingdoms which arose on the ruin of the empire in the West copied more or less intelligently the Roman model in all their judicial and financial administration. Under the Frankish kings of the Merovingian dynasty the *cancellarii* were subordinates of the great officer of state called the *referendarius*, who was the predecessor of the more modern chancellor. The office became established under the form *archi-cancellarius*, or chief of the *cancellarii*. Stubbs says that the Carolingian chancellor was the royal notary and the arch-chancellor keeper of the royal seal. His functions would naturally be discharged by a cleric in times when book learning was mainly confined to the clergy. From the reign of Louis the Pious the post was held

by a bishop. By an equally natural process he became the chief secretary of the king and of the queen, who also had her chancellor. Such an office possessed an obvious capacity for developing on the judicial as well as the administrative side. Appeals and petitions of aggrieved persons would pass through the chancellor's hands, as well as the political correspondence of the king. Nor was the king the only man who had need of a chancellor. Great officers and corporations also had occasion to employ an agent to do secretarial, notarial and judicial work for them, and called him by the convenient name of chancellor. The history of the office in its many adaptations to public and private service is the history of its development on judicial, administrative, political, secretarial and notarial lines.

The model of the Carolingian court was followed by the medieval states of Western Europe. In England the office of chancellor dates back to the reign of Edward the Confessor, the first English king to use the Norman practice of sealing instead of signing documents; and from the Norman Conquest onwards the succession of chancellors is continuous. The chancellor was originally, and long continued to be, an ecclesiastic, who combined the functions of the most dignified of the royal chaplains, the king's secretary in secular matters, and keeper of the royal seal. From the first, then, though at the outset overshadowed by that of the justiciar, the office of chancellor was one of great influence and importance. As chaplain the chancellor was keeper of the king's conscience; as secretary he enjoyed the royal confidence in secular affairs; as keeper of the seal he was necessary to all formal expressions of the royal will. By him and his staff of chaplains the whole secretarial work of the royal household was conducted, the accounts were kept under the justiciar and treasurer, writs were drawn up and sealed, and the royal correspondence was carried on. He was, in fact, as Stubbs puts it, a sort of secretary of state for all departments. "This is he," wrote John of Salisbury (d. 1180), "who cancels (*cancellat*) the evil laws of the realm, and makes equitable (*aequa*) the commands of a pious prince," a curious anticipation of the chancellor's later equitable jurisdiction. Under Henry II., indeed, the chancellor was already largely employed in judicial work, either in attendance on the king or in provincial visitations; though the peculiar jurisdiction of the chancery was of later growth. By this time, however, the chancellor was "great alike in Curia and Exchequer"; he was *secundus a rege, i.e.* took precedence immediately after the justiciar, and nothing was done either in the Curia or the exchequer without his consent. So great was his office that William FitzStephen, the biographer of Becket, tells us that it was not purchasable (*emenda non est*), a statement which requires modification, since it was in fact more than once sold under Henry I., Stephen, Richard and John (Stubbs, *Const. Hist.* i. pp. 384-497; Gneist, *Const. Hist. of England*, p. 219), an evil precedent which was, however, not long followed.

The chancellor in England.

The judicial duties of the chancellor grew out of the fact that all petitions addressed to the king passed through his hands. The number and variety of these became so great that in 1280, under Edward I., an ordinance was issued directing the chancellor and the justices to deal with the greater number of them; those which involved the use of the great seal being specially referred to the chancellor. The chancellor and justices were to determine which of them were "so great, and of grace, that the chancellor and others would not despatch them without the king," and these the chancellor and other chief ministers were to carry in person to the king (Stubbs ii. 263, note, and p. 268). At this period the chancellor, though employed in equity, had ministerial functions only; but when, in the reign of Edward III., the chancellor ceased to follow the court, his tribunal acquired a more definite character, and petitions for grace and favour began to be addressed primarily to him, instead of being merely examined and passed on by him to the king; and in the twenty-second year of this reign matters which were of grace were definitely committed to the chancellor for decision. This is the starting-point of the equitable jurisdiction of the chancellor, whence developed that immense body of rules, supplementing the deficiencies or modifying the harshness of the common law, which is known as Equity (*q.v.*).

The position of the chancellor as speaker or prolocutor of the House of Lords dates from the time when the ministers of the royal Curia formed *ex officio* a part of the *commune concilium* and parliament. The chancellor originally attended with the other officials, and he continued to attend *ex officio* after they had ceased to do so. If he chanced to be a bishop, he was summoned regularly *qua* bishop; otherwise he attended without summons. When not a peer the chancellor had no place in parliament except as chancellor, and the act of 31 Henry VIII. cap. 10 (1539) laid down that, if not a peer, he had "no interest to give any assent or dissent in the House." Yet Sir Robert Bourchier (d. 1349), the first lay chancellor, had protested in 1341 against the first statute of 15 Edward III. (on trial by peers, &c.), on the ground that it had not received his assent and was contrary to the laws of the realm. From the time, however, of William, Lord Cowper (first lord high chancellor of Great Britain in 1705, created Baron Cowper in 1706), all chancellors have been made peers on their elevation to the woolsack. Sometimes the custody of the great seal has been transferred from the chancellor to a special official, the lord keeper of the great seal (see Lord Keeper); this was notably the case under Queen Elizabeth (*cf.* the French *garde des sceaux*, below). Sometimes it is put into commission, being affixed by lords commissioners of the great seal. By the Catholic Emancipation Act of 1829 it was enacted that none of these offices could be held by a Roman Catholic (see further under Lord High Chancellor). The office of lord chancellor of Ireland, and that of chancellor of Scotland (who ceased to be appointed after the Act of Union of 1705) followed the same lines of development.

The chancellor in parliament.

The title of chancellor, without the predicates "high" or "lord," is also applied in the United Kingdom to a number of other officials and functionaries of varying rank and importance. Of these the most important is the chancellor of the exchequer, an office which originated in the separation of the chancery from the exchequer in the reign of Henry III. (1216–1272). His duties consisted originally in the custody and employment of the seal of the exchequer, in the keeping of a counter-roll to check the roll kept by the treasurer, and in the discharge of certain judicial functions in the exchequer of account. So long as the treasury board was in active working, the chancellorship of the exchequer was an office of small importance, and even during a great part of the 19th century was not necessarily a cabinet office, unless held in conjunction with that of first lord of the treasury. At the present time the chancellor of the exchequer is minister of finance, and therefore always of cabinet rank (see Exchequer).

Chancellor of the exchequer.

The chancellor of the duchy of Lancaster is the representative of the crown in the management of its lands and the control of its courts in the duchy of Lancaster, the property of which is scattered over several counties. These lands and privileges, though their inheritance has always been vested in the king and his heirs, have always been kept distinct from the hereditary revenues of the sovereign, whose palatine rights as duke of Lancaster were distinct from his rights as king. The Judicature Act of 1873 left only the chancery court of the duchy, but the chancellor can appoint and dismiss the county court judges within the limits of the duchy; he is responsible also for the land revenues of the duchy, which are the private property of the sovereign, and keeps the seal of the duchy. His appointment is by letters patent, and his salary is derived from the revenue of the duchy. As the judicial and estate work is done by subordinate officials, the office is practically a sinecure and is usually given to a minister whose assistance is necessary to a government, but who for one reason or another cannot undertake the duties of an important department. John Bright described him as the maid-of-all-work of the cabinet.

Chancellor of the duchy.

The chancellor of a diocese is the official who presides over the bishop's court and exercises jurisdiction in his name. This use of the word is comparatively modern, and, though

employed in acts of parliament, is not mentioned in the commission, having apparently been adopted on the analogy of the like title in the state. The chancellor was originally the keeper of the archbishop or bishop's seals; but the office, as now understood, includes two other offices distinguished in the commission by the titles of vicar-general and official principal (see ECCLESIASTICAL JURISDICTION). The chancellor of a diocese must be distinguished from the chancellor of a cathedral, whose office is the same as that of the ancient *scholasticus* (see CATHEDRAL).

Ecclesiastical chancellors.

The chancellor of an order of knighthood discharges notarial duties and keeps the seal. The chancellor of a university is an official of medieval origin. The appointment was originally made by the popes, and the office from the first was one of great dignity and originally of great power. The chancellor was, as he remains, the head of the university; he had the general superintendence of its studies and of its discipline, could make and unmake laws, try and punish offences, appoint to professorial chairs and admit students to the various degrees (see Du Cange, *s.* "*Cancellarii Academiarum*"). In England the chancellorship of the universities is now a more or less ornamental office and is conferred on noblemen or statesmen of distinction, whose principal function is to look after the general interests of the university, especially in its relations with the government. The chancellor is represented in the university by a vice-chancellor, who performs the administrative and judicial functions of the office. In the United States the heads of certain educational establishments have the title of chancellor. In Scotland the foreman of a jury is called its chancellor. In the United States the chancellors are judges of the chancery courts of the states, *e.g.* Delaware and New Jersey, where these courts are still maintained as distinct from the courts of common law. In other states, *e.g.* New York since 1847, the title has been abolished, and there is no federal chancellor.

Academic, &c.

In diplomacy generally the chancellor of an embassy or legation is an official attached to the suite of an ambassador or minister. He performs the functions of a secretary, archivist, notary and the like, and is at the head of the chancery, or chancellery (Fr. *chancellerie*), of the mission. The functions of this office are the transcribing and registering of official despatches and other documents, and generally the transaction of all the minor business, *e.g.* marriages, passports and the like, connected with the duties of a diplomatic agent towards his nationals in a foreign country. The dignified connotation of the title chancellor has given to this office a prestige which in itself it does not deserve; and "chancery" or "chancellery" is commonly used as though it were synonymous with embassy, while diplomatic style is sometimes called *style de chancellerie*, though as a matter of fact the chanceries have nothing to do with it.

France.—The country in which the office of chancellor followed most closely the same lines as in England is France. He had become a great officer under the Carolingians, and he grew still greater under the Capetian sovereigns. The great chancellor, *summus cancellarius* or *archi-cancellarius*, was a dignitary who had indeed little real power. The post was commonly filled by the archbishop of Reims, or the bishop of Paris. The *cancellarius*, who formed part of the royal court and administration, was officially known as the *sub-cancellarius* in relation to the *summus cancellarius*, but as *proto-cancellarius* in regard to his subordinate *cancellarii*. He was a very great officer, an ecclesiastic who was the chief of the king's chaplains or king's clerks, who administered all ecclesiastical affairs; he had judicial powers, and from the 12th century had the general control of foreign affairs. The chancellor in fact became so great that the Capetian kings, who did not forget the mayor of the palace, grew afraid of him. Few of the early ecclesiastical chancellors failed to come into collision with the king, or parted with him on good terms. Philip Augustus suspended the chancellorship throughout the whole of his reign, and appointed a keeper of the seals (*garde des sceaux*). The office was revived under Louis VIII., but the ecclesiastical chancellorship was finally suppressed in 1227. The king of the 13th century employed only keepers of the seal. Under the reign of Philip IV. le Bel lay chancellors were first appointed. From the reign of Charles V. to that of Louis XI. the French *chancelier* was elected by the royal council. In the 16th century he became irremovable, a distinction more honourable than effective, for though the king could not dismiss him from office he could, and on some occasions did, deprive him of the right to exercise his functions, and entrusted them to a keeper of the seal. The *chancelier* from the 13th century downwards was the head of the law, and performed the duties which are now entrusted to the minister of justice. His office was abolished when in 1790 the whole judicial system of France was swept away by the Revolution. The smaller *chanceliers* of the provincial parlements and royal courts disappeared at the same time. But when Napoleon was organizing the empire he created an arch-chancellor, an office which was imitated rather from the *Erz-Kanzler* of the Holy Roman Empire than from the old French *chancelier*. At the Restoration the office of chancellor of France was restored, the chancellor being president of the House of Peers, but it was finally abolished at the revolution of 1848. The administration of the Legion of Honour is presided over by a *grand chancelier*, who is a grand cross of the order, and who advises the head of the state in matters concerning the affairs of the order. The title of *chancelier* continues also to be used in France for the large class of officials who discharge notarial duties in some public offices, in embassies and consulates. They draw up diplomas and prepare all formal documents, and have charge of the registration and preservation of the archives.

Spain.—In Spain the office of chancellor, *canciller*, was introduced by Alphonso VII. (1126–1157), who adopted it from the court of his cousins of the Capetian dynasty of France. The *canciller* did not in Spain go beyond being the king's notary. The chancellor of the privy seal, *canciller del sello de la puridad* (literally the secret seal), was the king's secretary, and sealed all papers other than diplomas and charters. The office was abolished in 1496, and its functions were transferred to the royal secretaries. The *cancelario* was the chancellor of a university. The *canciller* succeeded the *maesescuela* or *scholasticus* of a church or monastery. *Canciller mayor de Castilla* is an honorary title of the archbishops of Toledo. The *gran canciller de las Indias*, high chancellor of the Indies, held the seal used for the American dominions of Spain, and presided at the council in the absence of the president. The office disappeared with the loss of Spain's empire in America.

Italy, Germany, &c.—In central and northern Europe, and in Italy, the office had different fortunes. In southern Italy, where Naples and Sicily were feudally organized, the chancellors of the Norman kings, who followed Anglo-Norman precedents very closely, and, at least in Sicily, employed Englishmen, were such officers as were known in the West. The similarity is somewhat concealed by the fact that these sovereigns also adopted names and offices from the imperial court at Constantinople. Their chancellor was officially known as Protonotary and Logothete, and their example was followed by the German princes of the Hohenstaufen family, who acquired the kingdoms of Naples and Sicily. The papal or apostolic chancery is dealt with in the article on the Curia Romana (*q.v.*). It may be pointed out here, however, that the close connexion of the papacy with the Holy Roman Empire is illustrated by the fact that the archbishop of Cologne, who by right of his see was the emperor's arch-chancellor (*Erz-Kanzler*) for Italy, was confirmed as papal arch-chancellor by a bull of Leo IX. in 1052. The origin and duration of this connexion are, however, obscure; it appears to have ceased before 1187. The last record of a papal chancellor in the middle ages dates from 1212, from which time onward, for reasons much disputed, the head of the papal chancery bore the title vice-chancellor (Hinschius i. 439), until the office of chancellor was restored by the constitution *Sapientius* of Pius X. in 1908.

The title of arch-chancellor (*Erz-Kanzler*) was borne by three great ecclesiastical dignitaries of the Holy Roman Empire.

The archbishop of Mainz was arch-chancellor for Germany. The archbishop of Cologne held the dignity for Italy, and the archbishop of Trier for Gaul and the kingdom of Arles. The second and third of these dignities became purely formal with the decline of the Empire in the 13th century. But the arch-chancellorship of Germany remained to some extent a reality till the Empire was finally dissolved in 1806. The office continued to be attached to the archbishopric of Mainz, which was an electorate. Karl von Dalberg, the last holder of the office, and the first prince primate of the Confederation of the Rhine, continued to act in show at least as chancellor of that body, and was after a fashion the predecessor of the *Bundes Kanzler*, or chancellor of the North German Confederation. The duties imposed on the imperial chancery by the very complicated constitution of the Empire were, however, discharged by a vice-chancellor who was attached to the court of the emperor. The abbot of Fulda was chancellor to the empress.

The house of Austria in their hereditary dominions, and in those of their possessions which they treated as hereditary, even where the sovereignty was in theory elective, made a large and peculiar use of the title chancellor. The officers so called were of course distinct from the arch-chancellor and vice-chancellor of the Empire, although the imperial crown became in practice hereditary in the house of Habsburg. In the family states their administration was, to use a phrase familiar to the French, "polysynodic." As it was when fully developed, and as it remained until the March revolution of 1848, it was conducted through boards presided over by a chancellor. There were three aulic chancellorships for the internal affairs of their dominions, "a united aulic chancellorship for all parts of the empire (*i.e.* of Austria, not the Holy Roman) not belonging to Hungary or Transylvania, and a separate chancellorship for each of those last-mentioned provinces" (Hartig, *Genesis of the Revolution in Austria*). There were also a house, a court, and a state chancellor for the business of the imperial household and foreign affairs, who were not, however, the presidents of a board. These "aulic" (*i.e.* court) officers were in fact secretaries of the sovereign, and administrative or political rather than judicial in character, though the boards over which they presided controlled judicial as well as administrative affairs. In the case of such statesmen as Kaunitz and Metternich, who were house, court, and state chancellors as well as "united aulic" chancellors, the combination of offices made them in practice prime ministers, or rather lieutenants-general, of the sovereign. The system was subject to modifications, and in the end it broke down under its own complications. We are not dealing here with the confusing history of the Austrian administration, and these details are only quoted to show how it happened that in Austria the title chancellor came to mean a political officer and minister. There is obviously a vast difference between such an official as Kaunitz, who as house, court, and state chancellor was minister of foreign affairs, and as "united aulic" chancellor had a general superiority over the whole machinery of government, and the lord high chancellor in England, the *chancelier* in France, or the *canciller mayor* in Castile, though the title was the same. The development of the office in Austria must be understood in order to explain the position and functions of the imperial chancellor (*Reichs Kanzler*) of the modern German empire. Although the present empire is sometimes rhetorically and absurdly spoken of as a revival of the medieval Empire, it is in reality an adaptation of the Austrian empire, which was a continuation under a new name of the hereditary Habsburg monarchy. The *Reichs Kanzler* is the immediate successor of the *Bundes Kanzler*, or chancellor of the North German Confederation (*Bund*). But the *Bundes Kanzler*, who bore no sort of resemblance except in mere name to the *Erz-Kanzler* of the old Empire, was in a position not perhaps actually like that of Prince Kaunitz, but capable of becoming much the same thing. When the German empire was established in 1871 Prince Bismarck, who was *Bundes Kanzler* and became *Reichs Kanzler*, took care that his position should be as like as possible to that of Prince Kaunitz or Prince Metternich. The constitution of the German empire is separately dealt with, but it may be pointed out here that the *Reichs Kanzler* is the federal minister of the empire, the chief of the federal officials, and a great political officer, who directs the foreign affairs, and superintends the internal affairs, of the empire.

In these German states the title of chancellor is also given as in France to government and diplomatic officials who do notarial duties and have charge of archives. The title of chancellor has naturally been widely used in the German and Scandinavian states, and in Russia since the reign of Peter the Great. It has there as elsewhere wavered between being a political and a judicial office. Frederick the Great of Prussia created a *Gross Kanzler* for judicial duties in 1746. But there was in Prussia a state chancellorship on the Austrian model. It was allowed to lapse on the death of Hardenberg in 1822. The Prussian chancellor after his time was one of the four court ministries (*Hofämter*) of the Prussian monarchy.

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CHANCELLORSVILLE, a village of Spottsylvania county, Virginia, U.S.A., situated almost midway between Washington and Richmond. It was the central point of one of the greatest battles of the Civil War, fought on the 2nd and 3rd of May 1863, between the Union Army of the Potomac under Major-General Hooker, and the Confederate Army of Northern Virginia under General Lee. (See AMERICAN CIVIL WAR, and WILDERNESS.) General "Stonewall" Jackson was mortally wounded in this battle.

CHANCE-MEDLEY (from the A.-Fr. *chance-medlée*, a mixed chance, and not from *chaude-medlée*, a hot affray), an accident of a mixed character, an old term in English law for a form of homicide arising out of a sudden affray or quarrel. The homicide has not the characteristic of "malice prepense" which would raise the death to murder, nor the completely accidental nature which would reduce it to homicide by misadventure. It was practically identical, therefore, with manslaughter.

CHANCERY, in English law, the court of the lord chancellor of England, consolidated in 1873 along with the other superior courts in the Supreme Court of Judicature. Its origin is noticed under the head of Chancellor.

It has been customary to say that the court of chancery consists of two distinct tribunals—one a court of common law, the other a court of equity. From the former have issued all the original writs passing under the great seal, all commissions of sewers, lunacy, and the like—some of these writs being originally kept in a *hanaper* or hamper (whence the "hanaper office"), and others in a little sack or bag (whence the "petty-bag office"). The court had likewise power to hold pleas upon *scire facias* (*q.v.*) for repeal of letters patent, &c. "So little," says Blackstone, "is commonly done on the common law side of the court that I have met with no traces of any writ of error being actually brought since the fourteenth year of Queen Elizabeth."

The equitable jurisdiction of the court of chancery was founded on the supposed superiority of conscience and equity over the strict law. The appearance of equity in England is in harmony with the general course of legal history in progressive societies. What is remarkable is that, instead of being incorporated with or superseding the common law, it gave rise to a wholly independent set of tribunals. The English dislike of the civil law, and the tendency to follow precedent which has never ceased to characterize English lawyers, account for this unfortunate separation. The claims of equity in its earlier stages are well expressed in the little treatise called *Doctor and Student*, published in the reign of Henry VIII.:—"Conscience never resisteth the law nor addeth to it, but only when the law is

directly in itself against the *law of God*, or *law of reason*." So also King James, speaking in the Star Chamber, says: "Where the rigour of the law in many cases will undo a subject, then the chancery tempers the law with equity, and so mixes mercy with justice, as it preserves a man from destruction." This theory of the essential opposition between law and equity, and of the natural superiority of the latter, remained long after equity had ceased to found itself on natural justice, and had become as fixed and rigid as the common law itself. The jealousy of the common lawyers came to a head in the time of Lord Ellesmere, when Coke disputed the right of the chancery to give relief against a judgment of the court of queen's bench obtained by gross fraud and imposition. James I., after consultation, decided in favour of the court of equity. The substitution of lay for clerical chancellors is regarded by G. Spence (*Equitable Jurisdiction of the Court of Chancery*, 2 vols., 1846–1849) as having at first been unfortunate, inasmuch as the laymen were ignorant of the principles on which their predecessors had acted. Lord Nottingham (1621–1682) is usually credited with the first attempt to reduce the decisions of the court to order, and his work was continued by Lord Hardwicke (1690–1764). By the time of Lord Elton equity had become fixed, and the judges, like their brethren in the common law courts, strictly followed the precedents. Henceforward chancery and common law courts have exhibited the anomaly of two co-ordinate sets of tribunals, empowered to deal with the same matters, and compelled to proceed in many cases on wholly different principles. The court of chancery could in most cases prevent a person from taking advantage of a common law right, not approved of by its own system. But if a suitor chose to go to a court of common law, he might claim such unjust rights, and it required the special intervention of the court of equity to prevent his enforcing them. In many cases also a special application had to be made to chancery for facilities which were absolutely necessary to the successful conduct of a case at common law. Another source of difficulty and annoyance was the uncertainty in many cases whether the chancery or common law courts were the proper tribunal, so that a suitor often found at the close of an expensive and protracted suit that he had mistaken his court and must go elsewhere for relief. Attempts more or less successful were made to lessen those evils by giving the powers to both sets of courts; but down to the consolidation effected by the Judicature Act, the English judicial system justified the sarcasm of Lord Westbury, that one tribunal was set up to do injustice and another to stop it.

The equitable jurisdiction of chancery was commonly divided into *exclusive*, *concurrent* and *auxiliary*. Chancery had exclusive jurisdiction when there were no forms of action by which relief could be obtained at law, in respect of rights which ought to be enforced. Trusts were the most conspicuous example of this class. It also included the rights of married women, infants and lunatics. Chancery had concurrent jurisdiction when the common law did not give *adequate* relief, *e.g.* in cases of fraud, accident, mistake, specific performance of contracts, &c. It had auxiliary jurisdiction when the administrative machinery of the law courts was unable to procure the necessary evidence.

The Judicature Act 1873 enacted (§ 24) that in every civil cause or matter commenced in the High Court of Justice, law and equity should be administered by the High Court of Justice and the court of appeal respectively, according to the rules therein contained, which provide for giving effect in all cases to "equitable rights and other matters of equity." The 25th section declared the law hereafter to be administered in England on certain points, and ordained that "generally in all matters not hereinbefore particularly mentioned in which there is any conflict or variance between the rules of equity and the rules of the common law with reference to the same matter, the rules of equity shall prevail." The 34th section specifically assigned to the chancery division the following causes and matters:—The administration of the estates of deceased persons; the dissolution of partnerships, or the taking of partnership, or other accounts; the redemption or foreclosure of mortgages; the raising of portions, or other charges on land; the sale and distribution of the proceeds of property subject to any lien or charge; the execution of trusts, charitable or private; the rectification, or setting aside, or cancellation of deeds or other written instruments; the specific performance of contracts between vendors and purchasers of real estates, including contracts for leases; the partition or sale of real estates; the wardship of infants and the care of infants' estates.

The chancery division originally consisted of the lord chancellor as president and the master of the rolls, and the three vice-chancellors. The master of the rolls was also a member of the court of appeal, but Sir George Jessel, who held that office when the new system came into force, regularly sat as a judge of first instance until 1881, when, by the act of that year (sec. 2), the master of the rolls became a member of the court of appeal only, and provision was made for the appointment of a judge to supply the vacancy thus occasioned (sec. 3). Sir James Bacon (1798–1895) was the last survivor of the vice-chancellors. He retained his seat on the bench until the year 1886, when he retired after more than seventeen years' judicial service. For some reason the solicitors, when they had the choice, preferred to bring their actions in the chancery division. The practice introduced by the Judicature Act of trying actions with oral evidence instead of affidavits, and the comparative inexperience of the chancery judges and counsel in that mode of trial, tended to lengthen the time required for the disposal of the business. Demand was consequently made for more judges in the chancery division. By an act of 1877 the appointment of an additional judge in that division was authorized, and Sir Edward Fry (afterwards better known as a lord justice) was appointed. In August 1899 the crown consented to the appointment of a new judge of the High Court in the chancery division on an address from both Houses of Parliament, pursuant to the 87th section of the Appellate Jurisdiction Act 1876. The chancery division, therefore, consists of the lord chancellor and six puisne judges. The latter are styled and addressed in the same manner as was customary in the old common law courts.[1] Formerly there were only four judges of this division (being the successors of the master of the rolls and the three vice-chancellors) to whom chambers were attached. The fifth judge heard only causes with witnesses transferred to him from the overflowing of the lists of his four brethren. In each set of chambers there were three chief clerks, with a staff of assistant clerks under them. The chief clerks had no original jurisdiction, but heard applications only on behalf of the judge to whose chambers they belonged, and theoretically every suitor had the right to have his application heard by the judge himself in chambers. But the appointment of a sixth judge enabled the lord chancellor to carry out a reform recommended by a departmental committee which reported in 1885. The great difficulty in the chancery division always was to secure the continuous hearing of actions with witnesses, as nearly one-half of the judge's time was taken up with cases adjourned to him from chambers and other administrative business and non-witness actions and motions. The interruption of a witness action for two or three days, particularly in a country case, occasioned great expense, and had other inconveniences. It was a simple remedy to link the judges in pairs with one list of causes and one set of chambers assigned to each pair. This reform was effected by the alteration of a few words in certain rules of court. There are, therefore, only three sets of chambers, each containing four chief clerks, or, as they are now styled, masters of the Supreme Court, and one of the linked judges, by arrangement between themselves, continuously tries the witness actions in their common list, while the other attends in chambers, and also hears the motions, petitions, adjourned summonses and non-witness cases.

Although styled masters it does not appear that the chief

[1] The comte de Franqueville comments on the misuse of the title "Lord" in addressing judges as another anomaly which only adds to the confusion, but perhaps unnecessarily. According to Foss (vol. viii. p. 200) it was only in the 18th century that the judges began to be addressed by the title of "Your Lordship." In the Year Books (he adds) they are constantly addressed by the title of "Sir." "Sir, vous voyez bien," &c.

clerks have any larger or different jurisdiction than they had before. They are still the representatives of and responsible to the judges to whom the chambers are attached. The judge may either hear an application in chambers, or may direct any matter which he thinks of sufficient importance to be argued before him in court, or a party may move in court to discharge an order made in chambers with a view to an appeal, but this is not required if the judge certifies that the matter was sufficiently discussed before him in chambers.

Under the existing rules of court many orders can now be made on summons in chambers which used formerly to require a suit or petition in court (see Order LV. as to foreclosure, administration, payment out of money in court and generally). The judge is also enabled to decide any particular question arising in the administration of the estate of a deceased person or execution of the trusts of a settlement without directing administration of the whole estate or execution of the trusts generally by the court (Order LV. rule 10), and where an application for accounts is made by a dissatisfied beneficiary or creditor to order the accounts to be delivered out of court, and the application to stand over till it can be seen what questions (if any) arise upon the accounts requiring the intervention of the court (Order LV. 2, 10a). Delay and consequent worry and expense are thus saved to the parties, and, at the same time, a great deal of routine administration is got rid of and a larger portion of the judicial term can be devoted to hearing actions and deciding any question of importance in court. The work of the chambers staff of the judges has probably been increased; but, on the other hand, it has been lightened by the removal of the winding-up business. The chancery division has also inherited from the court of chancery a staff of registrars and taxing masters.

In the United States "chancery" is generally used as the synonym of "equity." Chancery practice is practice in cases of equity. Chancery courts are equity courts (see EQUITY). For the diplomatic sense of chancery (chancellery) see CHANCELLOR.

CHANDA, a town and district of British India, in the Nagpur division of the Central Provinces. In 1901 the town had a population of 17,803. It is situated at the junction of the Virai and Jharpat rivers. It was the capital of the Gond kingdom of Chanda, which was established on the ruins of a Hindu state in the 11th or 12th century, and survived until 1751 (see GONDWANA). The town is still surrounded by a stone wall 5½ m. in circuit. It has several old temples and tombs, and the district at large is rich in remains of antiquity. There are manufactures of cotton, silk, brass-ware and leather slippers, and a considerable local trade.

The DISTRICT OF CHANDA has an area of 10,156 sq. m. Excepting in the extreme west, hills are thickly dotted over the country, sometimes in detached ranges, occasionally in isolated peaks rising sheer out from the plain. Towards the east they increase in height, and form a broad tableland, at places 2000 ft. above sea-level. The Wainganga river flows through the district from north to south, meeting the Wardha river at Seoni, where their streams unite to form the Pranhita. Chanda is thickly studded with fine tanks, or rather artificial lakes, formed by closing the outlets of small valleys, or by throwing a dam across tracts intersected by streams. The broad clear sheets of water thus created are often very picturesque in their surroundings of wood and rock. The chief architectural objects of interest are the cave temples at Bhandak, Winjbasani, Dewala and Ghugus; a rock temple in the bed of the Wardha river below Ballalpur; the ancient temples at Markandi, Ambgaon and elsewhere; the forts of Wairagarh and Ballalpur; and the old walls of the city of Chanda, its system of waterworks, and the tombs of the Gond kings. In 1901 the population was 601,533, showing a decrease of 15% in the decade. The principal crops are rice, millet, pulse, wheat, oil-seeds and cotton. The district contains the coalfield of Warora, which was worked by government till 1906, when it was closed. Other fields are known, and iron ores also occur. The district suffered severely from famine in 1900, when in April the number of persons relieved rose to 90,000.

CHANDAUSI, a town of British India, in the Moradabad district of the United Provinces, 28 m. south of Moradabad. Pop. (1901) 25,711. It is an important station on the Oudh & Rohilkhand railway, with a junction for Aligarh. Its chief exports are of cotton, hemp, sugar and stone. There is a factory for pressing cotton.

CHAND BARDAI (fl. *c.* 1200), Hindu poet, was a native of Lahore, but lived at the court of Prithwi Raja (Prithiraj), the last Hindu sovereign of Delhi. His *Prithiraj Rasau*, a poem of some 100,000 stanzas, chronicling his master's deeds and the contemporary history of his part of India, is valuable not only as historical material but as the earliest monument of the Western Hindi language, and the first of the long series of bardic chronicles for which Rajputana is celebrated. It is written in ballad form, and portions of it are still sung by itinerant bards throughout north-western India and Rajputana.

See Lieut.-Col. James Tod, *Annals and Antiquities of Rajast'han* (2 vols., London, 1829–1832; repub. by Lalit Mohan Auddy, 2 vols. *ib.*, 1894–1895), where good translations are given.

CHANDELIER, a frame of metal, wood, crystal, glass or china, pendent from roof or ceiling for the purpose of holding lights. The word is French, but the appliance has lost its original significance of a candle-holder, the chandelier being now chiefly used for gas and electric lighting. Clusters of hanging lights were in use as early as the 14th century, and appear originally to have been almost invariably of wood. They were, however, so speedily ruined by grease that metal was gradually substituted, and fine and comparatively early examples in beaten iron, brass, copper and even silver are still extant. Throughout the 17th century the hanging candle-holder of brass or bronze was common throughout northern Europe, as innumerable pictures and engravings testify. In the great periods of the art of decoration in France many magnificent chandeliers were made by Boulle, and at a later date by Gouthière and Thomire and others among the extraordinarily clever *fondeurs-ciseleurs* of the second half of the 18th century. The chandelier in rock crystal and its imitations had come in at least a hundred years before their day, and continued in favour to the middle of the 19th century, or even somewhat later. It reached at last the most extreme elaboration of banality, with ropes of pendants and hanging faceted drops often called lustres. When many lights were burning in one of these chandeliers an effect of splendour was produced that was not out of place in a ballroom, but the ordinary household varieties were extremely ugly and inartistic. The more purely domestic chandelier usually carries from two to six lights. The rapidly growing use of electricity as an illuminating medium and the preference for smaller clusters of lights have, however, pushed into the background an appliance which had grown extremely commonplace in design, and had become out of character with modern ideas of household decoration.

CHANDERNAGORE, or CHANDARNAGAR, a French settlement in India, with a small adjoining territory, situated on the right bank of the river Hugli, 20 m. above Calcutta, in 22° 51′ 40″ N. and 88° 24′ 50″ E. Area 3 sq. m.; pop. (1901) 25,000. Chandernagore has played an important part in the European history of Bengal. It became a permanent French settlement in 1688, but did not rise to any importance till the time of Dupleix, during whose administration more than two thousand brick houses were erected in the town and a considerable maritime trade was carried on. In 1757 Chandernagore was bombarded by an English fleet under Admiral Watson and captured; the fortifications and houses were afterwards demolished. On peace being established the town was restored to the French in 1763. When hostilities afterwards broke out in 1794, it was again taken possession of by the English, and was held by them till 1816, when it was a second time given up to the French; it has ever since remained in their possession. All the former commercial grandeur of Chandernagore has now passed away, and at present it is little more than a quiet suburb of Calcutta, without any external trade. The European town is situated at the bottom of a beautiful reach of the Hugli, with clean wide thoroughfares, and many elegant

residences along the river-bank. The authorities of Chandernagore are subject to the jurisdiction of the governor-general of Pondicherry, to whom is confided the general government of all the French possessions in India.

CHANDLER, HENRY WILLIAM (1828–1889), English scholar, was born in London on the 31st of January 1828. In 1848 he entered Pembroke College, Oxford, where he was elected fellow in 1853. In 1867 he succeeded H. L. Mansel as Waynflete professor of moral and metaphysical philosophy, and in 1884 was appointed curator of the Bodleian library. He died by his own hand in Oxford on the 16th of May 1889. He was chiefly known as an Aristotelian scholar, and his knowledge of the Greek commentators on Aristotle was profound. He collected a vast amount of material for an edition of the fragments of his favourite author, but on the appearance of Valentine Rose's work in 1886 he abandoned the idea. Two works on the bibliography of Aristotle, *A Catalogue of Editions of Aristotle's Nicomachean Ethics and of Works illustrative of them printed in the 15th century* (1868), and *A Chronological Index to Editions of Aristotle's Nicomachean Ethics, and of Works illustrative of them from the Origin of Printing to 1799* (1878), are of great value. Chandler's collection of works on Aristotelian literature is now in the library of Pembroke College. His *Practical Introduction to Greek Accentuation* (1862, ed. min. 1877) is the standard work in English.

CHANDLER, RICHARD (1738–1810), British antiquary, was born in 1738 at Elson in Hampshire, and educated at Winchester and at Queen's and Magdalen Colleges, Oxford. His first work consisted of fragments from the minor Greek poets, with notes (*Elegiaca Graeca*, 1759); and in 1763 he published a fine edition of the Arundelian marbles, *Marmora Oxoniensia*, with a Latin translation, and a number of suggestions for supplying the lacunae. He was sent by the Dilettanti Society with Nicholas Revett, an architect, and Pars, a painter, to explore the antiquities of Ionia and Greece (1763–1766); and the result of their work was the two magnificent folios of Ionian antiquities published in 1769. He subsequently held several church preferments, including the rectory of Tylehurst, in Berkshire, where he died on the 9th of February 1810. Other works by Chandler were *Inscriptiones Antiquae pleraeque nondum editae* (Oxford, 1774); *Travels in Asia Minor* (1775); *Travels in Greece* (1776); *History of Ilium* (1803), in which he asserted the accuracy of Homer's geography. His *Life of Bishop Waynflete*, lord high chancellor to Henry VI., appeared in 1811.

A complete edition (with notes by Revett) of the *Travels in Asia Minor and Greece* was published by R. Churton (Oxford, 1825), with an "Account of the Author."

CHANDLER, SAMUEL (1693–1766), English Nonconformist divine, was born in 1693 at Hungerford, in Berkshire, where his father was a minister. He was sent to school at Gloucester, where he began a lifelong friendship with Bishop Butler and Archbishop Secker; and he afterwards studied at Leiden. His talents and learning were such that he was elected fellow of the Royal and Antiquarian Societies, and was made D.D. of Edinburgh and Glasgow. He also received offers of high preferment in the Church of England. These he refused, remaining to the end of his life in the position of a Presbyterian minister. He was moderately Calvinistic in his views and leaned towards Arianism. He took a leading part in the deist controversies of the time, and discussed with some of the bishops the possibility of an act of comprehension. From 1716 to 1726 he preached at Peckham, and for forty years he was pastor of a meeting-house in Old Jewry. During two or three years, having fallen into pecuniary distress through the failure of the South Sea scheme, he kept a book-shop in the Poultry. On the death of George II. in 1760 Chandler published a sermon in which he compared that king to King David. This view was attacked in a pamphlet entitled *The History of the Man after God's own Heart*, in which the author complained of the parallel as an insult to the late king, and, following Pierre Bayle, exhibited King David as an example of perfidy, lust and cruelty. Chandler condescended to reply first in a review of the tract (1762) and then in *A Critical History of the Life of David*, which is perhaps the best of his productions. This work was just completed when he died, on the 8th of May 1766. He left 4 vols. of sermons (1768), and a paraphrase of the Epistles to the Galatians and Ephesians (1777), several works on the evidences of Christianity, and various pamphlets against Roman Catholicism.

CHANDLER, ZACHARIAH (1813–1879), American politician, was born at Bedford, New Hampshire, on the 10th of December 1813. In 1833 he removed to Detroit, Michigan, where he became a prosperous dry-goods merchant. He took a prominent part as a Whig in politics (serving as mayor in 1851), and, impelled by his strong anti-slavery views, actively furthered the work of the "Underground Railroad," of which Detroit was one of the principal "transfer" points. He was one of the organizers in Michigan of the Republican party, and in 1857 succeeded Lewis Cass in the United States Senate, serving until 1875, and at once taking his stand with the most radical opponents of slavery extension. When the Civil War became inevitable he endeavoured to impress upon the North the necessity of taking extraordinary measures for the preservation of the Union. After the fall of Fort Sumter he advocated the enlistment of 500,000 instead of 75,000 men for a long instead of a short term, and the vigorous enforcement of confiscation measures. In July 1862 he made a bitter attack in the Senate on General George B. McClellan, charging him with incompetency and lack of "nerve." Throughout the war he allied himself with the most radical of the Republican faction in opposition to President Lincoln's policy, and subsequently became one of the bitterest opponents of President Johnson's plan of reconstruction. From October 1875 to March 1877 he was secretary of the interior in the cabinet of President Grant, succeeding Columbus Delano (1809–1896). In 1876, as chairman of the national republican committee, he managed the campaign of Hayes against Tilden. In February 1879 he was re-elected to the Senate to succeed Isaac P. Christiancy (1812–1890), and soon afterwards, in a speech concerning Mexican War pensions, bitterly denounced Jefferson Davis. He died at Chicago, Illinois, on the 1st of November 1879. By his extraordinary force of character he exercised a wide personal influence during his lifetime, but failed to stamp his personality upon any measure or policy of lasting importance.

CHANDOS, BARONS AND DUKES OF. The English title of Chandos began as a barony in 1554, and was continued in the family of Brydges (becoming a dukedom in 1719) till 1789. In 1822 the dukedom was revived in connexion with that of Buckingham.

JOHN BRYDGES, 1st Baron Chandos (*c.* 1490–1557), a son of Sir Giles Brydges, or Bruges (d. 1511), was a prominent figure at the English court during the reigns of Henry VIII., Edward VI. and Mary. He took part in suppressing the rebellion of Sir Thomas Wyat in 1554, and as lieutenant of the Tower of London during the earlier part of Mary's reign, had the custody, not only of Lady Jane Grey and of Wyat, but for a short time of the princess Elizabeth. He was created Baron Chandos of Sudeley in 1554, one of his ancestors, Alice, being a grand-daughter of Sir Thomas Chandos (d. 1375), and he died in March 1557. The three succeeding barons, direct descendants of the 1st baron, were all members of parliament and persons of some importance. Grey, 5th Baron Chandos (*c.* 1580–1621), lord-lieutenant of Gloucestershire, was called the "king of the Cotswolds," owing to his generosity and his magnificent style of living at his residence, Sudeley Castle. He has been regarded by Horace Walpole and others as the author of some essays, *Horae Subsecivae*. His elder son George, 6th Baron Chandos (1620–1655), was a supporter of Charles I. during his struggle with Parliament, and distinguished himself at the first battle of Newbury in 1643. He had six daughters but no sons, and after the death of his brother William in 1676 the barony came to a kinsman, Sir James Brydges, Bart. (1642–1714), who was English ambassador to Constantinople from 1680 to 1685.

JAMES BRYDGES, 1st duke of Chandos (1673–1744), son and heir of the last-named, had been member of parliament for Hereford from 1698 to 1714, and, three days after his father's death, was created Viscount Wilton and earl of Carnarvon. For eight years, from 1705 to 1713, during the War of the Spanish

Succession, he was paymaster-general of the forces abroad, and in this capacity he amassed great wealth. In 1719 he was created marquess of Carnarvon and duke of Chandos. The duke is chiefly remembered on account of his connexion with Handel and with Pope. He built a magnificent house at Canons near Edgware in Middlesex, and is said to have contemplated the construction of a private road between this place and his unfinished house in Cavendish Square, London. For over two years Handel, employed by Chandos, lived at Canons, where he composed his oratorio *Esther*. Pope, who in his *Moral Essays* (*Epistle to the Earl of Burlington*) doubtless described Canons under the guise of "Timon's Villa," referred to the duke in the line, "Thus gracious Chandos is belov'd at sight"; but Swift, less complimentary, called him "a great complier with every court." The poet was caricatured by Hogarth for his supposed servility to the duke. Chandos, who was lord-lieutenant of the counties of Hereford and Radnor, and chancellor of the university of St Andrews, became involved in financial difficulties, and after his death on the 9th of August 1744 Canons was pulled down. He was succeeded by his son Henry, 2nd duke (1708–1771), and grandson James, 3rd duke (1731–1789). On the death of the latter without sons in September 1789 all his titles, except that of Baron Kinloss, became extinct, although a claimant arose for the barony of Chandos of Sudeley. The 3rd duke's only daughter, Anna Elizabeth, who became Baroness Kinloss on her father's death, was married in 1796 to Richard Grenville, afterwards marquess of Buckingham; and in 1822 this nobleman was created duke of Buckingham and Chandos (see BUCKINGHAM, DUKES OF).

See G. E. C(okayne), *Complete Peerage* (1887–1898); and J. R. Robinson, *The Princely Chandos, i.e.* the 1st duke (1893).

CHANDOS, SIR JOHN (?–1370), one of the most celebrated English commanders of the 14th century. He is found at the siege of Cambrai in 1337, and at the battle of Crécy in 1346. At the battle of Poitiers, in 1356, it was he who decided the day and saved the life of the Black Prince. For these services Edward III. made him a knight of the Garter, gave him the lands of the viscount of Saint Sauveur in Cotentin, and appointed him his lieutenant in France and vice-chamberlain of the royal household. In 1362 he was made constable of Aquitaine, and won the victories of Auray (1364) and Navaret in Spain (1367) over Duguesclin. He was seneschal of Poitou in 1369, and was mortally wounded at the bridge of Lussac near Poitiers on the 31st of December. He died on the following day, the 1st of January 1370.

See Benjamin Fillon, "John Chandos, Connétable d'Aquitaine et Sénéchal de Poitou," in the *Revue des provinces de l'ouest* (1855).

CHANDRAGUPTA MAURYA (reigned 321–296 B.C.), known to the Greeks as Sandracottus, founder of the Maurya empire and first paramount ruler of India, was the son of a king of Magadha by a woman of humble origin, whose caste he took, and whose name, Mura, is said to have been the origin of that of Maurya assumed by his dynasty. As a youth he was driven into exile by his kinsman, the reigning king of Magadha. In the course of his wanderings he met Alexander the Great, and, according to Plutarch (*Alexander*, cap. 62), encouraged him to invade the Ganges kingdom by enlarging on the extreme unpopularity of the reigning monarch. During his exile he collected a large force of the warlike clans of the north-west frontier, and on the death of Alexander attacked the Macedonian garrisons and conquered the Punjab. He next attacked Magadha, dethroned and slew the king, his enemy, with every member of his family, and established himself on the throne (321). The great army acquired from his predecessor he increased until it reached the total of 30,000 cavalry, 9000 elephants, and 600,000 infantry; and with this huge force he overran all northern India, establishing his empire from the Arabian Sea to the Bay of Bengal. In 305 Seleucus Nicator crossed the Indus, but was defeated by Chandragupta and forced to a humiliating peace (303), by which the empire of the latter was still farther extended in the north. About six years later Chandragupta died, leaving his empire to his son Bindusura.

An excellent account of the court and administrative system of Chandragupta has been preserved in the fragments of Megasthenes, who came to Pataliputra as the envoy of Seleucus shortly after 303. The government was, of course, autocratic and even tyrannous, but it was organized on an elaborate system, army and civil service being administered by a series of boards, while the cities were governed by municipal commissioners responsible for public order and the upkeep of public works. Chandragupta himself is described as living in barbaric splendour, appearing in public only to hear causes, offer sacrifice, or to go on military and hunting expeditions, and withal so fearful of assassination that he never slept two nights running in the same room.

See J. W. MacCrindle, *Ancient India as described by Megasthenes and Arrian* (Calcutta, 1877); V. A. Smith, *Early Hist. of India* (Oxford, 1908); also the articles INDIA: *History*, and INSCRIPTIONS: *Indian*.

CHANGARNIER, NICOLAS ANNE THÉODULE (1793–1877), French general, was born at Autun on the 26th of April 1793. Educated at St Cyr, he served for a short time in the bodyguard of Louis XVIII., and entered the line as a lieutenant in January 1815. He achieved distinction in the Spanish campaign of 1823, and became captain in 1825. In 1830 he entered the Royal Guard and was sent to Africa, where he took part in the Mascara expedition. Promoted commandant in 1835, he distinguished himself under Marshal Clausel in the campaign against Ahmed Pasha, bey of Constantine, and became lieutenant-colonel in 1837. The part he took in the expedition of Portes-de-Fer gained him a colonelcy, and his success against the Hajutas and Kabyles, the cross of the Legion of Honour. Three more years of brilliant service in Africa won for him the rank of *maréchal de camp* in 1840, and of lieutenant-general in 1843. In 1847 he held the Algiers divisional command. He visited France early in 1848, assisted the provisional government to establish order, and returned to Africa in May to succeed General Cavaignac in the government of Algeria. He was speedily recalled on his election to the general assembly for the department of the Seine, and received the command of the National Guard of Paris, to which was added soon afterwards that of the troops in Paris, altogether nearly 100,000 men. He held a high place and exercised great influence in the complicated politics of the next two years. In 1849 he received the grand cross of the Legion of Honour. An avowed enemy of republican institutions, he held a unique position in upholding the power of the president; but in January 1851 he opposed Louis Napoleon's policy, was in consequence deprived of his double command, and at the *coup d'état* in December was arrested and sent to Mazas, until his banishment from France by the decree of the 9th of January 1852. He returned to France after the general amnesty, and resided in his estate in the department of Saône-et-Loire. In 1870 he held no command, but was present with the headquarters, and afterwards with Bazaine in Metz. He was employed on an unsuccessful mission to Prince Frederick Charles, commanding the German army which besieged Metz, and on the capitulation became a prisoner of war. At the armistice he returned to Paris, and in 1871 was elected to the National Assembly by four departments, and sat for the Somme. He took an active part in politics, defended the conduct of Marshal Bazaine, and served on the committee which elaborated the monarchical constitution. When the comte de Chambord refused the compromise, he moved the resolution to extend the executive power for ten years to Marshal MacMahon. He was elected a life senator in 1875. He died in Paris on the 14th of February 1877.

CHANG-CHOW, a town of China, in the province of Fu-kien, on a branch of the Lung Kiang, 35 m. W. of Amoy. It is surrounded by a wall 4½ m. in circumference, which, however, includes a good deal of open ground. The streets are paved with granite, but are very dirty. The river is crossed by a curious bridge, 800 ft. long, constructed of wooden planks supported on twenty-five piles of stones about 30 ft. apart. The city is a centre of the silk-trade, and carries on an extensive commerce in different directions. Brick-works and sugar-factories are among its chief

industrial establishments. Its population is estimated at about 1,000,000.

CHANG CHUN, KIU (1148–1227), Chinese Taoist sage and traveller, was born in 1148. In 1219 he was invited by Jenghiz Khan, founder of the Mongol empire and greatest of Asiatic conquerors, to visit him. Jenghiz' letter of invitation, dated the 15th of May 1219 (by present reckoning), has been preserved, and is among the curiosities of history; here the terrible warrior appears as a meek disciple of wisdom, modest and simple, almost Socratic in his self-examination, alive to many of the deepest truths of life and government. Chang Chun obeyed this summons; and leaving his home in Shantung (February 1220) journeyed first to Peking. Learning that Jenghiz had gone far west upon fresh conquests, the sage stayed the winter in Peking. In February 1221 he started again and crossed eastern Mongolia to the camp of Jenghiz' brother Ujughen, near Lake Bör or Buyur in the upper basin of the Kerulun-Amur. Thence he travelled south-westward up the Kerulun, crossed the Karakorum region in north-central Mongolia, and so came to the Chinese Altai, probably passing near the present Uliassutai. After traversing the Altai he visited Bishbalig, answering to the modern Urumtsi, and moved along the north side of the Tian Shan range to lake Sairam, Almalig (or Kulja), and the rich valley of the Ili. We then trace him to the Chu, over this river to Talas and the Tashkent region, and over the Jaxartes (or Syr Daria) to Samarkand, where he halted for some months. Finally, through the "Iron Gates" of Termit, over the Oxus, and by way of Balkh and northern Afghanistan, Chang Chun reached Jenghiz' camp near the Hindu Kush. Returning home he followed much the same course as on his outward route: certain deviations, however, occur, such as a visit to Kuku-khoto. He was back in Peking by the end of January 1224. From the narrative of his expedition (the *Si yu ki*, written by his pupil and companion Li Chi Chang) we derive some of the most faithful and vivid pictures ever drawn of nature and man between the Great Wall of China and Kabul, between the Aral and the Yellow Sea: we may particularly notice the sketches of the Mongols, and of the people of Samarkand and its neighbourhood; the account of the fertility and products of the latter region, as of the Ili valley, at or near Almalig-Kulja; and the description of various great mountain ranges, peaks and defiles, such as the Chinese Altai, the Tian Shan, Mt Bogdo-ola (?), and the Iron Gates of Termit. There is, moreover, a noteworthy reference to a land apparently identical with the uppermost valley of the Yenisei. After his return Chang Chun lived at Peking till his death on the 23rd of July 1227. By order of Jenghiz some of the former imperial garden grounds were made over to him, for the foundation of a Taoist monastery.

See E. Bretschneider, *Mediaeval Researches from Eastern Asiatic Sources*, vol. i. pp. 35-108, where a complete translation of the narrative is given, with a valuable commentary; C. R. Beazley *Dawn of Modern Geography*, iii. 539. (C. R. B.)

CHANGE (derived through the Fr. from the Late Lat. *cambium, cambiare*, to barter; the ultimate derivation is probably from the root which appears in the Gr. *κάμπτειν*, to bend), properly the substitution of one thing for another, hence any alteration or variation, so applied to the moon's passing from one phase to another. The use of the word for a place of commercial business has usually been taken to be a shortened form of Exchange (*q.v.*) and so is often written 'Change. The *New English Dictionary* points out that "change" appears earlier than "exchange" in this sense. "Change" is particularly used of coins of lower denomination given in substitution for those of larger denomination or for a note, cheque, &c., and also for the balance of a sum paid larger than that which is due. A further application is that in bell-ringing, of the variations in order in which a peal of bells may be rung. The term usually excludes the ringing of the bells according to the diatonic scale in which they are hung (see BELL). It is from a combination of these two meanings that the thieves' slang phrase "ringing the changes" arises; it denotes the various methods by which wrong change may be given or extracted, or counterfeit coin passed.

CHANGELING, the term used of a child substituted or changed for another, especially in the case of substitutions popularly supposed to be through fairy agency. There was formerly a widespread superstition that infants were sometimes stolen from their cradles by the fairies. Any specially peevish or weakly baby was regarded as a changeling, the word coming at last to be almost synonymous with imbecility. It was thought that the elves could only effect the exchange before christening, and in the highlands of Scotland babies were strictly watched till then. Strype states that in his time midwives had to take an oath binding themselves to be no party to the theft or exchange of babies. The belief is referred to by Shakespeare, Spenser and other authors. Pennant, writing in 1796, says: "In this very century a poor cottager, who lived near the spot, had a child who grew uncommonly peevish; the parents attributed this to the fairies and imagined it was a changeling. They took the child, put it in a cradle, and left it all night beneath the "Fairy Oak" in hopes that the *tylwydd têg* or fairy family would restore their own before morning. When morning came they found the child perfectly quiet, so went away with it, quite confirmed in their belief" (*Tour in Scotland*, 1796, p. 257).

See W. Wirt Sikes, *British Goblins* (1880).

CHANGOS, a tribe of South American Indians who appear to have originally inhabited the Peruvian coast. A few of them still live on the coast of Atacama, northern Chile. They are a dwarfish race, never exceeding 5 ft. in height. Their sole occupation is fishing, and in former times they used boats of inflated sealskins, lived in sealskin huts, and slept on heaps of dried seaweed. They are a hospitable and friendly people, and never resisted the whites.

CHANGRA, or KANGHARI (anc. *Gangra*; called also till the time of Caracalla, *Germanicopolis*, after the emperor Claudius), the chief town of a sanjak of the same name in the Kastamuni vilayet, Asia Minor, situated in a rich, well-watered valley; altitude 2500 ft. The ground is impregnated with salt, and the town is unhealthy. Pop. (1894) 15,632, of whom 1086 are Christians (Cuinet). Gangra, the capital of the Paphlagonian kingdom of Deiotarus Philadelphus, son of Castor, was taken into the Roman province of Galatia on his death in 6–5 B.C. The earlier town, the name of which signified "she-goat," was built on the hill behind the modern city, on which are the ruins of a late fortress; while the Roman city occupied the site of the modern. In Christian times Gangra was the metropolitan see of Paphlagonia. In the 4th century the town was the scene of an important ecclesiastical synod.

Synod of Gangra.—Conjectures as to the date of this synod vary from 341 to 376. All that can be affirmed with certainty is that it was held about the middle of the 4th century. The synodal letter states that twenty-one bishops assembled to take action concerning Eustathius (of Sebaste?) and his followers, who contemned marriage, disparaged the offices of the church, held conventicles of their own, wore a peculiar dress, denounced riches, and affected especial sanctity. The synod condemned the Eustathian practices, declaring however, with remarkable moderation, that it was not virginity that was condemned, but the dishonouring of marriage; not poverty, but the disparagement of honest and benevolent wealth; not asceticism, but spiritual pride; not individual piety, but dishonouring the house of God. The twenty canons of Gangra were declared ecumenical by the council of Chalcedon, 451.

See Mansi ii. pp. 1095-1122; Hardouin i. pp. 530-540; Hefele 2nd ed., i. pp. 777 sqq. (English trans. ii. pp. 325 sqq.).

CHANNEL ISLANDS (French *Îles Normandes*), a group of islands in the English Channel, belonging (except the Iles Chausey) to Great Britain. (For map, see ENGLAND, Section VI.) They lie between 48° 50′ and 49° 45′ N., and 1° 50′ and 2° 45′ W., along the French coast of Cotentin (department of Manche), at a distance of 4 to 40 m. from it, within the great rectangular bay of which the northward horn is Cape La Hague. The greater part of this bay is shallow, and the currents among the numerous groups of islands and rocks are often dangerous to navigation. The nearest point of the English coast to the Channel Islands

is Portland Bill, a little over 50 m. north of the northernmost outlier of the islands. The total land area of the islands is about 75 sq. m. (48,083 acres), and the population in 1901 was 95,618. The principal individual islands are four:—JERSEY (area 45 sq. m., pop. 52,576), GUERNSEY (area 24·5 sq. m., pop. 40,446), ALDERNEY (area 3·06 sq. m., pop. 2062), and SARK (area nearly 2 sq. m., pop. 504). Each of these islands is treated in a separate article. The chief town and port of Jersey is St Helier, and of Guernsey St Peter Port; a small town on Alderney is called St Anne. Regular communication by steamer with Guernsey and Jersey is provided on alternate days from Southampton and Weymouth, by steamers of the London & South-Western and Great Western railway companies of England. Railway communications within the islands are confined to Jersey. Regular steamship communications are kept up from certain French ports, and locally between the larger islands. In summer the islands, especially Jersey, Guernsey and Sark, are visited by numerous tourists, both from England and from France.

The islands fall physically into four divisions. The northernmost, lying due west of Cape La Hague, and separated therefrom by the narrow Race of Alderney, includes that island, Burhou and Ortach, and numerous other islets west of it, and west again the notorious Casquets, and angry group of jagged rocks, on the largest of which is a powerful lighthouse. Doubtful tradition places here the wreck of the "White Ship," in which William, son of Henry I., perished in 1120; in 1744 the "Victory," a British man-of-war, struck on one of the rocks, and among calamities of modern times the wreck of the "Stella," a passenger vessel, in 1899, may be recalled. The second division of islands is also the most westerly; it includes Guernsey with a few islets to the west, and to the east, Sark, Herm, Jethou (inhabited islands) and others. The strait between Guernsey and Herm is called Little Russel, and that between Herm and Sark Great Russel. Sark is famous for its splendid cliffs and caves, while Herm possesses the remarkable phenomenon of a shell-beach, or shore, half-a-mile in length, formed wholly of small shells, which accumulate in a tidal eddy formed at the north of the island. To the south-east of these, across the channel called La Déroute, lies Jersey, forming, with a few attendant islets, of which the Ecréhou to the north-east are the chief, the third division. The fourth and southernmost division falls into two main subdivisions. The Minquiers, the more western, are a collection of abrupt rocks, the largest of which, Maltresse Ile, affords a landing and shelter for fishermen. Then eastern subdivision, the Iles Chausey, lies about 9 m. west by north of Granville (to which commune they belong) on the French coast, and belongs to France. These rocks are close set, low and curiously regular in form. On Grande Ile, the only permanently inhabited island (pop. 100), some farming is carried on, and several of the islets are temporarily inhabited by fishermen. There is also a little granite-quarrying, and seaweed-burning employs many.

None of the islands is mountainous, and the fine scenery for which they are famous is almost wholly coastal. In this respect each main island has certain distinctive characteristics. Bold cliffs are found on the south of Alderney; in Guernsey they alternate with lovely bays; Sark is specially noted for its magnificent sea-caves, while the coast scenery of Jersey is on the whole more gentle than the rest.

Geology.—Geologically, the Channel Islands are closely related to the neighbouring mainland of Normandy. With a few exceptions, to be noted later, all the rocks are of pre-Cambrian, perhaps in part of Archean age. They consist of massive granites, gneisses, diorites, porphyrites, schists and phyllites, all of which are traversed by dykes and veins. In Jersey we find in the north-west corner a granitic tract extending from Grosnez to St Mary and St John, beyond which it passes into a small granulitic patch. South of the granites is a schistose area, by St Ouen and St Lawrence, and reaching to St Aubin's Bay. Granitic masses again appear round St Brelade's Bay. The eastern half of the island is largely occupied by porphyrites and similar rocks (hornstone porphyry) with rhyolites and devitrified obsidians; some of the latter contain large spherulites with a diameter of as much as 24 in.; these are well exposed in Bouley Bay; a complex igneous and intrusive series of rocks lies around St Helier. In the north-east corner of the island a conglomerate, possibly of Cambrian age, occurs between Bouley Bay and St Catherine's Bay. Tracts of blown-sand cover the ground for some distance north of St Clement's Bay and again east of St Ouen's Bay. In the sea off the latter bay a submerged forest occurs. The northern half of Guernsey is mainly dioritic, the southern half, below St Peter, is occupied by gneisses. Several patches of granite and granulite fringe the western coast, the largest of these is a hornblende granite round Rocquainè Bay. Hornblende gneiss from St Sampson and quartz diorite from Capelles, Corvée and elsewhere are transported to England for road metal. Sark is composed almost wholly of hornblende-schists and gneisses with hornblendic granite at the north end of the island, in Little Sark and in the middle of Bréchou. Dykes of diabase and diorite are abundant. Alderney consists mainly of hornblende granite and granulite, which are covered on the east by two areas of sandstone which may be of Cambrian age. An enstatite-augite-diorite is sent from Alderney for road-making. Besides the submerged forest on the coast of Jersey already mentioned, there are similar occurrences near St Peter Port and St Sampson's harbour, and in Vazon Bay in Guernsey. Raised beaches are to be seen at several points in the islands.

Climate.—The climate is mild and very pleasant. In Jersey the mean temperature for twenty years is found to be—in January (the coldest month) 42·1° F., in August (the hottest) 63°, mean annual 51·7°. In Guernsey the figures are, for January 42·5°, for August 59·7°, mean annual 49·5°. The mean annual rainfall for twenty-five years in Jersey is 34·21 in., and in Guernsey 38·64 in. The average amount of sunshine in Jersey is considerably greater than in the most favoured spots on the south coast of England; and in Guernsey it is only a little less than in Jersey. Snow and frost are rare, and the seasons of spring and autumn are protracted. Thick sea-fogs are not uncommon, especially in May and June.

Flora and Fauna.—The flora of the islands is remarkably rich, considering their extent, nearly 2000 different species of plants having been counted throughout the group. Of timber properly speaking there is little, but the evergreen oak, the elm and the beech are abundant. Wheat is the principal grain in cultivation; but far more ground is taken up with turnips and potatoes, mangold, parsnip and carrot. The tomato ripens as in France, and the Chinese yam has been successfully grown. There is a curious cabbage, chiefly cultivated in Jersey, which shoots up into a long woody stalk from 10 to 15 ft. in height, fit for walking-sticks or palisades. Grapes and peaches come to perfection in greenhouses without artificial heat; and not only apples and pears but oranges and figs can be reared in the open air. The arbutus ripens its fruit, and the camellia clothes itself with blossom, as in more southern climates; the fuchsia reaches a height of 15 or 20 ft., and the magnolia attains the dimensions of a tree. Of the flowers, both indigenous and exotic, that abound throughout the islands, it is sufficient to mention the Guernsey lily with its rich red petals, which is supposed to have been brought from Japan.

The number of the species of the mammalia is little over twenty, and several of these have been introduced by man. There is a special breed of horned cattle, and each island has its own variety, which is carefully kept from all intermixture. The animals are small and delicate, and marked by a peculiar yellow colour round the eyes and within the ears. The red deer was once indigenous, and the black rat is still common in Alderney, Sark and Herm. The list of birds includes nearly 200 species, nearly 100 of which are permanent inhabitants of the islands. There are few localities in the northern seas which are visited by a greater variety of fish, and the coasts abound in crustacea, shell-fish and zoophytes.

Government.—For the purposes of government the Channel Islands (excluding the French Chauseys) are divided into two divisions:—(1) Jersey, and (2) the bailiwick of Guernsey, which includes Alderney, Sark, Herm and Jethou with the island of Guernsey. The constitutions of each division are peculiar and broadly similar, but differing in certain important details; they may therefore be considered together for the sake of comparison. Until 1854 governors were appointed by the crown; now a separate military lieutenant-governor is appointed for each division on the recommendation of the war office after consultation with the home office. The other crown officials are the

bailiff (*bailli*) or chief magistrate, the *procureur du roi*, representing the attorney-general, and the *avocat du roi*, or in Guernsey the *contrôle*, representing the solicitor-general. In Jersey the *vicomte* is also appointed by the crown, in the position of a high sheriff (and coroner); but his counterpart in Guernsey, the *prêvôt*, is not so appointed. The bailiff in each island is president of the royal court, which is composed of twelve jurats, elected for life, in Jersey by the ratepayers of each parish, in Guernsey by the Elective States, a body which also elects the *prêvôt*, who, with the jurats, serves upon it. The rest of the body is made up of the rectors of the parishes, the *douzaines*, or elected parish councils (" dozens," from the original number of their members) of the town parish of St Peter Port, the four cantons, and the county parishes, and certain other officials. The royal court administers justice (but in Jersey there is a trial by jury for criminal cases), and in Guernsey can pass temporary ordinances subject to no higher body. It also puts forward *projets de loi* for the approval of the Deliberative States. Alderney and Sark have a separate legal existence with courts dependent on the royal court of Guernsey. In both Jersey and Guernsey the chief administrative body is the Deliberative States. The Jersey States is composed of the lieutenant-governor (who has a veto on the deliberation of any question, but no vote), the bailiff, jurats, parish rectors, parish constables and deputies, the *procureur* and *avocat*, with right to speak but no vote, and the *vicomte*, with right of attendance only. Besides the veto of the lieutenant-governor, the bailiff has the power to dissent from any measure, in which case it is referred to the privy council. In Guernsey the States consists of the bailiff, jurats, eight out of ten rectors, the *procureur* and deputies; while the lieutenant-governor is always invited and may speak if he attends. By both States local administration is carried on (largely through committees); and relations with the British parliament are maintained through the privy council. Acts of parliament are transmitted to the islands by an order in council to be registered in the rolls of the royal court, and are not considered to be binding until this is done; moreover, registration may be held over pending discussion by the States if any act is considered to menace the privileges of the islands. The right of the crown to legislate by order in council is held to be similarly limited. In cases of encroachment on property, a remarkable form of appeal of very ancient origin called *Clameur de Haro* survives (see HARO, CLAMEUR DE). The islands are in the diocese of Winchester, and there is a dean in both Jersey and Guernsey, who is also rector of a parish.

These peculiar constitutions are of local development, the history of which is obscure. The bailiff was originally assisted in his judicial work by itinerant justices; their place was later taken by the elected jurats; later still the practice of summoning the States to assist in the passing of ordinances was established by the bailiff and jurats, and at last the States claimed the absolute right of being consulted. This was confirmed to them in 1771.

It is characteristic of these islands that there should be compulsory service in the militia. In Jersey and Alderney every man between the ages of sixteen and forty-five is liable, but in Jersey after ten years' service militiamen are transferred to the reserve. In Guernsey the age limit is from sixteen to thirty-three, and the obligation is extended to all who are British subjects, and draw income from a profession practised in the island. Garrisons of regular troops are maintained in all three islands. Taxation is light in the islands, and pauperism is practically unknown.

In 1904 the revenue of Jersey was £70,191, and its expenditure £69,658; the revenue of Guernsey was £79,334, and the expenditure £43,385. The public debt in the respective islands was £322,070 and £195,794. In Jersey the annual revenues from crown rights (principally seigneurial dues, houses and lands and tithes) amount to about £2700, and about £360 is remitted to the paymaster-general. In Guernsey these revenues, in which the principal item is fines on transference of property (*treizièmes* or fees), amount to about £4500, and about £1000 is remitted. In Alderney the revenues (chiefly from harbour dues) amount to about £1400.

In Jersey the English gold and silver coinage are current, but there is a local copper coinage and local one-pound notes are issued. Guernsey has also such notes, and its copper coinage consists of pence, halfpence, two-double and one-double (one-eighth of a penny) pieces. A Guernsey pound is taken as equal to 24 francs, and English and French currency pass equally throughout the islands.

Industry.—The old Norman system of land-tenure has survived, and the land is parcelled out among a great number of small proprietors; holdings ranging from 5 to 25 acres as a rule. The results of this arrangement seem to be favourable in the extreme. Every corner of the ground is carefully and intelligently cultivated, and a considerable proportion is allotted to market-gardening. The cottages are neat and comfortable, the hedges well-trimmed, and the roads kept in excellent repair. There is a considerable export trade in agricultural produce and stock, including vegetables and fruit, in fish (the fisheries forming an important industry) and in stone. There is no manufacture of importance. The inhabitants share in common the right of collecting and burning seaweed (called *vraic*) for manure. The cutting of the weed (vraicking) became a ceremonial occasion, taking place at times fixed by the government, and connected with popular festivities.

Language.—The language spoken in ordinary life by the inhabitants of the islands is in great measure the same as the old Norman French. The use of the *patois* has decreased naturally in modern times. Modern French is the official language, used in the courts and states, and English is taught in the parochial schools, and is familiar practically to all. The several islands have each its own dialect, differing from that of the others in vocabulary and idiom; differences are also observable in different localities within the same island, as between the north and the south of Guernsey. None of the dialects has received much literary cultivation, though Jersey is proud of being the birthplace of one of the principal Norman poets, Wace, who flourished in the 12th century.

History.—The original ethnology and pre-Christian history of the Channel Islands are largely matters of conjecture and debate. Of early inhabitants abundant proof is afforded by the numerous megalithic monuments—cromlechs, kistvaens and maenhirs—still extant. But little trace has been left of Roman occupation, and such remains as have been discovered are mainly of the portable description that affords little proof of actual settlement, though there may have been an unimportant garrison here. The constant recurrence of the names of saints in the place-names of the islands, and the fact that pre-Christian names do not occur, leads to the inference that before Christianity was introduced the population was very scanty. It may be considered to have consisted originally of Bretons (Celts), and to have received successively a slight admixture of Romans and Legionaries, Saxons and perhaps Jutes and Vandals. Christianity may have been introduced in the 5th century. Guernsey is said to have been visited in the 6th century by St Sampson of Dol (whose name is given to a small town and harbour in the island), St Marcou or Marculfus and St Magloire, a friend and fellow-evangelist of St Sampson, who founded monasteries at Sark and at Jersey, and died in Jersey in 575. Another evangelist of this period was St Helerius, whose name is borne by the chief town of Jersey, St Helier. In his life it is stated that the population of the island when he reached it was only 30. In 933 the islands were made over to William, duke of Normandy (d. 943), and after the Norman conquest of England their allegiance shifted between the English crown and the Norman coronet according to the vicissitudes of war and policy. During the purely Norman period they had been enriched with numerous ecclesiastical buildings, some of which are still extant, as the chapel of Rozel in Jersey.

In the reign of John of England the future of the islands was decided by their attachment to the English crown, in spite of the separation of the duchy of Normandy. To John it has been usual to ascribe a document, at one time regarded by the islanders as their Magna Carta; but modern criticism leaves little doubt that it is not genuine. An unauthenticated " copy " of uncertain origin alone has been discovered, and there is little proof of there ever having been an original. The reign of Edward I. was

full of disturbance; and in 1279 Jersey and Guernsey received from the king, by letters patent, a public seal as a remedy for the dangers and losses which they had incurred by lack of such a certificate. Edward II. found it necessary to instruct his collectors not to treat the islanders as foreigners: his successor, Edward III., fully confirmed their privileges, immunities and customs in 1341; and his charter was recognized by Richard II. in 1378. In 1343 there was a descent of the French on Guernsey; the governor was defeated, and Castle Cornet besieged. In 1372 there was another attack on Guernsey, and in 1374 and 1404 the French descended on Jersey. None of these attempts, however, resulted in permanent settlement. Henry V. confiscated the alien priories which had kept up the same connexion with Normandy as before the conquest, and conferred them along with the regalities of the islands on his brother, the duke of Bedford. During the Wars of the Roses, Queen Margaret, the consort of Henry VI., made an agreement with Pierre de Brézé, comte de Maulevrier, the seneschal of Normandy, that if he afforded assistance to the king he should hold the islands independently of the crown. A force was accordingly sent to take possession of Mont Orgueil. It was captured and a small part of the island subjugated, and here Maulevrier remained as governor from 1460 to 1465; but the rest held out under Sir Philip de Carteret, seigneur of St Ouen, and in 1467 the vice-admiral of England, Sir Richard Harliston, recaptured the castle and brought the foreign occupation to an end. In 1482–1483 Pope Sixtus IV., at the instance of King Edward IV., issued a bull of anathema against all who molested the islands; it was formally registered in Brittany in 1484, and in France in 1486; and in this way the islands acquired the right of neutrality, which they retained till 1689. In the same reign (Edward IV.) Sark was taken by the French, and only recovered in the reign of Mary, by the strategy (according to tradition) of landing from a vessel a coffin nominally containing a body for burial, but in reality filled with arms. By a charter of 1494, the duties of the governors of Jersey were defined and their power restricted; and the educational interests of the island were furthered at the same time by the foundation of two grammar schools. The religious establishments in the islands were dissolved, as in England, in the reign of Henry VIII. The Reformation was heartily welcomed in the islands. The English liturgy was translated into French for their use. In the reign of Mary there was much religious persecution; and in that of Elizabeth Roman Catholics were maltreated in their turn. In 1568 the islands were attached to the see of Winchester, being finally separated from that of Coutances, with which they had long been connected, with short intervals in the reign of John, when they had belonged to the see of Exeter, and that of Henry VI., when they had belonged to Salisbury.

The Presbyterian form of church government was adopted under the influence of refugees from the persecution of Protestantism on the continent. It was formally sanctioned in St Helier and St Peter Port by Queen Elizabeth; and in 1603 King James enacted that the whole of the islands "should quietly enjoy their said liberty." During his reign, however, disputes arose. An Episcopal party had been formed in Jersey, and in 1619 David Bandinel was declared dean of the island. A body of canons which he drew up agreeable to the discipline of the Church of England was accepted after considerable modification by the people of his charge; but the inhabitants of Guernsey maintained their Presbyterian practices. Of the hold which this form of Protestantism had got on the minds of the people even in Jersey abundant proof is afforded by the general character of the worship at the present day.

In the great struggle between king and parliament, Presbyterian Guernsey supported the parliament; in Jersey, however, there were at first parliamentarian and royalist factions. Sir Philip de Carteret, lieutenant-governor, declared for the king, but Dean Bandinel and Michael Lemprière, a leader of the people, headed the parliamentary party. They received a commission for the apprehension of Carteret, who established himself in Elizabeth Castle; but after some fighting had taken place he died in the castle in August 1643. Meanwhile in Guernsey Sir Peter Osborne, the governor, was defying the whole island and maintaining himself in Castle Cornet. A parliamentarian governor, Leonard Lydcott, arrived in Jersey immediately after Sir Philip de Carteret's death. But the dowager Lady Carteret was holding Mont Orgueil; George Carteret, Sir Philip's nephew, arrived from St Malo to support the royalist cause, and Lydcott and Lemprière presently fled to England. George Carteret established himself as lieutenant-governor and bailiff. Bandinel was imprisoned in Mont Orgueil, and killed himself in trying to escape. Jersey was now completely royalist. In 1646 the prince of Wales, afterwards Charles II., arrived secretly at Jersey, and remained over two months at Elizabeth Castle. He went on to France, but returned in 1649, having been proclaimed king by George Carteret, and at Elizabeth Castle he signed the declaration of his claims to the throne on the 29th of October. In 1651, when Charles had fled to France again after the battle of Worcester, parliamentarian vessels of war appeared at Jersey. The islanders, weary of the tyrannical methods of their governor, now Sir George Carteret, offered little resistance. On the 15th of December the royalist remnant yielded up Elizabeth Castle; and at the same time Castle Cornet, Guernsey, which had been steadily held by Osborne, capitulated. In each case honourable terms of surrender were granted. Both islands had suffered severely from the struggle, and the people of Guernsey, appealing to Cromwell on the ground of their support of his cause, complained that two-thirds of the land was out of cultivation, and that they had lost "their ships, their traffic and their trading." After the Restoration there was considerable improvement, and in the reign of James II. the islanders got a grant of wool for the manufacture of stockings—4000 tods[1] of wool being annually allowed to Jersey, 2000 to Guernsey, 400 to Alderney and 200 to Sark. Alderney, which had been parliamentarian, was granted after the Restoration to the Carteret family; and it continued to be governed independently till 1825.

By William of Orange the neutrality of the islands was abolished in 1689, and during the war between England and France (1778–1783) there were two unsuccessful attacks on Jersey, in 1779 and 1781, the second, under Baron de Rullecourt, being famous for the victory over the invaders due to the bravery of the young Major Peirson, who fell when the French were on the point of surrender. During the revolutionary period in France the islands were the home of many refugees. In the 18th century various attempts were made to introduce the English custom-house system; but proved practically a failure, and the islands throve on smuggling and privateering down to 1800.

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CHANNING, WILLIAM ELLERY (1780–1842), American divine and philanthropist, was born in Newport, Rhode Island, on the 7th of April 1780. His maternal grandfather was William Ellery, a signer of the Declaration of Independence; his mother, Lucy Ellery, was a remarkable woman; and his father, William Channing, was a prominent lawyer in Newport. Channing had as a child a refined delicacy of feature and temperament, and seemed to have inherited from his father simple and elegant tastes, sweetness of temper, and warmth of affection, and from his mother that strong moral discernment and straightforward rectitude of purpose and action which formed so striking a feature

[1] A tod generally equalled 28 lb.

of his character. From his earliest years he delighted in the beauty of the scenery of Newport, and always highly estimated its influence upon his spiritual character. His father was a strict Calvinist, and Dr Samuel Hopkins, one of the leaders of the old school Calvinists, was a frequent guest in his father's house. He was, even as a child, he himself says, "quite a theologian, and would chop logic with his elders according to the fashion of that controversial time." He prepared for college in New London under the care of his uncle, the Rev. Henry Channing, and in 1794, about a year after the death of his father, entered Harvard College. Before leaving New London he came under religious influences to which he traced the beginning of his spiritual life. In his college vacations he taught at Lancaster, Massachusetts, and in term time he stinted himself in food that he might need less exercise and so save time for study,—an experiment which undermined his health, producing acute dyspepsia. From his college course he thought that he got little good, and said "when I was in college, only three books that I read were of any moment to me: . . . Ferguson on *Civil Society*, . . . Hutcheson's *Moral Philosophy*, and Price's *Dissertations*. Price saved me from Locke's philosophy."

After graduating in 1798, he lived at Richmond, Virginia, as tutor in the family of David Meade Randolph, United States marshal for Virginia. Here he renewed his ascetic habits and spent much time in theological study, his mind being greatly disturbed in regard to Trinitarian teachings in general and especially prayer to Jesus. He returned to Newport in 1800 "a thin and pallid invalid," spent a year and a half there, and in 1802 went to Cambridge as regent (or general proctor) in Harvard; in the autumn of 1802 he began to preach, having been approved by the Cambridge Association. On the 1st of June 1803, having refused the more advantageous pastorate of Brattle Street church, he was ordained pastor of the Federal Street Congregational church in Boston. At this time it seems certain that his theological views were not fixed, and in 1808, when he preached a sermon at the ordination of the Rev. John Codman (1782–1847), he still applied the title "Divine Master" to Jesus Christ, and used such expressions as "shed for souls" of the blood of Jesus, and "the Son of God himself left the abodes of glory and expired a victim of the cross." But his sermon preached in 1819 at Baltimore at the ordination of the Rev. Jared Sparks was in effect a powerful attack on Trinitarianism, and was followed in 1819 by an article in *The Christian Disciple*, "Objections to Unitarian Christianity Considered," and in 1820 by another, "The Moral Argument against Calvinism"—an excellent evidence of the moral (rather than the intellectual) character of Unitarian protest. In 1814 he had married a rich cousin, Ruth Gibbs, but refused to make use of the income from her property on the ground that clergymen were so commonly accused of marrying for money.

He was now entering on his public career. Even in 1810, in a Fast Day sermon, he warned his congregation of Bonaparte's ambition; two years later he deplored "this country taking part with the oppressor against that nation which has alone arrested his proud career of victory"; in 1814 he preached a thanksgiving sermon for the overthrow of Napoleon; and in 1816 he preached a sermon on war which led to the organization of the Massachusetts Peace Society. His sermon on "Religion, a Social Principle," helped to procure the omission from the state constitution of the third article of Part I., which made compulsory a tax for the support of religious worship. In 1821 he delivered the Dudleian lecture on the "Evidences of Revealed Religion" at Harvard, of whose corporation he had been a member since 1813; he had received its degree of S.T.D. in 1820. In August 1821 he undertook a journey to Europe, in the course of which he met in England many distinguished men of letters, especially Wordsworth and Coleridge. Both of these poets greatly influenced him personally and by their writings, and he prophesied that the Lake poets would be one of the greatest forces in a coming spiritual reform. Coleridge wrote of him, "He has the love of wisdom and the wisdom of love."

On his return to America in August 1823, Dr Channing resumed his duties as pastor, but with a more decided attention than before to literature and public affairs, especially after receiving as colleague, in 1824, the Rev. Ezra Stiles Gannett. In 1830, because of his wife's bad health, Channing went to the West Indies. Negro slavery, as he saw it there, and as he had seen it in Richmond, more than thirty years before, so strongly impressed him that he began to write his book *Slavery* (1835). In this he insists that "not what is profitable, but what is right" is "the first question to be proposed by a rational being"; that slavery ought to be discussed "with a deep feeling of responsibility, and so done as not to put in jeopardy the peace of the slave-holding states"; that "man cannot be justly held and used as property"; that the tendency of slavery is morally, intellectually, and domestically, bad; that emancipation, however, should not be forced on slave-holders by governmental interference, but by an enlightened public conscience in the South (and in the North), if for no other reason, because "slavery should be succeeded by a friendly relation between master and slave; and to produce this the latter must see in the former his benefactor and deliverer." He declined to identify himself with the Abolitionists, whose motto was "Immediate Emancipation" and whose passionate agitation he thought unsuited to the work they were attempting. The moderation and temperance of his presentation of the anti-slavery cause naturally resulted in some misunderstanding and misstatement of his position, such as is to be found in Mrs Chapman's *Appendix* to the *Autobiography of Harriet Martineau*, where Channing is represented as actually using his influence on behalf of slavery. In 1837 he published *Thoughts on the Evils of a Spirit of Conquest, and on Slavery: A Letter on the Annexation of Texas to the United States*, addressed to Henry Clay, and arguing that the Texan revolt from Mexican rule was largely the work of land-speculators, and of those who resolved "to throw Texas open to slave-holders and slaves"; that the results of annexation must be war with Mexico, embroiling the United States with England and other European powers, and at home the extension and perpetuation of slavery, not alone in Texas but in other territories which the United States, once started at conquest, would force into the Union. But he still objected to political agitation by the Abolitionists, preferring "unremitting appeals to the reason and conscience," and, even after the prominent part he took in the meeting in Faneuil Hall, called to protest against the murder of Elijah P. Lovejoy, he wrote to *The Liberator*, counselling the Abolitionists to "disavow this resort to force by Mr Lovejoy." Channing's pamphlet *Emancipation* (1840) dealt with the success of emancipation in the West Indies, as related in Joseph John Gurney's *Familiar Letters to Henry Clay of Kentucky, describing a Winter in the West Indies* (1840), and added his own advice "that we should each of us bear our conscientious testimony against slavery," and that the Free States "abstain as rigidly from the use of political power against Slavery in the States where it is established, as from exercising it against Slavery in foreign communities," and should free themselves "from any obligation to use the powers of the national or state governments in any manner whatever for the support of slavery." In 1842 he published *The Duty of the Free States*, or *Remarks Suggested by the Case of the Creole*, a careful analysis of the letter of complaint from the American to the British government, and a defence of the position taken by the British government. On the 1st of August 1842 he delivered at Lenox, Massachusetts, an address celebrating the anniversary of emancipation in the British West Indies. Two months later, on the 2nd of October 1842, he died at Bennington, Vermont.

Physically Channing was short and slight; his eyes were unnaturally large; his voice wonderfully clear, and like his face, filled with devotional spirit. He was not a great pastor, and lacked social tact, so that there were not many people who became his near friends; but by the few who knew him well, he was almost worshipped. As a preacher Channing was often criticised for his failure to deal with the practical everyday duties of life. But his sermons are remarkable for their rare simplicity and gracefulness of style as well as for the thought

that they express. The first open defence of Unitarians was not based on doctrinal differences but on the peculiar nature of the attack on them made in June 1815 by the conservatives in the columns of *The Panoplist*, where it was stated that Unitarians were "operating only in secret, . . . guilty of hypocritical concealment of their sentiments." His chief objection to the doctrine of the Trinity (as stated in his sermon at the ordination of the Rev. Jared Sparks) was that it was no longer used philosophically, as showing God's relation to the triple nature of man, but that it had lapsed into mere Tritheism. To the name "Unitarian" Channing objected strongly, thinking "unity" as abstract a word as "trinity" and as little expressing the close fatherly relation of God to man. It is to be noted that he strongly objected to the growth of "Unitarian orthodoxy" and its increasing narrowness. His views as to the divinity of Jesus were based on phrases in the Gospels which to his mind established Christ's admission of inferiority to God the Father,—for example, "Knoweth no man, neither the Son, but the Father"; at the same time he regarded Christ as "the sinless and spotless son of God, distinguished from all men by that infinite peculiarity—freedom from moral evil." He believed in the pre-existence of Jesus, and that it differed from the pre-existence of other souls in that Jesus was actually conscious of such pre-existence, and he reckoned him one with God the Father in the sense of spiritual union (and not metaphysical mystery) in the same way that Jesus bade his disciples "Be ye one, even as I am one." Bunsen called him "the prophet in the United States for the presence of God in mankind." Channing believed in historic Christianity and in the story of the resurrection, "a fact which comes to me with a certainty I find in few ancient histories." He also believed in the miracles of the Gospels, but held that the Scriptures were not inspired, but merely records of inspiration, and so saw the possibility of error in the construction put upon miracles by the ignorant disciples. But in only a few instances did he refuse full credence of the plain gospel narrative of miracles. He held, however, that the miracles were facts and not "evidences" of Christianity, and he considered that belief in them followed and did not lead up to belief in Christianity. His character was absolutely averse from controversy of any sort, and in controversies into which he was forced he was free from any theological odium and continually displayed the greatest breadth and catholicity of view. The differences in New England churches he considered were largely verbal, and he said that "would Trinitarians tell us what they mean, their system would generally be found little else than a mystical form of the Unitarian doctrine."

His opposition to Calvinism was so great that even in 1812 he declared "existence a curse" if Calvinism be true. Possibly his boldest and most elaborate defence of Unitarianism was his sermon on *Unitarianism most favourable to Piety*, preached in 1826, criticizing as it did the doctrine of atonement by the sacrifice of an "infinite substitute"; and the Election Sermon of 1830 was his greatest plea for spiritual and intellectual freedom.

Channing's reputation as an author was probably based largely on his publication in *The Christian Examiner of Remarks on the Character and Writings of John Milton* (1826), *Remarks on the Life and Character of Napoleon Bonaparte* (1827–1828), and an *Essay on the Character and Writings of Fénelon* (1829). An *Essay on Self-Culture* (1838) was an address introducing the Franklin Lectures delivered in Boston September 1838. Channing was an intimate friend of Horace Mann, and his views on the education of children are stated, by no less an authority than Elizabeth Palmer Peabody, to have anticipated those of Froebel. His *Complete Works* have appeared in various editions (5 vols., Boston, 1841; 2 vols., London, 1865; 1 vol., New York, 1875).

Among members of his family may be mentioned his two nephews William Henry (1810–1884), son of his brother Francis Dana, and William Ellery, commonly known as Ellery (1818–1901), son of his brother Walter, a Boston physician (1786–1876). The former, whose daughter married Sir Edwin Arnold, the English poet, became a Unitarian pastor, for some time in America, and also in England, where he died; he was deeply interested in Christian Socialism, and was a constant writer, translating Jouffroy's *Ethics* (1840), and assisting in editing the *Memoirs of Margaret Fuller* (1852); and he wrote the biography of his uncle (see O. B. Frothingham's *Memoir*, 1886). Ellery Channing married Margaret Fuller's sister (1842), and besides critical essays and poems published an intimate sketch of Thoreau in 1873.

See the *Memoir* by William Henry Channing (3 vols., London, 1848; republished in one volume, New York, 1880); Elizabeth Palmer Peabody, *Reminiscences of the Rev. William Ellery Channing, D.D.* (Boston, 1880), intimate but inexact; John White Chadwick, *William Ellery Channing, Minister of Religion* (Boston, 1903); and William M. Salter, "Channing as a Social Reformer" (*Unitarian Review*, March 1888). (R. We.)

CHANSONS DE GESTE, the name given to the epic chronicles which take so prominent a place in the literature of France from the 11th to the 15th century. Gaston Paris defined a chanson de geste as a song the subject of which is a series of historical facts or *gesta*. These facts form the centre around which are grouped sets of poems, called cycles, and hence the two terms have in modern criticism become synonymous for the epic family to which the hero of the particular group or cycle belongs. The earliest chansons de geste were founded on the fusion of the Teutonic spirit, under a Roman form, into the new Christian and French civilization. It seems probable that as early as the 9th century epic poems began to be chanted by the itinerant minstrels who are known as jongleurs. It is conjectured that in a base Latin fragment of the 10th century we possess a translation of a poem on the siege of Girona. Gaston Paris dates from this lost epic the open expression of what he calls "the epic fermentation" of France. But the earliest existing chanson de geste is also by far the noblest and most famous, the *Chanson de Roland*; the conjectural date of the composition of this poem has been placed between the years 1066 and 1095. That the author, as has been supposed, was one of the conquerors of England, it is perhaps rash to assert, but undoubtedly the poem was composed before the First Crusade, and the writer lived at or near the sanctuary of Mont Saint-Michel. The *Chanson de Roland* stands at the head of modern French literature, and its solidity and grandeur give a dignity to the whole class of poetry of which it is the earliest and by far the noblest example. But it is in the crowd of looser and later poems, less fully characterized, less steeped in the individuality of their authors, that we can best study the form of the typical chanson de geste. These epics sprang from the soil of France; they were national and historical; their anonymous writers composed them spontaneously, to a common model, with little regard to the artificial niceties of style. The earlier examples, which succeed the *Roland*, are unlike that great work in having no plan, no system of composition. They are improvisations which wander on at their own pace, whither accident may carry them. This mass of medieval literature is monotonous, primitive and superficial. As Léon Gautier has said, in the rudimentary psychology of the chansons de geste, man is either entirely good or entirely bad. There are no fine shades, no observation of character. The language in which these poems are composed is extremely simple, without elaboration, without ornament. Everything is sacrificed to the telling of a story by a narrator of little skill, who helps himself along by means of a picturesque, but almost childish fancy, and a primitive sentiment of rhythm. Two great merits, however, all the best of these poems possess, force and lucidity; and they celebrate, what they did much to create, that unselfish elevation of temper which we call the spirit of chivalry.

Perhaps the most important cycle of chansons de geste was that which was collected around the name of Charlemagne, and was known as the *Geste du roi*. A group of this cycle dealt with the history of the mother of the emperor, and with Charlemagne himself down to the coming of Roland. To this group belong *Bertha Greatfoot* and *Aspremont*, both of the 12th century, and a variety of chansons dealing with the childhood of Charlemagne and of Ogier the Dane. A second group deals with the struggle

of Charlemagne with his rebellious vassals. This is what has been defined as the Feudal Epic; it includes *Girars de Viane* and *Ogier the Dane*, both of the 13th century, or the end of the 12th. A third group follows Charlemagne and his peers to the East. It is in the principal of these poems, *The Pilgrimage to Jerusalem*, that Alexandrine verse first makes its appearance in French literature. This must belong to the beginning of the 12th century. A fourth group, antecedent to the Spanish war, is of the end of the 12th century and the beginning of the 13th; it includes *Aiquin*, *Fierabras* and *Otinel*. The fifth class discusses the war in Spain, and it is to this that *Roland* belongs; there are different minor epics dealing with the events of Roncevaux, and independent chansons of *Gui de Bourgogne*, *Gaidon* and *Anseïs de Carthage*. The *Geste du Roi* comprises a sixth and last group, proceeding with events up to the death of Charlemagne; this contains *Huon de Bordeaux* and a vast number of poems of minor originality and importance.

Another cycle is that of Duke William Shortnose, *La Geste de Guillaume*. This includes the very early and interesting *Departure of the Aimeri Children*, *Aliscans* and *Rainoart*. It is thought that this cycle, which used to be called the *Geste de Garin de Monglane*, is less artificial than the others; it deals with the heroes of the South who remained faithful in their vassalage to the throne. The poems belonging to this cycle are extremely numerous, and some of them are among the earliest which survive. These chansons find their direct opposites in those which form the great cycle of *La Geste de Doon de Mayence*, sometimes called "la faulse geste," because it deals with the feats of the traitors, of the rebellious family of Ganelon. This is the geste of the Northmen, always hostile to the Carlovingian dynasty. It comprises some of the most famous of the chansons, in particular *Parise la duchesse* and *The Four Sons of Aymon*. Several of its sections are the production of a known poet, Raimbert of Paris. From this triple division of the main body of the chansons de geste into *La Geste du Roi*, *La Geste de Guillaume* and *La Geste de Doon*, are excluded certain poems of minor importance,—some provincial, such as *Amis and Amiles* and *Garin*, some dealing with the Crusades, such as *Antioche*, and some which are not connected with any existing cycle, such as *Ciperis de Vignevaux*; most of this last category, however, are works of the decadence.

The analysis which is here sketched is founded on the latest theories of Léon Gautier, who has given the labour of a lifetime to the investigation of this subject. The wealth of material is baffling to the ordinary student; of the medieval chansons de geste many hundreds of thousands of lines have been preserved. The habit of composing became in the 14th century, as has been said, no longer an art but a monomania. Needless to add that a very large proportion of the surviving poems have never yet been published. All the best of the early chansons de geste are written in ten-syllable verse, divided into stanzas or *laisses* of different length, united by a single assonance. Rhyme came in with the 13th century, and had the effect in languid bards of weakening the narrative; the sing-song of it led at last to the abandonment of verse in favour of plain historical prose. The general character of the chansons de geste, especially of those of the 12th century, is hard, coarse, inflexible, like the march of rough men stiffened by coats of mail. There is no art and little grace, but a magnificent display of force. These poems enshrine the self-sufficiency of a young and powerful people; they are full of Gallic pride, they breathe the spirit of an indomitable warlike energy. All their figures belong to the same social order of things, and all illustrate the same fighting aristocracy. The moving principle is that of chivalry, and what is presented is, invariably, the spectacle of the processional life of a medieval soldier. The age described is a disturbed one; the feudal anarchy of Europe is united, for a moment, in defending western civilization against the inroads of Asia, against "the yellow peril." But it is a time of transition in Europe also, and Charlemagne, the immortal but enfeebled emperor, whose beard is whiter than lilies, represents an old order of things against which the rude barons of the North are perpetually in successful revolt. The loud cry of the dying Ronald, as E. Quinet said, rings through the whole poetical literature of medieval France; it is the voice of the individuality of the great vassal, who, in the decay of the empire, stands alone with himself and with his sword.

AUTHORITIES.—Léon Gautier, *Les Épopées françaises* (4 vols., 1878–1894); Gaston Paris, *La Littérature française au moyen âge* (1890); Paul Meyer, *Recherches sur l'épopée française* (1867); G. Paris, *Histoire poétique de Charlemagne* (1865); A. Longnon, *Les Quatre Fils Aimon*, &c. (1879). (E. G.)

CHANT (derived through the Fr. from the Lat. *cantare*, to sing; an old form is "chaunt"), a song or melody, particularly one sung according to the rules of church service-books. For an account of the chant or *cantus firmus* of the Roman Church see PLAIN-SONG. In the English church "chants" are the tunes set to the unmetrical verses of the psalms and canticles. The chant consisted of an "intonation" followed by a reciting note of indefinite length; a "mediation" closed the first part of the verse, leading to a second reciting note; a "termination" closed the second part of the verse. In the English chant the "intonation" disappeared. Chants are "single," if written for one verse only, "double," if for two. "Quadruple" chants for four verses have also been written.

CHANTABUN, or CHANTABURI, the principal town of the Siamese province of the same name, on the E. side of the Gulf of Siam, in 102° 6′ E., 12° 38′ N. Pop. about 5000. The town lies about 12 m. from the sea on a river which is navigable for boats and inside the bar of which there is good anchorage for light-draft vessels. The trade is chiefly in rubies and sapphires from the mines of the Krat and Pailin districts, and in pepper, of which about 500 tons are exported annually. Cardamoms and rosewood are also exported. In 1905 Chantabun was made the headquarters of a high commissioner with jurisdiction extending over the coast districts from the Nam Wen on the East to Cape Liant on the West, which were thus united to form a provincial division (*Monton*). In 1893 Chantabun was occupied by a French force of four hundred men, a step taken by France as a guarantee for the execution by Siam of undertakings entered into by the treaty of that year. The occupation, which was merely military and did not affect the civil government, lasted until January 1905, when, in accordance with the provisions of the Franco-Siamese treaty of 1904, the garrison of occupation was withdrawn. Chantabun has been since the 17th century, and still is, a stronghold of the Roman Catholic missionaries, and the Christian element amongst the population is greater here than anywhere else in Siam.

CHANTADA, a town of north-western Spain, in the province of Lugo, on the left bank of the Río de Chantada, a small right-hand tributary of the river Miño, and on the main road from Orerse, 18 m. S. by W., to Lugo, 28 m. N. by E. Pop. (1900) 15,003. Chantada is the chief town of the fertile region between the Miño and the heights of El Faro, which mark the western border of the province. Despite the lack of railway communication, it has a thriving trade in grain, flax, hemp, and dairy produce.

CHANTAGE (a Fr. word from *chanter*, to sing, slang for a criminal making an avowal under examination), a demand for money backed by the threat of scandalous revelations, the French equivalent of "blackmail."

CHANTARELLE, an edible fungus, known botanically as *Cantharellus cibarius*, found in woods in summer. It is golden yellow, somewhat inversely conical in shape and about 2 in. broad and high. The cap is flattened above with a central depression and a thick lobed irregular margin. Running down into the stem from the cap are a number of shallow thick gills. The substance of the fungus is dry and opaque with a peculiar smell suggesting ripe apricots or plums. The flesh is whitish tinged with yellow. The chantarelle is sold in the markets on the continent of Europe, where it forms a regular article of food, but seems little known in Britain though often plentiful in the New Forest and elsewhere. Before being cooked they should be allowed to dry, and then thrown into boiling water. They may

then be stewed in butter or oil, or cut up small and stewed with meat. No fungus requires more careful preparation.

See M. C. Cooke, *British Edible Fungi*, (1891), pp. 104-105.

CHANTAVOINE, HENRI (1850–), French man of letters, was born at Montpellier on the 6th of August 1850, and was educated at the École Normale Supérieure. After teaching in the provinces he moved, in 1876, to the Lycée Charlemagne in Paris, and subsequently became professor of rhetoric at the Lycée Henri IV. and *maître de conférences* at the École Normale at Sèvres. He was associated with the *Nouvelle Revue* from its foundation in 1879, and he joined the *Journal des débats* in 1884. His poems include *Poèmes sincères* (1877), *Satires contemporaines* (1881), *Ad memoriam* (1884), *Au fil des jours* (1889).

CHANTILLY, a town of northern France, in the department of Oise, 25 m. N. of Paris on the Northern railway to St Quentin. Pop. (1906) 4632. It is finely situated to the north of the forest of Chantilly and on the left bank of the river Nonette, and is one of the favourite Parisian resorts. Its name was long associated with the manufacture, which has now to a great extent decayed, of lace and blonde; it is still more celebrated for its château and its park (laid out originally by A. Le Nôtre in the second half of the 17th century), and as the scene of the great annual races of the French Jockey Club. The château consists of the palace built from 1876 to 1885 and of an older portion adjoining it known as the châtelet. The old castle must have been in existence in the 13th century, and in the reign of Charles VI. the lordship belonged to Pierre d'Orgemont, chancellor of France. In 1484 it passed to the house of Montmorency, and in 1632 from that family to the house of Condé. Louis II., prince de Condé, surnamed the Great, was specially attached to the place, and did a great deal to enhance its beauty and splendour. Here he enjoyed the society of La Bruyère, Racine, Molière, La Fontaine, Boileau, and other great men of his time; and here his steward Vatel killed himself in despair, because of a hitch in the preparations for the reception of Louis XIV. The stables close to the racecourse were built from 1719 to 1735 by Louis-Henri, duke of Bourbon. Of the two splendid mansions existing at that period known as the grand château and the châtelet, the former was destroyed about the time of the Revolution, but the latter, built for Anne de Montmorency by Jean Bullant, still remains as one of the finest specimens of Renaissance architecture in France. The château d'Enghien, facing the entrance to the grand château, was built in 1770 as a guest-house. On the death in 1830 of the duke of Bourbon, the last representative of the house of Condé, the estate passed into the hands of Henri, duc d'Aumale, fourth son of Louis Philippe. In 1852 the house of Orleans was declared incapable of possessing property in France, and Chantilly was accordingly sold by auction. Purchased by the English bankers, Coutts & Co., it passed back into the hands of the duc d'Aumale in 1872. By him a magnificent palace, including a fine chapel in the Renaissance style, was erected on the foundations of the ancient grand château and in the style of the châtelet. It is quadrilateral in shape, consisting of four unequal sides flanked by towers and built round a courtyard. The whole group of buildings as well as the pleasure-ground behind them, known as the Parterre de la Volière, is surrounded by fosses supplied with water from the Nonette. On the terrace in front of the château there is a bronze statue of the constable Anne de Montmorency. The duc d'Aumale installed in the châtelet a valuable library, specially rich in incunabula and 16th century editions of classic authors, and a collection of the paintings of the great masters, besides many other objects of art. By a public act in 1886 he gave the park and château with its superb collections to the Institute of France in trust for the nation, reserving to himself only a life interest; and when he died in 1897 the Institute acquired full possession.

CHANTREY, SIR FRANCIS LEGATT (1782–1841), English sculptor, was born on the 7th of April 1782 at Norton near Sheffield, where his father, a carpenter, cultivated a small farm. His father died when he was eight years of age; and his mother having married again, his profession was left to be chosen by his friends. In his sixteenth year he was on the point of being apprenticed to a grocer in Sheffield, when, having seen some wood-carving in a shop-window, he requested to be made a carver instead, and was accordingly placed with a Mr Ramsey, wood-carver in Sheffield. In this situation he became acquainted with Raphael Smith, a distinguished draftsman in crayon, who gave him lessons in painting; and Chantrey, eager to commence his course as an artist, procured the cancelling of his indentures, and went to try his fortune in Dublin and Edinburgh, and finally (1802) in London. Here he first obtained employment as an assistant wood-carver, but at the same time devoted himself to portrait-painting, bust-sculpture, and modelling in clay. He exhibited pictures at the Academy for some years from 1804, but from 1807 onwards devoted himself mainly to sculpture. The sculptor Nollekens showed particular zeal in recognizing his merits. In 1807 he married his cousin, Miss Wale, who had some property of her own. His first imaginative work in sculpture was the model of the head of Satan, which was exhibited at the Royal Academy in 1808. He afterwards executed for Greenwich hospital four colossal busts of the admirals Duncan, Howe, Vincent and Nelson; and so rapidly did his reputation spread that the next bust which he executed, that of Horne Tooke, procured him commissions to the extent of £12,000. From this period he was almost uninterruptedly engaged in professional labour. In 1819 he visited Italy, and became acquainted with the most distinguished sculptors of Florence and Rome. He was chosen an associate (1815) and afterwards a member (1818) of the Royal Academy, received the degree of M.A. from Cambridge, and that of D.C.L. from Oxford, and in 1835 was knighted. He died after an illness of only two hours' duration on the 25th of November 1841, having for some years suffered from disease of the heart, and was buried in a tomb constructed by himself in the church of his native village.

The works of Chantrey are extremely numerous. The principal are the statues of Washington in the State-house at Boston, U.S.A.; of George III. in the Guildhall, London; of George IV. at Brighton; of Pitt in Hanover Square, London; of James Watt in Westminster Abbey and in Glasgow; of Roscoe and Canning in Liverpool; of Dalton in Manchester; of Lord President Blair and Lord Melville in Edinburgh, &c. Of his equestrian statues the most famous are those of Sir Thomas Munro in Calcutta, and the duke of Wellington in front of the London Exchange. But the finest of Chantrey's works are his busts, and his delineations of children. The figures of two children asleep in each other's arms, which form a monumental design in Lichfield cathedral, have always been lauded for beauty, simplicity and grace. So is also the statue of the girlish Lady Louisa Russell, represented as standing on tiptoe and fondling a dove in her bosom. Both these works appear, in design, to have owed something to Stothard; for Chantrey knew his own scantiness of ideal invention or composition, and on system sought aid from others for such attempts. In busts, his leading excellence is facility—a ready unconstrained air of life, a prompt vivacity of ordinary expression. Allan Cunningham and Weekes were his chief assistants, and were indeed the active executants of many works that pass under Chantrey's name. Chantrey was a man of warm and genial temperament, and is said to have borne a noticeable though commonplace resemblance to the usual portraits of Shakespeare.

Chantrey Bequest.—By the will dated the 31st of December 1840, Chantrey (who had no children) left his whole residuary personal estate after the decease or on the second marriage of his widow (less certain specified annuities and bequests) in trust for the president and trustees of the Royal Academy (or in the event of the dissolution of the Royal Academy, to such society as might take its place), the income to be devoted to the encouragement of British fine art in painting and sculpture only, by "the purchase of works of fine art of the highest merit . . . that can be obtained." The funds might be allowed to accumulate for not more than five years; works by British or foreign artists, dead or living, might be acquired, so long as such works were entirely executed within the shores of Great Britain, the artists having been in residence there during such execution and completion. The prices to be paid

were to be "liberal," and no sympathy for an artist or his family was to influence the selection or the purchase of works, which were to be acquired solely on the ground of intrinsic merit. No commission or orders might be given: the works must be finished before purchase. Conditions were made as to the exhibition of the works, in the confident expectation that as the intention of the testator was to form and establish a "public collection of British Fine Art in Painting and Sculpture," the government or the country would provide a suitable gallery for their display; and an annual sum of £300 and £50 was to be paid to the president of the Royal Academy and the secretary respectively, for the discharge of their duties in carrying out the provisions of the will.

Lady Chantrey died in 1875, and two years later the fund became available for the purchase of paintings and sculptures. The capital sum available amounted to £105,000 in 3% Consols, which (since reduced to 2½%) produces an available annual income varying from £2500 to £2100. Galleries in the Victoria and Albert Museum at South Kensington were at first adopted as the depository of the works acquired, until in 1898 the Royal Academy arranged with the treasury, on behalf of the government, for the transference of the collection to the National Gallery of British Art, which had been erected by Sir Henry Tate at Millbank. It was agreed that the "Tate Gallery" should be its future home, and that "no power of selection or elimination is claimed on behalf of the trustees and director of the National Gallery" (Treasury Letter, 18054-98, 7th December 1898) in respect of the pictures and sculptures which were then to be handed over and which should, from time to time, be sent to augment the collection. Inasmuch as it was felt that the provision that all works must be complete to be eligible for purchase militated against the most advantageous disposition of the fund in respect of sculpture, in the case of wax models or plaster casts before being converted into marble or bronze, it was sought in the action of *Sir F. Leighton* v. *Hughes* (tried by Mr Justice North, judgment May 7th, 1888, and in the court of appeal, before the master of the rolls, Lord Justice Cotton, and Lord Justice Fry, judgment June 4th, 1889—the master of the rolls dissenting) to allow of sculptors being commissioned to complete in bronze or marble a work executed in wax or plaster, such "completion" being more or less a mechanical process. The attempt, however, was abortive.

A growing discontent with the interpretation put by the Royal Academy upon the terms of the will as shown in the works acquired began to find expression more than usually forcible and lively in the press during the year 1903, and a debate raised in the House of Lords by the earl of Lytton led to the appointment of a select committee of the House of Lords, which sat from June to August 1904. The committee consisted of the earls of Carlisle, Lytton, and Crewe, and Lords Windsor, Ribblesdale, Newton, and Killanin, and the witnesses represented the Royal Academy and representative art institutions and art critics. The report (ordered to be printed on the 8th of August 1904) made certain recommendations with a view to the prevention of certain former errors of administration held to have been sustained, but dismissed other charges against the Academy. In reply thereto a memorandum was issued by the Royal Academy (February 1905, ordered to be printed on the 7th of August 1905—Paper 166) disagreeing with certain recommendations, but allowing others, either intact or in a modified form.

Up to 1905 inclusive 203 works had been bought—all except two from living painters—at a cost of nearly £68,000. Of these, 175 were in oil-colours, 12 in water-colours, and 16 sculptures (10 in bronze and 6 marble).

See *The Administration of the Chantrey Bequest*, by D. S. MacColl (16mo, London, 1904), a highly controversial publication by the leading assailant of the Royal Academy; *Chantrey and His Bequest*, by Arthur Fish, a complete illustrated record of the purchases, &c. (London, 1904); *The Royal Academy, its Uses and Abuses*, by H. J. Laidlay (London, 1898), controversial; *Report from the Select Committee of the House of Lords on the Chantrey Trust; together with the Proceedings of the Committee, Minutes of Evidence and Appendix* (Wyman & Sons, 1904), and *Index* (separate publication, 1904).

CHANT ROYAL, one of the fixed forms of verse invented by the ingenuity of the poets of medieval France. It is composed of five strophes, identical in arrangement, of eleven verses each, and of an envoi of five verses. All the strophes are written on the five rhymes exhibited in the first strophe, the entire poem, therefore, consisting of sixty lines in the course of which five rhymes are repeated. It has been conjectured that the chant royal is an extended ballade, or rather a ballade conceived upon a larger scale; but which form preceded the other appears to be uncertain. On this point Henri de Croï, who wrote about these forms of verse in his *Art et science de rhêtorique* (1493), throws no light. He dwells, however, on the great dignity of what he calls the "Champt Royal," and says that those who defy with success the ardour of its rules deserve crowns and garlands for their pains. Étienne Pasquier (1529–1615) points out the fact that the Chant Royal, by its length and the rigidity of its structure, is better fitted than the ballade for solemn and pompous themes. In Old French, the most admired chants royal are those of Clement Marot; his *Chant royal chrestien*, with its refrain

"Santé au corps, et Paradis à l'âme,"

was celebrated. Théodore de Banville defines the chant royal as essentially belonging to ages of faith, when its subjects could be either the exploits of a hero of royal race or the processional splendours of religion. La Fontaine was the latest of the French poets to attempt the chant royal, until it was resuscitated in modern times.

This species of poem was unknown in English medieval literature and was only introduced into Great Britain in the last quarter of the 19th century. The earliest chant royal in English was that published by Edmund Gosse in 1877; it is here given to exemplify the structure and rhyme-arrangement of the form:—

THE PRAISE OF DIONYSUS

"Behold, above the mountains there is light,
A streak of gold, a line of gathering fire,
And the dim East hath suddenly grown bright
With pale aerial flame, that drives up higher
The lurid mists which all the night long were
Breasting the dark ravines and coverts bare;
Behold, behold! the granite gates unclose,
And down the vales a lyric people flows,
Who dance to music, and in dancing fling
Their frantic robes to every wind that blows,
And deathless praises to the Vine-God sing.

Nearer they press, and nearer still in sight,
Still dancing blithely in a seemly choir;
Tossing on high the symbol of their rite,
The cone-tipp'd thyrsus of a god's desire;
Nearer they come, tall damsels flushed and fair,
With ivy circling their abundant hair,
Onward, with even pace, in stately rows,
With eye that flashes, and with cheek that glows,
And all the while their tribute-songs they bring,
And newer glories of the past disclose
And deathless praises to the Vine-God sing.

The pure luxuriance of their limbs is white,
And flashes clearer as they draw the nigher,
Bathed in an air of infinite delight,
Smooth without wound of thorn, or fleck of mire,
Borne up by song as by a trumpet's blare,
Leading the van to conquest, on they fare,
Fearless and bold, whoever comes or goes,
These shining cohorts of Bacchantes close,
Shouting and shouting till the mountains ring,
And forests grim forget their ancient woes,
And deathless praises to the Vine-God sing.

And youths there are for whom full many a night
Brought dreams of bliss, vague dreams that haunt and tire,
Who rose in their own ecstasy bedight,
And wandered forth through many a scourging briar,
And waited shivering in the icy air,
And wrapped the leopard-skin about them there,
Knowing for all the bitter air that froze,
The time must come, that every poet knows,
When he shall rise and feel himself a king,
And follow, follow where the ivy grows,
And deathless praises to the Vine-God sing.

But oh! within the heart of this great flight,
Whose ivory arms hold up the golden lyre?
What form is this of more than mortal height?
What matchless beauty, what inspirèd ire?
The brindled panthers know the prize they bear,
And harmonize their steps with tender care;
Bent to the morning, like a living rose,
The immortal splendour of his face he shows;
And, where he glances, leaf and flower and wing
Tremble with rapture, stirred in their repose,
And deathless praises to the Vine-God sing.

Envoi.

PRINCE of the flute and ivy, all thy foes
Record the bounty that thy grace bestows,
But we, thy servants, to thy glory cling,
And with no frigid lips our songs compose,
And deathless praises to the Vine-God sing."

In the middle ages the chant royal was largely used for the praise of the Virgin Mary. Eustache Deschamps (1340–1410) distinguishes these Marian chants royaux, which were called "serventois," by the absence of an envoi. These poems are first mentioned by Rutebeuf, a *trouvère* of the 13th century. The chant royal is practically unknown outside French and English literature. (E. G.)

CHANTRY (Fr. *chanterie*, from *chanter*, to sing; Med. Lat. *cantuaria*), a small chapel built out from a church, endowed in pre-Reformation times for the express purpose of maintaining priests for the chanting of masses for the soul of the founder or of some one named by him. It generally contained the tomb of the founder, and, as the officiator or mass-priest was often unconnected with the parochial clergy, had an entrance from the outside. The word passed through graduations of meaning. Its first sense was singing or chanting. Then it meant the endowment funds, next the priests, and then the church or chapel itself.

CHANUTE, a city of Neosho county, Kansas, U.S.A., 1 m. from the Neosho river, and about 120 m. S.S.W. of Kansas city. Pop. (1890) 2826; (1900) 4208, of whom 210 were foreign-born and 171 were negroes; (1905, state census) 9074. It is served by the Atchison, Topeka & Santa Fe and the Missouri, Kansas & Texas railways, the former having large repair shops. The city is in the Kansas-Oklahoma oil and gas field, and is surrounded by a fine farming and dairying region, in which special attention is given to the raising of small fruit; oil, gas, cement rock and brick shale are found in the vicinity. Among the city's manufactures are refined oil, Portland cement, vitrified brick and tile, glass, asphalt, ice, cigars, drilling machinery, and flour. The municipality owns and operates the waterworks, a natural gas plant, and an electric lighting plant. Four towns —New Chicago, Tioga, Chicago Junction and Alliance—were started here about the same time (1870). In 1872 they were consolidated, and the present name was adopted in honour of Octave Chanute (b. 1832), the civil engineer and aeronautist (see FLIGHT AND FLYING), then the engineer of the Lawrence, Leavenworth & Galveston railway (now part of the Atchison system). Chanute was incorporated as a city of the third class in 1873, and its charter was revised in 1888. Natural gas and oil were found here in 1899, and Chanute became one of the leaders of the Kansas independent refineries in their contest with the Standard Oil Company.

CHANZY, ANTOINE EUGÈNE ALFRED (1823–1883), French general, was born at Nouart (Ardennes) on the 18th of March 1823. The son of a cavalry officer, he was educated at the naval school at Brest, but enlisted in the artillery, and, subsequently passing through St Cyr, was commissioned in the Zouaves in 1843. He saw a good deal of fighting in Algeria, and was promoted lieutenant in 1848, and captain in 1851. He became *chef de bataillon* in 1856, and served in the Lombardy campaign of 1859, being present at Magenta and Solferino. He took part in the Syrian campaign of 1860–61 as a lieutenant-colonel; and as colonel commanded the 48th regiment at Rome in 1864. He returned to Algeria as general of brigade, assisted to quell the Arab insurrection, and commanded the subdivisions of Bel Abbes and Tlemçen in 1868. Although he had acquired a good professional reputation, he was in bad odour at the war office on account of suspected contributions to the press, and at the outbreak of the Franco-German War he was curtly refused a brigade command. After the revolution, however, the government of national defence called him from Algeria, made him a general of division, and gave him command of the XVI. corps of the army of the Loire. (For the operations of the Orleans campaign which followed, see FRANCO-GERMAN WAR.) The Loire army won the greatest success of the French during the whole war at Coulmiers, and followed this up with another victorious action at Patay; in both engagements General Chanzy's corps took the most brilliant part. After the second battle of Orleans and the separation of the two wings of the French army, Chanzy was appointed to command that in the west, designated the second army of the Loire. His enemies, the grand duke of Mecklenburg, Prince Frederick Charles, and General von der Tann, all regarded Chanzy as their most formidable opponent. He displayed conspicuous moral courage and constancy, not less than technical skill, in the fighting from Beaugency to the Loire, in his retreat to Le Mans, and in retiring to Laval behind the Mayenne. As Gambetta was the soul, Chanzy was the strong right arm of French resistance to the invader. He was made a grand officer of the Legion of Honour, and was elected to the National Assembly. At the outbreak of the Commune, Chanzy, then at Paris, fell into the hands of the insurgents, by whom he was forced to give his parole not to serve against them. It was said that he would otherwise have been appointed instead of MacMahon to command the army of Versailles. A ransom of £40,000 was also paid by the government for him. In 1872 he became a member of the committee of defence and commander of the VII. army corps, and in 1873 was appointed governor of Algeria, where he remained for six years. In 1875 he was elected a life senator, in 1878 received the grand cross of the Legion of Honour, and in 1879, without his consent, was nominated for the presidency of the republic, receiving a third of the total votes. For two years he was ambassador at St Petersburg, during which time he received many tokens of respect, not only from the Russians, but also from the German emperor, William I., and Prince Bismarck. He died suddenly, while commanding the VI. army corps (stationed nearest to the German frontier), at Châlons-sur-Marne, on the 4th of January 1883, only a few days after Gambetta, and his remains received a state funeral. He was the author of *La Deuxième Armée de la Loire* (1872). Statues of General Chanzy have been erected at Nouart and Le Mans.

CHAOS, in the Hesiodic theogony, the infinite empty space, which existed before all things (*Theog.* 116, 123). It is not, however, a mere abstraction, being filled with clouds and darkness; from it proceed Erebus and Nyx (Night), whose children are Aether (upper air) and Hemera (Day). In the Orphic cosmogony the origin of all goes back to Chronos, the personification of time, who produces Aether and Chaos. In the Aristophanic parody (*Birds*, 691) the winged Eros in conjunction with gloomy Chaos brings forth the race of birds. The later Roman conception (Ovid, *Metam.* i. 7) makes Chaos the original undigested, amorphous mass, into which the architect of the world introduces order and harmony, and from which individual forms are created. In the created world (cosmos, order of the universe) the word has various meanings:—the universe; the space between heaven and earth; the under-world and its ruler. Metaphorically it is used for the immeasurable darkness, eternity, and the infinite generally. In modern usage "chaos" denotes a state of disorder and confusion.

CHAPBOOK (from the O. Eng. *chap*, to buy and sell), the comparatively modern name applied by booksellers and bibliophiles to the little stitched tracts written for the common people and formerly circulated in England, Scotland and the American colonies by itinerant dealers or chapmen, consisting chiefly of vulgarized versions of popular stories, such as *Tom Thumb*, *Jack the Giant Killer*, *Mother Shipton*, and *Reynard the Fox*—travels, biographies and religious treatises. Few of the older chapbooks exist. Samuel Pepys collected some of the best and had them bound into small quarto volumes, which he called

Vulgâria; also four volumes of a smaller size, which he lettered *Penny Witticisms*, *Penny Merriments*, *Penny Compliments* and *Penny Godlinesses*. The early chapbooks were the direct descendants of the black-letter tracts of Wynkyn de Worde. It was in France that the printing-press first began to supply reading for the common people. At the end of the 15th century there was a large popular literature of farces, tales in verse and prose, satires, almanacs, &c., stitched together so as to contain a few leaves, and circulated by itinerant booksellers, known as colporteurs. Most early English chapbooks are adaptations or translations of these French originals, and were introduced into England early in the 16th century. The chapbooks of the 17th century present us with valuable illustrations of the manners of the time; one of the best known is that containing the story of Dick Whittington. Others which had a great vogue are *Jack the Giant Killer*, *Little Red Riding Hood*, and *Mother Shipton*. Those of the 18th century are far inferior in every way, both as regards the literature and the printing; and unfortunately it is these which form the bulk of what is now known to us in collections as chapbooks. They have never exercised any great influence in England nor received much attention, owing no doubt to their poor literary character. In France, on the other hand, their French equivalents have been the object of close and systematic study, and *L'Histoire des livres populaires ou de la littérature du colportage* by Charles Nisard (1854) goes deeply into the subject. Amongst English books may be mentioned *Notices of Fugitive Tracts and Chapbooks*, by J. O. Halliwell-Phillipps (1849); *Chapbooks of the 18th Century*, by John Ashton (1882), and some reprints by the Villon Society in 1885. The word "chapbook" has not been noticed earlier than 1824, when Dibdin, the celebrated bibliographer, described a work as being "a chapbook, printed in rather a neat black-letter."

CHAPE (from the Fr. *chape*, a hood, cope or sheath), a cover or metal plate, such as the cap upon the needle in the compass, also the transverse guard of a sword which protects the hand. From the original meaning comes the use of the word as a support or catch to attach one thing to another, as the hook on a belt to which the sword is fastened. The word is also used for the tip of a fox's brush.

CHAPEL, a place of religious worship,[1] a name properly applied to that of a Christian religious body, but sometimes to any small temple of pagan worship (Lat. *sacellum*). The word is derived through the O. Fr. *chapele*, modern *chapelle*, from the Late Lat. *capelle* or *cappella*, diminutive of *cappa*, a cape, particularly that of a monk. This word was transferred to any sanctuary containing relics, in the early history of the Frankish Church, because the cloak of St Martin, *cappa brevior Sancti Martini*, one of the most sacred relics of the Frankish kings, was carried in a sanctuary or shrine wherever the king went, and oaths were taken on it (see Ducange, *Glossarium*, s.v. *Capella*). Such a sanctuary was served by a priest, who was hence called *capellanus*, from which is derived the English "chaplain" (*q.v.*). The strict application of the word to a sanctuary containing relics was extended to embrace any place of worship other than a church, and it was synonymous, therefore, with "oratory" (*oratorium*), especially one attached to a palace or to a private dwelling-house. The celebrated Sainte Chapelle in Paris, attached to what is now the Palais de Justice, well illustrates the early and proper meaning of the word. It was built (consecration, 1248) by St Louis of France to contain the relic of the Crown of Thorns, ransomed by the king from the Venetians, who held it in pawn from the Latin emperor of the East, John of Brienne, lately dead. The chapel served as the sanctuary of the relic lodged in the upper chapel, and the whole building was attached as the place of worship to the king's palace. This, the primary meaning, survives in the chapels usually placed in the aisles of cathedrals and large churches. They were originally built either to contain relics of a particular saint to whom they were dedicated, or the tomb of a particular family.

[1] The only other English sense is that of a printer's workshop, or the body of compositors in it, who are presided over by a "father of the chapel."

In the Church of England the word is applied to a private place of worship, attached either to the palaces of the sovereign, "chapels royal," or to the residence of a private person, to a college, school, prison, workhouse, &c. Further, the word has particular legal applications, though in each case the building might be and often is styled a church. These are places of worship supplementary to a parish church, and may be either "chapels of ease," to ease or relieve the mother-church and serve those parishioners who may live far away, "parochial chapels," the "churches" of ancient divisions of a very large and widely scattered parish, or "district chapels," those of a district of a parish divided under the various church building acts. A "free chapel" is one founded by the king and by his authority, and visited by him and not by the bishop. A "proprietary chapel" is one that belongs to a private person. They are anomalies to the English ecclesiastical law, have no parish rights, and can be converted to other than religious purposes, but a clergyman may be licensed to perform duty in such a place of worship. In the early and middle part of the 19th century such proprietary chapels were common, but they have practically ceased to exist. "Chapel" was early and still is in England the general name of places of worship other than those of the established Church, but the application of "church" to all places of worship without distinction of sect is becoming more and more common. The word "chapel" was in this restricted sense first applied to places of worship belonging to the Roman Church in England, and was thus restricted to those attached to foreign embassies, or to those of the consorts of Charles I. and II. and James II., who were members of that church. The word is still frequently the general term for Roman Catholic churches in Great Britain and always so in Ireland. The use of "chapel" as a common term for all Nonconformist places of worship was general through most of the 19th century, so that "church and chapel" was the usual phrase to mark the distinction between members of the established Church and those of Nonconformist bodies. Here the widened use of "church" noticed above has been especially marked. Most of the recent buildings for worship erected by Nonconformist bodies will be found to be styled Wesleyan, Congregational, &c., churches. It would appear that while the word "chapel" was not infrequent in the early history of Nonconformity, "meeting-house" was the more usual term.

From the architectural point of view the addition of chapels to a cathedral or large church assumes some historical importance in consequence of the changes it involved in the plan. It was the introduction of the apsidal chapels in the churches of France which eventually led to the *chevet* or cluster of eastern chapels in many of the great cathedrals, and also sometimes to the extension of the transept so as to include additional apsidal chapels on the east side. In France, and to a certain extent in Italy, the multiplication of chapels led to their being placed on the north and south side of the aisles, and in some cases, as at Albi in France, to the suppression of the aisles and the instalment of the chapels in their place. The chapels of the colleges at Oxford and Cambridge are sometimes of large dimensions and architecturally of great importance, that of Christ Church being actually the cathedral of Oxford; among others may be mentioned the chapel of Merton College, and the new chapel of Exeter College, both in Oxford, and the chapel of King's College, Cambridge, which is roofed over with perhaps the finest fan-vault in England. (See VAULT, Plate II., fig. 19.)

CHAPELAIN, JEAN (1595–1674), French poet and man of letters, the son of a notary, was born in Paris on the 4th of December 1595. His father destined him for his own profession; but his mother, who had known Ronsard, had determined otherwise. At an early age Chapelain began to qualify himself for literature, learning, under Nicolas Bourbon, Greek and Latin, and teaching himself Italian and Spanish. Having finished his studies, he was engaged for a while in teaching Spanish to a young nobleman. He was then appointed tutor to the two sons of a M. de la Trousse, grand provost of France. Attached for the next seventeen years to the family of this gentleman, the administration of whose fortune was wholly in his hands, he

seems to have published nothing during this period, yet to have acquired a great reputation as a probability. His first work given to the public was a preface for the *Adone* of Marini, who printed and published that notorious poem at Paris. This was followed by an excellent translation of Mateo Aleman's novel, *Guzman de Alfarache*, and by four extremely indifferent odes, one of them addressed to Richelieu. The credit of introducing the law of the dramatic unities into French literature has been claimed for many writers, and especially for the Abbé d'Aubignac, whose *Pratique du théâtre* appeared in 1657. The theory had of course been enunciated in the *Art poëtique* of J. C. Scaliger in 1561, and subsequently by other writers, but there is no doubt that it was the action of Chapelain that transferred it from the region of theory to that of actual practice. In a conversation with Richelieu in about 1632, reported by the abbé d'Olivet, Chapelain maintained that it was indispensable to maintain the unities of time, place and action, and it is explicitly stated that the doctrine was new to the cardinal and to the poets who were in his pay. French classical drama thus owes the riveting of its fetters to Chapelain. Rewarded with a pension of a thousand crowns, and from the first an active member of the newly-constituted Academy, Chapelain drew up the plan of the grammar and dictionary the compilation of which was to be a principal function of the young institution, and at Richelieu's command drew up the *Sentiments de l'Académie sur le Cid*. In 1656 he published, in a magnificent form, the first twelve cantos of his celebrated epic *La Pucelle*,[1] on which he had been engaged during twenty years. Six editions of the poem were disposed of in eighteen months. But this was the end of the poetic reputation of Chapelain, "the legist of Parnassus." Later the slashing satire of Boileau (in this case fairly master of his subject) did its work, and Chapelain ("*Le plus grand poète Français qu' ait jamais été et du plus solide jugement*," as he is called in Colbert's list) took his place among the failures of modern art.

Chapelain's reputation as a critic survived this catastrophe, and in 1663 he was employed by Colbert to draw up an account of contemporary men of letters, destined to guide the king in his distribution of pensions. In this pamphlet, as in his letters, he shows to far greater advantage than in his unfortunate epic. His prose is incomparably better than his verse; his criticisms are remarkable for their justice and generosity; his erudition and kindliness of heart are everywhere apparent; the royal attention is directed alike towards the author's firmest friends and bitterest enemies. To him young Racine was indebted not only for kindly and seasonable counsel, but also for that pension of six hundred livres which was so useful to him. The catholicity of his taste is shown by his *De la lecture des vieux romans* (pr. 1870), in which he praises the *chansons de geste*, forgotten by his generation. Chapelain refused many honours, and his disinterestedness in this and other cases makes it necessary to receive with caution the stories of Ménage and Tallemant des Réaux, who assert that he was in his old age a miser, and that a considerable fortune was found hoarded in his apartments when he died on the 22nd of February 1674.

There is a very favourable estimate of Chapelain's merits as a critic in George Saintsbury's *History of Criticism*, ii. 256-261. An analysis of *La Pucelle* is given in pp. 23-79 of Robert Southey's *Joan of Arc*. See also *Les Lettres de Jean Chapelain* (ed. P. Tanuzey de Larroque, 1880–1882); *Lettres inédites . . . à P. D. Huet* (1658–1673, ed. by L. G. Pelliseier, 1894); Julien Duchesne, *Les Poèmes épiques du XVIIe siècle* (1870); the abbé A. Fabre, *Les Ennemis de Chapelain* (1888), *Chapelain et nos deux premières Académies* (1890); and A. Muehlan, *Jean Chapelain* (1893).

CHAPEL-EN-LE-FRITH, a market town in the High Peak parliamentary division of Derbyshire, England, 20 m. S.E. of Manchester, on the London & North-Western and Midland railways. Pop. (1901) 4626. It lies in an upland valley of the Peak district, the hills of which rise above 1200 ft. in its immediate vicinity. There are paper-works and ironworks, and brewing is carried on. The foundation of the church of St Thomas of Canterbury is attributed to the foresters of the royal forest or frith of the Peak early in the 13th century; and from this the town took name. After the defeat of the Scottish forces at Preston by Cromwell in 1648, it is said that 1500 prisoners were confined in the church at Chapel-en-le-Frith.

CHAPEL HILL, a town of Orange county, North Carolina, U.S.A., about 28 m. N.W. of Raleigh. Pop. (1890) 1017; (1900) 1099. It is served by a branch of the Southern railway, connecting at University, 10 m. distant, with the Greensboro & Goldsboro division. The town is best known as the seat of the University of North Carolina (see NORTH CAROLINA), whose campus contains 48 acres. There are cotton and knitting mills and lumber interests of some importance. Chapel Hill was settled late in the 18th century, and was first incorporated in 1851.

CHAPELLE ARDENTE (Fr. "burning chapel"), the chapel or room in which the corpse of a sovereign or other exalted personage lies in state pending the funeral service. The name is in allusion to the many candles which are lighted round the catafalque. This custom is first chronicled as occurring at the obsequies of Dagobert I. (602–638).

CHAPERON, originally a cap or hood (Fr. *chape*) worn by nobles and knights of the Garter in full dress, and after the 16th century by middle-aged ladies. The modern use of the word is of a married or elderly lady (cf. "duenna") escorting or protecting a young and unmarried girl in public places and in society.

CHAPLAIN, strictly one who conducts service in a chapel (*q.v.*), *i.e.* a priest or minister without parochial charge who is attached for special duties to a sovereign or his representatives (ambassadors, judges, &c.), to bishops, to the establishments of nobles, &c., to institutions (*e.g.* parliament, congress, colleges, schools, workhouses, cemeteries), or to the army and the navy. In some cases a parish priest is also appointed to a chaplaincy, but in so far as he is a chaplain he has no parochial duties. Thus a bishop of the English Church appoints examining chaplains who conduct the examination of candidates for holy orders; such officials generally hold ordinary benefices also. The British sovereign has 36 "Chaplains in Ordinary," who perform service at St James's in rotation, as well as "Honorary Chaplains" and "Chaplains of the Household." There are also royal chaplains in Scotland and Ireland. The Scottish chaplains in ordinary are on the same basis as those in England, but the Irish chaplains are attached to the household of the lord-lieutenant. The Indian civil service appoints a number of clergymen of the Church of England and the Church of Scotland. These clergymen are known as Chaplains, and are subject to the same conditions as other civil servants, being eligible for a retiring pension after 23 years of service. Chaplains are also appointed under the foreign office to embassies, legations, consulates, &c.

Workhouse chaplains are appointed by overseers and guardians on the direction of the Local Government Board, to which alone such chaplains are responsible. Prison chaplains are appointed by the home secretary.

In the British army there are two kinds of chaplains, permanent and occasional. The former, described as Chaplains to the Forces, hold commissions, serving throughout the empire except in India: they include a Chaplain-General who ranks as a major-general, and four classes of subordinate chaplains who rank respectively as colonels, lieutenant-colonels, majors and captains. There are about 100 in all. Special chaplains (Acting Chaplains for Temporary Service) may be appointed by a secretary of state under the Army Chaplains Act of 1868 to perform religious service for the army in particular districts. The permanent chaplains may be Church of England, Roman Catholic, or Presbyterian; Wesleyans (if they prefer not to accept commissions) may be appointed Acting Chaplains. The Church of England chaplains report to the chaplain-general, while other chaplains report to the War Office direct. In the navy, chaplains are likewise appointed but do not hold official rank. They must have a special ecclesiastical licence from the archbishop of Canterbury. In 1909 a Chaplains' Department of the Territorial Force was formed; there is no denominational restriction.

[1] The last twelve cantos of *La Pucelle* were edited (1882) from the MS. with corrections and a preface in the author's autograph, in the *Bibliothèque Nationale*, by H. Herluison. Another edition, by E. de Molènes (2 vols.), was published in 1892.

In the armies and navies of all Christian countries chaplains are officially appointed, with the single exception of France, where the office was abolished on the separation of Church and State. In the army of the United States of America chaplains are originally appointed by the president, and subsequently are under the authority of the secretary of war, who receives recommendations as regards transfer from department commanders. By act of Congress, approved in April 1904, the establishment of chaplains was fixed at 57 (15 with the rank of major), 12 for the artillery corps and 1 each for the cavalry and infantry regiments. There is no distinction of sect. In the U.S. navy the chaplains are 24 in number, of whom 13 rank as lieutenants, 7 as commanders, 4 as captains.

In the armies of Roman Catholic countries there are elaborate regulations. Where the chaplains are numerous a chaplain-major is generally appointed, but in the absence of special sanction from the pope such officer has no spiritual jurisdiction. Moreover, chaplains must be approved by the ordinary of the locality. In Austria there are Roman Catholic, Greek Church, Jewish and Mahommedan chaplains. The Roman Catholic chaplains are classed as parish priests, curates and assistants, and are subject to an army Vicar Apostolic. In war, at an army headquarters there are a "field-rabbi," a "military imam," an evangelical minister, as well as the Roman Catholic hierarchy. By a decree of the Sacred Congregation of Propaganda (May 15, 1906), the archbishop of Westminster is the ecclesiastical superior of all commissioned Roman Catholic chaplains in the British army and navy, and he is empowered to negotiate with the civil authorities concerning appointments.

In Germany, owing to the fact that there are different religions in the different states, there is no uniform system. In Prussia there are two *Feldprobste* (who are directly under the war minister), one Lutheran, one Roman Catholic. The latter is a titular bishop, and has sole spiritual authority over soldiers. There are also army corps and divisional chaplains of both faiths. Bavaria and Saxony, both Roman Catholic states, have no special spiritual hierarchy; in Bavaria, the archbishop of Munich and Freysing is *ex officio* bishop of the army.

The origin of the office of *capellanus* or *cappellanus* in the medieval church is generally traced (see Du Cange, *Gloss. med. et infim. Latin.*) to the appointment of persons to watch over the sacred cloak (*cappa* or *capella*) of St Martin of Tours, which was preserved as a relic by the French monarchs. In time of war this cloak was carried with the army in the field, and was kept in a tent which itself came to be known as a *cappella* or *capella*. It is also suggested that the *capella* was simply the tent or canopy which the French kings erected over the altar in the field for the worship of the soldiers. However this may be, the name *capellanus* was generally applied to those who were in charge of sacred relics: such officials were also known as *custodes*, *martyrarii*, *cubicularii*. Thus we hear of a *custos palatinae capellae* who was in charge of the palace chapel relics, and guarded them in the field; the chief of these *custodes* was sometimes called the *archi-capellanus*. From the care of sacred relics preserved in royal chapels, &c. (*sacella* or *capellae*), the office of *capellanus* naturally extended its scope until it covered practically that of the modern court chaplain, and was officially recognized by the Church. These clerics became the confessors in royal and noble houses, and were generally chosen from among bishops and other high dignitaries. The arch-chaplain not only received jurisdiction within the royal household, but represented the authority of the monarch in religious matters, and also acquired more general powers. In France the arch-chaplain was grand-almoner, and both in France and in the Holy Roman Empire was also high chancellor of the realm. The office was abolished in France at the Revolution in 1789, revived by Pius IX. in 1857, and again abolished on the fall of the Second Empire.

The Roman Catholic Church also recognizes a class of beneficed chaplains, supported out of "pious foundations" for the specific duty of saying, or arranging for, certain masses, or taking part in certain services. These chaplains are classified as follows:—*Ecclesiastical*, if the foundation has been recognized officially as a benefice; *Lay*, if this recognition has not been obtained; *Mercenary*, if the person who has been entrusted with the duty of performing or procuring the desired celebration is a layman (such persons also are sometimes called "Lay Chaplains"); *Collative*, if it is provided that a bishop shall collate or confer the right to act upon the accepted candidate, who otherwise could not be recognized as an ecclesiastical chaplain. There are elaborate regulations governing the appointment and conduct of these chaplains.

Other classes of chaplains are:—(1) *Parochial* or *Auxiliary Chaplains*, appointed either by a parish priest (under a provision authorized by the Council of Trent) or by a bishop to take over certain specified duties which he is unable to perform; (2) *Chaplains of Convents*, appointed by a bishop: these must be men of mature age, should not be regulars unless secular priests cannot be obtained, and are not generally to be appointed for life; (3) *Pontifical Chaplains*, some of whom (known as Private Chaplains) assist the pontiff in the celebration of Mass; others attached directly to the pope are honorary private chaplains who occasionally assist the private chaplains, private clerics of the chapel, common chaplains and supernumerary chaplains. The common chaplains were instituted by Alexander VII., and in 1907 were definitely allowed the title "Monsignore" by Pius X.

CHAPLIN, HENRY (1841–), English statesman, second son of the Rev. Henry Chaplin, of Blankney, Lincolnshire, was educated at Harrow and Christ Church, Oxford, and first entered parliament in 1868 as Conservative member for Mid-Lincolnshire. He represented this constituency (which under the Redistribution Act of 1885 became the Sleaford division) till 1906, when he was defeated, but in 1907 returned to the House of Commons as member for Wimbledon at a by-election. In 1876 he married a daughter of the 3rd duke of Sutherland, but lost his wife in 1881. Outside the House of Commons he was a familiar figure on the Turf, winning the Derby with Hermit in 1867; and in politics from the first the "Squire of Blankney" took an active interest in agricultural questions, as a popular and typical representative of the English "country gentleman" class. Having filled the office of chancellor of the duchy of Lancaster in Lord Salisbury's short ministry of 1885–1886, he became president of the new Board of Agriculture in 1889, with a seat in the cabinet, and retained this post till 1892. In the Conservative cabinet of 1895–1900 he was president of the Local Government Board, and was responsible for the Agricultural Rates Act of 1896; but he was not included in the ministry after its reconstruction in 1900. Mr Chaplin had always been an advocate of protectionism, being in this respect the most prominent inheritor of the views of Lord George Bentinck; and when in 1903 the Tariff Reform movement began under Mr Chamberlain's leadership, he gave it his enthusiastic support, becoming a member of the Tariff Commission and one of the most strenuous advocates in the country of the new doctrines in opposition to free trade.

CHAPMAN, GEORGE (? 1559–1634), English poet and dramatist, was born near Hitchin. The inscription on the portrait which forms the frontispiece of *The Whole Works of Homer* states that he was then (1616) fifty-seven years of age. Anthony à Wood (*Athen. Oxon.* ii. 575) says that about 1574 he was sent to the university, "but whether first to this of Oxon, or that of Cambridge, is to me unknown; sure I am that he spent some time in Oxon, where he was observed to be most excellent in the Latin and Greek tongues, but not in logic or philosophy." Chapman's first extant play, *The Blind Beggar of Alexandria*, was produced in 1596, and two years later Francis Meres mentions him in *Palladis Tamia* among the "best for tragedie" and the "best for comedie." Of his life between leaving the university and settling in London there is no account. It has been suggested, from the detailed knowledge displayed in *The Shadow of Night* of an incident in Sir Francis Vere's campaign, that he saw service in the Netherlands. There are frequent entries with regard to Chapman in Henslowe's diary for the years 1598–1599, but his dramatic activity slackened during

the following years, when his attention was chiefly occupied by his *Homer*. In 1604 he was imprisoned with John Marston for his share in *Eastward Ho*, in which offence was given to the Scottish party at court. Ben Jonson voluntarily joined the two, who were soon released. Chapman seems to have enjoyed favour at court, where he had a patron in Prince Henry, but in 1605 Jonson and he were for a short time in prison again for "a play." Beaumont, the French ambassador in London, in a despatch of the 5th of April 1608, writes that he had obtained the prohibition of a performance of *Biron* in which the queen of France was represented as giving Mademoiselle de Verneuil a box on the ears. He adds that three of the actors were imprisoned, but that the chief culprit, the author, had escaped (Raumer, *Briefe aus Paris*, 1831, ii. 276). Among Chapman's patrons was Robert Carr, earl of Somerset, to whom he remained faithful after his disgrace. Chapman enjoyed the friendship and admiration of his great contemporaries. John Webster in the preface to *The White Devil* praised "his full and heightened style," and Ben Jonson told Drummond of Hawthornden that Fletcher and Chapman "were loved of him." These friendly relations appear to have been interrupted later, for there is extant in the Ashmole MSS. an "Invective written by Mr George Chapman against Mr Ben Jonson." Chapman died in the parish of St Giles in the Fields, and was buried on the 12th of May 1634 in the churchyard. A monument to his memory was erected by Inigo Jones. (M. Br.)

Chapman, his first biographer is careful to let us know, "was a person of most reverend aspect, religious and temperate, qualities rarely meeting in a poet"; he had also certain other merits at least as necessary to the exercise of that profession. He had a singular force and solidity of thought, an admirable ardour of ambitious devotion to the service of poetry, a deep and burning sense at once of the duty implied and of the dignity inherent in his office; a vigour, opulence, and loftiness of phrase, remarkable even in that age of spiritual strength, wealth and exaltation of thought and style; a robust eloquence, touched not unfrequently with flashes of fancy, and kindled at times into heat of imagination. The main fault of his style is one more commonly found in the prose than in the verse of his time,—a quaint and florid obscurity, rigid with elaborate rhetoric and tortuous with labyrinthine illustration; not dark only to the rapid reader through closeness and subtlety of thought, like Donne, whose miscalled obscurity is so often "all glorious within," but thick and slab as a witch's gruel with forced and barbarous eccentricities of articulation. As his language in the higher forms of comedy is always pure and clear, and sometimes exquisite in the simplicity of its earnest and natural grace, the stiffness and density of his more ambitious style may perhaps be attributed to some pernicious theory or conceit of the dignity proper to a moral and philosophic poet. Nevertheless, many of the gnomic passages in his tragedies and allegoric poems are of singular weight and beauty; the best of these, indeed, would not discredit the fame of the very greatest poets for sublimity of equal thought and expression: witness the lines chosen by Shelley as the motto for a poem, and fit to have been chosen as the motto for his life.

The romantic and sometimes barbaric grandeur of Chapman's *Homer* remains attested by the praise of Keats, of Coleridge and of Lamb; it is written at a pitch of strenuous and laborious exaltation, which never flags or breaks down, but never flies with the ease and smoothness of an eagle native to Homeric air. From his occasional poems an expert and careful hand might easily gather a noble anthology of excerpts, chiefly gnomic or meditative, allegoric or descriptive. The most notable examples of his tragic work are comprised in the series of plays taken, and adapted sometimes with singular licence, from the records of such part of French history as lies between the reign of Francis I. and the reign of Henry IV., ranging in date of subject from the trial and death of Admiral Chabot to the treason and execution of Marshal Biron. The two plays bearing as epigraph the name of that famous soldier and conspirator are a storehouse of lofty thought and splendid verse, with scarcely a flash or sparkle of dramatic action. The one play of Chapman's whose popularity on the stage survived the Restoration is *Bussy d'Ambois* (d'Amboise),—a tragedy not lacking in violence of action or emotion, and abounding even more in sweet and sublime interludes than in crabbed and bombastic passages. His rarest jewels of thought and verse detachable from the context lie embedded in the tragedy of *Caesar and Pompey*, whence the finest of them were first extracted by the unerring and unequalled critical genius of Charles Lamb. In most of his tragedies the lofty and labouring spirit of Chapman may be said rather to shine fitfully through parts than steadily to pervade the whole; they show nobly altogether as they stand, but even better by help of excerpts and selections. But the excellence of his best comedies can only be appreciated by a student who reads them fairly and fearlessly through, and, having made some small deductions on the score of occasional pedantry and occasional indecency, finds in *All Fools*, *Monsieur d'Olive*, *The Gentleman Usher*, and *The Widow's Tears* a wealth and vigour of humorous invention, a tender and earnest grace of romantic poetry, which may atone alike for these passing blemishes and for the lack of such clear-cut perfection of character and such dramatic progression of interest as we find only in the yet higher poets of the English heroic age.

So much it may suffice to say of Chapman as an original poet, one who held of no man and acknowledged no master, but from the birth of Marlowe well-nigh to the death of Jonson held on his own hard and haughty way of austere and sublime ambition, not without kindly and graceful inclination of his high grey head to salute such younger and still nobler compeers as Jonson and Fletcher. With Shakespeare we should never have guessed that he had come at all in contact, had not the keen intelligence of William Minto divined or rather discerned him to be the rival poet referred to in Shakespeare's sonnets with a grave note of passionate satire, hitherto as enigmatic as almost all questions connected with those divine and dangerous poems. This conjecture Professor Minto fortified by such apt collocation and confrontation of passages that we may now reasonably accept it as an ascertained and memorable fact.

The objections which a just and adequate judgment may bring against Chapman's master-work, his translation of Homer, may be summed up in three epithets: it is romantic, laborious, Elizabethan. The qualities implied by these epithets are the reverse of those which should distinguish a translator of Homer; but setting this apart, and considering the poems as in the main original works, the superstructure of a romantic poet on the submerged foundations of Greek verse, no praise can be too warm or high for the power, the freshness, the indefatigable strength and inextinguishable fire which animate this exalted work, and secure for all time that shall take cognizance of English poetry an honoured place in its highest annals for the memory of Chapman. (A. C. S.)

Chapman's works include:—Σκιὰ νυκτός: *The Shadow of Night: Containe two Poeticall Hymnes . . .* (1594), the second of which deals with Sir Francis Vere's campaign in the Netherlands; *Ovid's Banquet of Sence. A Coronet for his Mistresse Philosophie; and His Amorous Zodiacke with a translation of a Latine coppie, written by a Fryer, Anno Dom. 1400* (1595, 2nd ed. 1639), a collection of poems frequently quoted from in *England's Parnassus* (1600); "De Guiana, carmen epicum," a poem prefixed to Lawrence Keymis's *A Relation of the second voyage to Guiana* (1596); *Hero and Leander. Begun by Christopher Marloe; and finished by George Chapman* (1598); *The Blinde begger of Alexandria, most pleasantly discoursing his variable humours . . .* (acted 1596, printed 1598), a popular comedy; *A Pleasant Comedy entituled An Humerous dayes Myrth* (identified by Mr Fleay with the "Comodey of Umero" noted by Henslowe on the 11th of May 1597; printed 1599); *Al Fooles, A Comedy* (paid for by Henslowe on the 2nd of July 1599, its original name being "The World runs on wheels"; printed 1605); *The Gentleman Usher* (*c.* 1601, pr. 1606), a comedy; *Monsieur d'Olive* (1604, pr. 1606), one of his most amusing and successful comedies; *Eastward Hoe* (1605), written in conjunction with Ben Jonson and John Marston, an excellent comedy of city life; *Bussy d'Ambois*,[1] *A*

[1] Chapman's source in this piece remains undetermined. It cannot be the *Historia sui temporis* of Jacques de Thom, for the 4th volume of his work, which relates the story, was not published until 1609 (see Koeppel, p. 14).

Tragedie (1604, pr. 1607, 1608, 1616, 1641, &c.), the scene of which is laid in the court of Henry III.; *The Revenge of Bussy d'Ambois. A Tragedie* (pr. 1613, but probably written much earlier); *The Conspiracie, And Tragedie of Charles Duke of Byron, Marshall of France . . . in two plays* (1607 and 1608; pr. 1608 and 1625); *May-Day, A witty Comedie* (pr. 1611; but probably acted as early as 1601); *The widdowes Teares. A Comedie* (pr. 1612; produced perhaps as early as 1605); *Caesar and Pompey: A Roman Tragedy, declaring their warres. Out of whose events is evicted this Proposition. Only a just man is a freeman* (pr. 1631), written, says Chapman in the dedication, "long since," but never staged.

The Tragedy of Alphonsus Emperour of Germany (see the edition by Dr Karl Elye; Leipzig, 1867) and *Revenge for Honour* (1654)[1] both bear Chapman's name on the title-page, but his authorship has been disputed. In *The Ball* (lic. 1632; pr. 1639), a comedy, and *The Tragedie of Chabot Admirall of France* (lic. 1635; pr. 1639) he collaborated with James Shirley. *The memorable Masque of the two Honourable Houses or Inns of Court; the Middle Temple and Lyncoln's Inne*, was performed at court in 1613 in honour of the marriage of the Princess Elizabeth.

The Whole Works of Homer: Prince of Poets. In his Iliads and Odysseys . . . appeared in 1616, and about 1624 he added *The Crowne of all Homers works Batrachomyomachia or the Battaile of Frogs and Mise. His Hymns and Epigrams.* But the whole works had been already published by instalments. *Seaven Bookes of the Iliades of Homer* had appeared in 1598, *Achilles Shield* in the same year, books i.-xii. about 1609; in 1611 *The Iliads of Homer, Prince of Poets* . . . ; and in 1614 *Twenty-four Bookes of Homer's Odisses* were entered at Stationers' Hall. In 1609 he addressed to Prince Henry *Enthymiae Raptus; or the Teares of Peace*, and on the death of his patron he contributed *An Epicede, or Funerall Song* (1612). A paraphrase of *Petrarchs Seven Penitentiall Psalms* (1612), a poem in honour of the marriage of Robert Carr, earl of Somerset, and Frances, the divorced countess of Essex, indiscreetly entitled *Andromeda Liberata* . . . (1614), a translation of *The Georgicks of Hesiod* (1618), *Pro Vere Autumni Lachrymae* (1622), in honour of Sir Horatio Vere, *A justification of a Strange Action of Nero* . . . *also* . . . *the fifth Satyre of Juvenall* (1629), and *Eugenia* . . . (1614), an elegy on Sir William Russell, complete the list of his separately published works.

Chapman's *Homer* was edited in 1857 by the Rev. Richard Hooper; and a reprint of his dramatic works appeared in 1873. The standard edition of Chapman is the *Works*, edited by R. H. Shepherd (1874–1875), the third volume of which contains an "Essay on the Poetical and Dramatic works of George Chapman," by Mr Swinburne, printed separately in 1875. The selection of his plays (1895) for the Mermaid Series is edited by Mr W. L. Phelps. For the sources of the plays see Emil Koeppel, "Anellen Studien zu den Dramen George Chapman's, Philip Massinger's und John Ford's" in *Quellen und Forschungen zur Sprach und Kulturgeschichte* (vol. 82, Strassburg, 1897). The suggestion of W. Minto (see *Characteristics of the English Poets*, 1885) that Chapman was the "rival poet" of Shakespeare's sonnets is amplified in Mr A. Acheson's *Shakespeare and the Rival Poet* 1903). Much satire in Chapman's introduction is there applied to Shakespeare. For other criticisms of his translation of Homer see Matthew Arnold, *Lectures on translating Homer* (1861), and Dr A. Lohff, *George Chapman's Ilias-Übersetzung* (Berlin, 1903). (M. Br.)

CHAPMAN (from O. Eng. *cēap*, and Mid. Eng. *cheap*, to barter, cf. "Cheapside" in London, and Ger. *Kaufmann*), one who buys or sells, a trader or dealer, especially an itinerant pedlar. The word "chap," now a slang term, meant originally a customer.

CHAPONE, HESTER (1727–1801), English essayist, daughter of Thomas Mulso, a country gentleman, was born at Twywell, Northamptonshire, on the 27th of October 1727. She was a precocious child, and at the age of nine wrote a romance entitled *The Loves of Amoret and Melissa*. Hecky Mulso, as she was familiarly called, developed a beautiful voice, which earned her the name of "the linnet." While on a visit to Canterbury she made the acquaintance of the learned Mrs Elizabeth Carter, and soon became one of the admirers of the novelist Samuel Richardson. She was one of the little court of women who gathered at North End, Fulham; and in Miss Susannah Highmore's sketch of the novelist reading *Sir Charles Grandison* to his friends Miss Mulso is the central figure. She corresponded with Richardson on "filial obedience" in letters as long as his own, signing herself his "ever obliged and affectionate child." She admired, however, with discrimination, and in the words of her biographer (*Posthumous Works*, 1807, p. 9) "her letters show with what dignity, tempered with proper humility, she could maintain her own well-grounded opinion." In 1760 Miss Mulso, with her father's reluctant consent, married the attorney, John Chapone, who had been befriended by Richardson. Her husband died within a year of her marriage. Mrs Chapone remained in London visiting various friends. She had already made small contributions to various periodicals when she published, in 1772, her best known work, *Letters on the Improvement of the Mind*. This book brought her numerous requests from distinguished persons to undertake the education of their children. She died on the 25th of December 1801.

See *The Posthumous Works of Mrs Chapone, containing her correspondence with Mr Richardson; a series of letters to Mrs Elizabeth Carter . . . together with an account of her life and character drawn up by her own family* (1807).

CHAPPE, CLAUDE (1763–1805), French engineer, was born at Brûlon (Sarthe) in 1763. He was the inventor of an optical telegraph which was widely used in France until it was superseded by the electric telegraph. His device consisted of an upright post, on the top of which was fastened a transverse bar, while at the ends of the latter two smaller arms moved on pivots. The position of these bars represented words or letters; and by means of machines placed at intervals such that each was distinctly visible from the next, messages could be conveyed through 50 leagues in a quarter of an hour. The machine was adopted by the Legislative Assembly in 1792, and in the following year Chappe was appointed *ingénieur-télégraphe*; but the originality of his invention was so much questioned that he was seized with melancholia and (it is said) committed suicide at Paris in 1805.

His elder brother, Ignace Urbain Jean Chappe (1760–1829), took part in the invention of the telegraph, and with a younger brother, Pierre François, from 1805 to 1823 was administrator of the telegraphs, a post which was also held by two other brothers, René and Abraham, from 1823 to 1830. Ignace was the author of a *Histoire de la télégraphie* (1824). An uncle, Jean Chappe d'Auteroche (1728–1769), was an astronomer who observed two transits of Venus, one in Siberia in 1761, and the other in 1769 in California, where he died.

CHAPPELL, WILLIAM (1809–1888), English writer on music, a member of the London musical firm of Chappell & Co., was born on the 20th of November 1809, eldest son of Samuel Chappell (d. 1834), who founded the business. William Chappell is particularly noteworthy for his starting the Musical Antiquarian Society in 1840, and his publication of the standard work *Popular Music of the Olden Time* (1855–1859)—an expansion of a collection of "national English airs" made by him in 1838–1840. The modern revival of interest in English folk-songs owes much to this work, which has since been re-edited by Professor H. E. Wooldridge (1893). W. Chappell died on the 20th of August 1888. His brother, Thomas Patey Chappell (d. 1902), meanwhile had largely extended the publishing business, and had started (1859) the Monday and Saturday Popular Concerts at St James's Hall, which were successfully managed by a younger brother, S. Arthur Chappell, till they came to an end towards the close of the century.

CHAPRA, or Chupra, a town of British India, the administrative headquarters of Saran district in Bengal, near the left bank of the river Gogra, just above its confluence with the Ganges; with a railway station on the Bengal & North-Western line towards Oudh. Pop. (1901) 45,901, showing a decrease of 21% in the decade. There are a government high school, a German Lutheran mission, and a public library endowed by a former maharaja of Hatwa. Chapra is the centre of trade in indigo and saltpetre, and conducts a large business by water as well as by rail.

CHAPTAL, JEAN ANTOINE CLAUDE, Comte de Chanteloup (1756–1832), French chemist and statesman, was born at Nogaret, Lozère, on the 4th of June 1756. The son of an apothecary, he studied chemistry at Montpellier, obtaining his doctor's diploma in 1777, when he repaired to Paris. In 1781 the States of Languedoc founded a chair of chemistry for him at the school of medicine in Montpellier, where he taught the doctrines of Lavoisier. The capital he acquired by the death of a wealthy uncle he employed in the establishment of chemical

[1] This play appears to have been issued in 1653 with the title *The Parracide, or Revenge for Honour* as the work of Henry Glathorne.

works for the manufacture of the mineral acids, alum, white-lead, soda and other substances. His labours in the cause of applied science were at length recognized by the French government, which presented him with letters of nobility, and the cordon of the order of Saint Michel. During the Revolution a publication by Chaptal, entitled *Dialogue entre un Montagnard et un Girondin*, caused him to be arrested; but being speedily set at liberty through the intermission of his friends, he undertook, in 1793, the management of the saltpetre works at Grenelle. In the following year he went to Montpellier, where he remained till 1797, when he returned to Paris. After the *coup d'état* of the 18th of Brumaire (November 9, 1799) he was made a councillor of state by the First Consul, and succeeded Lucien Bonaparte as minister of the interior, in which capacity he established a chemical manufactory near Paris, a school of arts, and a society of industries; he also reorganized the hospitals, introduced the metrical system of weights and measures, and otherwise greatly encouraged the arts and sciences. A misunderstanding between him and Napoleon (who conferred upon him the title of comte de Chanteloup) occasioned Chaptal's retirement from office in 1804; but before the end of that year he was again received into favour by the emperor, who bestowed on him the grand cross of the Legion of Honour, and made him treasurer to the conservative senate. On Napoleon's return from Elba, Chaptal was made director-general of commerce and manufactures and a minister of state. He was obliged after the downfall of the emperor to withdraw into private life; and his name was removed from the list of the peers of France until 1819. In 1816, however, he was nominated a member of the Academy of Sciences by Louis XVIII. Chaptal was especially a popularizer of science, attempting to apply to industry and agriculture the discoveries of chemistry. In this way he contributed largely to the development of modern industry. He died at Paris on the 30th of July 1832.

His literary works exhibit both vigour and perspicuity of style; he wrote, in addition to various articles, especially in the *Annales de chimie*, *Élémens de chimie* (3 vols., 1790; new ed., 1796–1803); *Traité du salpètre et des goudrons* (1796); *Tableau des principaux sels terreux* (1798); *Essai sur le perfectionnement des arts chimiques en France* (1800); *Art de faire, de gouverner, et de perfectionner les vins* (1 vol., 1801; new ed., 1819); *Traité théorique et pratique sur la culture de la vigne*, &c. (2 vols., 1801; new ed., 1811); *Essai sur le blanchiment* (1801); *La Chimie appliquée aux arts* (4 vols., 1806); *Art de la teinture du coton en rouge* (1807); *Art du teinturier et du dégraisseur* (1800); *De l'industrie française* (2 vols., 1819); *Chimie appliquée à l'agriculture* (2 vols., 1823; new ed., 1829).

CHAPTER (a shortened form of *chapiter*, a word still used in architecture for a capital; derived from O. Fr. *chapitre*, Lat. *capitellum*, diminutive of *caput*, head), a principal division or section of a book, and so applied to acts of parliament, as forming "chapters" or divisions of the legislation of a session of parliament. The name "chapter" is given to the permanent body of the canons of a cathedral or collegiate church, presided over, in the English Church, by the dean, and in the Roman communion by the provost or the dean, and also to the body of the members of a religious order. This may be a "conventual" chapter of the monks of a particular monastery, "provincial" of the members of the order in a province, or "general" of the whole order. This ecclesiastical use of the word arose from the custom of reading a chapter of Scripture, or a head (*capitulum*) of the *regula*, to the assembled canons or monks. The transference from the reading to the assembly itself, and to the members constituting it, was easy, through such phrases as *convenire ad capitulum*. The title "chapter" is similarly used of the assembled body of knights of a military or other order. (See also CANON; CATHEDRAL; DEAN).

CHAPTER-HOUSE (Lat. *capitolium*, Ital. *capitolo*, Fr. *chapitre*, Ger. *Kapitelhaus*), the chamber in which the chapter or heads of the monastic bodies (see ABBEY and CATHEDRAL) assembled to transact business. They are of various forms; some are oblong apartments, as Canterbury, Exeter, Chester, Gloucester, &c.; some octagonal, as Salisbury, Westminster, Wells, Lincoln, York, &c. That at Lincoln has ten sides, and that at Worcester is circular; most are vaulted internally and polygonal externally, and some, as Salisbury, Wells, Lincoln, Worcester, &c., depend on a single slight vaulting shaft for the support of the massive vaulting. They are often provided with a vestibule, as at Westminster, Lincoln, Salisbury and are almost exclusively English.

CHAPU, formerly an important maritime town of China, in the province of Cheh-kiang, 50 m. N.W. of Chên-hai, situated in one of the richest and best cultivated districts in the country. It is the port of Hang-chow, with which it has good canal communication, and it was formerly the only Chinese port trading with Japan. The town has a circuit of about 5 m. exclusive of the suburbs that lie along the beach; and the Tatar quarter is separated from the rest by a wall. It was captured and much injured by the British force in 1842, but was abandoned immediately after the engagement. The sea around it has now silted up, though in the middle of the 19th century it was accessible to the light-draught ships of the British fleet.

CHAR (*Salvelinus*), a fish of the family Salmonidae, represented in Europe, Asia and North America. The best known and most widely distributed species, the one represented in British and Irish lakes, is *S. alpinus*, a graceful and delicious fish, covered with very minute scales and usually dark olive, bluish or purplish black above, with or without round orange or red spots, pinkish white or yellowish pink to scarlet or claret red below. When the char go to sea, they assume a more silvery coloration, similar to that of the salmon and sea trout; the red spots become very indistinct and the lower parts are almost white. The very young are also silvery on the sides and white below, and bear 11 to 15 bars, or parr-marks, on the side. This fish varies much according to localities; and the difference in colour, together with a few points of doubtful constancy, have given rise to the establishment of a great number of untenable so-called species, as many as seven having been ascribed to the British and Irish fauna, viz. *S. alpinus*, *nivalis*, *killinensis*, *willoughbyi*, *perisii*, *colii* and *grayi*, the last from Lough Melvin, Ireland, being the most distinct. *S. alpinus* varies much in size according to the waters it inhabits, remaining dwarfed in some English lakes, and growing to 2 ft. or more in other localities. In other parts of Europe, also, various local forms have been distinguished, such as the "omble chevalier" of the lakes of Switzerland and Savoy (*S. umbla*), the "Säbling" of the lakes of South Germany and Austria (*S. salvelinus*), the "kullmund" of Norway (*S. carbonarius*), &c., while the North American *S. parkei*, *alipes*, *stagnalis*, *arcturus*, *areolus*, *oquassa* and *marstoni* may also be regarded as varieties. Taken in this wide sense, *S. alpinus* has a very extensive distribution. In central Europe, in the British islands and in the greater part of Scandinavia it is confined to mountain lakes, but farther to the north, in both the Old World and the New, it lives in the sea and ascends rivers to spawn. In Lapland, Iceland, Greenland and other parts of the arctic regions, it ranks among the commonest fishes. The extreme northern point at which char have been obtained is 82° 34′ N. (Victoria lake and Floeberg Beach, Arctic America). It reaches an altitude of 2600 ft. in the Alps and 6000 ft. in the Carpathians.

The American brook char, *S. fontinalis*, is a close ally of *S. alpinus*, differing from it in having fewer and shorter gill-rakers, a rather stouter body, the back more or less barred or marbled with dark olive or black, and the dorsal and caudal fins mottled or barred with black. Many local varieties of colour have been distinguished. Sea-run individuals are often nearly plain bright silvery. It is a small species, growing to about 18 in. abundant in all clear, cold streams of North America, east of the Mississippi, northward to Labrador. The fish has been introduced into other parts of the United States, and also into Europe.

Another member of the same section of Salmonidae is the Great Lake char of North America, *S. namaycush*, one of the largest salmonids, said to attain a weight of 100 lb. The body is very elongate and covered with extremely small scales. The colour varies from grey to black, with numerous round pale spots, which may be tinged with reddish; the dorsal and caudal fins reticulate with darker. This fish inhabits the Great Lakes regions and neighbouring parts of North America.

CHAR-À-BANC (Fr. for "benched carriage"), a large form of wagonette-like vehicle for passengers, but with benched seats

arranged in rows, looking forward, commonly used for large parties, whether as public conveyances or for excursions.

CHARACTER (Gr. χαρακτήρ, from χαράττειν, to scratch), a distinctive mark (spelt "caracter" up to the 16th century, with other variants); so applied to symbols of notation or letters of the alphabet; more figuratively, the distinguishing traits of anything, and particularly the moral and mental qualities of an individual human being, the sum of those qualities which distinguish him as a personality. From the latter usage "a character" becomes almost identical with "reputation"; and in the sense of "giving a servant a character," the word involves a written testimonial. For the law relating to servants' characters see MASTER AND SERVANT. A further development is the use of "character" to mean an "odd or eccentric person"; or of a "character actor," to mean an actor who plays a highly-coloured strange part. The word is also used as the name of a form of literature, consisting of short descriptions of types of character. Well-known examples of such "characters" are those of Theophrastus and La Bruyère, and in English, of Joseph Hall (1574–1656) and Sir Thomas Overbury.

CHARADE, a kind of riddle, probably invented in France during the 18th century, in which a word of two or more syllables is divined by guessing and combining into one word (the answer) the different syllables, each of which is described, as an independent word, by the giver of the charade. Charades may be either in prose or verse. Of poetic charades those by W. Mackworth Praed are well known and excellent examples, while the following specimens in prose may suffice as illustrations. "My *first*, with the most rooted antipathy to a Frenchman, prides himself, whenever they meet, upon sticking close to his jacket; my *second* has many virtues, nor is its least that it gives its name to my first; my *whole* may I never catch!" "My *first* is company; my *second* shuns company; my *third* collects company; and my *whole* amuses company." The solutions are *Tar-tar* and *Co-nun-drum*. The most popular form of this amusement is the acted charade, in which the meaning of the different syllables is acted out on the stage, the audience being left to guess each syllable and thus, combining the meaning of all the syllables, the whole word. A brilliant example of the acted charade is described in Thackeray's *Vanity Fair*.

CHARCOAL, the blackish residue consisting of impure carbon obtained by removing the volatile constituents of animal and vegetable substances; wood gives origin to wood-charcoal; sugar to sugar-charcoal; bone to bone-charcoal (which, however, mainly consists of calcium phosphate); while coal gives "coke" and "gas-carbon." The first part of the word charcoal is of obscure origin. The independent use of "char," meaning to scorch, to reduce to carbon, is comparatively recent, and must have been taken from "charcoal," which is quite early. The *New English Dictionary* gives as the earliest instance of "char" a quotation dated 1679. Similarly the word "chark" or "chak," meaning the same as "char," is also late, and is probably due to a wrong division of the word "charcoal," or, as it was often spelled in the 16th and 17th centuries, "charkole" and "charke-coal." No suggestions for an origin of "char" are satisfactory. It may be a use of the word "chare," which appears in "char-woman," the American "chore"; in all these words it means "turn," a turn of work, a job, and "charcoal" would have to mean "turned coal," *i.e.* wood changed or turned to coal, a somewhat forced derivation, for which there is no authority. Another suggestion is that it is connected with "chirk" or "chark," an old word meaning "to make a grating noise."

Wood-charcoal.—In districts where there is an abundance of wood, as in the forests of France, Austria and Sweden, the operation of charcoal-burning is of the crudest description. The method, which dates back to a very remote period, generally consists in piling billets of wood on their ends so as to form a conical pile, openings being left at the bottom to admit air, with a central shaft to serve as a flue. The whole is covered with turf of moistened soil. The firing is begun at the bottom of the flue, and gradually spreads outwards and upwards. The success of the operation—both as to the intrinsic value of the product and its amount—depends upon the rate of the combustion. Under average conditions, 100 parts of wood yield about 60 parts by volume, or 25 parts by weight, of charcoal. The modern process of carbonizing wood—either in small pieces or as sawdust—in cast iron retorts is extensively practised where wood is scarce, and also by reason of the recovery of valuable by-products (wood spirit, pyroligneous acid, wood-tar), which the process permits. The question of the temperature of the carbonization is important; according to J. Percy, wood becomes brown at 220° C., a deep brown-black after some time at 280°, and an easily powdered mass at 310°. Charcoal made at 300° is brown, soft and friable, and readily inflames at 380°; made at higher temperatures it is hard and brittle, and does not fire until heated to about 700°. One of the most important applications of wood-charcoal is as a constituent of gunpowder (*q.v.*). It is also used in metallurgical operations as a reducing agent, but its application has been diminished by the introduction of coke, anthracite smalls, &c. A limited quantity is made up into the form of drawing crayons; but the greatest amount is used as a fuel.

The porosity of wood-charcoal explains why it floats on the surface of water, although it is actually denser, its specific gravity being about 1·5. The porosity also explains the property of absorbing gases and vapours; at ordinary temperatures ammonia and cyanogen are most readily taken up; and Sir James Dewar has utilized this property for the preparation of high vacua at low temperatures. This character is commercially applied in the use of wood-charcoal as a disinfectant. The fetid gases produced by the putrefaction and waste of organic matter enter into the pores of the charcoal, and there meet with the oxygen previously absorbed from the atmosphere; oxidation ensues, and the noxious effluvia are decomposed. Generally, however, the action is a purely mechanical one, the gases being only absorbed. Its pharmacological action depends on the same property; it absorbs the gases of the stomach and intestines (hence its use in cases of flatulence), and also liquids and solids. Wood-charcoal has also the power of removing colouring matters from solutions, but this property is possessed in a much higher degree by animal-charcoal.

Animal-charcoal or *bone black* is the carbonaceous residue obtained by the dry distillation of bones; it contains only about 10% of carbon, the remainder being calcium and magnesium phosphates (80%) and other inorganic material originally present in the bones. It is generally manufactured from the residues obtained in the glue (*q.v.*) and gelatin (*q.v.*) industries. Its decolorizing power was applied in 1812 by Derosne to the clarification of the syrups obtained in sugar-refining; but its use in this direction has now greatly diminished, owing to the introduction of more active and easily managed reagents. It is still used to some extent in laboratory practice. The decolorizing power is not permanent, becoming lost after using for some time; it may be revived, however, by washing and reheating.

Lampblack or *soot* is the familiar product of the incomplete combustion of oils, pitch, resins, tallow, &c. It is generally prepared by burning pitch residues (see COAL-TAR) and condensing the product. Thus obtained it is always oily, and, before using as a pigment, it must be purified by ignition in closed crucibles (see CARBON).

CHARCOT, JEAN MARTIN (1825–1893), French physician, was born in Paris on the 29th of November 1825. In 1853 he graduated as M.D. of Paris University, and three years later was appointed physician of the Central Hospital Bureau. In 1860 he became professor of pathological anatomy in the medical faculty of Paris, and in 1862 began that famous connexion with the Salpêtrière which lasted to the end of his life. He was elected to the Academy of Medicine in 1873, and ten years afterwards became a member of the Institute. His death occurred suddenly on the 16th of August 1893 at Morvan, where he had gone for a holiday. Charcot, who was a good linguist and well acquainted with the literature of his own as well as of other countries, excelled as a clinical observer and a pathologist. His work at the Salpêtrière exerted a great influence on the development of the science of neurology, and his classical *Leçons sur les maladies du*

système nerveux, the first series of which was published in 1873, represents an enormous advance in the knowledge and discrimination of nervous diseases. He also devoted much attention to the study of obscure morbid conditions like hysteria, especially in relation to hypnotism (*q.v.*); indeed, it is in connexion with his investigation into the phenomena and results of the latter that his name is popularly known. In addition to his labours on neurological and even physiological problems he made many contributions to other branches of medicine, his published works dealing, among other topics, with liver and kidney diseases, gout and pulmonary phthisis. As a teacher he was remarkably successful, and always commanded an enthusiastic band of followers.

CHARD, JOHN ROUSE MERRIOTT (1847–1897), British soldier, was born at Boxhill, near Plymouth, on the 21st of December 1847, and in 1868 entered the Royal Engineers. In 1878 Lieutenant Chard was ordered to South Africa to take part in the Zulu War, and was stationed at the small post of Rorke's Drift to protect the bridges across the Buffalo river, and some sick men and stores. Here, with Lieutenant Gonville Bromhead (1856–1891) and eighty men of the 2nd 24th Foot, he heard, on the 22nd of January 1879, of the disaster of Isandhlwana from some fugitives who had escaped the slaughter. Believing that the victorious Zulus would attempt to cross into Natal, they prepared, hastily, to hold the Drift until help should come. They barricaded and loopholed the old church and hospital, and improvised defences from wagons, mealie sacks and bags of Indian corn. Early in the afternoon they were attacked by more than 3000 Zulus, who, after hours of desperate hand-to-hand fighting, carried the outer defences, an inner low wall of biscuit boxes, and the hospital, room by room. The garrison then retired to the stone kraal, and repulsed attack after attack through the night. The next morning relieving forces appeared, and the enemy retired. The spirited defence of Rorke's Drift saved Natal from a Zulu invasion, and Chard's and Bromhead's gallantry was rewarded with the V.C. and immediate promotion to the rank of captain and brevet-major. On Chard's return to England he became a popular hero. From 1893–1896 he commanded the Royal Engineers at Singapore, and was made a colonel in 1897. He died the same year at Hatch-Beauchamp, near Taunton, on the 1st of November.

CHARD, a market town and municipal borough in the Southern parliamentary division of Somersetshire, England, 142½ m. W. by S. of London by the London & South Western railway. Pop. (1901) 4437. It stands on high ground within 1 m. of the Devonshire border. Its cruciform parish church of St Mary the Virgin is Perpendicular of the 15th century. A fine east window is preserved. The manufactures include linen, lace, woollens, brassware and ironware. Chard is governed by a mayor, 4 aldermen and 12 councillors. Area, 444 acres.

Chard (*Cerdre*, *Cherdre*, *Cherde*) was commercial in origin, being a trade centre near the Roman road to the west. There are two Roman villas in the parish. There was a British camp at Neroche in the neighbourhood. The bishop of Bath held Chard in 1086, and his successor granted in 1234 the first charter which made Chard a free borough, each burgage paying a rent of 12d. Trade in hides was forbidden to non-burgesses. This charter was confirmed in 1253, 1280 and 1285. Chard is said to have been incorporated by Elizabeth, as the corporation seal dates from 1570, but no Elizabethan charter can be found. It was incorporated by grant of Charles I. in 1642, and Charles II. gave a charter in 1683. Chard was a mesne borough, the first overlord being Bishop Joceline, whose successors held it (with a brief interval from 1545 to 1552) until 1801, when it was sold to Earl Poulett. Parliamentary representation began in 1312, and was lost in 1328. A market on Monday and fair on the 25th of July were granted in 1253, and confirmed in 1642 and 1683, when two more fair days were added (November 2 and May 3), the market being changed to Tuesday. The market day is now Monday, fairs being held on the first Wednesday in May, August and November, for corn and cattle only, their medieval importance as centres of the cloth trade having departed.

CHARDIN, JEAN SIMÉON (1699–1779), French *genre* painter, was born in Paris, and studied under Pierre Jacques Cazes (1676–1754), the historical painter, and Noël Nicolas Coypel. He became famous for his still-life pictures and domestic interiors, which are well represented at the Louvre, and for figure-painting, as in his *Le Bénédicité* (1740).

CHARDIN, SIR JOHN (1643–1713), French traveller, was born at Paris in 1643. His father, a wealthy jeweller, gave him an excellent education, and trained him in his own art; but instead of settling down in the ordinary routine of the craft, he set out in company with a Lyons merchant named Raisin in 1665 for Persia and India, partly on business and partly to gratify his own inclination. After a highly successful journey, during which he had received the patronage of Shah Abbas II. of Persia, he returned to France in 1670, and there published in the following year *Récit du Couronnement du roi de Perse Soliman III.* Finding, however, that his Protestant profession cut him off from all hope of honours or advancement in his native country, he set out again for Persia in August 1671. This second journey was much more adventurous than the first, as instead of going directly to his destination, he passed by Smyrna, Constantinople, the Crimea, Caucasia, Mingrelia and Georgia, and did not reach Ispahan till June 1673. After four years spent in researches throughout Persia, he again visited India, and returned to Europe by the Cape of Good Hope in 1677. The persecution of Protestants in France led him, in 1681, to settle in London, where he was appointed jeweller to the court, and received from Charles II. the honour of knighthood. In 1683 he was sent to Holland as representative of the English East India Company; and in 1686 he published the first part of his great narrative—*The Travels of Sir John Chardin into Persia and the East Indies*, &c. (London). Sir John died in London in 1713, and was buried in Westminster Abbey, where his monument bears the inscription *Nomen sibi fecit eundo*.

It was not till 1711 that the complete account of Chardin's travels appeared, under the title of *Journal du voyage du chevalier Chardin*, at Amsterdam. The Persian portion is to be found in vol. ii. of Harris's *Collection*, and extracts are reprinted by Pinkerton in vol. ix. The best complete reprint is by Langlès (Paris, 1811). Sir John Chardin's narrative has received the highest praise from the most competent authorities for its fulness, comprehensiveness and fidelity; and it furnished Montesquieu, Rousseau, Gibbon and Helvétius with most important material.

CHARENTE, an inland department of south-western France, comprehending the ancient province of Angoumois, and inconsiderable portions of Saintonge, Poitou, Marche, Limousin and Périgord. It is bounded N. by the departments of Deux-Sèvres and Vienne, E. by those of Vienne and Dordogne, S. by Dordogne and W. by Charente-Inférieure. Area 2305 sq. m. Pop. (1906) 351,733. The department, though it contains no high altitudes, is for the most part of a hilly nature. The highest points, many of which exceed 1000 ft., are found in the Confolentais, the granite region of the extreme north-east, known also as the Terres Froides. In the Terres Chaudes, under which name the remainder of the department is included, the levels vary in general between 300 and 650 ft., except in the western plains —the Pays-Bas and Champagne—where they range from 40 to 300 ft. A large part of Charente is thickly wooded, the principal forests lying in its northern districts. The department, as its name indicates, belongs mainly to the basin of the river Charente (area of basin 3860 sq. m.; length of river 225 m.), the chief affluents of which, within its borders, are the Tardoire, the Touvre and the Né. The Confolentais is watered by the Vienne, a tributary of the Loire, while the arrondissement of Barbezieux in the south-west belongs almost wholly to the basin of the Gironde.

The climate is temperate but moist, the rainfall being highest in the north-east. Agriculturally, Charente is prosperous. More than half its surface is arable land, on the greater part of which cereals are grown. The potato is an important crop. The vine is predominant in the region of Champagne, the wine produced being chiefly distilled into the famous brandy to which the town of Cognac gives its name. The best pasture is found

in the Confolentais, where horned cattle are largely reared. The chief fruits are chestnuts, walnuts and cider-apples. The poultry raised in the neighbourhood of Barbezieux is highly esteemed. Charente has numerous stone quarries, and there are peat workings and beds of clay which supply brick and tile-works and earthenware manufactories. Among the other industries, paper-making, which has its chief centre at Angoulême, is foremost. The most important metallurgical establishment is the large foundry of naval guns at Ruelle. Flour-mills and leather-works are numerous. There are also many minor industries subsidiary to paper-making and brandy-distilling, and Angoulême manufactures gunpowder and confectionery. Coal, salt and timber are prominent imports. Exports include paper, brandy, stone and agricultural products. The department is served chiefly by the Orléans and Ouest-État railways, and the Charente is navigable below Angoulême. Charente is divided into the five arrondissements of Angoulême, Cognac, Ruffec, Barbezieux and Confolens (29 cantons, 426 communes). It belongs to the region of the XII. army corps, to the province of the archbishop of Bordeaux, and to the académie (educational division) of Poitiers. Its court of appeal is at Bordeaux.

Angoulême (the capital), Cognac, Confolens, Jarnac and La Rochefoucauld (*q.v.*) are the more noteworthy places in the department. Barbezieux and Ruffec, capitals of arrondissements and agricultural centres, are otherwise of little importance. The department abounds in churches of Romanesque architecture, of which those of Bassac, St Amant-de-Boixe (portions of which are Gothic in style), Plassac and Gensac-la-Pallue may be mentioned. There are remains of a Gothic abbey church at La Couronne, and Roman remains at St Cybardeaux, Brossac and Chassenon (where there are ruins of the Gallo-Roman town of Cassinomagus).

CHARENTE-INFÉRIEURE, a maritime department of south-western France, comprehending the old provinces of Saintonge and Aunis, and a small portion of Poitou, and including the islands of Ré, Oléron, Aix and Madame. Area, 2791 sq. m. Pop. (1906) 453,793. It is bounded N. by Vendée, N.E. by Deux-Sèvres, E. by Charente, S.E. by Dordogne, S.W. by Gironde and the estuary of the Gironde, and W. by the Bay of Biscay. Plains and low hills occupy the interior; the coast is flat and marshy, as are the islands (Ré, Aix, Oléron) which lie opposite to it. The department takes its name from the river Charente, which traverses it during the last 61 m. of its course and drains the central region. Its chief tributaries are on the right the Boutonne, on the left the Seugne. The climate is temperate and, except along the coast, healthy. There are several sheltered bays on the coast, and several good harbours, the chief of which are La Rochelle, Rochefort and Tonnay-Charente, the two latter some distance up the Charente. Royan on the north shore of the Gironde is an important watering-place much frequented for its bathing.

The majority of the inhabitants of Charente-Inférieure live by agriculture. The chief products of the arable land are wheat, oats, maize, barley and the potato. Horse and cattle-raising is carried on and dairying is prosperous. A considerable quantity of wine, most of which is distilled into brandy, is produced. The department has a few peat-workings, and produces freestone, lime and cement; the salt-marshes of the coast are important sources of mineral wealth. Glass, pottery, bricks and earthenware are prominent industrial products. Ship-building, brandy-distilling, iron-founding and machine construction are also carried on. Oysters and mussels are bred in the neighbourhood of La Rochelle and Marennes, and there are numerous fishing ports along the coast.

The railways traversing the department belong to the Ouest-État system, except one section of the Paris-Bordeaux line belonging to the Orléans Company. The facilities of the department for internal communication are greatly increased by the number of navigable streams which water it. The Charente, the Sèvre Niortaise, the Boutonne, the Seudre and the Gironde furnish 142 m. of navigable waterway, to which must be added the 56 m. covered by the canals of the coast. There are 6 arrondissements (40 cantons, 481 communes), cognominal with the towns of La Rochelle, Rochefort, Marennes, Saintes, Jonzac and St Jean d'Angély—La Rochelle being the chief town of the department. The department forms the diocese of La Rochelle, and is attached to the 18th military region, and in educational matters to the académie of Poitiers. Its court of appeal is at Poitiers.

La Rochelle, St Jean d'Angély, Rochefort and Saintes (*q.v.*) are the principal towns. Surgères and Aulnay possess fine specimens of the numerous Romanesque churches. Pons has a graceful château of the 15th and 16th centuries, beside which there rises a fine keep of the 12th century.

CHARENTON-LE-PONT, a town of northern France in the department of Seine, situated on the right bank of the Marne, at its confluence with the Seine, 1 m. S.E. of the fortifications of Paris, of which it is a suburb. Pop. (1906) 18,034. It derives the distinctive part of its name from the stone bridge of ten arches which crosses the Marne and unites the town with Alfortville, well known for its veterinary school founded in 1766. It has always been regarded as a point of great importance for the defence of the capital, and has frequently been the scene of sanguinary conflicts. The fort of Charenton on the left bank of the Marne is one of the older forts of the Paris defence. In the 16th and 17th centuries Charenton was the scene of the ecclesiastical councils of the Protestant party, which had its principal church in the town. At St Maurice adjoining Charenton is the famous Hospice de Charenton, a lunatic asylum, the foundation of which dates from 1641. Till the time of the Revolution it was used as a general hospital, and even as a prison, but from 1802 onwards it was specially appropriated to the treatment of lunacy. St Maurice has two other national establishments, one for the victims of accidents in Paris (*asile national Vacassy*), the other for convalescent working-men (*asile national de Vincennes*). Charenton has a port on the Canal de St Maurice, beside the Marne, and carries on boat-building and the manufacture of tiles and porcelain.

CHARES, Athenian general, is first heard of in 366 B.C. as assisting the Phliasians, who had been attacked by Argos and Sicyon. In 361 he visited Corcyra, where he helped the oligarchs to expel the democrats, a policy which led to the subsequent defection of the island from Athens. In 357, Chares was appointed to the command in the Social War, together with Chabrias, after whose death before Chios he was associated with Iphicrates and Timotheus (for the naval battle in the Hellespont, see TIMOTHEUS). Chares, having successfully thrown the blame for the defeat on his colleagues, was left sole commander, but receiving no supplies from Athens, took upon himself to join the revolted satrap Artabazus. A complaint from the Persian king, who threatened to send three hundred ships to the assistance of the confederates, led to the conclusion of peace (355) between Athens and her revolted allies, and the recall of Chares. In 349, he was sent to the assistance of Olynthus (*q.v.*) against Philip II. of Macedon, but returned without having effected anything; in the following year, when he reached Olynthus, he found it already in the hands of Philip. In 340 he was appointed to the command of a force sent to aid Byzantium against Philip, but the inhabitants, remembering his former plunderings and extortions, refused to receive him. In 338 he was defeated by Philip at Amphissa, and was one of the commanders at the disastrous battle of Chaeroneia. Lysicles, one of his colleagues, was condemned to death, while Chares does not seem to have been even accused. After the conquest of Thebes by Alexander (335), Chares is said to have been one of the Athenian orators and generals whose surrender was demanded. Two years later he was living at Sigeum, for Arrian (*Anabasis* i. 12) states that he went from there to pay his respects to Alexander. In 332 he entered the service of Darius and took over the command of a Persian force in Mytilene, but capitulated on the approach of a Macedonian fleet on condition of being allowed to retire unmolested. He is last heard of at Taenarum, and is supposed to have died at Sigeum. Although boastful and vain-glorious, Chares was not lacking in personal courage, and was among the best Athenian generals

of his time. At the best, however, he was "hardly more than an ordinary leader of mercenaries" (A. Holm). He openly boasted of his profligacy, was exceedingly avaricious, and his bad faith became proverbial.

Diod. Sic. xv. 75, 95, xvi. 7, 21, 22, 85-88; Plutarch, *Phocion*, 14; Theopompus, *ap.* Athenaeum, xii. p. 532; A. Schäfer, *Demosthenes und seine Zeit* (1885); A. Holm, *History of Greece* (Eng. trans., 1896), vol. iii.

CHARES, of Lindus in Rhodes, a noted sculptor, who fashioned for the Rhodians a colossal bronze statue of the sun-god, the cost of which was defrayed by selling the warlike engines left behind by Demetrius Poliorcetes, when he abandoned the siege of the city in 303 B.C. (Pliny, *Nat. Hist.* xxxiv. 41). The colossus was seventy cubits (105 ft.) in height; and its fingers were larger than many statues. The notion that the legs were planted apart, so that ships could sail between them, is absurd. The statue was thrown down by an earthquake after 56 years; but the remains lay for ages on the spot.

CHARES, of Mytilene, a Greek belonging to the suite of Alexander the Great. He was appointed court-marshal or introducer of strangers to the king, an office borrowed from the Persian court. He wrote a history of Alexander in ten books, dealing mainly with the private life of the king. The fragments are chiefly preserved in Athenaeus.

See *Scriptores Rerum Alexandri* (pp. 114-120) in the Didot edition of Arrian.

CHARGE (through the Fr. from the Late Lat. *carricare*, to load in a *carrus* or wagon; cf. "cargo"), a load; from this, its primary meaning, also seen in the word "charger," a large dish, come the uses of the word for the powder and shot to load a fire-arm, the accumulation of electricity in a battery, the necessary quantity of dynamite or other explosive in blasting, and a device borne on an escutcheon in heraldry. "Charge" can thus mean a burden, and so a care or duty laid upon one, as in "to be in charge" of another. With a transference to that which lays such a duty on another, "charge" is used of the instructions given by a judge to a jury, or by a bishop to the clergy of his diocese. In the special sense of a pecuniary burden the word is used of the price of goods, of an encumbrance on property, and of the expenses of running a business. Further uses of the word are of the violent, rushing attack of cavalry, or of a bull or elephant, or football player; hence "charger" is a horse ridden in a charge, or more loosely a horse ridden by an officer, whether of infantry or cavalry.

CHARGÉ D'AFFAIRES (Fr. for "in charge of business"), the title of two classes of diplomatic agents. (1) *Chargés d'affaires* (*ministres chargés d'affaires*), who were placed by the *règlement* of the congress of Vienna in the 4th class of diplomatic agents, are heads of permanent missions accredited to countries to which, for some reason, it is not possible or not desirable to send agents of a higher rank. They are distinguished from these latter by the fact that their credentials are addressed by the minister for foreign affairs of the state which they are to represent to the minister for foreign affairs of the receiving state. Though still occasionally accredited, ministers of this class are now rare. They have precedence over the other class of *chargés d'affaires*. (2) *Chargés d'affaires per interim*, or *chargés des affaires*, are those who are presented as such, either verbally or in writing, by heads of missions of the first, second or third rank to the minister for foreign affairs of the state to which they are accredited, when they leave their post temporarily, or pending the arrival of their successor. It is usual to appoint a counsellor or secretary of legation *chargé d'affaires*. Some governments are accustomed to give the title of minister to such *chargés d'affaires*, which ranks them with the other heads of legation. Essentially *chargés d'affaires* do not differ from ambassadors, envoys or ministers resident. They represent their nation, and enjoy the same privileges and immunities as other diplomatic agents (see DIPLOMACY).

CHARGING ORDER, in English law, an order obtained from a court or judge by a judgment creditor under the Judgment Acts 1838 and 1840, by which the property of the judgment debtor in any stocks or funds stands charged with the payment of the amount for which judgment shall have been recovered, with interest. A charging order can only be obtained in respect of an ascertained sum, but this would include a sum ordered to be paid at a future date. An order can be made on stock standing in the name of a trustee in trust for the judgment debtor, or on cash in court to the credit of the judgment debtor, but not on stock held by a debtor as a trustee. The application for a charging order is usually made by motion to a divisional court, though it may be made to a judge. The effect of the order is not that of a contract to pay the debt, but merely of an instrument of charge on the shares, signed by the debtor. An interval of six months must elapse before any proceedings are taken to enforce the charge, but, if necessary, a stop order on the fund and the dividends payable by the debtor can be obtained by the creditor to protect his interest A solicitor employed to prosecute any suit, matter or proceeding in any court, is entitled, on declaration of the court, to a charge for his costs upon the property recovered or preserved in such suit or proceeding. (See *Rules of the Supreme Court*, o. XLIX.)

CHARIBERT (d. 567), king of the Franks, was the son of Clotaire I. On Clotaire's death in 561 his estates were divided between his sons, Charibert receiving Paris as his capital, together with Rouen, Tours, Poitiers, Limoges, Bordeaux and Toulouse. Besides his wife, Ingoberga, he had unions with Merofleda, a wool-carder's daughter, and Theodogilda, the daughter of a neatherd. He was one of the most dissolute of the Merovingian kings, his early death in 567 being brought on by his excesses. (C. PF.)

CHARIDEMUS, of Oreus in Euboea, Greek mercenary leader. About 367 B.C. he fought under the Athenian general Iphicrates against Amphipolis. Being ordered by Iphicrates to take the Amphipolitan hostages to Athens, he allowed them to return to their own people, and joined Cotys, king of Thrace, against Athens. Soon afterwards he fell into the hands of the Athenians and accepted the offer of Timotheus to re-enter their service. Having been dismissed by Timotheus (362) he joined the revolted satraps Memnon and Mentor in Asia, but soon lost their confidence, and was obliged to seek the protection of the Athenians. Finding, however, that he had nothing to fear from the Persians, he again joined Cotys, on whose murder he was appointed guardian to his youthful son Cersobleptes. In 357, on the arrival of Chares with considerable forces, the Chersonese was restored to Athens. The supporters of Charidemus represented this as due to his efforts, and, in spite of the opposition of Demosthenes, he was honoured with a golden crown and the franchise of the city. It was further resolved that his person should be inviolable. In 351 he commanded the Athenian forces in the Chersonese against Philip II. of Macedon, and in 349 he superseded Chares as commander in the Olynthian War. He achieved little success, but made himself detested by his insolence and profligacy, and was in turn replaced by Chares. After Chaeroneia the war party would have entrusted Charidemus[1] with the command against Philip, but the peace party secured the appointment of Phocion. He was one of those whose surrender was demanded by Alexander after the destruction of Thebes, but escaped with banishment. He fled to Darius III., who received him with distinction. But, having expressed his dissatisfaction with the preparations made by the king just before the battle of Issus (333), he was put to death.

See Diod. Sic. xvii. 30; Plutarch, *Phocion*, 16, 17; Arrian, *Anabasis*, i. 10; Quintus Curtius iii. 2; Demosthenes, *Contra Aristocratem*; A. Schäfer, *Demosthenes und seine Zeit* (1885).

CHARING CROSS, the locality about the west end of the Strand and the north end of Whitehall, on the south-east side of Trafalgar Square, London, England. It falls within the bounds of the city of Westminster. Here Edward I. erected the last of the series of crosses to the memory of his queen, Eleanor (d. 1290). It stood near the present entrance to Charing

[1] According to some authorities, this is a second Charidemus, the first disappearing from history after being superseded by Chares in the Olynthian war.

Cross station of the South-Eastern & Chatham railway, in the courtyard of which a fine modern cross has been erected within a few feet of the exact site. A popular derivation of the name connected it with Edward's "dear queen" (*chère reine*), and a village of Cherringe or Charing grew up here later, but the true origin of the name is not known. There is a village of Charing in Kent, and the name is connected by some with that of a Saxon family, Cerring.

CHARIOT (derived from an O. Fr. word, formed from *char*, a car), in antiquity, a conveyance (Gr. *ἅρμα*, Lat. *currus*) used in battle, for the chase, in public processions and in games. The Greek chariot had two wheels, and was made to be drawn by two horses; if a third or, more commonly, two reserve horses were added, they were attached on each side of the main pair by a single trace fastened to the front of the chariot, as may be seen on two prize vases in the British Museum from the Panathenaic games at Athens. On the monuments there is no other sign of traces, from the want of which wheeling round must have been difficult. Immediately on the axle (*ἄξων*, *axis*), without springs of any kind, rested the basket or body (*δίφρος*) of the chariot, which consisted of a floor to stand on, and a semicircular guard round the front about half the height of the driver. It was entirely open at the back, so that the combatant might readily leap to the ground and up again as was necessary. There was no seat, and generally only room for the combatant and his charioteer to stand in. The pole (*ῥυμός*, *temo*) was probably attached to the middle of the axle, though it appears to spring from the front of the basket; at the end of the pole was the yoke (*ζυγόν*, *jugum*), which consisted of two small saddles fitting the necks of the horses, and fastened by broad bands round the chest. Besides this the harness of each horse consisted of a bridle and a pair of reins, mostly the same as in use now, made of leather and ornamented with studs of ivory or metal. The reins were passed through rings attached to the collar bands or yoke, and were long enough to be tied round the waist of the charioteer in case of his having to defend himself. The wheels and body of the chariot were usually of wood, strengthened in places with bronze or iron; the wheels had from four to eight spokes and tires of bronze or iron. This description applies generally to the chariots of all the nations of antiquity; the differences consisted chiefly in the mountings. The chariots of the Egyptians and Assyrians, with whom the bow was the principal arm of attack, were richly mounted with quivers full of arrows, while those of the Greeks, whose characteristic weapon was the spear, were plain except as regards mere decoration. Among the Persians, again, and more remarkably among the ancient Britons, there was a class of chariot having the wheels mounted with sharp, sickle-shaped blades, which cut to pieces whatever came in their way. This was probably an invention of the Persians; Cyrus the younger employed these chariots in large numbers. Among the Greeks and Romans, on the other hand, the chariot had passed out of use in war before historical times, and was retained only for races in the public games, or for processions, without undergoing any alteration apparently, its form continuing to correspond with the description of Homer, though it was lighter in build, having to carry only the charioteer. On two Panathenaic prize vases in the British Museum are figures of racing *bigae*, in which, contrary to the description given above, the driver is seated with his feet resting on a board hanging down in front close to the legs of his horses. The *biga* itself consists of a seat resting on the axle, with a rail at each side to protect the driver from the wheels. The chariot was unsuited to the uneven soil of Greece and Italy, and it is not improbable that these nations had brought it with them as part of their original habits from their former seats in the East. In the remains of Egyptian and Assyrian art there are numerous representations of chariots, from which it may be seen with what richness they were sometimes ornamented. The "iron" chariots in use among the Jews appear to have been chariots strengthened or plated with metal, and no doubt were of the form above described, which prevailed generally among the other ancient nations. (See also CARRIAGE.)

The chief authorities are J. C. Ginzrot, *Die Wagen und Fahrwerke der Griechen und Römer* (1817); C. F. Grashof, *Über das Fuhrwerk bei Homer und Hesiod* (1846); W. Leaf in *Journal of Hellenic Studies*, v.; E. Buchholz, *Die homerischen Realien* (1871–1885); W. Helbig, *Das homerische Epos aus den Denkmälern erläuterl* (1884), and the article "Currus" in Daremberg and Saglio, *Dictionnaire des Antiquités*.

CHARISIUS, FLAVIUS SOSIPATER, Latin grammarian, flourished about the middle of the 4th century A.D. He was probably an African by birth, summoned to Constantinople to take the place of Euanthius, a learned commentator on Terence. The *Ars Grammatica* of Charisius, in five books, addressed to his son (not a Roman, as the preface shows), has come down to us in a mutilated condition, the beginning of the first, part of the fourth, and the greater part of the fifth book having been lost. The work, which is merely a compilation, is valuable as containing excerpts from the earlier writers on grammar, who are in many cases mentioned by name—Q. Remmius Palaemon, C. Julius Romanus, Cominianus.

The best edition is by H. Keil, *Grammatici Latini*, i. (1857); see also article by G. Götz in Pauly-Wissowa's *Realencyclopädie*, iii. 2 (1899); Teuffel-Schwabe, *Hist. of Roman Literature* (Eng. trans.), § 419, 1. 2; Fröhde, in *Jahr. f. Philol.*, 18 Suppl. (1892), 567-672.

CHARITON, of Aphrodisias in Caria, the author of a Greek romance entitled *The Loves of Chaereas and Callirrhoë*, probably flourished in the 4th century A.D. The action of the story, which is to a certain extent historical, takes place during the time of the Peloponnesian War. Opinions differ as to the merits of the romance, which is an imitation of Xenophon of Ephesus and Heliodorus.

Editions by J. P. D'Orville (1783), G. A. Hirschig (1856) and R. Hercher (1859); there is an (anonymous) English translation (1764); see also E. Rohde, *Der griechische Roman* (1900).

CHARITY AND CHARITIES. The word "charity," or love, represents the principle of the good life. It stands for a mood or habit of mind and an endeavour. From it, as a habit of mind, springs the social and personal endeavour which in the widest sense we may call charity. The two correspond. Where the habit of mind has not been gained, the endeavour fluctuates and is relatively purposeless. In so far as it has been gained, the endeavour is founded on an intelligent scrutiny of social conditions and guided by a definite purpose. In the one case it is realized that some social theory must be found by us, if our action is to be right and consistent; in the other case no need of such a theory is felt. This article is based on the assumption that there are principles in charity or charitable work, and that these can be ascertained by a study of the development of social conditions, and their relation to prevalent social aims and religious or philosophic conceptions. It is assumed also that the charity of the religious life, if rightly understood, cannot be inconsistent with that of the social life.

Perhaps some closer definition of charity is necessary. The words that signify goodwill towards the community and its members are primarily words expressive of the affections of family life in the relations existing between parents, and between parent and child. As will be seen, the analogies underlying such phrases as "God the Father," "children of God," "brethren," have played a great part in the development of charitable thought in pre-Christian as well as in Christian days. The germ, if we may say so, of the words *φιλία*, *ἀγάπη*, *amor*, love; *amicitia*, friendship, is the sexual or the parental relation. With the realization of the larger life in man the meaning of the word expands. *Caritas*, or charity, strikes another note—high price, and thus dearness. It is charity, indeed, expressed in mercantile metaphor; and it would seem that it was associated in thought with the word *χάρις*, which has also a commercial meaning, but signifies as well favour, gratitude, grace, kindness. Partly thus, perhaps, it assumed and suggested a nobler conception; and sometimes, as, for instance, in English ecclesiastical documents, it was spelt *charitas*. Ἀγάπη, which in the Authorized Version of the Bible is translated charity, was used by St Paul as a translation of the Hebrew word *hēsēd*, which in the Old Testament is in the same version translated "mercy"—as in Hosea vi. 6, "I desired mercy, and not sacrifice." This word represents the charity of kindness and goodness, as distinguished from almsgiving. Almsgiving, *ṣedāqāh*, is translated by the word ἐλεημοσύνη in the Septuagint, and in the Authorized Version by the word "righteousness." It represents the deed or the gift which is due—done or made, not spontaneously, but under a sense of religious obligation. In the earlier Christian period the word almsgiving has this meaning, and was in that sense applied to a wide range of actions and contracts, from

a gift to a beggar at a church door to a grant and a tenure of land. It also, in the word almoner, represented the fulfilment of the religious obligation with the aid of an agent or delegate. The words charity or love (*caritas* or ἀγάπη), on the other hand, without losing the tone with which the thought of parental or family love inspires them, assume a higher meaning. In religious thought they imply an ideal life, as represented by such expressions as "love (*agape*) of God." This on the one side; and on the other an ideal social relation, in such words as "love of man." Thus in the word "charity" religious and social associations meet; and thus regarded the word means a disciplined and habitual mood in which the mind is considerate of the welfare of others individually and generally, and devises what is for their real good, and in which the intelligence and the will strive to fulfil the mind's purpose. Charity thus has no necessary relation to relief or alms. To give a lecture, or to nurse a sick man who is not in want or "poor," may be equally a deed of charity; though in fact charity concerns itself largely with the classes usually called "the poor," and with problems of distress and relief. Relief, however, is not an essential part of charity or charitable work. It is one of many means at its disposal. If the world were so poor that no one could make a gift, or so wealthy that no one needed it, charity—the charity of life and of deeds—would remain.

The history of charity is a history of many social and religious theories, influences and endeavours, that have left their mark alike upon the popular and the cultivated thought of the present day. The inconsistencies of charitable effort and argument may thus in part be accounted for. To understand the problem of charity we have therefore (1) to consider the stages of charitable thought—the primitive, pagan, Greek and Roman, Jewish and Christian elements, that make up the modern consciousness in regard to charity, and also the growth of the habit of "charity" as representing a gradually educated social instinct. (2) We have also to consider in their relation to charity the results of recent investigations of the conditions of social life. (3) At each stage we have to note the corresponding stage of practical administration in public relief and private effort—for the division between public or "poor-law" relief and charity which prevails in England is, comparatively speaking, a novelty, and, generally speaking, the work of charity can hardly be appreciated or understood if it be considered without reference to public relief. (4) As to the present day, we have to consider practical suggestions in regard to such subjects as charity and economic thought, charity organization, friendly visiting and almonership, co-operation with the poor-law, charity and thrift, parochial management, hospitals and medical relief, exceptional distress and the "unemployed," the utilization of endowments and their supervision, and their adaptation to new needs and emergencies. (5) We have also throughout to consider charitable help in relation to classes of dependants, who appear early in the history of the question—widows and orphans, the sick and the aged, vagrants and wayfarers.

First in the series come the charities of the family and of hospitality; then the wider charities of religion, the charities of the community, and of individual donors and of mutual help. These gradually assumed importance in communities which consisted originally of self-supporting classes, within which widows and orphans, for instance, would be rather provided for, in accordance with recognized class obligations, than relieved. Then come habitual almsgiving, the charitable endowment, and the modern charitable institution and association. But throughout the test of progress or decadence appears to be the condition of the family. The family is the source, the home and the hearthstone of charity. It has been created but slowly, and there is naturally a constant tendency to break away from its obligations and to ignore and depreciate its utility. Yet the family, as we now have it, is itself the outcome of infinite thought working through social instinct, and has at each stage of its development indicated a general advance. To it, therefore, constant reference must be made.

Part I.—Primitive Charity

The study of early communities has brought to light the history of the development of the family. "Marriage in its lowest phases is by no means a matter of affection or companionship"; and only very slowly has the position of both parents been recognized as implying different but correlative responsibilities towards their child. Only very slowly, also, has the morality necessary to the making of the family been won. Charity at earlier stages is hardly recognized as a virtue, nor infanticide as an evil. Hospitality—the beginning of a larger social life—is non-existent. The self-support of the community is secured by marriage, and when relations fail marriage becomes a provision against poverty. Then by the tribal system is created another safeguard against want. But apart also from these methods of maintenance, at a very early stage there is charitable relief. The festivals of the solstices and equinoxes, and of the seasons, are the occasions for sacrifice and relief; and, as Christmas customs prove, the instinct to give help or alms at such festival periods still remains. Charity is concerned primarily with certain elemental forces of social life: the relation between these primitive instincts and impulses that still influence charity should not, therefore, be overlooked. The basis of social life is also the basis of charitable thought and action.

The savage is the civilized man in the rough. "The lowest races have," Lord Avebury writes, "no institution of marriage." Many have no word for "dear" or "beloved." The child belongs to the tribe rather than to the parent. In these circumstances a problem of charity such as the following may arise:—"Am I to starve, while my sister has children whom she can sell?" a question asked of Burton by a negro. From the point of view of the tribe, an able-bodied man would be more valuable than dependent children, and the relationship of the larger family of brothers and sisters would be a truer claim to help than that of mother and child. Subsequently the child is recognized as related, not to the father, but to the mother, and there is "a kind of bond which lasts for life between mother and child, although the father is a stranger to it." Slowly only is the relative position of both parents, with different but correlative responsibilities, recognized. The first two steps of charity have then been made: the social value of the bond between the mother, and then between the father, and the child has been recognized. Until this point is reached the morality necessary to the making of the family is wanting, and for a long time afterwards it is hardly won. The virtue of chastity—the condition precedent to the higher family life—is unrecognized. Indeed, the set of such religious thought as there may be is against it. Abstract conceptions, even in the nobler races, are lacking. The religion of life is vaguely struggling with its animality, and that which it at last learns to rule it at first worships. In these circumstances there is little charity for the child and little for the stranger. "There is," Dr Schweinfurth wrote in his *Heart of Africa*, "an utter want of wholesome intercourse between race and race. For any member of a tribe that speaks one dialect to cross the borders of a tribe that speaks another is to make a venture at the hazard of his life." The religious obligations that fostered and sanctified family life among the Greeks and Romans and Jews are unknown. Much later in development comes charity for the child, with the abhorrence of infanticide—against which the Jewish-Christian charity of 2000 years ago uttered its most vigorous protests. If the child belonged primarily to the tribe or state, its maintenance or destruction was a common concern. This motive influenced the Greeks, who are historically nearer the earlier forms of social life than ourselves. For the common good they exposed the deformed child; but also "where there were too many, for in our state population has a limit," as Aristotle says, "the babe or unborn child was destroyed." And so, to lighten their own responsibilities, parents were wont to do in the slow years of the degradation of the Roman empire, though the interest of the state then required a contrary policy. The transition to our present feeling of responsibility for child-life has been very gradual and uncertain, through the middle ages and even till the 18th century. Strictly it may be said that all penitentiaries and other similar institutions are concrete protests on behalf of a better family life. The movement for the care of children in the 18th century naturally and instinctively allied itself with the penitentiary movement. The want of regard for child-life, when the rearing of children becomes a source of economic pressure, suggests why in earlier stages of civilization all that charitable apparatus which we now think necessary for the assistance of children is wanting, even if the need, so far as it does arise, is not adequately met by the recognized obligations of the clan-family or brotherhood.

In the case of barbarous races charity and self-support may be considered from some other points of view. Self-support is secured in two ways—by marriage and by slavery. "For a man or woman to be unmarried after the age of thirty is unheard of" (T. H. Lewin, *Wild Races of South-East India*). On the other hand, if any one is without a father, mother or other relative, and destitute of the necessaries of life, he may sell himself and become a slave. Thus slavery becomes a provision for poverty when relations fail. The clan-family may serve the same purpose. David Livingstone describes the formation of the clan-family among the Bakuena. "Each man, by virtue of paternity, is chief of his own children. They build huts round his. . . . Near the centre of each circle of huts is a spot

called a 'kotla,' with a fireplace; here they work, eat, &c. A poor man attaches himself to the 'kotla' of a rich one, and is considered a child of the latter." Thus the clan-family is also a poor-relief association.

Studies in folklore bring to light many relations between the charity of the old world and that of our own day.

In regard to the charity of the early community, we may take the 8th century B.C. as the point of departure. The *Odyssey* (about 800 B.C.) and Hesiod (about 700 B.C.) are roughly parallel with Amos (816–775), and represent two streams of thought that meet in the early Christian period. The period covered by the *Odyssey* seems to merge into that of Hesiod. We take the former first, dealing with the clan-family and the phratry, which are together the self-maintaining unit of society, with the general relief of the poor, with hospitality, and with vagrancy. In Hesiod we find the customary law of charity in the earlier community definitely stated, and also indications of the normal methods of neighbourly help which were in force in country districts. First of the family and brotherhood, or phratry. The family (*Od.* viii. 582) included alike the wife's father and the daughter's husband. It was thus a clanlike family. Out of this was developed the phratry or brotherhood, in which were included alike noble families, peasants and craftsmen, united by a common worship and responsibilities and a common customary law (*themis*). Zeus, the god of social life, was worshipped by the phratry. He was the father of the law (*themis*). He was god of host and guest. Society was thus based on law, the brotherhood and the family. The irresponsible man, the man worthy of no respect or consideration, was one who belonged to no brotherhood, was subject to no customary law, and had no hearth or family. The phratry was, and became afterwards still more, "a natural gild." Outside the self-sustaining phratry was the stranger, including the wayfarer and the vagrant; and partly merged in these classes was the beggar, the recognized recipient of the alms of the community. To change one's abode and to travel was assumed to be a cause of reproach (*Il.* ix. 648). The "land-louper" was naturally suspected. On the other hand, a stranger's first thought in a new country was whether the inhabitants were wild or social (δίκαιοι), hospitable and God-fearing (*Od.* xiii. 201). Hospitality thus became the first public charity; Zeus sent all strangers and beggars, and it was against all law (θέμις) to slight them. Out of this feeling—a kind of glorified almsgiving—grew up the system of hospitality in Greek states and also in the Roman world. The host greeted the stranger (or the suppliant). An oath of friendship was taken by the stranger, who was then received with the greeting, Welcome (χαῖρε), and water was provided for ablution, and food and shelter. In the larger house there was a guests' table. In the hut he shared the peasant's meal. The custom bound alike the rich and the poor. On parting presents were given, usually food for the onward journey, sometimes costly gifts. The obligation was mutual, that the host should give hospitality, and that the guest should not abuse it. From early times tallies were exchanged between them as evidence of this formal relationship, which each could claim again of the other by the production of the token. And further, the relationship on either side became hereditary. Thus individuals and families and tribes remained linked in friendship and in the interchange of hospitalities.

The early community.

Under the same patronage of Zeus and the same laws of hospitality were vagrants and beggars. The vagrant and loafer are sketched in the *Odyssey*—the vagrant who lies glibly that he may get entertainment, and the loafer who prefers begging to work on a farm. These and the winter idlers, whom Hesiod pictures—a group known to modern life—prefer at that season to spend their time in the warmth of the village smithy, or at a house of common resort (λέσχη)—a common lodging-house, we might say—where they would pass the night. Apparently, as in modern times, the vagrants had organized their own system of entertainment, and, supported by the public, were a class for whom it was worth while to cater. The local or public beggars formed a still more definite class. Their begging was a recognized means of maintenance; it was a part of the method of poor relief. Thus of Penelope it was said that, if Odysseus' tale were true, she would give him better clothes, and then he might beg his bread throughout the country-side. Feasts, too, and almsgiving were nearly allied, and feasts have always been one resource for the relief of the poor. Thus naturally the beggars frequented feasts, and were apparently a recognized and yet inevitable nuisance. They wore, as part of their dress, scrips or wallets in which they carried away the food they received, as later Roman clients carried away portions of food in baskets (*sportula*) from their patron's dinner. Odysseus, when he dresses up as a beggar, puts on a wallet as part of his costume. Thus we find a system of voluntary relief in force based on a recognition of the duty of almsgiving as complete and peremptory as that which we shall notice later among the Jews and the early Christians. We are concerned with country districts, and not with towns, and, as social conditions that are similar produce similar methods of administration, so we find here a general plan of relief similar to that which was in vogue in Scotland till the Scottish Poor Law Act of 1845.

In Hesiod the fundamental conceptions of charity are more clearly expressed. He has, if not his ten, at least his four commandments, for disobedience to which Zeus will punish the offender. They are: Thou shalt do no evil to suppliant or guest; thou shalt not dishonour any woman of the family; thou shalt not sin against the orphan; thou shalt not be unkind to aged parents.

The laws of social life are thus duty to one's guest and duty to one's family; and chastity has its true place in that relation, as the later Greeks, who so often quote Hesiod (cf. the so-called *Economics* of Aristotle), fully realized. Also the family charities due to the orphan, whose lot is deplored in the *Iliad* (xxii. 490), and to the aged are now clearly enunciated. But there is also in Hesiod the duty to one's neighbour, not according to the "perfection" of "Cristes lore," but according to a law of honourable reciprocity in act and intent. "Love him who loves thee, and cleave to him who cleaveth to thee: to him who would have given, give; to him who would not have given, give not." The groundwork of Hesiod's charity outside the family is neighbourly help (such as formed no small part of old Scottish charity in the country districts); and he put his argument thus: Competition, which is a kind of strife, "lies in the roots of the world and in men." It is good, and rouses the idle "handless" man to work. On one side are social duty (δίκη) and work, done briskly at the right season of the year, which brings a full barn. On the other side are unthrift and hunger, and relief with the disgrace of begging; and the relief, when the family can do no more, must come from neighbours, to whose house the beggar has to go with his wife and children to ask for victual. Once they may be helped, or twice, and then they will be refused. It is better, Hesiod tells his brother, to work and so pay off his debts and avoid hunger (see *Erga*, 391, &c., and elsewhere). Here indeed is a problem of to-day as it appeared to an early Greek. The alternatives before the idler—so far as his own community is concerned—are labour with neighbourly help to a limited extent, or hunger.

Hesiod was a farmer in Boeotia. Some 530 years afterwards a pupil of Aristotle thus describes the district and its community of farmers. "They are," he says, "well to do, but simple in their way of life. They practise justice, good faith, and hospitality. To needy townsmen and vagabonds they give freely of their substance; for meanness and covetousness are unknown to them." The charitable method of Homeric and Hesiodic days still continued.

Part II.—Charity among the Greeks

Society in a Greek state was divided into two parts, citizens and slaves. The citizens required leisure for education, war and government. The slaves were their ministers and servants to enable them to secure this leisure. We have therefore to consider, on the one hand, the position of the family and the clan-family, and the maintenance of the citizen from public funds and by public and private charities; and on the other hand the condition of the slaves, and the relation between slavery and charity.

The Greek state.

The slaves formed the larger part of the population. The census of Attica, made between 317 and 307 B.C., gives their numbers at 400,000 out of a population of about 500,000; and even if this be considered excessive, the proportion of slaves to citizens would certainly be very large. The citizens with their wives and children formed some 12% of the community. Thus, apart from the resident aliens, returned in the census at 10,000,

and their wives and children, we have two divisions of society: the citizens, with their own organization of relief and charities; and the slaves, permanently maintained by reason of their dependence on individual members of the civic class. Thus, there is no poverty but that of the poor citizens. Poverty is limited to them. The slaves—that is to say, the bulk of the labouring population—are provided for.

From times relatively near to Hesiod's we may trace the growth and influence of the clan-family as the centre of customary charity within the community, the gradual increase of a class of poor either outside the clan-family or eventually independent of it, and the development of a new organization of relief introduced by the state to meet newer demands. We picture the early state as a group of families, each of which tends to form in time a separate group or clan. At each expansion from the family to the clan the members of the clan retain rights and have to fulfil duties which are the same as, or similar to, those which prevailed in the family. Thus, in Attica the clan-families (*genos*) and the brotherhoods (*phratria*) were "the only basis of legal rights and obligations over and above the natural family." The clan-family was "a natural guild," consisting of rich and poor members—the well-born or noble and the craftsman alike. Originally it would seem that the land was divided among the families of the clan by lot and was inalienable. Thus with the family was combined the means of supporting the family. On the other hand, every youth was registered in his phratry, and the phratry remained till the reforms of Cleisthenes (509 B.C.) a political, and even after that time a social, organization of importance.

First, as to the family—the mother and wife, and the father. Already before the age of Plato and Xenophon (450–350 B.C.) we find that the family has suffered a slow decline. The wife, according to later Greek usage, was married as a child, hardly educated, and confined to the house, except at some festival or funeral. But with the decline came criticism and a nobler conception of family life. "First, then, come laws regarding the wife," writes the author of the so-called *Economics* of Aristotle, and the law, "thou shalt do no wrong; for, if we do no wrong, we shall not be wronged." This is the "common law," as the Pythagoreans say, "and it implies that we must not wrong the wife in the least, but treat her with the reverence due to a suppliant, or one taken from the altar." The sanctity of marriage is thus placed among the "commandments" of Hesiod, beside the duty towards the stranger and the orphan. These and other references to the Pythagoreans suggest that they, possibly in common with other mystics, preached the higher religion of marriage and social life, and thus inspired a deeper social feeling, which eventually allied itself with the Christian movement.

Next, as to parents and children: the son was under an obligation to support his father, subject, after Solon's time, to the condition that he had taught him a trade; and after Solon's time the father had no claim for support from an illegitimate son. "The possession of children," it was said (Arist. *Econ.*), "is not by nature for the public good only, but also for private advantage. For what the strong may gain by their toil for the weak, the weak in their old age receive from the strong . . . Thus is the nature of each, the man and the woman, prearranged by the Divine Being for a life in common." Honour to parents is "the first and greatest and oldest of all debts" (Plato, *Laws*, 717). The child has to care for the parent in his old age. "Nemesis, the minister of justice (δίκη), is appointed to watch over all these things." And "if a man fail to adorn the sepulchre of his dead parents, the magistrates take note of it and inquire" (Xen. *Mem.* ii. 14). The heightened conception of marriage implies a fuller interpretation of the mutual relations of parent and child as well; both become sacred.

Then as to orphans. Before Solon's time (594 B.C.) the property of any member of the clan-family who died without children went to the clan; and after his time, when citizens were permitted to leave their property by will, the property of an intestate fell to the clan. This arrangement carried with it corresponding duties. Through the clan-family provision was made for orphans. Any member of the clan had the legal right to claim an orphan member in marriage; and, if the nearest agnate did not marry her, he had to give her a dowry proportionate to the amount of his own property. Later, there is evidence of a growing sense of responsibility in regard to orphans. Hippodamus (about 443 B.C.), in his scheme of the perfected state (Arist. *Pol.* 1268), suggested that there should be public magistrates to deal with the affairs of orphans (and strangers); and Plato, his contemporary, writes of the duty of the state and of the guardian towards them very fully. Orphans, he proposes (*Laws*, 927), should be placed under the care of public guardians. "Men should have a fear of the loneliness of orphans . . . and of the souls of the departed, who by nature take a special care of their own children. . . . A man should love the unfortunate orphan (boy or girl) of whom he is guardian as if he were his own child; he should be as careful and diligent in the management of the orphan's property as of his own—or even more careful still."

To relieve the poverty of citizens and to preserve the citizenhood were objects of public policy and of charity. In Crete and Sparta the citizens were wholly supported out of the public resources. In Attica the system was different. The citizens were aided in various ways, in which, as often happens, legal or official and voluntary or private methods worked on parallel lines. The means were (1) legal enactment for release of debts; (2) emigration; (3) the supply of corn; (4) poor relief for the infirm, and relief for the children of those fallen in war; (5) emoluments; (6) voluntary public service, separate gifts and liberality; (7) loan societies.

(1) In 594 B.C. the labouring class in Attica were overwhelmed with debts and mortgages, and their persons pledged as security. Only by a sharp reform was it possible to preserve them from slavery. This Solon effected. He annulled their obligations, abolished the pledge of the person, and gave the labourers the franchise (but see under SOLON). Besides the laws above mentioned, he gave power to the Areopagus to inquire from what sources each man obtained the necessaries of life, and to punish those who did not work. His action and that of his successor, Peisistratus (560 B.C.), suggest that the class of poor (ἄποροι) was increasing, and that by the efforts of these two men the social decline of the people was avoided or at least postponed. Peisistratus lent the poor money that they might maintain themselves in husbandry. He wished, it is said (Arist. *Ath. Pol.* xvi.), to enable them to earn a moderate living, that they might be occupied with their own affairs, instead of spending their time in the city or neglecting their work in order to visit it. As rent for their land they paid a tenth of the produce.

(2) Akin to this policy was that of emigration. Athenians, selected in some instances from the two lowest political classes, emigrated, though still retaining their rights of citizenship. In 570–565 B.C. Salamis was annexed and divided into lots and settled, and later Pericles settled more than 2750 citizens in the Chersonese and elsewhere—practically a considerable section of the whole body of citizens. "By this means," says Plutarch, "he relieved the state of numerous idle agitators and assisted the necessitous." In other states this expedient was frequently adopted.

(3) A third method was the supply of corn at reduced rates—a method similar to that adopted, as we shall see, at Rome, Constantinople and elsewhere. The maintenance of the mass of the people depended on the corn fleets. There were public granaries, where large stores were laid up at the public expense. A portion of all cargoes of corn was retained at Athens and in other ways importation was promoted. Exportation was forbidden. Public donations and distributions of corn were frequent, and in times of scarcity rich citizens made large contributions with that object. The distributions were made to adult citizens of eighteen years of age and upwards whose names were on the registers.

(4) In addition to this there was a system of public relief for those who were unable to earn a livelihood on account of bodily defects and infirmities. The qualification was a property test. The property of the applicant had to be shown to be of a value of not more than three minae (say £12). Socrates, it may be noted, adopts the same method of estimating his comparative poverty (Xen. *Econ.* 2. 6), saying that his goods would realize about five minae (or about twenty guineas). The senate examined the case, and the ecclesia awarded the bounty, which amounted to 1 or 2 obols a day, rather more than 1½d. or 3d.—out-door relief, as we might say, amounting at most to about 1s. 9d. a week. There was also a fund for the maintenance of the children of those who had fallen in war, up to the age of eighteen.

(5) But the main source of support was the receipt of emoluments for various public services. This was not relief, though it produced in the course of time the effect of relief. It was rather the Athenian method of supporting a governing class of citizens.

The inner political history of Athens is the history of the extension of the franchise to the lower classes of citizens, with the privileges of holding office and receiving emoluments. In early times, either by Solon (*q.v.*) or previously, the citizens were classified on the basis of property. The rich retained the franchise and the right of holding office; the middle classes obtained the franchise; the fourth or lowest class gained neither. By the reforms of Cleisthenes (509 B.C.) the clan-family and the phratry were set aside for the *deme* or parish, a geographical division superseding the social. Finally, about 478 B.C., when all had acquired the franchise, the right to hold office also was obtained by the third class. These changes coincided with a period of economic progress. The rate of interest was high, usually 12%; and in trading and bottomry the returns were much higher. A small capital at this interest soon produced comparative wealth; and simultaneously prices were falling. Then came the reaction. "After the Peloponnesian war" (432–404 B.C.), writes Professor Jebb, "the wealth of the country ceased to grow, as population had ceased to grow about 50 years sooner. The rich went on accumulating: the poor, having no means of enriching themselves by enterprise, were for the most part occupied in watching for some chance of snatching a larger share of the stationary total." Thus the poorer classes in a time of prosperity had won the power which they were able to turn to their own account afterwards. A period of economic pressure followed, coupled with a decline in the population; no return to the land was feasible, nor was emigration; the people had become town-folk inadaptable to new uses; decreasing vitality and energy were marked by a new temper, the "pauper" temper, unsettled, idle and grasping, and political power was utilized to obtain relief. The relief was forthcoming, but it was of no avail to stop the general decline. The state, it might almost be said, in giving scope to the assertion of the spirit of dependence, had ruined the self-regarding energy on which both family and state alike depended. The emoluments were diverse. The number of citizens was not large; the functions in which citizens could take part were numerous; and when payment was forthcoming the poorer citizens pressed in to exercise their rights (cf. Arist. *Pol.* 1293 a). All Athenian citizens could attend the public assembly or *ecclesia*. Probably the attendance at it varied from a few hundred to 5000 persons. In 395 B.C. the payment for attendance was fixed at 3 obols, or little more than 4½d. a day—for the system of payment had probably been introduced a few years before (but see ECCLESIA and refs.). A juror or *dicast* would receive the same sum for attendance, and the courts or juries often consisted of 500 persons. If the estimate (Böckh, *Public Economy of Athens*, Eng. trans. pp. 109, 117) holds good that in the age of Demosthenes (384–323 B.C.) the member of a poor family of four free persons could live (including rent) on about 3·3d. or between 2 and 3 obols a day, the pay of the citizen attending the assembly or the court would at least cover the expenses of subsistence. On the other hand, it would be less than the pay of a day labourer, which was probably about 4 obols or 6d. a day. In any case many citizens—they numbered in all about 20,000—in return for their participation in political duties would receive considerable pecuniary assistance. Attending a great public festival also, the citizen would receive 2 obols or 3d. a day during the festival days; and there were besides frequent public sacrifices, with the meal or feast which accompanied them. But besides this there were confiscations of private property, which produced a surplus revenue divisible among the poorer citizens. (Some hold that there were confiscations in other Greek states, but not in Athens.) In these circumstances it is not to be wondered that men like Isocrates should regret that the influence of the Areopagus, the old court of morals and justice in Athens, had disappeared, for it "maintained a sort of censorial police over the lives and habits of the citizens; and it professed to enforce a tutelary and paternal discipline, beyond that which the strict letter of the law could mark out, over the indolent, the prodigal, the undutiful, and the deserters of old rite and custom."

(6) In addition to public emoluments and relief there was much private liberality and charity. Many expensive public services were undertaken honorarily by the citizens under a kind of civic compulsion. Thus in a trial about 425 B.C. (Lysias, *Or.* 19. 57) a citizen submitted evidence that his father expended more than £2000 during his life in paying the expenses of choruses at festivals, fitting out seven triremes for the navy, and meeting levies of income tax to meet emergencies. Besides this he had helped poor citizens by portioning their daughters and sisters, had ransomed some, and paid the funeral expenses of others (cf. for other instances Plutarch's *Cimon*, Theophrastus, *Eth.*, and Xen. *Econ.*).

(7) There were also mutual help societies (ἔρανοι). Those for relief would appear to have been loan societies (cf. Theoph. *Eth.*), one of whose members would beat up contributions to help a friend, who would afterwards repay the advance.

The criticisms of Aristotle (384–321 B.C.) suggest the direction to which he looked for reform. He (*Pol.* 1320 a) passes a very unfavourable judgment on the distribution of public money to the poorer citizens. The demagogues (he does not speak of Athens particularly) distributed the surplus revenues to the poor, who received them all at the same time; and then they were in want again. It was only, he argued, like pouring water through a sieve. It were better to see to it that the greater number were not so entirely destitute, for the depravity of a democratic government was due to this. The problem was to contrive how plenty (εὐπορία, not poverty, ἀπορία) should become permanent. His proposals are adequate aid and voluntary charity. Public relief should, he urges, be given in large amounts so as to help people to acquire small farms or start in business, and the well-to-do (εὔποροι) should in the meantime subscribe to pay the poor for their attendance at the public assemblies. (This proves, indeed, how the payments had become poor relief.) He mentions also how the Carthaginian notables divided the destitute amongst them and gave them the means of setting to work, and the Tarentines (κοινὰ ποιοῦντες) shared their property with the poor. (The Rhodians also may be mentioned (Strabo xiv. c. 652), amongst whom the well-to-do undertook the relief of the poor voluntarily.) The later word for charitable distribution was a sharing (κοινωνία, Ep. Rom. xv. 26), which would seem to indicate that after Aristotle's time popular thought had turned in that direction. But the chief service rendered by Aristotle—a service which covered indeed the whole ground of social progress—was to show that unless the purpose of civil and social life was carefully considered and clearly realized by those who desired to improve its conditions, no change for the better could result from individual or associated action.

Two forms of charity have still to be mentioned: charity to the stranger and to the sick. It will be convenient to consider both in relation to the whole classical period.

With the growth of towns the administration of hospitality was elaborated.

The stranger.

(1) There was hospitality between members of families bound by the rites of host and guest. The guest received as a right only shelter and fire. Usually he dined with the host the first day, and if afterwards he was fed provisions were supplied to him. There were large guest-chambers (ξενών) or small guest-houses, completely isolated on the right or left of the principal house; and here the guest was lodged. (2) There were also, *e.g.* at Hierapolis (Sir W. M. Ramsay's *Phrygia*, ii. 97), brotherhoods of hospitality (ξένοι τεκμηρεῖοι, bearers of the sign), which made hospitality a duty, and had a common chest and Apollo as their tutelary god. (3) There were inns or resting-places (καταγώγια) for strangers at temples (Thuc. iii. 68; Plato, *Laws*, 953 A) and places of resort (λέσχη) at or near the temples for the entertainment of strangers—for instance, at a temple of Asclepius at Epidaurus (Pausanias ii. 174); and Pausanias argues that they were common throughout the country. Probably also at the temples hospitable provision was made for strangers. The evidence at present is not perhaps sufficiently complete, but, so far as it goes, it tends to the conclusion that in pre-Christian times hospitality was provided to passers-by and strangers in the temple buildings, as later it was furnished in the monasteries and churches. (4) There were also in towns houses for strangers (ξενών) provided at the public cost. This was so at Megara; and in Crete strangers had a place at the public meals and a dormitory. Xenophon suggested that it would be profitable for the Athenian state to establish inns for traders (καταγώγια δημόσια) at Athens. Thus, apart from the official hospitality of the proxenus or "consul," who had charge of the affairs of foreigners, and the hospitality which was shown to persons of distinction by states or private individuals, there was in Greece a large provision for strangers, wayfarers and vagrants based on the charitable sentiment of hospitality. Among the Romans similar customs of private and public hospitality prevailed; and throughout the empire the older system was altered, probably very slowly. In Christian times (cf. Ramsay above) Pagan temples were (about A.D. 408) utilized for other purposes, including that of hospitality to strangers.

The sick.

Round the temples, at first probably village temples, the organization of medical relief grew up. Primitive medicine is connected with dreams, worship, and liturgical "pollution," punishment and penitence, and an experimental practice. Finally, systematic observation and science (with no knowledge of chemistry and little of physiology) assert themselves, and a secular administration is created by the side of the older religious organization.

Sickness among primitive races is conceived to be a material substance to be extracted, or an evil spirit to be driven away by incantation. Religion and medicine are thus at the beginning almost one and the same thing. In Anatolia, in the groups of villages (cf. Ramsay as above, i. 101) under the theocratic government of a central ἱερόν or temple, the god Men Karou was the physician and saviour (σωτὴρ and σώζων) of his people. Priests, prophets and physicians were his ministers. He punished wrongdoing by diseases which he taught the penitent to cure. So elsewhere pollution, physical or moral, was chastened by disease and loss of property or children, and further ills were avoided by sacrifice and expiation and public warning. In the temple and out of this phase of thought grew up schools of medicine, in whose practice dreams and religious ritual retained a place. The newer gods, Asclepius and Apollo, succeeded the older local divinities; and

the "sons" of Asclepius became a profession, and the temple with its adjacent buildings a kind of hospital. There were many temples of Asclepius in Greece and elsewhere, placed generally in high and salubrious positions. After ablution the patient offered sacrifices, repeating himself the words of the hymn that was chanted. Then, when night came on, he slept in the temple. In the early dawn he was to dream "the heavenly dream" which would suggest his cure; but if he did not dream, relations and others—officials at the temple—might dream for him. At dawn the priests or sons of Asclepius came into the temple and visited the sick, so that, in a kind of drama, where reality and appearance seemed to meet, the patients believed that they saw the god himself. The next morning the prescription and treatment were settled. At hand in the inn or guest-chambers of the temple the patient could remain, sleeping again in the temple, if necessary, and carrying out the required regimen. In the temple were votive tablets of cases, popular and awe-inspiring, and records and prescriptions, which later found their way into the medical works of Galen and others. At the temple of Asclepius at Epidaurus was an inn (καταγώγιον) with four courts and colonnades, and in all 160 rooms. (Cf. Pausanias ii. 171; and *Report, Archaeol. in Greece*, R. C. Bosanquet, 1899, 1900.)

At three centres more particularly, Rhodes, Cnidos and Cos, were the medical schools of the Asclepiads. If one may judge from an inscription at Athens, priests of Asclepius attended the poor gratuitously. And years afterwards, in the 11th century, when there was a revival of medicine, we find (Daremberg, *La Médecine: histoire et doctrines*) at Salerno the Christian priest as doctor, a simple and less palatable pharmacy for the poor than for the rich, and gratuitous medical relief.

Besides the temple schools and hospitals there was a secular organization of medical aid and relief. States appointed trained medical men as physicians, and provided for them medical establishments (*larpeîa*, "large houses with large doors full of light") for the reception of the sick, and for operations there were provided beds, instruments, medicines, &c. At these places also pupils were taught. A lower degree of medical establishment was to be found at the barbers' shops. Out-patients were seen at the *iatreia*. They were also visited at home. There were doctors' assistants and slave doctors. The latter, apparently, attended only slaves (Plato, *Laws*, 720); they do "a great service to the master of the house, who in this manner is relieved of the care of his slaves." It was a precept of Hippocrates that if a physician came to a town where there were sick poor, he should make it his first duty to attend to them; and the state physician attended gratuitously any one who applied to him. There were also travelling physicians going rounds to heal children and the poor. These methods continued, probably all of them, to Christian times.

It has been argued that medical practice was introduced into Italy by the Greeks. But the evidence seems to show that there was a quite independent Latin tradition and school of medicine (René Brian, "Médecine dans le Latium et à Rome," *Rev. Archéol.*, 1885). In Rome there were consulting-rooms and dispensaries, and houses in which the sick were received. Hospitals are mentioned by Roman writers in the 1st century A.D. There were infirmaries—detached buildings—for sick slaves; and in Rome, as at Athens, there were slaves skilled in medicine. In Rome also for each *regio* there was a chief physician who attended to the poorer people.

Slavery was so large a factor in pre-Christian and early Christian society that a word should be said on its relation to charity. Indirectly it was a cause of poverty and social degradation. Thus in the case of Athens, with the achievement of maritime supremacy the number of slaves increased greatly. Manual arts were despised as unbecoming to a citizen, and the slaves carried on the larger part of the agricultural and industrial work of the community; and for a time—until after the Peloponnesian War (404 B.C.)—slavery was an economic success. But by degrees the slave, it would seem, dispossessed the citizen and rendered him unfit for competition. The position of the free artisan thus became akin to that of the slave (Arist. *Pol.* 1260 a, &c.), and slavery became the industrial method of the country. Though Greeks, Romans, Jews and Christians spent money in ransoming individual slaves and also enfranchised many, no general abolition of slavery was possible. At last through economic changes the new status of *coloni*, who paid as rent part of the produce of the land they tilled, superseded the status of slavery (cf. above; the system turned to account by Peisistratus). But this result was only achieved much later, when a new society was being created, when the slaves from the slave prisons (*ergastula*) of Italy joined its invaders, and the slave-owner or master, as one may suppose, unable any longer to work the gangs, let them become *coloni*.

Slavery.

In Greece the feeling towards the slave became constantly more humane. Real slavery, Aristotle said, was a cast of mind, not a condition of life. The slave was not to be ordered about, but to be commanded and persuaded like a child. The master was under the strongest obligation to promote his welfare. In Rome, on the other hand, slavery continued to the end a massive, brutal, industrial force—a standing danger to the state. But alike in Greece and Rome the influence of slavery on the family was pernicious. The pompous array of domestic slaves, the transfer of motherly duties to slave nurses, the loss of that homely education which for most people comes only from the practical details of life—all this in later Greece and Italy, and far into Christian times, prevented that permanent invigoration and reform of family life which Jewish and Christian influences might otherwise have produced.

Part III.—Charity in Roman Times

The words that suggest most clearly the Roman attitude towards what we call charity are *liberalitas*, *beneficentia* and *pietas*. The two former are almost synonymous (Cicero, *De Offic.* i. 7, 14). Liberality lays stress on the mood—that of the *liber*, the freeborn, and so in a sense the independent and superior; beneficence on the deed and its purpose (Seneca, *De Benef.* vi. 10). The conditions laid down by Cicero, following Panaetius the Stoic (185–112 B.C.) are three: not to do harm to him whom one would benefit, not to exceed one's means, and to have regard to merit. The character of the person whom we would benefit should be considered, his feelings towards us, the interest of the community, our social relations in life, and services rendered in the past. The utility of the deed or gift graded according to social relationship and estimated largely from the point of view of ultimate advantage to the doer or donor seems to predominate in the general thought of the book, though (cf. Aristotle, *Eth.* viii. 3) the idea culminates in the completeness of friendship where "all things are in common." *Pietas* has the religious note which the other words lack, loving dutifulness to gods and home and country. Not "piety" only but "pity" derive from it: thus it comes near to our "charity." Both books, the *De Officiis* and the *De Beneficiis*, represent a Roman and Stoical revision of the problem of charity and, as in Stoicism generally, there seems to be a half-conscious attempt to feel the way to a new social standpoint from this side.

As from the point of view of charity the well-being of the community depends upon the vigour of the deep-laid elemental life within it, so in passing to Roman times we consider the family first. The Roman family was unique in its completeness, and by some of its conditions the world has long been bound. The father alone had independent authority (*sui juris*), and so long as he lived all who were under his power—his wife, his sons, and their wives and children, and his unmarried daughters—could not acquire any property of their own. Failing father or husband, the unmarried daughters were placed under the guardianship of the nearest male members of the family. Thus the family, in the narrower sense in which we commonly use the word, as meaning descendants of a common father or grandfather, was, as it were, a single point of growth in a larger organism, the *gens*, which consisted of all those who shared a common ancestry.

Roman times.

The wife, though in law the property of her husband, held a position of honour and influence higher than that of the Greek wife, at least in historic times. She seems to come nearer to the ideal of Xenophon: "the goodwife should be the mistress of everything within the house." "A house of his own and the blessing of children appeared to the Roman citizen as the end and essence

of life" (Mommsen, *Hist. Rome*). The obligation of the father to the sons was strongly felt. The family, past, present and future, was conceived as one and indivisible. Each succeeding generation had a right to the care of its predecessor in mind, body and estate. The training of the sons was distinctly a home and not a school training. Brought up by the father and constantly at his side, they learnt spontaneously the habits and traditions of the family. The home was their school. By their father they were introduced into public life, and though still remaining under his power during his lifetime, they became citizens, and their relation to the state was direct. The nation was a nation of yeomen. Only agriculture and warfare were considered honourable employments. The father and sons worked outdoors on the farm, employing little or no slave labour; the wife and daughters indoors at spinning and weaving. The drudgery of the household was done by domestic slaves. The father was the working head of a toiling household. Their chief gods were the same as those of early Greece—Zeus-Diovis and Hestia-Vesta, the goddess of the hearth and home. Out of this solid, compact family Roman society was built, and so long as the family was strong attachment to the service of the state was intense. The *res publica*, the common weal, the phrase and the thought, meet one at every turn; and never were citizens more patient and tenacious combatants on their country's behalf. The men were soldiers in an unpaid militia and were constantly engaged in wars with the rivals of Rome, leaving home and family for their campaigns and returning to them in the winter. With a hardness and closeness inconsistent with—indeed, opposed to—the charitable spirit, they combined the strength of character and sense of justice without which charity becomes sentimental and unsocial. In the development of the family, and thus, indirectly, in the development of charity, they stand for settled obligation and unrelenting duty.

Under the protection of the head of the family "in dependent freedom" lived the clients. They were in a middle position between the freemen and the slaves. The relation between patron and client lasted for several generations; and there were many clients. Their number increased as state after state was conquered, and they formed the *plebs*, in Rome the *plebs urbana*, the lower orders of the city.

In relation to our subject the important factors are the family, the *plebs* and slavery.

Two processes were at work from an early date, before the first agrarian law (486 B.C.): the impoverishment of the *plebs* and the increase of slavery. The former led to the *annona civica*, or the free supply of corn to the citizens, and to the *sportula* or the organized food-supply for poor clients, and ultimately to the *alimentarii pueri*, the maintenance of children of citizens by voluntary and imperial bounty. The latter (slavery) was the standing witness that, as self-support was undermined, the task of relief became hopeless, and the impoverished citizen, as the generations passed, became in turn dependant, beggar, pauper and slave.

The great patrician families—"an oligarchy of warriors and slaveholders"—did not themselves engage in trade, but, entering on large speculations, employed as their agents their clients, *libertini* or freedmen, and, later, their slaves. The constant wars, for which the soldiers of a local militia were eventually retained in permanent service, broke up the yeomanry and very greatly reduced their number. Whole families of citizens became impoverished, and their lands were in consequence sold to the large patrician families, members of which had acquired lucrative posts, or prospered in their speculations, and assumed possession of the larger part of the land, the *ager publicus*, acquired by the state through conquest. The city had always been the centre of the patrician families, the patron of the trading *libertini* and other dependants. To it now flocked as well the *metoeci*, the resident aliens from the conquered states, and the poorer citizens, landless and unable for social reasons to turn to trade. There was thus in Rome a growing multitude of aliens, dispossessed yeomen and dependent clients. Simultaneously slavery increased very largely after the second Punic War (202 B.C.). Every conquest brought slaves into the market, for whom ready purchasers were found. The slaves took the place of the freemen upon the old family estates, and the free country people became extinct. Husbandry gave place to shepherding. The estates were thrown into large domains (*latifundia*), managed by bailiffs and worked by slaves, often fettered or bound by chains, lodged in cells in houses of labour (*ergastula*), and sometimes cared for when ill in infirmaries (*valetudinaria*). In Crete and Sparta the slaves toiled that the mass of citizens might have means and leisure. In Rome the slave class was organized for private and not for common ends. In Athens the citizens were paid for their services; at Rome no offices were paid. Thus the citizen at Rome was, one might almost say, forced into a dependence on the public corn, for as the large properties swallowed up the smaller, and the slave dispossessed the citizen, a population grew up unfit for rural toil, disinclined to live by methods that pride considered sordid, unstable and pleasure-loving, and yet a serious political factor, as dependent on the rich for their enjoyments as they were on their patrons or the prefect of the corn in the city for their food.

It is estimated, from extremely difficult and uncertain data, that the population of Rome in the time of Augustus was about 1,200,000 or 1,500,000. At that time the *plebs urbana* numbered 320,000. If this be multiplied by three, to give a low average of dependants, wives and children, this section of the population would number 960,000. The remainder of the 1,500,000, 540,000, would consist of (*a*) slaves, and (*b*) those, the comparatively few, who would be members of the great clan-families (*gentes*). Proportionately to Attica this seems to allow too small a population of slaves. But however this be, we may picture the population of Rome as consisting chiefly of a few patrician families ministered to by a very large number of slaves, and a populace of needy citizens, in whose ranks it was profitable for an outsider to find a place in order that he might participate in the advantages of state maintenance.

In Rome the clan-family became the dominant political factor. As in England and elsewhere in the middle ages, and even in later times, the family, in these circumstances, assumes an influence which is out of harmony with the common good. The social advantage of the family lies in its self-maintenance, its home charities, and its moral and educational force, but if its separate interests are made supreme, it becomes uncharitable and unsocial. In Rome this was the line of development. The stronger clan-families crushed the weaker, and became the "oligarchy of warriors and slaveholders." In the same spirit they possessed themselves of the *ager publicus*. The land obtained by the Romans by right of conquest was public. It belonged to the state, and to a yeoman state it was the most valuable acquisition. At first part of it was sold and part was distributed to citizens without property and destitute (cf. Plutarch, *Tib. Gracchus*). At a very early date, however, the patrician families acquired possession of much of it and held it at a low rental, and thus the natural outlet for a conquering farmer race was monopolized by one class, the richer clan-families. This injustice was in part remedied by the establishment of colonies, in which the emigrant citizens received sufficient portions of land. But these colonies were comparatively few, and after each conquest the rich families made large purchases, while the smaller proprietors, whose services as soldiers were constantly required, were unable to attend to their lands or to retain possession of them. To prevent this (367 B.C.) the Licinian law was passed, by which ownership in land was limited to 500 *jugera*, about 312 acres. This law was ignored, however, and more than two centuries later the evil, the double evil of the dispossession of the citizen farmer and of slavery, reached a crisis. The slave war broke out (134 B.C.) and (133 B.C.) Tiberius Gracchus made his attempt to re-endow the Roman citizens with the lands which they had acquired by conquest. He undertook what was essentially a charitable or philanthropic movement, which was set on foot too late. He had passed through Tuscany, and seen with resentment and pity the deserted country where the foreign slaves and barbarians were now the only shepherds and cultivators. He had been brought up under the influence of Greek Stoical thought, with which, almost in spite of itself, there was always associated an element of pity. The problem which he desired to solve, though larger in scale, was essentially the same as that with which Solon and Peisistratus had dealt successfully. At bottom the issue lay between private property, considered as the basis of family life for the great bulk of the community, with personal independence, and pauperism, with the *annona* or slavery. In 133 B.C. Tiberius Gracchus became tribune. To expand society on the lines of private property, he proposed the enforcement of "the Licinian

The annona civica.

Rogations"; the rich were to give up all beyond their rightful 312 acres, and the remainder was to be distributed amongst the poor. The measure was carried by the use of arbitrary powers, and followed by the death of Tiberius at the hands of the patricians, the dominant clan-families. In 132 B.C. Caius Gracchus took up his brother's quarrel, and adopting, it would seem, a large scheme of political and social reform, proposed measures for emigration and for relief. The former failed; the latter apparently were acceptable to all parties, and continued in force long after C. Gracchus had been slain (121 B.C.). Already, at times, there had been sales of corn at cheap prices. Now, by the *lex frumentaria* he gave the citizens—those who had the Roman franchise—the right to purchase corn every month from the public stores at rather more than half-price, 6⅔ *asses* or about 3.3d. the peck. This, the fatal alternative, was accepted, and henceforth there was no possibility of a reversion to better social conditions.

The provisioning of Rome was, like that of Athens, a public service. There were public granaries (267 B.C.), and there was a quaestor to supervise the transit of the corn from Sicily and, later, from Spain and Africa, and an elaborate administration for collecting and conveying it. The *lex frumentaria* of Caius was followed by the *lex Octavia*, restricting the monthly sale to citizens settled in Rome, and to 5 *modii* (1¼ bushels). According to Polybius, the amount required for the maintenance of a slave was 5 *modii* a month, and of a soldier 4. Hence the allowance, if continued at this rate, was practically a maintenance. The *lex Clodia* (58 B.C.) made the corn gratuitous to the *plebs urbana*.

Julius Caesar (5 B.C.) found the number of recipients to be 320,000, and reduced them to 150,000. In Augustus's time they rose to 200,000. There seems, however, to be some confusion as to the numbers. From the *Ancyranum Monumentum* it appears that the *plebs urbana* who received Augustus's dole of 60 *denarii* (37s. 6d.) in his eighth consulship numbered 320,000. And (Suet. *Caes.* 41) it seems likely that in Caesar's time the lists of the recipients were settled by lot; further, probably only those whose property was worth less than 400,000 *sesterces* (£3541) were placed on the lists. It is probable, therefore, that 320,000 represents a maximum, reduced for purposes of administration to a smaller number (*a*) by a property test, and (*b*) by some kind of scrutiny. The names of those certified to receive the corn were exposed on bronze tablets. They were then called *aerarii*. They had tickets (*tesserae*) for purposes of identification, and they received the corn or bread in the time of the republic at the temple of Ceres, and afterwards at steps in the several (14) regions or wards of Rome. Hence the bread was called *panis gradilis*. In the middle of the 2nd century there were state bakeries, and wheaten loaves were baked for the people perhaps two or three times a week. In Aurelian's time (A.D. 270) the flour was of the best, and the weight of the loaf (one *uncia*) was doubled. To the gifts of bread were added pork, oil and possibly wine; clothes also—white tunics with long sleeves—were distributed. In the period after Constantine (cf. *Theod. Code*, xiv. 15) three classes received the bread—the palace people (*palatini*), soldiers (*militares*), and the populace (*populares*). No distribution was permitted except at the steps. Each class had its own steps in the several wards. The bread at one step could not be transferred to another step. Each class had its own supply. There were arrangements for the exchange of stale loaves. Against misappropriation there were (law of Valentinian and Valens) severe penalties. If a public prosecutor (*actor*), a collector of the revenue (*procurator*), or the slave of a senator obtained bread with the cognizance of the clerk, or by bribery, the slave, if his master was not a party to the offence, had to serve in the state bakehouse in chains. If the master were involved, his house was confiscated. If others who had not the right obtained the bread, they and their property were placed at the service of the bakery (*pistrini exercitio subjugari*). If they were poor (*pauperes*) they were enslaved, and the delinquent client was to be put to death.

The right to relief was dependent on the right of citizenship. Hence it became hereditary and passed from father to son. It was thus in the nature of a continuous endowed charity, like the well-known family charity of Smith, for instance, in which a large property was left to the testator's descendants, of whom it was said that as a result no Smith of that family could fail to be poor. But the *annona civica* was an endowed charity, affecting not a single family, but the whole population. Later, when Constantinople was founded, the right to relief was attached to new houses as a premium on building operations. Thus it belonged not to persons only, but also to houses, and became a species of "immovable" property, passing to the purchaser of the house or property, as would the adscript slaves. The bread followed the house (*aedes sequantur annonae*). If, on the transfer of a house, bread claims were lost owing to the absence of claimants, they were transferred to the treasury (*fisci viribus vindicentur*). But the savage law of Valentinian, referred to above, shows to what lengths such a system was pushed. Early in its history the *annona civica* attracted many to Rome in the hope of living there without working. For the 400 years since the *lex Clodia* was enacted constant injury had been done by it, and now (A.D. 364) people had to be kept off the civic bounty as if they were birds of prey, and the very poor man (*pauperrimus*), who had no civic title to the food, if he obtained it by fraud, was enslaved. Thus, in spite of the abundant state relief, there had grown up a class of the very poor, the Gentiles of the state, who were outside the sphere of its ministrations. The *annona civica* was introduced not only into Constantinople, but also into Alexandria, with baleful results, and into Antioch. When Constantinople was founded the corn-ships of Africa sailed there instead of to Rome. On charitable relief, as we shall see, the *annona* has had a long-continued and fatal influence.

1. If the government considers itself responsible for provisioning the people it must fix the price of necessaries, and to meet distress or popular clamour it will lower the price. It becomes thus a large relief society for the supply of corn. In a time of distress, when the corn laws were a matter of moment in England, a similar system was adopted in the well-known Speenhamland scale (1795), by which a larger or lesser allowance was given to a family according to its size and the prevailing price of corn. A maintenance was thus provided for the able-bodied and their families, at least in part, without any equivalent in labour; though in England labour was demanded of the applicant, and work was done more or less perfunctorily. In amount the Roman dole seems to have been equivalent to the allowance provided for a slave, but the citizen received it without having to do any labour task. He received it as a statutory right. There could hardly be a more effective method for degrading his manhood and denaturalizing his family. He was also a voter, and the alms appealed to his weakness and indolence; and the fear of displeasing him and losing his vote kept him, socially, master of the situation, to his own ruin. If in England now relief were given to able-bodied persons who retained their votes, this evil would also attach to it.

2. The system obliged the hard-working to maintain the idlers, while it continually increased their number. The needy teacher in Juvenal, instead of a fee, is put off with a *tessera*, to which, not being a citizen, he has no right. "The foreign reapers," it was said, "filled Rome's belly and left Rome free for the stage and the circus." The freeman had become a slave—"stupid and drowsy, to whom days of ease had become habitual, the games, the circus, the theatre, dice, eating-houses and brothels." Here are all the marks of a degraded pauperism.

3. The system led the way to an ever more extensive slavery. The man who could not live on his dole and other scrapings had the alternative of becoming a slave. "Better have a good master than live so distressfully"; and "If I were free I should live at my own risk; now I live at yours," are the expressions suggestive of the natural temptations of slavery in these conditions. The escaped slaves returned to "their manger." The *annona* did not prevent destitution. It was a half-way house to slavery.

4. The effect on agriculture, and proportionally on commerce generally, was ruinous. The largest corn-market, Rome, was withdrawn from the trade—the market to which all the necessaries of life would naturally have gravitated; and the supply of corn was placed in the hands of producers at a few centres where it could be grown most cheaply—Sicily, Spain and Africa. The Italian farmer had to turn his attention to other produce—the cultivation of the olive and the vine, and cattle and pig rearing. The greater the extension of the system the more impossible was the regeneration of Rome. The Roman citizen might well say that he was out of work, for, so far as the land was concerned, the means of obtaining a living were placed out of his reach. While not yet unfitted for the country by life in the town, he at least could not "return to the land."

5. The method was the outcome of distress and political hopelessness. Yet the rich also adopted it in distributing their private largess. Cicero (*De Off.* ii. 16) writes as though he recognized its evil; but though he expresses his disapprobation of the popular shows upon which the *aediles* spent large sums, he argues that something must be done "if the people demand it, and if good men, though they do not wish it, assent to it." Thus in a guarded manner he approves a distribution of food—a free breakfast in the streets of Rome. One bad result of the *annona* was that it encouraged a special and ruinous form of charitable munificence.

The *sportula* was a form of charity corresponding to the *annona civica*. Charity and poor relief run on parallel lines, and when the one is administered without discrimination, little discrimination will usually be exercised in the other. It was the charity of the patron of the chiefs of the clan-families to their clients. Between them it was natural that a relation, partly hospitable, partly charitable, should grow up. The clients who attended the patron at his house were invited to dine at his table. The patron, as Juvenal describes him, dined luxuriously and in solitary grandeur, while the guests put up with what they could get; or, as was usual under the empire, instead of the dinner (*coena recta*) a present of food was given at the outer vestibule of the house to clients who brought with them baskets (*sportula*) to carry off their food, or even charcoal stoves to keep it warm. There was endless trickery. The patron (or almoner who acted for him) tried to identify the applicant, fearing lest he might get the dole under a false name; and at each mansion was kept a list of persons, male and female, entitled to receive the allowance. "The pilferer grabs the dole" (*sportulam furunculus captat*) was a proverb. The *sportula* was a charity sufficiently important for state regulation. Nero (A.D. 54) reduced it to a payment in money (100 *quadrantes*, about 1s.). Domitian (A.D. 81) restored the custom of giving food. Subsequently both practices—gifts in money and in food—appear to have been continued.

The sportula.

In these conditions the Roman family steadily decayed. Its "old discipline" was neglected; and Tacitus (A.D. 75), in his dialogue on Oratory, wrote (*c.* xxviii.) what might be called its epitaph. Of the general decline the laws of Caesar and Augustus to encourage marriage and to reward the parents of large families are sufficient evidence.

The destruction of the working-class family must have been finally achieved by the imperial control of the *collegia*.

In old Rome there were corporations of craftsmen for common worship, and for the maintenance of the traditions of the craft. These corporations were ruined by slave labour, and becoming secret societies, in the time of Augustus were suppressed. Subsequently they were reorganized, and gave scope for much friendliness. They often existed in connexion with some great house, whose chief was their patron and whose household gods they worshipped. The gilds of the poor, or rather of the lower orders (*collegia tenuiorum*), consisted of artisans and others, and slaves also, who paid monthly contributions to a common fund to meet the expenses of worship, common meals, and funerals. They were not in Italy, it would seem (J. P. Waltzing, *Études histor. sur les corporations professionnelles chez les Romains*, i. 145, 300), though they may have been in Asia Minor and elsewhere, societies for mutual help generally. They were chiefly funeral benefit societies. Under Severus (A.D. 192) the *collegia* were extended and more closely organized as industrial bodies. They were protected and controlled, as in England in the 15th century the municipalities affected the cause of the craft gilds and ended by controlling them. Industrial disorder was thus prevented; the government were able to provide the supplies required in Rome and the large cities with less risk and uncertainty; and the workmen employed in trade, especially the carrying trade, became almost slaves. In the 2nd century, and until the invasions, there were three groups of *collegia*: (1) those engaged in various state manufactures; (2) those engaged in the provision trade; and (3) the free trades, which gradually lapsed into a kind of slavery. If the members of these gilds fled they were brought back by force. Parents had to keep to the trade to which they belonged; their children had to succeed them in it. A slave caste indeed had been formed of the once free workmen.

The collegia.

As a charitable protest against the destruction of children, in the midst of a broken family life, and increasing dependence and poverty, a special institution was founded (to use the Scottish word) for the "alimentation" of the children of citizens, at first by voluntary charity and afterwards by imperial bounty.

Pueri alimentarii.

Nerva and Trajan adopted the plan. Pliny (*Ep.* vii. 18) refers to it. There was a desire to give more lasting and certain help than an allotment of food to parents. A list of children, whose names were on the relief tables at Rome, was accordingly drawn up, and a special service for their maintenance established. Two instances are recorded in inscriptions—one at Velcia, one at Beneventum. The emperor lent money for the purpose at a low percentage—2½ or 5% as against the usual 10 or 12. At Velcia his loan amounted to 1,044,000 *sesterces*—about £8156, and 51 of the local landed proprietors mortgaged land, valued at 13 or 14 million *sesterces*, as security for the debt. The interest on the emperor's money at 5% was paid into the municipal treasury, and out of it the children were relieved. The figures seem small; at Velcia 300 children were assisted, of whom 36 were girls. The annual interest at 5% amounted to nearly £408, which divided among 300 gives about 27s. a head. The figures suggest that the money served as a charitable supplementation of the citizens' relief in direct aid of the children. Apparently the scheme was widely adopted. Curators of high position were the patrons; procurators acted as inspectors over large areas; and *quaestores alimentarii* undertook the local management. Antoninus Pius (A.D. 138), and Marcus Aurelius (A.D. 160), and subsequently Severus (A.D. 192) established these bursaries for children in the names of their wives. In the 3rd century the system fell into disorder. There were large arrears of payments, and in the military anarchy that ensued it came to an end. It is of special interest, as indicating a new feeling of responsibility towards children akin to the humane Stoicism of the Antonines, and an attempt to found, apart from temples or *collegia*, what was in the nature of a public endowed charity.

Part IV.—Jewish and Christian Charity

With Christianity two elements came into fusion, the Jewish and the Greco-Roman. To trace this fusion and its results it is necessary to describe the Jewish system of charity, and to compare it with that of the early Christian church, to note the theory of love or friendship in Aristotle as representing Greek thought, and of charity in St Paul as representing Christian thought, and to mark the Roman influences which moulded the administration of Ambrose and Gregory and Western Christianity generally.

In the early history of the Hebrews we find the family, clan-family and tribe. With the Exodus (probably about 1390 B.C.) comes the law of Moses (cf. Kittel, *Hist. of the Hebrews*, Eng. trans. i. 244), the central and permanent element of Jewish thought. We may compare it to the "commandments" of Hesiod. There is the recognition of the family and its obligations: "Honour thy father and mother"; and honour included help and support. There is also the law essential to family unity: "Thou shalt not commit adultery"; and as to property there is imposed the regulation of desire: "Thou shalt not covet thy neighbour's house." Maimonides (A.D.1135), true to the old conception of the family (x. 16), calls the support of adult children, "after one is exempt from supporting them," and the support of a father or mother by a child, "great acts of charity; since kindred are entitled to the first consideration." To relief of the stranger the Decalogue makes no reference, but in the Hebraic laws it is constantly pressed; and the Levitical law (xix. 18) goes further. It first applies a new standard to social life: "Thou shalt love thy neighbour as thyself." This thought is the outcome of a deep ethical fervour—the element which the Jews brought into the work of charity. In Judges and Joshua, the "Homeric" books of the Old Testament, the Hebrews appear as a passionately fierce and cruel people. Subsequently against their oppression of the poor the prophets protested with a vehemence as great as the evil was intense; and their denunciations remained part of the national literature, a standing argument that life without charity is nothing worth. Thus schooled and afterwards tutored into discipline by the tribulation of the exile (587 B.C.), they turned their fierceness into a zeal, which, as their literature shows, was as fervent in ethics as it was in religion and ceremonial. In the services at the synagogues, which supplemented and afterwards took the place of the Temple, the Commandments were constantly repeated and the Law and the Prophets read; and as the Jews of the Dispersion increased in number, and especially after the destruction of Jerusalem, the synagogues became centres of social and charitable co-operation. Thus rightly would a Jewish rabbi say, "On three things the world is stayed: on the Thorah (or the law), and on worship, and on the bestowal of kindness." Also there was on the charitable side an indefinite power of expansion. Rigid in its ceremonial, there it was free. Within the nation, as the Prophets, and after the exile, as the Psalms show, there was the hope of a universal religion, and with it of a universally recognized charity. St Paul accentuated the prohibitive side of the law and protested against it; but, even while he was so doing, stimulated by the Jewish discipline, he was moving unfettered towards new conceptions of charity and life—

Hebrew charity.

charity as the central word of the Christian life, and life as a participation in a higher existence—the "body of Christ."

To mark the line of development, we could compare—1. The family among the Jews and in the early Christian church; 2. The sources of relief and the tithe, the treatment of the poor and their aid, and the assistance of special classes of poor; 3. The care of strangers; and, lastly, we would consider the theory of almsgiving, friendship or love, and charity.

1. As elsewhere, property is the basis of the family. Wife and children are the property of the father. But the wife is held in high respect. In the post-exilian period the virtuous wife is represented as laborious as a Roman matron, a "lady bountiful" to the poor, and to her husband wife and friend alike. Monogamy without concubinage is now the rule—is taken for granted as right. There is no "exposure of children." The slaves are kindly treated, as servants rather than slaves—though in Roman times and afterwards the Jews were great slave-traders. The household is not allowed to eat the bread of idleness. "Six days," it was said, "*must* [not *mayest*] thou work." "Labour, if poor; but find work, if rich." "Whoever does not teach his son business or work, teaches him robbery." In Job xxxi., a chapter which has been called "an inventory of late Old Testament morality," we find the family life developed side by side with the life of charity. In turn are mentioned the relief of the widow, the fatherless and the stranger—the classification of dependents in the Christian church; and the whole chapter is a justification of the homely charities of a good family. "The Jewish religion, more especially in the old and orthodox form, is essentially a family religion" (C. G. Montefiore, *Religion of Ancient Hebrews*).

In the early documents of the Church the fifth commandment is made the basis of family life (cf. Eph. vi. 1; *Apost. Const.* ii. 32, iv. 11—if we take the first six books of the *Apost. Const.* as a composite production before A.D. 300, representing Judaeo-Christian or Eastern church thought). But two points are prominent. Duties are insisted on as reciprocal (cf. especially St Paul's Epistles), as, *e.g.* between husband and wife, parent and child, master and servant. Charity is mutual; the family is a circle of reciprocal duties and charities. This implies a principle of the greatest importance in relation to the social utility of charity. Further reference will be made to it later. Next the "thou shalt love thy neighbour" is translated from its position as one among many sayings to the chief place as a rule of life. In the *Didachē* or *Teaching of the Twelve Apostles* (Jewish-Christian, *c.* 90-120 A.D.) the first commandment in "the way of life" is adapted from St Matthew's Gospel thus: "First, thou shalt love God who made thee; secondly, thy neighbour as thyself; and all things whatsoever thou wouldst not have done to thee, neither do thou to another." A principle is thus applied which touches all social relations in which the "self" can be made the standard of judgment. Of this also later. To touch on other points of comparison: the earlier documents seem to ring with a reiterated cry for a purer family life (cf. the second, the negative, group of commandments in the *Didachē*, and the judgment of the apocalyptic writings, such as the Revelations of Peter, &c.); and, sharing the Jewish feeling, the riper conscience of the Christian community formulates and accepts the injunction to preserve infant life at every stage. It advocates, indeed, the Jewish purity of family life with a missionary fervour, and it makes of it a condition of church membership. The Jewish rule of labour is enforced (*Ap. Const.* ii. 63). If a stranger settle (*Didachē*, xii. 3) among the brotherhood, "let him work and eat." And the father (*Constit.* iv. 11) is to teach the children "such trades as are agreeable and suitable to their need." And the charities to the widow, the fatherless, are organized on Jewish lines.

2. The sources of relief among the Jews were the three gifts of corn: (1) the corners of the field (cf. Lev. xix. &c.), amounting to a sixtieth part of it; (2) the gleanings, a definite minimum dropped in the process of reaping (Maimonides, *Laws of the Hebrews relating to the Poor*, iv. 1); (3) corn overlooked and left behind. So it was with the grapes and with all crops that were harvested, as opposed, *e.g.* to figs, that were gathered from time to time. These gifts were divisible three times in the day, so as to suit the convenience of the poor (Maim. ii. 17), and the poor had a right to them. They are indeed a poor-rate paid in kind such as in early times would naturally spring up among an agricultural people. Another gift "out of the seed of the earth," is the tithe. In the post-exilian period the septenniad was in force. Each year a fiftieth part of the produce (Maim. vi. 2, and Deut. xviii. 4) was given to the priest (the class which in the Jewish state was supported by the community). Of the remainder one-tenth went to the Levite, and one-tenth in three years of the septennium was retained for pilgrimage to Jerusalem, in two given to the poor. In the seventh year "all things were in common." Supplementing these gifts were alms to all who asked; "and he who gave less than a tenth of his means was a man of evil eye" (Maim. vii. 5). All were to give alms, even the poor themselves who were in receipt of relief. Refusal might be punished with stripes at the hand of the Sanhedrim. At the Temple alms for distribution to the worthy poor were placed by worshippers in the cell of silence; and it is said that in Palestine at meal times the table was open to all comers. As the synagogues extended, and possibly after the fall of Jerusalem (A.D. 70), the collections of alms was further systematized. There were two collections. In each city alms of the box or chest (*kupha*) were collected for the poor of the city on each Sabbath eve (later, monthly or thrice a year), and distributed in money or food for seven days. Two collected, three distributed. Three others gathered and distributed daily alms of the basket (*tamchui*). These were for strangers and wayfarers—casual relief "for the poor of the whole world." In the Jewish synagogue community from early times the president (*parnass*) and treasurer were elected annually with seven heads of the congregation (see Abraham's *Jewish Life in the Middle Ages*, p. 54), and sometimes special officers for the care of the poor. A staff of almoners was thus forthcoming. In addition to these collections were the *pruta* given to the poor before prayers (Maim. x. 15), and moneys gathered to help particular cases (cf. *Jewish Life*, p. 322) by circular letter. There were also gifts at marriages and funerals; and fines imposed for breach of the communal ordinances were reserved for the poor. The distinctive feature of the Jewish charity was the belief that "the poor would not cease out of the land," and that therefore on charitable grounds a permanent provision should be made for them—a poor-rate, in fact, subject to stripes and distraint, if necessary (Maim. vii. 10; and generally cf. articles on "Alms" and "Charity" in the *Jewish Encyclopaedia*).

If we compare this with the early church we find the following sources of relief: (1) The Eucharistic offerings, some consumed at the time, some carried home, some reserved for the absent (see Hatch, *Early Church*, p. 40). The ministration, like the Eucharist, was connected with the love feast, and was at first daily (Acts ii. 42, vi. 1, and the *Didachē*). (2) Freewill offerings and first-fruits and voluntary tithes (*Ap. Con.* ii. 25) brought to the bishop and used for the poor—orphans, widows, the afflicted and strangers in distress, and for the clergy, deaconesses, &c. (3) Collections in churches on Sundays and week-days, alms-boxes and gifts to the poor by worshippers as they entered church; also collections for special purposes (cf. for Christians at Jerusalem). Apart from "the corners," &c., the sources of relief in the Christian and Jewish churches are the same. The separate Jewish tithe for the poor, which (Maim. vi. 11, 13) might be used in part by the donor as personal charity, disappears. A voluntary tithe remains, in part used for the poor. We do not hear of stripes and distraint, but in both bodies there is a penitential system and excommunication (cf. *Jewish Life*, p. 52), and in both a settlement of disputes within the body (Clem. *Hom.* iii. 67). In both, too, there is the abundant alms provided in the belief of the permanence of poverty and the duty of giving to all who ask. As to administration in the early church (Acts vi. 3), we find seven deacons, the number of the local Jewish council; and later there were in Rome seven ecclesiastical relief districts, each in charge of a deacon. The deacon acted as the minister of the bishop (*Ep.* Clem. to Jam. xii.), reporting to him and giving as he dictated (*Ap. Con.* ii. 30, 31). He at first combined disciplinary powers with charitable. The presbyters also (Polycarp, *Ad Phil.* 6, A.D. 69–155), forming (Hatch, p. 69) a kind of bishop's council, visited the sick, &c. The bishop was president and treasurer. The bishop was thus the trustee of the poor. By reason of the churches' care of orphans, responsibilities of trusteeship also

devolved on him. The temples were in pagan times depositories of money. Probably the churches were also.

3. Great stress is laid by the Jews on the duty of gentleness to the poor (Maim. x. 5). The woman was to have first attention (Maim. vi. 13). If the applicant was hungry he was to be fed, and then examined to learn whether he was a deceiver (Maim. vii. 6). Assistance was to be given according to the want—clothes, household things, a wife or a husband—and according to the poor man's station in life. For widows and orphans the "gleanings" were left. Both are the recognized objects of charity (Maim. x. 16, 17). "The poor and the orphan were to be employed in domestic affairs in preference to servants." The dower was a constant form of help. The ransoming of slaves took precedence of relief to the poor. The highest degree of alms-deed (Maim. x. 7) was "to yield support to him who is cast down, either by means of gifts, or by loan, or by commerce, or by procuring for him traffic with others. Thus his hand becometh strengthened, exempt from the necessity of soliciting succour from any created being."

If we compare the Christian methods we find but slight difference. The absoluteness of "Give to him that asketh" is in the *Didachē* checked by the "Woe to him that receives: for if any receives having need, he shall be guiltless, but he that has no need shall give account, . . . and coming into distress . . . he shall not come out thence till he hath paid the last farthing." It is the duty of the bishop to know who is most worthy of assistance (*Ap. Con.* ii. 3, 4); and "if any one is in want by gluttony, drunkenness, or idleness, he does not deserve assistance, or to be esteemed a member of the church." The widow assumes the position not only of a recipient of alms, but a church worker. Some were a private charge, some were maintained by the church. The recognized "widow" was maintained: she was to be sixty years of age (cf. 1 Tim. v. 9 and *Ap. Con.* iii. 1), and was sometimes tempted to become a bedeswoman and gossipy pauper, if one may judge from the texts. Remarriage was not approved. Orphans were provided for by members of the churches. The virgins formed another class, as, contrary to the earlier feeling, marriage came to be held a state of lesser sanctity. They too seem to have been also, in part at least, church workers. Thus round the churches grew up new groups of recognized dependents; but the older theory of charity was broad and practical—akin to that of Maimonides. "Love all your brethren, performing to orphans the part of parents, to widows that of husbands, affording them sustenance with all kindliness, arranging marriages for those who are in their prime, and for those who are without a profession the means of necessary support through employment: giving work to the artificer and alms to the incapable" (*Ep.* Clem. to James viii.).

4. The Jews in pre-Christian and Talmudic times supported the stranger or wayfarer by the distribution of food (*tamchui*); the strangers were lodged in private houses, and there were inns provided at which no money was taken (cf. *Jewish Life*, p. 314). Subsequently, besides these methods, special societies were formed "for the entertainment of the resident poor and of strangers." There were commendatory letters also. These conditions prevailed in the Christian church also. The *Xenodocheion*, coming by direct succession alike from Jewish and Greek precedents, was the first form of Christian hospital both for strangers and for members of the Christian churches. In the Christian community the endowment charity comes into existence in the 4th century, among the Jews not till the 13th. The charities of the synagogue without separate societies sufficed.

Greek, Jewish and Christian thought.

We may now compare the conceptions of Jews and Christians on charity with those of the Greeks. There are two chief exponents of the diverse views—Aristotle and St Paul; for to simplify the issues we refer to them only. Thoughts such as Aristotle's, recast by the Stoic Panaetius (185–112 B.C.), and used by Cicero in his *De Officiis*, became in the hands of St Ambrose arguments for the direction of the clergy in the founding of the mediæval church; and in the 13th century Aristotle reasserts his influence through such leaders of mediæval thought as St Thomas Aquinas. St Paul's chapters on charity, not fully appreciated and understood, one is inclined to think, have perhaps more than any other words prevented an absolute lapse into the materialism of almsgiving. After him we think of St Francis, the greatest of a group of men who, seeking reality in life, revived charity; but to the theory of charity it might almost be said that since Aristotle and St Paul nothing has been added until we come to the economic and moral issues which Dr Chalmers explained and illustrated.

The problem turns on the conception (1) of purpose, (2) of the self, and (3) of charity, love or friendship as an active force in social life. To the Greek, or at least to Greek philosophic thought, purpose was the measure of goodness. To have no purpose was, so far as the particular act was concerned, to be simply irrational; and the less definite the purpose the more irrational the act. This conception of purpose was the touchstone of family and social life, and of the civic life also. In no sphere could goodness be irrational. To say that it was without purpose was to say that it was without reality. So far as the actor was concerned, the main purpose of right action was the good of the soul (ψυχή); and by the soul was meant the better self, "the ruling part" acting in harmony with every faculty and function of the man. With faculties constantly trained and developed, a higher life was gradually developed in the soul. We are thus, it might be said, what we become. The gates of the higher life are within us. The issue is whether we will open them and pass in.

Consistent with this is the social purpose. Love or friendship is not conceived by Aristotle except in relation to social life. Society is based on an interchange of services. This interchange in one series of acts we call justice; in another friendship or love. A man cannot be just unless he has acquired a certain character or habit of mind; and hence no just man will act without knowledge, previous deliberation and definite purpose. So also will a friend fulfil these conditions in his acts of love or friendship. In the love existing between good men there is continuance and equality of service; but in the case of benefactor and benefited, in deeds of charity, in fact, there is no such equality. The satisfaction is on one side but often not on the other. (The dilemma is one that is pressed, though not satisfactorily, in Cicero and Seneca.) The reason for this will be found, Aristotle suggests, in the feeling of satisfaction which men experience in action. We realize ourselves in our deeds—throw ourselves into them, as people say; and this is happiness. What we make we like: it is part of us. On the other hand, in the person benefited there may be no corresponding action, and in so far as there is not, there is no exchange of service or the contentment that arises from it. The "self" of the recipient is not drawn out. On the contrary, he may be made worse, and feel the uneasiness and discontent that result from this. In truth, to complete Aristotle's argument, the good deed on one side, as it represents the best self of the benefactor, should on the other side draw out the best self of the person benefited. And where there is not ultimately this result, there is not effective friendship or charity, and consequently there is no personal or social satisfaction. The point may be pushed somewhat further. In recent developments of charitable work the term "friendly visitor" is applied to persons who endeavour to help families in distress on the lines of associated charity. It represents the work of charity in one definite light. So far as the relation is mutual, it cannot at the outset be said to exist. The charitable friend wishes to befriend another; but at first there may be no reciprocal feeling of friendship on the other's part—indeed, such a feeling may never be created. The effort to reciprocate kindness by becoming what the friend desires may be too painful to make. Or the two may be on different planes, one not really befriending, but giving without intelligence, the other not really endeavouring to change his nature, but receiving help solely with a view to immediate advantage. The would-be befriender may begin "despairing of no man," expecting nothing in return; but if, in fact, there is never any kind of return, the friendship actually fails of its purpose, and the "friend's" satisfaction is lost, except in that he may "have loved much." In any case,

according to this theory friendship, love and charity represent the mood from which spring social acts, the value of which will depend on the knowledge, deliberation and purpose with which they are done, and accordingly as they acquire value on this account will they give lasting satisfaction to both parties.

St Paul's position is different. He seems at first sight to ignore the state and social life. He lays stress on motive force rather than on purpose. He speaks as an outsider to the state, though technically a citizen. His mind assumes towards it the external Judaic position, as though he belonged to a society of settlers (πάροικοι). Also, as he expects the millennium, social life and its needs are not uppermost in his thoughts. He considers charity in relation to a community of fellow-believers—drawn together in congregations. His theory springs from this social base, though it over-arches life itself. He is intent on creating a spiritual association. He conceives of the spirit (πνεῦμα) as "an immaterial personality." It transcends the soul (ψυχή), and is the Christ life, the ideal and spiritual life. Christians participate in it, and they thus become part of "the body of Christ," which exists by virtue of love—love akin to the ideal life, ἀγάπη. The word represents the love that is instinct with reverence, and not love (φιλία) which may have in it some quality of passion. This love is the life of "the body of Christ." Therefore no act done without it is a living act—but, on the contrary, must be dead—an act in which no part of the ideal life is blended. On the individual act or the purpose no stress is laid. It is assumed that love, because it is of this intense and exalted type, will find the true purpose in the particular act. And, when the expectation of the millennium passed away, the theory of this ideal charity remained as a motive force available for whatever new conditions, spiritual or social, might arise. Nevertheless, no sooner does this charity touch social conditions, than the necessity asserts itself of submitting to the limitations which knowledge, deliberation and purpose impose. This view had been depreciated or ignored by Christians, who have been content to rely upon the strength of their motives, or perhaps have not realized what the Greeks understood, that society was a natural organism (Arist. *Pol.* 1253A), which develops, fails or prospers in accordance with definite laws. Hence endless failure in spite of some success. For love, whether we idealize it as ἀγάπη or consider it a social instinct as φιλία, cannot be love at all unless it quickens the intelligence as much as it animates the will. It cannot, except by some confusion of thought, be held to justify the indulgence of emotion irrespective of moral and social results. Yet, though this fatal error may have dominated thought for a long time, it is hardly possible to attribute it to St Paul's theory of charity when the very practical nature of Judaism and early Christianity is considered. In his view the misunderstanding could not arise. And to create a world or "body" of men and women linked together by love, even though it be outside the normal life of the community, was to create a new form of religious organization, and to achieve for it (so far as it was achieved) what, *mutatis mutandis*, Aristotle held to be the indispensable condition of social life; friendship (φιλία), "the greatest good of states," for "Socrates and all the world declare," he wrote, that "the unity of the state" is "created by friendship" (Arist. *Pol.* ii. 1262 b).

It should, however, be considered to what extent charity in the Christian church was devoid of social purpose. (1) The Jewish conceptions of charity passed, one might almost say, in their completeness into the Christian church. Prayer, the petition and the purging of the mind, fasting, the humiliation of the body, and alms, as part of the same discipline, the submissive renunciation of possessions—all these formed part of the discipline that was to create the religious mood. Alms henceforth become a definite part of the religious discipline and service. Humility and poverty hereafter appear as yoked virtues, and many problems of charity are raised in regard to them. The non-Christian no less than the Christian world appreciated more and more the need of self-discipline (ἄσκησις); and it seems as though in the first two centuries A.D. those who may have thought of reinvigorating society searched for the remedy rather in the preaching and practice of temperance than in the application of ideas that were the outcome of the observation of social or economic conditions. Having no object of this kind as its mark, almsgiving took the place of charity, and, as Christianity triumphed, the family life, instead of reviving, continued to decay, while the virtues of the discipline of the body, considered apart from social life, became an end in themselves, and it was desired rather to annihilate instinct than to control it. Possibly this was a necessary phase in a movement of progress, but however that be, charity, as St Paul understood it, had in it no part. (2) But the evil went farther. Jewish religious philosophy is not elaborated as a consistent whole by any one writer. It is rather a miscellany of maxims; and again and again, as in much religious thought, side issues assume the principal place. The direct effect of the charitable act, or almsgiving, is ignored. Many thoughts and motives are blended. The Jews spoke of the poor as the means of the rich man's salvation. St Chrysostom emphasizes this: "If there were no poor, the greater part of your sins would not be removed: they are the healers of your wounds" (*Hom.* xiv., Timothy, &c., St Cyprian on works and alms). Alms are the medicine of sin. And the same thought is worked into the penitential system. Augustine speaks of "penance such as fasting, almsgiving and prayer for breaches of the Decalogue" (Reichel, *Manual of Canon Law*, p. 23); and many other references might be cited. "Pecuniary penances (*Ib.* 154), in so far as they were relaxations of, or substitutes for, bodily penances, were permitted because of the greater good thereby accruing to others" (and in this case they were—A.D. 1284—legally enforceable under English statute law). The penitential system takes for granted that the almsgiving is good for others and puts a premium on it, even though in fact it were done, not with any definite object, but really for the good of the penitent. Thus almsgiving becomes detached from charity on the one side and from social good on the other. Still further is it vulgarized by another confusion of thought. It is considered that the alms are paid to the credit of the giver, and are realized as such by him in the after-world; or even that by alms present prosperity may be obtained, or at least evil accident avoided. Thus motives were blended, as indeed they now are, with the result that the gift assumed a greater importance than the charity, by which alone the gift should have been sanctified, and its actual effect was habitually overlooked or treated as only partially relevant.

(3) The Christian maxim of "loving (ἀγάπη) one's neighbour as one's self" sets a standard of charity. Its relations are idealized according as the "self" is understood; and thus the good self becomes the measure of charity. In this sense, the nobler the self the completer the charity; and the charity of the best men, men who love and understand their neighbours best, having regard to their chief good, is the best, the most effectual charity. Further, if in what we consider "best" we give but a lesser place to social purpose or even allow it no place at all, our "self" will have no sufficient social aim and our charity little or no social result. For this "self," however, religion has substituted not St Paul's conception of the spirit (πνεῦμα), but a soul, conceived as endowed with a substantial nature, able to enjoy and suffer quasi-material rewards and punishments in the after-life; and in so far as the safeguard of this soul by good deeds or almsgiving has become a paramount object, the purpose of charitable action has been translated from the actual world to another sphere. Thus, as we have seen, the aid of the poor has been considered not an object in itself, but as a means by which the almsgiver effects his own ulterior purpose and "makes God his debtor." The problem thus handled raises the question of reward and also of punishment. Properly, from the point of view of charity, both are excluded. We may indeed act from a complexity of motives and expect a complexity of rewards, and undoubtedly a good act does refresh the "self," and may as a result, though not as a reward, win approval. But in reality reward, if the word be used at all, is according to purpose; and the only reward of a deed lies in the fulfilment of its purpose. In the theory of almsgiving which we are discussing, however, act and reward are on different planes. The reward is on that of a future life; the act related to a distressed person here and now. The interest in the act on the doer's part lies in its post-mortal consequences to himself, and not either wholly or chiefly in the act itself. Nor, as the interest ends with the act—the giving—can the intelligence be quickened by it. The questions "How? by whom? with what object? on what plan? with what result?" receive no detailed consideration at all. Two general results follow. In so far as it is thus practised, almsgiving is out of sympathy with social progress. It is indeed alien to it. Next also the self-contained, self-sustained poverty that will have no relief and does without it, is outside the range of its thought and understanding. On the other hand, this almsgiving is equally incapable of influencing the weak and the vicious; and those who are suffering from illness or trouble it has not the width of vision to understand nor the moral energy to support so that they shall not fall out of the ranks of the self-supporting. It believes that "the poor" will not cease out of the land. And indeed, however great might be the economic progress of the people, it is not likely that the poor will cease, if the alms given in this spirit be large enough in amount to affect social conditions seriously one way or the other. When we measure the effects of charity, this inheritance of divided thought and inconsistent counsels must be given its full weight.

The sub-apostolic church was a congregation, like a synagogue, the centre of a system of voluntary and personal relief, connected

with the congregational meals (or ἀγάπαι) and the Eucharist, and under the supervision of no single officer or bishop. Out of this was developed a system of relief controlled by a bishop, who was assisted chiefly by deacons or presbyters, while the ἀγάπαι, consisting of offerings laid before the altar, still remained. Subsequently the meal was separated from the sacrament, and became a dole of food, or poor people's meal—*e.g.* in St Augustine's time in western Africa—and it was not allowed to be served in churches (A.D. 391). As religious asceticism became dominant, the sacrament was taken fasting; it appeared unseemly that men and women should meet together for such purposes, and the ἀγάπαι fell out of repute. Simultaneously it would seem that the parish (παροικία) became from a congregational settlement a geographical area.

The organization of the parish and endowed charities.

The organization of relief at Rome illustrates both a type of administration and a transition. St Gregory's reforms (A.D. 590) largely developed it. The first factor in the transition was the church fund of the second period of Christianity, about A.D. 150 to after 208 (Tertullian, *Apol.* 39). It served as a friendly fund, was supported by voluntary gifts, and was used to succour and to bury the poor, to help destitute and orphaned children, old household slaves and those who suffered for the faith. This fund is quite different from the *collegia tenuiorum* or *funeratica* of the Romans, which were societies to which the members paid stipulated sums at stated periods, for funeral benefits or for common meals (J. P. Waltzing, *Corporations professionnelles chez les Romains*, i. 313). It represents the charitable centre round which the parochial system developed. That system was adopted probably about the middle of the 3rd century, but in Rome the diaconate probably remained centralized. At the end of the 4th century Pope Anastasius had founded deaconries in Rome, and endowed them largely "to meet the frequent demands of the diaconate." Gregory two hundred years later reorganized the system. He divided the fourteen old "regions" into seven ecclesiastical districts and thirty "titles" (or parishes). The parishes were under the charge of sixty-six priests; the districts were elecmosynary divisions. Each was placed under the charge of a deacon, not (Greg. *Ep.* xi. and xxviii.) under the priests (*presbyteri titularii*). Over the deacons was an archdeacon. It was the duty of the deacons to care for the poor, widows, orphans, wards, and old people of their several districts. They inquired in regard to those who were relieved, and drew up under the guidance of the bishop the register of poor (*matricula*). Only these received regular relief. In each district was an hospital or office for alms, of which the deacon had charge, assisted by a steward (or *oeconomus*). Here food was given and meals were taken, the sick and poor were maintained, and orphan or foundling children lodged. The churches of Rome and of other large towns possessed considerable estates, "the patrimony of the patron saints," and to Rome belonged estates in Sicily which had not been ravaged by the invaders, and they continued to pay to it their tenth of corn, as they had done since Sicily was conquered. Four times a year (Milman, *Lat. Christ.* ii. 117) the shares of the (1) clergy and papal officers, (2) churches and monasteries, and (3) "hospitals, deaconries and ecclesiastical wards for the poor," were calculated in money and distributed; and the first day in every month St Gregory distributed to the poor in kind corn, wine, cheese, vegetables, bacon, meal, fish and oil. The sick and infirm were superintended by persons appointed to inspect every street. Before the pope sat down to his own meal a portion was separated and sent out to the hungry at his door. The Roman *plebs* had thus become the poor of Christ (*pauperes Christi*), and under that title were being fed by *civica annona* and *sportula* as their ancestors had been; and the deaconries had superseded the "regions" and the "steps" from which the corn had been distributed. The *hospitium* was now part of a common organization of relief, and the sick were visited according to Jewish and early Christian precedent. How far kindly Romans visited the sick of their day we do not know. Alms and the *annona* were now, it would seem, administered concurrently; and there was a system of poor relief independent of the churches and their alms (unless these, organized, as in Scottish towns, on the ancient ecclesiastical lines, were paid wholly or in part to a central diaconate fund). Much had changed, but in much Roman thought still prevailed.

On lines similar to these the organization of poor relief in the middle ages was developed. In the provinces in the later empire the senate or *ordo decurionum* were responsible for the public provisioning of the towns (Fustel de Coulanges, *La Gaule romaine*, p. 251), and no doubt the care of the poor would thus in some measure devolve on them in times of scarcity or distress. On the religious side, on the other hand, the churches would probably be constant centres of almsgiving and relief; and then, further, when the Roman municipal system had decayed, each citizen (as in Charlemagne's time, 742–814) was required to support his own dependants—a step suggestive of much after-history.

The change in sentiment and method could hardly be more strongly marked than by a comparison of "the *Teaching*" with St Ambrose's (334-397) "Duties of the Clergy" (*De Officiis Ministrorum*). For the old instinctive obedience to a command there is now an endeavour to find a reasoned basis for charitable action. Pauperism is recognized. "Never was the greed of beggars greater than it is now. . . . They want to empty the purses of the poor, to deprive them of the means of support. Not content with a little, they ask for more. . . . With lies about their lives they ask for further sums of money." "A method in giving is necessary." But in the suggestions made there is little consistency. Liberality is urged as a means of gaining the love of the people; a new and a false issue is thus raised. The relief is neither to be "too freely given to those who are unsuitable, nor too sparingly bestowed upon the needy." Everywhere there is a doctrine of the mean reflected through Cicero's *De Officiis*, the doctrine insufficiently stated, as though it were a mean of quantity, and not that rightly tempered mean which is the harmony of opposing moods. The poor are not to be sent away empty. Those rejected by the church are not to be left to the "outer darkness" of an earlier Christianity. They must be supplied if they are in want. The methodic giver is "hard towards none, but is free towards all." Consequently none are refused, and no account is taken of the regeneration that may spring up in a man from the effort towards self-help which refusal may originate. Thus after all it appears that method means no more than this—to give sometimes more, sometimes less, to all needy people. In the small congregational church of early Christianity, each member of which was admitted on the conditions of strictest discipline, the common alms of the faithful could hardly have done much harm within the body, even though outside they created and kept alive a horde of vagrant alms-seekers and pretenders. Now in this department at least the church had become the state, and discipline and a close knowledge of one's fellow-Christians no longer safeguarded the alms. From Cicero is borrowed the thought of "active help," which "is often grander and more noble," but the thought is not worked out. From the social side the problem is not understood or even stated, and hence no principle of charity or of charitable administration is brought to light in the investigation. Still there are rudiments of the economics of charity in the praise of Joseph, who made the people *buy* the corn, for otherwise "they would have given up cultivating the soil; for he who has the use of what is another's often neglects his own." Perhaps, as St Augustine inspired the theology of the middle ages, we may say that St Ambrose, in the mingled motives, indefiniteness, and kindliness of this book, stands for the charity of the middle ages, except in so far as the movement which culminated in the brotherhood of St Francis awakened the intelligence of the world to wider issues.

In Constantinople the pauperism seems to have been extreme. The corn supplies of Africa were diverted there in great part when it became the capital of the empire. This must have left to Rome a larger scope for the development of the civic-religious administration of relief. St Chrysostom's sermons give no impression of the rise of any new administrative force, alike sagacious and dominant. The appeal to give alms is constant, but the positive counsel on charitable work is *nil*. The people had the *annona civica*, and imperial gifts, corn, allowances (*salaria*) from the treasury granted for the poor and needy, and an annual gift of 50 gold pounds (rather more than £1400) for funerals. Besides these there were many institutions, and the begging and the almsgiving at the church doors. "The land could not support the lazy and valiant beggars." There were public works provided for them; if they refused to work on them they were to be driven away. The sick might visit the capital, but must be registered and sent back (A.D. 382); the sturdy beggar was condemned to slavery. So little did alms

effect. And in the East monasticism seems to have produced no firmness of purpose such as led to the organization of the church and of charitable relief under St Gregory.

Another movement of the Byzantine period was the establishment of the endowed charity. The Jewish synagogue long served as a place for the reception of strangers—a religious ξενοδοχεῖον. Probably the strangers referred to in "the *Teaching*" were so entertained. The table of the bishop and a room in his house served as the guest-chamber, for which afterwards a separate building was instituted. In the East the Jewish charitable inn first appears, and there took place the earliest extension of institutions. There was probably a demand for an elaboration of institutions as social changes made themselves felt in the churches. We have seen this in the case of the ἀγάπη. Similar changes would affect other branches of charitable work. The hospital (*hospitalium*, ξενοδοχεῖον) is defined as a "house of God in which strangers who lack hospitality are received" (Suicerus, *Thesaur.*), a home separated from the church; and round the church, out of the primitive ξενοδοχεῖον of early Christian times and the entertainment of strangers at the houses of members of the community, would grow up other similar charities. In A.D. 321 licence was given by Constantine to leave property to the Church. The churches were thus placed in the same position as pagan temples, and though subsequently Valentinian (A.D. 379) withdrew the permission on account of the shameless legacy-hunting of the clergy, in that period much must have been done to endow church and charitable institutions. In the same period grew to its height the passion for monasticism. This affected the parish and the endowed charity alike. Under its influence the deacon as an almoner tends to disappear, except where, as in Rome, there is an elaborate system of relief. Nor does it seem that deaconesses, widows, and virgins continued to occupy their old position as church workers and alms-receivers. Naturally when marriage was considered "in itself an evil, perhaps to be tolerated, but still degrading to human nature," and (A.D. 385) the marriage of the clergy was prohibited, men, except those in charge of parishes, and women would join regular monastic bodies; the deacon, as almoner, would disappear, and the "widows" and virgins would become nuns. Thus there would grow up a large body of men and women living segregated in institutions, and forming a leisured class able to superintend institutional charities. And now two new officers appear, the *eleemosynarius* or almoner and the *oeconomus* or steward (already an assistant treasurer to the bishop), who superintend and distribute the alms and manage the property of the institution. (In the first six books of the *Apost. Constit.*, A.D. 300, these officers are not mentioned.) In these circumstances the *hospitium* or hospital (ξενών, καταγώγιον) assumes a new character. It becomes in St Basil's hands (A.D. 330–379) a resort not only for those who "visit it from time to time as they pass by, but also for those who need some treatment in illness." And round St Basil at Caesarea there springs up a colony of institutions. Four kinds principally are mentioned in the Theodosian code: (1) the guest-houses (ξενοδοχεῖα); (2) the poor-houses (πτωχεῖα), where the poor (*mendici*) were housed and maintained (the πτωχεῖον was a general term also applied to all houses for the poor, the aged, orphans and sick); (3) there were orphanages (ὀρφανοτροφεῖα) for orphans and wards; and (4) there were houses for infant children (βρεφοτροφεῖα). Thus a large number of endowed charities had grown up. This new movement it is necessary to consider in connexion with the law relating to religious property and bequests, in its bearing on the rule of the monasteries, and in its effect on the family.

The sacred property (*res sacra*) of Roman law consisted of things dedicated to the gods by the pontiff with the approval of the civil authority, in turn, the people, the senate and the emperor. Things so consecrated were inalienable. Apart from this in the empire, the municipalities as they grew up were considered "juristic persons" who were entitled to receive and hold property. In a similar position were authorized *collegia*, amongst which were the mutual aid societies referred to above. Christians associated in these societies would leave legacies to them. Thus (W. M. Ramsay, *Cities and Bishoprics of Phrygia*, I. i. 119) an inscription mentions a bequest (possibly by a Christian) to the council (συνέδριον) of the presidents of the dyers in purple for a ceremonial, on the condition that, if the ceremony be neglected, the legacy shall become the property of the gild for the care of nurslings; and in the same way a bequest is left in Rome (Orelli 4420) for a memorial sacrifice, on the condition that, if it be not performed, double the cost be paid to the treasury of the corn-supply (*fisco stationis annonae*). No unauthorized *collegia* could receive a legacy. "The law recognized no freedom of association." Nor could any private individual create a foundation with separate property of its own. Property could only be left to an authorized juristic person, being a municipality or a *collegium*. But as the problem of poverty was considered from a broader standpoint, there was a desire to deal with it in a more permanent manner than by the *annona civica*. The *pueri alimentarii* (see above) were considered to hold their property as part of the *fiscus* or property of the state. Pliny (*Ep.* vii. 18), seeking a method of endowment, transferred property in land to the steward of public property, and then took it back again subject to a permanent charge for the aid of children of freemen. By the law of Constantine and subsequent laws no such devices were necessary. Widows or deaconesses, or virgins dedicated to God, or nuns (A.D. 455), could leave bequests to a church or memorial church (*martyrum*), or to a priest or a monk, or to the poor in any shape or form, in writing or without it. Later (A.D. 475) donations of every kind, "to the person of any martyr, or apostle, or prophet, or the holy angels," for building an oratory were made valid, even if the building were promised only and not begun; and the same rule applied to infirmaries (νοσοκομεῖα) and poor-houses (πτωχεῖα)—the bishop or steward being competent to appear as plaintiff in such cases. Later, again (A.D. 528), contributions of 50 solidi (say about £19, 10s.) to a church, hostel (ξενοδοχεῖον), &c., were made legal, though not registered; while larger sums, if registered, were also legalized. So (A.D. 529) property might be given for "churches, hostels, poor-houses, infant and orphan homes, and homes for the aged, or any such community" (*consortium*), even though not registered, and such property was free from taxation. The next year (530) it was enacted that prescription even for 100 years did not alienate church and charitable property. The broadest interpretation was allowed. If by will a share of an estate was left "to Christ our Lord," the church of the city or other locality might receive it as heir; "let these, the law says, belong to the holy churches, so that they may become the alimony of the poor." It was sufficient to leave property to the poor (*Corpus Juris Civilis*, ed. Krueger, 1877, ii. 25). The bequest was legal. It went to the legal representative of the poor—the church. Charitable property was thus church property. The word "alms" covered both. It was given to pious uses, and as a kind of public institution "shared that corporate capacity which belonged to all ecclesiastical institutions by virtue of a general rule of law." On a *pia causa* it was not necessary to confer a juristic personality. Other laws preserved or regulated alienation (A.D. 477, A.D. 530), and checked negligence or fraud in management. The clergy had thus become the owners of large properties, with the *coloni* and slaves upon the estates and the allowances of civic corn (*annona civica*); and (A.D. 357) it was stipulated that whatever they acquired by thrift or trading should be used for the service of the poor and needy, though what they acquired from the labour of their slaves in the labour houses (*ergastula*) or inns (*tabernae*) might be considered a profit of religion (*religionis lucrum*).

Thus grew up the system of endowed charities, which with certain modifications continued throughout the middle ages, and, though it assumed different forms in connexion with gilds and municipalities, in England it still retains, partially at least, its relation to the church. It remained the system of institutional relief parallel to the more personal almsgiving of the parish.

Monasticism, in acting on men of strong character, endowed them with a double strength of will, and to men like St Gregory it seemed to give back with administrative power the relentless firmness of the Roman. In the East it produced the turbulent soldiery of the church, in the West its missionaries; and each mission-monastery was a centre of relief. But whatever the services monasticism rendered, it can hardly be said to have furthered true charity from the social standpoint, though out of regard to some of its institutional work we may to a certain degree qualify this judgment. The movement was almost of necessity in large measure anti-parochial, and thus out of sympathy with the charities of the parish, where personal relations with the poor at their homes count for most.

The good and evil of it may be weighed. Monasticism working through St Augustine helped the world to realize the mood of love as the real or eternal life. Of the natural life of the world and its responsibilities, through which that mood would have borne its completest fruit, it took but little heed, except in so far as, by creating a class possessed of leisure, it created able scholars, lawyers

and administrators, and disciplined the will of strong men. It had no power to stay the social evils of the day. Unlike the friars, at their best the monks were a class apart, not a class mixed up with the people. So were their charities. The belief in poverty as a fixed condition—irretrievable and ever to be alleviated without any regard to science or observation, subjected charity to a perpetual stagnation. Charity requires belief in growth, in the sharing of life, in the utility and nobility of what is done here and now for the hereafter of this present world. Monasticism had no thought of this. It was based on a belief in the evil of matter; and from that root could spring no social charity. Economic difficulties also fostered monasticism. Gold was appreciated in value, and necessaries were expensive, and the cost of maintaining a family was great. It was an economy to force a son or a brother into the church. The population was decreasing; and in spite of church feeling Marjorian (A.D. 461) had to forbid women from taking the veil before forty, and to require the remarriage of widows, subject to a large forfeit of property (Hodgkin, *Italy and her Invaders*, ii. 420). Monasticism was inconsistent with the social good. As to the family—like the moderns who depreciate thrift and are careless of the life of the family, the monks, believing that marriage was a lower form of morality, if not indeed, as would at times appear, hardly moral at all, could feel but little enthusiasm for what is socially a chief source of health to the community and a well-spring of spontaneous charitable feeling. By the sacerdotal-monastic movement the moralizing force of Christianity was denaturalized. Among the secular clergy the falsity of the position as between men and women revealed itself in relations which being unhallowed and unrecognized became also degrading. But worse than all, it pushed charity from its pivot. For this no monasteries or institutions, no domination of religious belief, could atone. The church that with so fine an intensity of purpose had fostered chastity and marriage was betraying its trust. It was out of touch with the primal unit of social life, the child-school of dawning habits and the loving economy of the home. It produced no treatise on economy in the older Greek sense of the word. The home and its associations no longer retained their pre-eminence. In the extreme advocacy of the celibate state, the honourable development of the married life and its duties were depreciated and sometimes, one would think, quite forgotten.

We may ask, then, What were the results of charity at the close of the period which ends with St Gregory and the founding of the medieval church?—for if the charity is reflected in the social good the results should be manifest. Economic and social conditions were adverse. With lessened trade the middle class was decaying (Dill, *Roman Society in the Last Century of the Western Empire*, p. 204) and a selfish aristocracy rising up. Municipal responsibility had been taxed to extinction. The public service was corrupt.. The rich evaded taxation, the poor were oppressed by it. There were laws upon laws, endeavours to underpin the framework of a decaying society. Society was bankrupt of skill—and the skill of a generation has a close bearing on its charitable administration. While hospitals increased, medicine was unprogressive. There were miserable years of famine and pestilence, and constant wars. The care of the poorer classes, and ultimately of the people, was the charge of the church. The church strengthened the feeling of kindness for those in want, widows, orphans and the sick. It lessened the degradation of the "actresses," and, co-operating with Stoic opinion, abolished the slaughter of the gladiatorial shows. It created a popular "dogmatic system and moral discipline," which paganism failed to do; but it produced no prophet of charity, such as enlarged the moral imagination of the Jews. It ransomed slaves, as did paganism also, but it did not abolish slavery. Large economic causes produced that great reform. The serf attached to the soil took the place of the slave. The almsgiving of the church by degrees took the place of *annona* and *sportula*, and it may have created pauperism. But dependence on almsgiving was at least an advance on dependence founded on a civic and hereditary right to relief. As the *colonus* stood higher than the slave, so did the pauper, socially at any rate, free to support himself, exceed the *colonus*. Bad economic conditions and traditions, and a bad system of almsgiving, might enthral him. But the way, at least, was open; and thus it became possible that charity, working in alliance with good economic traditions, should in the end accomplish the self-support of society, the independence of the whole people.

Part V.—Medieval Charity and its Development

It remains to trace the history of thought and administration in relation to (1) the development of charitable responsibility in the parish, and the use of tithe and church property for poor relief; and (2) the revision of the theory of charity, with which are associated the names of St Augustine (354–430), St Benedict (480–542), St Bernard (1091–1153), St Francis (1182–1226), and St Thomas Aquinas (1225–1274). (3) There follows, in reference chiefly to England, a sketch of the dependence of the poor under feudalism, the charities of the parish, the monastery and the hospital—the medieval system of endowed charity; the rise of gild and municipal charities; the decadence at the close of the 15th century, and the statutory endeavours to cope with economic difficulties which, in the 16th century, led to the establishment of statutory serfdom and the poor-laws. New elements affect the problem of charity in the 17th and 18th centuries; but it is not too much to say that almost all these headings represent phases of thought or institutions which in later forms are interwoven with the charitable thought and endeavours of the present day.

Naturally, two methods of relief have usually been prominent: relief administered locally, chiefly to residents in their own homes, and relief administered in an institution. At the time of Charlemagne (742–814) the system of relief was parochial, consisting principally of assistance at the home. After that time, except probably in England, the institutional method appears to have predominated, and the monastery or hospital in one form or another gradually encroached on the parish.

The parish and charitable relief.

The system of parochial charity was the outcome, apparently, of three conditions: the position and influence of the bishop, the eleemosynary nature of the church funds, and the need of some responsible organization of relief. It resulted in what might almost be called an ecclesiastical poor-law. The affairs of a local church or congregation were superintended by a bishop. To deal with the outlying districts he detached priests for religious work and, as in Rome and (774) Strassburg, deacons also for the administration of relief. Originally all the income of the church or congregation was paid into one fund only, of which the bishop had charge, and this fund was available primarily for charitable purposes. Church property was the patrimony of the poor. In the 4th century (IV. Council of Carthage, 398) the names of the clergy were entered on a list (*matricula* or *canon*), as were also the names of the poor, and both received from the church their daily portion (cf. Ratzinger, *Geschichte der kirchlichen Armenpflege*, p. 117). There were no expenses for building. Before the reign of Constantine (306) very few churches were built (Ratzinger, p. 120). Thus the early church as has been said, was chiefly a charitable society. By degrees the property of the church was very largely increased by gifts and bequests, and in the West before St Gregory's time the division of it for four separate purposes—the support of the bishop, of the clergy, and of the poor, and for church buildings—still further promoted decentralization. Apart from any special gifts, there was thus created a separate fund for almsgiving, supervised by the bishop, consisting of a fourth of the church property, the oblations (mostly used for the poor), and the tithe, which at first was used for the poor solely. The organization of the church was gradually extended. The church once established in the chief city of a district would become in turn the mother church of other neighbourhoods, and the bishop or priest of the mother church would come to exercise supervision over them and their parishes.

In France, which may serve as a good illustration, in the 4th century (Ratzinger, p. 181) the civic organization was utilized for a further change. The Roman provinces were divided into large areas, *civitates*, and these were adopted by the church as bishop's parishes or, as we should call them, dioceses; and the chief city became the cathedral city. The bishop thus became responsible in Charlemagne's time both for his own parish—that of the mother church—and for the supervision of the parishes in the *civitas*, and so for the sick and needy of the diocese generally. He had to take charge of the poor in his own parish personally, keep the list of the poor, and houses for the homeless. The other parishes were at first, or in some measure, supported from his funds, but they acquired by degrees tithe and property of their own and were endowed by Charlemagne, who gave one or more manses or lots of land (cf. Fustel de Coulanges, *Hist. des institutions politiques de l'ancienne France*, p. 360) for the support of each parish priest. The priests were required to relieve their own poor so that they should not stray into other cities (II. Counc. Tours, 567), and to provide food and lodging for strangers. The method was indeed elaborated and became, like the Jewish, that contradiction in terms—a compulsory system of charitable relief. The payment of tithe was enforced by Charlemagne, and it became a legal due (Counc. Frankfort, 794; Arelat. 794). At the same time two other conditions were enforced. Each person (*unusquisque fidelium nostrorum* or *omnes cives*) was to keep his own family, *i.e.* all dependent on him—all, that is, upon his freehold estate (*allodium*), and no one was to presume to give

relief to able-bodied beggars unless they were set to work (Charlem. *Capit.* v. 10). Thus we find here the germ of a poor-law system. As in the times of the *annona civica*, slavery, feudalism, or statutory serfdom, the burthen of the maintenance of the poor fell only in part on charity. Only those who could not be maintained as members of some "family" were properly entitled to relief, and in these circumstances the officially recognized clients of the church consisted of the gradually decreasing number of free poor and those who were tenants of church lands.

Since 817 there has been no universally binding decision of the church respecting the care of the poor (Ratzinger, p. 236). So long ago did laicization begin in charity. In the wars and confusion of the 9th and 10th centuries the poorer freemen lapsed still further into slavery, or became *coloni* or bond servants; and later they passed under the feudal rule. Thus the church's duty to relieve them became the masters' obligation to maintain them. Simultaneously the activity of the clergy, regular and secular alike, dwindled. They were exhorted to increase their alms. The revenues and property of "the poor" were largely turned to private or partly ecclesiastical purposes, or secularized. Legacies went wholly to the clergy, but only the tithe of the produce of their own lands was used for relief; and of the general tithe, only a third or fourth part was so applied. Eventually to a large extent, but more elsewhere than in England (Ratzinger, pp. 246, 269), the tithe itself was appropriated by nobles or even by the monasteries; and thus during and after the 10th century a new organization of charity was created on non-parochial methods of relief. Alms, with prayer and fasting, had always been connected with penance. But the character of the penitential system had altered. By the 7th century private penance had superseded the public and congregational penance of the earlier church (*Dict. Christian Antiquities*, art. "Penitence"). To the penalties of exclusion from the sacraments or from the services of the church or from its communion was coupled, with other penitential discipline, an elaborate penitential system, in which about the 7th century the redemption of sin by the "sacrifice" of property, payments of money fines, &c., was introduced. (Cf. for instance Conc. Elberti:—Labbeus i. 969 (A.D. 305), with Conc. Berghamstedense, Wilkins, Conc. p. 60 (A.D. 696), and the Penitential (p. 115) and Canons (A.D. 960), p. 236.) The same sin committed by an overseer (*praepositus paganus*) was compensated by a fine of 100 *solidi*; in the case of a *colonus* by a fine of 50. So amongst the ways of penitence were entered in the above-mentioned Canons, to erect a church, and if means allowed, add to it land . . . to repair the public roads . . . "to distribute," to help poor widows, orphans and strangers, redeem slaves, fast, &c.—a combination of "good deeds" which suggests a line of thought such as ultimately found expression in the definition of charities in the Charitable Uses Act of Queen Elizabeth. The confessor, too, was "*spiritualis medicus*," and much that from the point of view of counsel would now be the work of charity would in his hands be dealt with in that capacity. For lesser sins (cf. Bede (673–735), *Hom.* 34, quoted by Ratzinger) the penalty was prayer, fasting and alms; for the greater sins—murder, adultery and idolatry—to give up all. Thus while half-converted barbarians were kept in moral subjection by material penances, the church was enriched by their gifts; and these tended to support the monastic and institutional methods which were in favour, and to which, on the revival of religious earnestness in the 11th century, the world looked for the reform of social life.

Medieval revision of the theory of charity.

To understand medieval charity it is necessary to return to St Augustine. According to him, the motive of man in his legitimate effort to assert himself in life was love or desire (*amor* or *cupido*). "All impulses were only evolutions of this typical characteristic" (Harnack, *History of Dogma* (trans.), v. iii.); and this was so alike in the spiritual and the sensuous life. Happiness thus depended on desire; and desire in turn depended on the regulation of the will; but the will was regulated only by grace. God was the *spiritualis substantia*; and freedom was the identity of the will with the omnipotent unchanging nature. This highest Being was "holiness working on the will in the form of omnipotent love." This love was grace—"grace imparting itself in love." Love (*caritas*—charity) is identified with justice; and the will, the goodwill, is love. The identity of the will with the will of God was attained by communion with Him. The after-life consummated by sight this communion, which was here reached only by faith. Such a method of thought was entirely introspective, and it turned the mind "wholly to hope, asceticism and the contemplation of God in worship." "Where St Augustine indulges in the exposition of practical piety he has no theory at all of Christ's work." To charity on that side he added nothing. In the 11th century there was a revival of piety, which had amongst its objects the restoration of discipline in the monasteries and a monastic training for the secular clergy. To this Augustinian thought led the way. "Christianity was asceticism and the city of God" (Harnack vi. 6). A new religious feeling took possession of the general mind, a regard and adoration of the actual, the historic Christ. Of this St Bernard was the expositor. "Beside the sacramental Christ the image of the historical took its place,—majesty in humility, innocence in penal suffering, life in death." The spiritual and the sensuous were intermingled. Dogmatic formulae fell into the background. The picture of the historic Christ led to the realization of the Christ according to the spirit (κατὰ πνεῦμα). Thus St Bernard carried forward Augustinian thought; and the historic Christ became the "sinless man, approved by suffering, to whom the divine grace, by which He lives, has lent such power that His image takes shape in other men and incites them to corresponding humility and love."

Humility and poverty represented the conditions under which alone this spirit could be realized; and the poverty must be spiritual, and therefore self-imposed ("wilful," as it was afterwards called). This led to practical results. Poverty was not a social state, but a spiritual; and consequently the poor generally were not the *pauperes Christi*, but those who, like the monks, had taken vows of poverty. From these premisses followed later the doctrine that gifts to the church were not gifts to the poor, as once they had been, but to the religious bodies. The church was not the church of the poor, but of the poor in spirit. But the immediate effect was the belief for a time, apparently almost universal, that the salvation of society would come from the monastic orders. By their aid, backed by the general opinion, the secular clergy were brought back to celibacy and the monasteries newly disciplined. But charity could not thus regain its touch of life and become the means of raising the standard of social duty.

Next, one amongst many who were stirred by a kindred inspiration, St Francis turned back to actual life and gave a new reality to religious idealism. For him the poor were once again the *pauperes Christi*. To follow Christ was to adopt the life of "evangelical poverty," and this was to live among the poor the life of a poor man. The follower was to work with his hands (as the poor clergy of the early church had done and the clergy of the early English church were exhorted to do); he was to receive no money; he was to earn the actual necessaries of life, though what he could not earn he might beg. To ask for this was a right, so long as he was bringing a better life into the world. All in excess of this he gave to the poor. He would possess no property, buildings or endowments, nor was his order to do so. The fulness of his life was in the complete realization of it now, without the cares of property and without any fear of the future. Having a definite aim and mission, he was ready to accept the want that might come upon him, and his life was a discipline to enable him to suffer it if it came. To him humility was the soul making itself fit to love; and poverty was humility expanded from a mood to a life, a life not guarded by seclusion, but spent amongst those who were actually poor. The object of life was to console the poor—those outside all monasteries and institutions—the poor as they lived and worked. The movement was practically a lay movement, and its force consisted in its simplicity and directness. Book learning was disparaged: life was to be the teacher. The brothers thus became observant and practical, and afterwards indeed learned, and their learning had the same characteristics. Their power lay in their practical sagacity, in their treatment of life, outside the cloister and the hospital, at first hand. They knew the people because they settled amongst them, living just as they did. This was their method of charity.

The inspiration that drew St Francis to this method was the contemplation of the life of Christ. But it was more than this. The Christ was to him, as to St Bernard, an ideal, whose nature passed into that of the contemplating and adoring beholder, so that, as he said, "having lost its individuality, of itself the creature could no longer act." He had no impulse but the Christ impulse. He was changed. His identity was merged in that of Christ. And with this came the conception of a

gracious and finely ordered charity, moving like the natural world in a constant harmonious development towards a definite end. The mysticism was intense, but it was practical because it was intense. In that lay the strength of the movement of the true Franciscans, and in those orders that, whether called heretical or not, followed them—Lollards and others. Religion thus became a personal and original possession. It became individual. It was inspired by a social endeavour, and for the world at large it made of charity a new thing.

St Thomas Aquinas took up St Bernard's position. Renunciation of property, voluntary poverty, was in his view also a necessary means of reaching the perfect life; and the feeling that was akin to this renunciation and prompted it was charity. "All perfection of the Christian life was to be attained according to charity," and charity united us to God.

In the system elaborated by St Thomas Aquinas two lines of thought are wrought into a kind of harmony. The one stands for Aristotle and nature, the other for Christian tradition and theology. We have thus a duplicate theory of thought and action throughout, both rational and theologic virtues, and a duplicate beatitude or state of happiness correspondent to each. On the one hand it is argued that the good act is an act which, in relation to its object, wholly serves its purpose; and thus the measure of goodness (*Prima Secundae Summae Theolog.* Q. xviii. 2) is the proportion between action and effect. On the other hand, the act has to satisfy the twofold law, human reason and eternal reason. From the point of view of the former the cardinal factor is desire, which, made proportionate to an end, is love (*amor*); and, seeking the good of others, it loses its quality of concupiscence and becomes friendly love (*amor amicitiae*). But this rational love (*amor*) and charity (*caritas*), the theologic virtue, may meet. All virtue or goodness is a degree of love (*amor*), if by virtue we mean the cardinal virtues and refer to the rule of reason only. But there are also theologic virtues, which are on one side "essential," on the other side participative. As wood ignited participates in the natural fire, so does the individual in these virtues (II.II.^{ae} lxii. 1). Charity is a kind of friendship towards God. It is received *per infusionem spiritus sancti*, and is the chief and root of the theologic virtues of faith and hope, and on it the rational virtues depend. They are not degrees of charity as they are of (*amor*) love, but charity gives purpose, order and quality to them all. In this sense the word is applied to the rational virtues —as, for instance, beneficence. The counterpart of charity in social life is pity (*misericordia*), the compassion that moves us to supply another's want (*summa religionis Christianae in misericordia consistit quantum ad exteriora opera*). It is, however, an emotion, not a virtue, and must be regulated like any other emotion (. . . *passio est et non virtus. Hic autem motus potest esse secundum rationem regulatus*, II. II.^{ae} xxx. 3). Thus we pass to alms, which are the instrument of pity—an act of charity done through the intervention of pity. The act is not done in order to purchase spiritual good by a corporal means, but to merit a spiritual good (*per effectum caritatis*) through being in a state of charity; and from that point of view its effect is tested by the recipient being moved to pray for his benefactor. The claim of others on our beneficence is relative, according to consanguinity and other bonds (II. II.^{ae} xxxi. 3), subject to the condition that the common good of many is a holier obligation (*divinius*) than that of one. Obedience and obligation to parents may be crossed by other obligations, as, for instance, duty to the church. To give alms is a command. Alms should consist of the superfluous— that is, of all that the individual possesses after he has reserved what is necessary. What is necessary the donor should fix in due relation to the claims of his family and dependants, his position in life (*dignitas*), and the sustenance of his body. On the other hand, his gift should meet the actual necessities of the recipient and no more. More than this will lead to excess on the recipient's part (*ut inde luxurietur*) or to want of spirit and apathy (*ut aliis remissio et refrigerium sit*), though allowance must be made for different requirements in different conditions of life. It were better to distribute alms to many persons than to give more than is necessary to one. In individual cases there remains the further question of correction—the removing of some evil or sin from another; and this, too, is an act of charity.

It will be seen that though St Thomas bases his argument on a duplicate theory of thought, action and happiness, part natural, part theologic, and states fully the conditions of good action, he does not bring the two into unison. Logically the argument should follow that alms that fail in social benefit (produce *remissionem et refrigerium*, for instance) fail also in spiritual good, for the two cannot be inconsistent. But in regard to the former he does not press the importance of purpose, and, in spite of his Aristotle, he misses the point on which Aristotle, as a close observer of social conditions, insists, that gifts without purpose and reciprocity foster the dependence they are designed to meet. The proverb of the "pierced cask" is as applicable to ecclesiastical as to political almsgiving, as has often been proved by the event. The distribution of all "superfluous" income in the form of alms would have the effect of a huge endowment, and would stereotype "the poor" as a permanent and unprogressive class. The proposal suggests that St Thomas contemplated the adoption of a method of relief which would be like a voluntary poor-law; and it is noteworthy that his phrase "necessary relief" forms the defining words of the Elizabethan poor-law, while he also lays stress on the importance of "correction," which, on the decline and disappearance of the penitential system, assumed at the Reformation a prominent position in administration in relation not only to "sin," but also to offences against society, such as idleness, &c.

On this foundation was built up the classification of acts of charity, which in one shape or another has a long social tradition, and which St Thomas quotes in an elaborated form—the seven spiritual acts (*consule, carpe, doce, solare, remitte, fer, ora*), counsel, sustain, teach, console, save, pardon, pray; and the seven corporal (*vestio, poto, cibo, redimo, tego, colligo, condo*) I clothe, I give drink to, I feed, I free from prison, I shelter, I assist in sickness, I bury (II. II.^{ae} xxxii. 2). These in subsequent thought became "good works," and availed for the after-life, bringing with them definite boons. Thus charity was linked to the system of indulgences. The bias of the act of charity is made to favour the actor. Primarily the benefit reverts to him. He becomes conscious of an ultimate reward accruing to himself. The simplicity of the deed, the spontaneity from which, as in a well-practised art, its freshness springs and its good effects result, is falsified at the outset. The thought that should be wholly concerned in the fulfilment of a definite purpose is diverted from it. The deed itself, apart from the outcome of the deed, is highly considered. An extreme inducement is placed on giving, counselling, and the like, but none on the personal or social utility of the gift or counsel. Yet the value of these lies in their end. No policy or science of charity can grow out of such a system. It can produce innumerable isolated acts, which may or may not be beneficent, but it cannot enkindle the "ordered charity." This charity is, strictly speaking, by its very nature alike intellectual and emotional. Otherwise it would inevitably fail of its purpose, for though emotion might stimulate it, intelligence would not guide it.

There are, then, these three lines of thought. That of St Bernard, who invigorated the monastic movement, and helped to make the monastery or hospital the centre of charitable relief. That of St Francis, who, passing by regular and secular clergy alike, revived and reinvigorated the conception of charity and gave it once more the reality of a social force, knowing that it would find a freer scope and larger usefulness in the life of the people than in the religious aristocracy of monasteries. And that of St Thomas Aquinas, who, analysing the problem of charity and almsgiving, and associating it with definite groups of works, led to its taking, in the common thought, certain stereotyped forms, so that its social aim and purpose were ignored and its power for good was neutralized.

We have now to turn to the conditions of social life in which these thoughts fermented and took practical shape. The population of England from the Conquest to the 14th century is estimated at between 1½ and 2½ millions. London, it is believed, had a population of about 40,000. Other towns were small. Two or three of the larger had 4000 or 5000 inhabitants. The only substantial building in a village, apart perhaps from the manor-house, was the church, used for many secular as well as religious purposes. In the towns the mud or wood-paved huts sheltered a people who, accepting a common poverty, traded in little more than the necessaries of life (Green, *Town Life in the 15th Century*, i.13). The population was stationary. Famine and pestilence were of frequent occurrence (Creighton, *Epidemics in Britain*, p. 19), and for the careless there was waste at harvest-time and want in winter. Hunger was the drill-sergeant of society. Owing to the hardship and penury of life infant mortality was probably very great (Blashill, *Sutton in Holdernesse*, p. 123). The 15th century was, however, "the golden age of the labourer." Our problem is to ascertain what was the service of charity to this people till the end of that century. In order to estimate this we have to apply tests similar to those we

Charity and social conditions in England.

applied before to Greece and Rome and the pre-medieval church.

The Family.—Largely Germanic in its origin, we may perhaps set down as elemental in the English race what Tacitus said of the Germans. They had the home virtues. They had a high regard for chastity, and respected and enforced the family tie. The wife was honoured. The men were poor, but when the actual pressure of their work—fighting—was removed, idle. They were born gamblers. Much toil fell upon the wife; but slavery was rather a form of tenure than a Roman bondage. As elsewhere, there was in England "the joint family or household" (Pollock and Maitland, *English Law before Edward I.* i. 31). Each member of the community was, or should be, under some lord; for the lordless man was, like the wanderer in Homer, who belonged to no phratry, suspected and dangerous, and his kinsfolk might be required to find a lord for him. There was personal servitude, but it was not of one complexion; there were grades amongst the unfree, and the general advance to freedom was continuous. By the 9th century the larger amount of the slavery was bondage by tenure. In the reign of Edward I., though "the larger half of the rural population was unfree," yet the serf, notwithstanding the fact that he was his lord's chattel, was free against all save his lord. A century later (1381) villenage—that is payment for tenancy by service, instead of by quit-rent—was practically extinguished. So steady was the progress towards the freedom and self-maintenance of the individual and his family.

The Manor.—In social importance, next to the family, comes the manor, the organization of which affected charity greatly on one side. It was "an economic unit," the estate of a lord on which there were associated the lord with his demesne, tenants free of service, and villeins and others, tenants by service. All had the use of land, even the serf. The estate was regulated by a manor court, consisting of the lord of the manor or his representative, and the free tenants, and entrusted with wide quasi-domestic jurisdiction. The value of the estate depended on the labour available for its cultivation, and the cultivators were the unfree tenants. Hence the lord, through the manor-court, required an indemnity or fine if a child, for instance, left the manor; and similarly, if a villein died, his widow might have to remarry or pay a fine. Thus the lord reacquired a servant and the widow and her family were maintained. The courts, too, fixed prices, and thus in local and limited conditions of supply and demand were able to equalize them in a measure and neutralize some of the effects of scarcity. In this way, till the reign of Edward I., and, where the manor courts remained active, till much later, a self-supporting social organization made any systematic public or charitable relief unnecessary.

The Parish and the Tithe.—The conversion of England in the 7th century was effected by bishops, accompanied by itinerant priests, who made use of conventual houses as the centres of their work. The parochial system was not firmly established till the 10th century (970). Then, by a law of Edgar, a man who had a church on his own land was allowed to pay a third of his tithe to his own church, instead of giving the whole of it to the minister or conventual church. Theodore, archbishop of Canterbury (667), had introduced the Carolingian system into England; and, accordingly, the parish priest was required to provide for strangers and to keep a room in his house for them. Of the tithe, a third and not a fourth was to go to the poor with any surplus; and in order to have larger means of helping them, the priests were urged to work themselves, according to the ancient canons of the church (cf. Labbeus, IV. Conc. Carthag. A.D. 398). The importance of the tithe to the poor is shown by acts of Richard II. and Henry IV., by which it was enacted that, if parochial tithes were appropriated to a monastery, a portion of them should be assigned to the poor of the parish. At a very early date (1287) quasi-compulsory charges in the nature of a rate were imposed on parishioners for various church purposes (Pollock and Maitland, i. 604), though in the 14th and 15th centuries a compulsory church rate was seldom made. Collections were made by paid collectors, especially for Hock-tide (*q.v.*) money—gathered for church purposes (Brand's *Antiquities*, p. 112). But there must have been many varieties in practice. In Somersetshire the churchwardens' accounts (1349 to 1560) show that the parish contributed nothing to the relief of the poor, and it seems probable that the personal charities of the parishioners, and the charities of the gild fellowships and of the parsonage house sufficed (Bishop Hobhouse, *Churchwardens' Accounts, 1349–1560*, Somerset Record Society). Many parishes possessed land, houses and cattle, and received gifts and legacies of all kinds. The proceeds of this property, if given for the use of the parish generally, might, if necessary, be available for the relief of the poor, but, if given definitely for their use, would provide doles, or stock cattle or "poor's" lands, &c. (Cf. Augustus Jessopp, *Before the Great Pillage*, p. 40; and many instances in the reports of the Charity Commissioners, 1818–1835.) Of the endowments for parish doles very many may have disappeared in the break-up of the 16th century. There were also "Parish Ales," the proceeds of which would be used for parish purposes or for relief. Further, all the greater festivals were days of feasting and the distribution of food; at funerals also there were often large distributions, and also at marriages. The faithful generally, subject to penance, were required to relieve the poor and the stranger. In the larger part of England the parish and the vill were usually coterminous. In the north a parish contained several vills. There were thus side by side the charitable relief system of the parish, which at an early date became a rating area, and the self-supporting system of the manor.

The Monasteries.—As Christianity spread monasteries spread, and each monastery was a centre of relief. Sometimes they were established, like St Albans (796), for a hundred Benedictine monks and for the entertainment of strangers; or sometimes without any such special purpose, like the abbey of Croyland (reorganized 946), which, becoming exceeding rich from its *diversorium pauperum*, or almonry, "relieved the whole country round so that prodigious numbers resorted to it." At Glastonbury, for instance (1537), £140 16s. 8d. was given away in doles. But documents seem to prove (Denton, *England in Fifteenth Century*, p. 245) that the relief generally given by monasteries was much less than is usually supposed.

The general system may be described (cf. Rule, *St Dunst. Cant. Archp.* p. 42, Dugdale; J. B. Clark, *The Observances*, Augustinian Priory, Barnwell; Abbot Gasquet, *English Monastic Life*). The almonry was usually near the church of the monastery. An almoner was in charge. He was to be prudent and discreet in the distribution of his doles (*portiones*) and to relieve travellers, palmers, chaplains and mendicants (*mendicantes*, apparently the beggars recognized as living by begging, such as we have noted under other social conditions), and the leprous more liberally than others. The old and infirm, lame and blind who were confined to their beds he was to visit and relieve suitably (*in competenti annona*). The importunity of the poor he was to put up with, and to meet their need as far as he could. In the almonry there were usually rooms for the sick. The sick outside the precincts were relieved at the almoner's discretion. Continuous relief might be given after consultation with the superior. All the remnants of meals and the old clothes of the monks were given to the almoner for distribution, and at Christmas he had a store of stockings and other articles to give away as presents to widows, orphans and poor clerks. He also provided the Maundy gifts and selected the poor for the washing of feet. He was thus a local visitor and alms distributor, not merely at the gate of the monastery but in the neighbourhood, and had also at his disposal "indoor" relief for the sick. Separate from the rest of the house there was also a dormitory and rooms and the kitchen for strangers. A *hospitularius* attended to their needs and novices waited on them. Guests who were laymen might stay on, working in return for board and lodging (Smith's *Dict. Christian Antiq.*, "Benedictine").

The monasteries often established hospitals; they served also as schools for the gentry and for the poor; and they were pioneers of agriculture. In the 12th century, in which many monastic orders were constituted, there were many lavish endowments. In the 14th century their usefulness had begun to wane. At the end of that century the larger estates were generally held in entail, with the result that younger sons were put into religious houses. This worldliness had its natural consequences. In the 15th century, owing to mismanagement, waste, and subsequently to the decline of rural prosperity, their resources were greatly crippled. In their relation to charity one or two points may be noted: (1) Of the small population of England the professed monks and nuns with the parish priests (Rogers, *Hist. Agric. and Prices*, i. 58) numbered at least 30,000 or 40,000. This number of celibates was a standing protest against the moral sufficiency of the family life. On the other hand, amongst them were the brothers and sisters who visited the poor and nursed the sick in hospitals; and many who now succumb physically or mentally to the pressure of life, and are cared for in institutions, may then have found maintenance and a retreat in the monasteries. (2) Bound together by no common controlling organization, the monasteries were but so many miscellaneous centres of relief, chiefly casual relief. They were mostly "magnificent hostelries." (3) They stood outside the parish, and they weakened its organization and hampered its development.

The Hospitals.—The revival of piety in the 11th century led to a large increase in the number of hospitals and hospital orders. To show how far they covered the field in England two instances may be quoted. At Canterbury (Creighton, *Epidemics*, p. 87) there were four for different purposes, two endowed by Lanfranc (1084), one for poor, infirm, lame and blind men and women, and one outside the town for lepers. These hospitals were put under the charge of a priory, and endowed out of tithes payable to the secular clergy. Later (Henry II.), a hospital for leprous sisters was established, and afterwards a hospital for leprous monks and poor relations of the monks of St Augustine's. In a less populous parish, Luton (Cobbe, *Luton Church*), there were a hospital for the poor, an almshouse, and two hospitals, one for the sick and one for the leprous. The word "leper," it is evident, was used very loosely, and was applied to many diseases other than leprosy. There were hospitals for the infirm and the leprous; the disease was not considered contagious. The hospital in its modern sense was but slowly created. Thus St Bartholomew's in London was founded (1123) for a master, brethren and sisters, and for the entertainment of poor diseased persons till they got well; of distressed women big with child till they were able to go abroad; and for the maintenance, until the age

of seven, of all such children whose mothers died in the house. St Thomas's (rebuilt 1228) had a master and brethren and three lay sisters, and 40 beds for poor, infirm and impotent people, who had also victual and firing. There were hospitals for many special purposes—as for the blind, for instance. There were also many hospital orders in England and on the continent. They sprang up beside the monastic orders, and for a time were very popular: brothers and sisters of the Holy Ghost (1198), sisters of St Elizabeth (1207–1231), Beguines and Beghards (see BEGUINES), knights of St John and others.

The Mendicant Orders.—The Franciscans tended the sick and poor in the slums of the towns with great devotion—indeed, the whole movement tells of a splendid self-abandonment and an intensity of effort in the early spring of its enthusiasm, and with the aid of reform councils and reformations it lengthened out its usefulness for two centuries.

Medieval endowed charities.

As in the pre-medieval church, the system of relief is that of charitable endowments—a marked contrast to the modern method of voluntary associations or rate-supported institutions.

(1) *The Church as Legatee.*—The church building among the Teutonic races was not held by the bishop as part of what was originally the charitable property of the church. It was assigned to the patron saint of the church by the donor, who retained the right of administration, of which his own patronage or right of presentation is a relic. Subsequently, with the study of Roman law, the conception of the church as a *persona ficta* prevailed; and till the larger growth of the gilds and corporations it was the only general legatee for charitable gifts. As these arise a large number of charitable trusts are created and held by lay corporations; and "alms" include gifts for social as well as religious or eleemosynary purposes. (2) *Freedom from Taxation and Service.*—Gifts to the church for charitable or other purposes were made in free, pure and perpetual alms ("*ad tenendum in puram et perpetuam eleemosynam sine omni temporali servicio et consuetudine*"). Land held under this *frankalmoigne* was given "in perpetual alms," therefore the donor could not retract it; in free alms, therefore he could exact no services in regard to it; and in pure alms as being free from secular jurisdiction (cf. Pollock and Maitland). (3) *Alienation and Mortmain.*—To prevent alienation of property to religious houses, with the consequent loss of service to the superior or chief lords, a licence from the chief lord was required to legalize the alienation (Magna Carta, and Edw. I., *De viris religiosis*). Other statutes (Edw. I. and Rich. II.) enacted that this licence should be issued out of chancery after investigation; and the principle was applied to civil corporations. The necessity of this licence was one lay check on injurious alienation. (4) *Irresponsible Administration.*—Until after the 13th century, when the lay courts had asserted their right to settle disputes as to lands held in alms, the administration of charity was from the lay point of view entirely irresponsible. It was outside the secular jurisdiction; and civilly the professed clergy, who were the administrators, were "dead." They could not sue or be sued except through their sovereign—their chief, the abbot. They formed a large body of non-civic inhabitants free from the pressure and the responsibilities of civil life. (5) *Control.*—Apart from the control of the abbot, prior, master or other head, the bishop was visitor, or, as we should say, inspector; and abuses might be remedied by the visit of the bishop or his ordinary. The bishop's ordinary (2 Henry V. i. 1) was the recognized visitor of all hospitals apart from the founder. The founder and his family retained a right of intervention. Sometimes thus an institution was reorganized, or even dissolved, the property reverting to the founder (Dugdale, *Monasticon Anglicanum*, vi. 2. 715). (6) *Cy-près.*—Charities were, especially after Henry V.'s reign, appropriated to other uses, either because their original purpose failed or because some new object had become important. Thus, for instance, a college or hospital for lepers (1363) is re-established by the founder's family with a master and priest, *quod nulli leprosi reperiebantur*; and a similar hospital founded in Henry I.'s time near Oxford has decayed, and is given by Edward III. to Oriel College, Oxford, to maintain a chaplain and poor brethren. Thus, apart from alienation pure and simple, the principle of adaptation to new uses was put in force at an early date, and supplied many precedents to Wolsey, Edward VI. and the post-Reformation bishops. The system of endowments was indeed far more adaptable than it would at first sight seem to have been. (7) *The Sources of Income.*—The hospitals were chiefly supported by rents or the produce of land; or, if attached to monasteries, out of the tithe of their monastic lands or other sources of revenue, or out of the appropriated tithes of the secular clergy; or they might be in part maintained by collections made, for instance, by a commissioner duly authorized by a formal attested document, in which were recounted the indulgences by popes, archbishops and bishops to those who became its benefactors (Cobbe, p. 75); or, in the case of leper hospitals, by a leper with a "clapdish," who begged in the markets; or by a proctor, in the case of more important institutions in towns, who "came with his box one day in every month to the churches and other religious houses, at times of service, and there received the voluntary gifts of the congregation"; or they might receive inmates on payment, and thus apparently a frequent abuse, decayed servants of the court and others, were "farmed out." (8) *Mode of Admission.*—The admission was usually, no doubt, regulated by the prior or master. At York, at the hospital of St Nicholas for the leprous, the conditions of admission were: promise or vow of continence, participation in prayer, the abandonment of all business, the inmate's property at death to go to the house. This may serve as an example. The master was usually one of the regular clergy. (9) *Decline of the Hospitals.*—It is said that, in addition to 645 monasteries and 90 "colleges" and many chantries, Henry VIII. suppressed 110 hospitals (Speed's *Chronicle*, p. 778). The numbers seem small. In the economic decline at the end of the 15th and beginning of the 16th centuries many hospitals may have lapsed.

Gild and municipal charities.

In the 15th century the towns grew in importance. First the wool trade and then the cloth trade flourished, and the English developed a large shipping trade. The towns grew up like "little principalities"; and for the advancement of trade, gilds, consisting alike of masters and workmen, were formed, which endeavoured to regulate and then to monopolize the market. By degrees the corporations of the towns were worked in their interests, and the whole commercial system became restrictive and inadaptable. Meanwhile the towns attracted newcomers; freedom from feudal obligations was gained with comparative ease; and a new *plebs* was congregating, a population of inhabitants not qualified as burghers or gild members, women, sons living with their fathers, menial servants and apprentices. There was thus an increasing restriction imposed on trade, coupled with a growing *plebs*. Naturally, then, lay charities sprang up for members of gilds, and for burghers and for the commonalty. Men left estates to their gilds to maintain decayed members in hospitals, almshouses or otherwise, to educate their children, portion their daughters, and to assist their widows. The middle-class trader was thus in great measure insured against the risks of life. The gilds were one sign of the new temper and wants of burghers freed from feudalism. Another sign was a new standard of manners. Rules and saws, Hesiodic in their tone, became popular—in regard, for instance, to such a question as "how to enable a man to live on his means, and to keep himself and those belonging to him." The boroughs established other charities also, hospitals and almshouses for the people, a movement which, like that of the gilds, began very early—in Italy as early as the 9th century. They sometimes gave outdoor relief also to registered poor (Green i. 41), and they had in large towns courts of orphans presided over by the mayor and aldermen, thus taking over a duty that previously had been one of conspicuous importance in the church. As early as 1257 in Westphalian towns there was a rough-and-ready system of Easter relief of the poor; and in Frankfort in 1437 there was a town council of almoners with a systematic programme of relief (Ratzinger, p. 352). Thus at the close of the middle ages the towns were gradually assuming what had been charitable functions of the church.

Statutory wage control.

While a new freedom was being attained by the labourer in the country and the burgher in the town, the difficulty of obtaining a sufficient supply of labour for agriculture must have been constant, especially at every visitation of plague and famine. In accordance with a general policy of state regulation which was to control and supervise industry, agriculture and poor relief and to repress vagrancy by gaols and houses of correction, the state stepped in as arbiter and organizer. By Statutes of Labourers beginning in 1351 (25 Edw. III. 135), it aimed at enforcing a settled wage and restraining migration. From 1351 it endeavoured to suppress mendicity, and in part to systematize it in the interest of infirm and aged mendicants. Each series of enactments is the natural complement of the other. In the main their signification, from the point of view of charity, lies in the fact that they represent a persistent endeavour to prevent social unsettlement and in part the distress which unsettlement causes, and which vagrancy in some measure indicates, by keeping the people within the ranks of recognized dependence, the settled industry of the crafts and of agriculture, or forcing them back into it by fear of the gaol or the stocks. The extreme point of this policy was

reached when by the laws of Edward VI. and Elizabeth the "rogue, vagabond or sturdy beggar" was branded with an R on the shoulder and handed over as a bondman for a period to any one who would take him. On the other hand, it was desired that relief should be a means of preventing migration. In any time of general pressure there is a desire to organize mendicity, to prevent the wandering of beggars, to create a kind of settled poor, distinguished from the rest as infirm and not able-bodied, and to keep these at least at home sufficiently supported by local and parochial relief; and this, in its simpler form all the world over, has in the past been by response to public begging. The argument may be summed up thus: We cannot have begging, which implies that the beggar is cared for by no one, belongs to no one, and therefore throws himself on the world at large. Therefore, if he is able-bodied he must be punished as unsocial, for it is his fault that he belongs to no one; or we must make him some one's dependant, and so keep him; or if he is infirm, and therefore of no service to any one—if no one will keep him—we must organize his mendicity, for such mendicity is justified. If he cannot dig for the man to whom he does or should belong, he must beg. Then out of the failure to organize mendicity—for relief of itself is no remedy, least of all casual relief—a poor-law springs up, which, afterwards associated with the provision of employment, will, it is hoped, make relief in some measure remedial by increasing its quantity by means of compulsory levies. This argument, which combined statutory wage control and statutory poor relief, seems to have been firmly bedded in the English legislative mind for more than two centuries, from 1351 till after 1600; and until 1834 these two series of laws effectually reduced the English labourer to a new industrial dependence. To people imbued with ideas of feudalism the way of escape from villenage seemed to be not independence, but a new reversion to it.

Many elements produced the social and economic catastrophe of the 16th century, for the condition into which the country fell can hardly be considered less than a catastrophe. With the growing independence of the people there was created after the 13th century an unsettled "masterless" class, a residue of failure resulting from social changes, which was large and important enough to call for legislation. In the 15th century, "the golden age of the English labourer," the towns increased and flourished. Both town and country did well. At the end of the century came the decadence. The measure of the strain, when perhaps it had reached its lowest level, is indicated by the following comparison: "The cost of a peasant's family of four in the early part of the 14th century was £3:4:9; after 1540 it was £8" (Rogers, *Hist. of Agric. and Prices*, iv. 756).

The decadence.

The cause of this has now been fairly investigated. The value of land in the 13th century generally depended chiefly on "the head of labour" retained upon it. Its fertility depended on main-oeuvre (manure). To keep labour upon it was therefore the aim of the lord or owner. The enclosing of lands for sheep began early, and in the time of Edward III., in the great days of the woolstaple, must have been extensive. So long as the demand for the exportation of wool, and then for its consumption at home in the cloth trade, continued, the towns prospered, and the enclosures did not become a grievance. Even before the reign of Henry VII., with the decay of trade, the towns decayed, and their population in some cases diminished extraordinarily. This reacted on the country, where the great families had already become impoverished, and were hardly able to support their retainers. In Henry VIII.'s time the lands of the religious houses were confiscated. Worked on old lines, the custom of tillage remained in force on them. Accordingly, when these estates fell into private hands they were transferred subject to the condition that they should be tilled as heretofore. The condition was evaded by the new owners, and the disbandment of farm labourers went on apace. In England and Wales these changes, it is said, affected a third of the country, more than 12,000,000 acres, if the estimates be correct, or rather a third of the best land in the kingdom. With towns decaying, the effect of this must have been terrible. What were really "latifundia" were created, "great landes," "enclosures of a mile or two or thereabouts . . . destroying thereby not only the farms and cottages within the same circuits, but also the towns and villages adjoining." A herdsman and his wife took the place of eighteen to twenty-four farm hands. The people thus set wandering could only join the wanderers from the decaying towns. At the same time the economic difficulty was aggravated by a new patrician or commercial greed; and once more the land question—the absorption of property into a few hands instead of its free exchange—led to lasting social demoralization. A few years after the alienation of the monasteries the coinage (1543) was debased. By this means prices were arbitrarily raised, and wages were increased nominally; but nevertheless the price of necessaries was "so enhanced" that neither "the poor labourers can live with their wages that is limited by your grace's laws, nor the artificers can make, much less sell, their wares at any reasonable price" (Lamond, *The Commonweal of this Realm of England*, p. xlvii). No social reformation, such as the charitable instincts of Wycliffe, More, Hales, Latimer and other men suggested, was attempted, or at least persistently carried out. In towns the organization of labour had become restrictive, exclusive and inadaptable, or, judged from the moral standpoint, uncharitable. There had been a time of plenty and extravagance, of which in high quarters the famous "field of the cloth of gold" was typical; and probably, in accordance with the frequently observed law of social economics, as the advance in wages and their purchasing power in the earlier part of the 15th century had not been accompanied by a simultaneous advance in self-discipline and intelligent expenditure, it resulted in part in lessened competence and industrial ability on the part of the workmen, and thus in the end produced pauperism.

The poverty of the country was very great in the reigns of Edward VI. and Elizabeth. Adversity then taught the people new manners, and households became more simple and thrifty. In the reign of James I., with enforced economy and thrift, a "slow but substantial improvement in agriculture" took place, and a new growth of commercial enterprise. The vigour of the municipalities had abated, so that in Henry VIII.'s time they had become the very humble servants of the government; and the government, on the other hand, had become strongly centralized—in itself a sign of the general withdrawal of self-sustaining activity in all administration, in the administration of charitable relief no less than in other departments. A system of endowed charities had been built up, supported chiefly by rents from landed property. These now had disappeared, and thus the means of relief, which Edward VI. and Queen Elizabeth might have utilized at a time of general distress, had been dissipated by the acts of their predecessors. The civil independence of the monasteries and religious houses might have been justified, possibly, when they were engaged in missionary work and were instilling into the people the precepts of a higher moral law than that which was in force around them. But afterwards, as the ability and intelligence of the community increased, their privileges became more and more antagonistic to charity, and tended to create a non-social and even anti-social ecclesiastical democracy actuated by aims and interests in which the general good of the people had little or no place. There was a growing alienation between religious tradition and secular opinion, as Lollardism slowly permeated the thought of the people and led the way to the Reformation. While this alienation existed no national system of charity, civic and yet religious, could be created. But worse than all, the ideal of charity had been degraded. A self-regarding system of relief had superseded charity, and it was productive of nothing but alms, large or small, isolated and unmethodic, given with a wrong bias, and thus almost inevitably with evil results. Out of this could spring no vigorous co-operative charity. Charity—not relief—indeed seemed to have left the world. The larger issues were overlooked. Then the property of the hospitals and the gilds was wantonly confiscated, though the poor had already lost that share in the revenues of the church to which at one time they were admitted to have a just claim. A new beginning had to be made. The obligations of charity had to be revived. A new organization of charitable relief had to be created, and that with an empty exchequer and after a vast waste of charitable resources. There were signs of a new congregational and parochial energy, yet the task could not be entrusted to the religious bodies, divided and disunited as they were. In their stead it could be imposed only on some authority which represented the general community, such as municipalities; and in spite of the centralization of the government there seemed some hope of creating a system of relief in connexion with them. They were tried, and, very naturally, failed. In the poverty of the time it seemed that the poor could be relieved only by a

compulsory rate, and the administration of statutory relief naturally devolved on the central government—the only vigorous administrative body left in the country. The government might indeed have adopted the alternative of letting the industrial difficulties of the country work themselves out, but they had inherited a policy of minute legislative control, and they continued it. Revising previous statutes, they enacted the Poor Law, which still remains on the statute book. It could be no remedy for social offences against charity and the community. But in part at least it was successful. It helped to conceal the failure to find a remedy.

Part VI.—After the Reformation

During the Reformation, which extended, it should be understood, from the middle of the 14th century to the reign of James I., the groundwork of the theory of charity was being recast. The old system and the narrow theory on which it had come to depend were discredited. The recoil is startling. To a very large extent charitable administration had been in the hands of men and women who, as an indispensable condition to their participation in it, took the vows of obedience, chastity and "wilful" poverty. Now this was all entirely set aside. It was felt (see *Homilies on Faith and Good Works, &c.*, A.D. 1547) that socially and morally the method had been a failure. The vow of obedience, it was argued, led to a general disregard of the duties of civic and family life. Those who bound themselves by it were outside the state and did not serve it. In regard to chastity the *Homily* states the common opinion: "How the profession of chastity was kept, it is more honesty to pass over in silence and let the world judge of what is well known." As to wilful poverty, the regulars, it is urged, were not poor, but rich, for they were in possession of much wealth. Their property, it is true, was held *in communi*, and not personally, but nevertheless it was practically theirs, and they used it for their personal enjoyment; and "for all their riches they might never help father nor mother, nor others that were indeed very needy and poor, without the license of their father abbot" or other head. This was the negative position. The positive was found in the doctrine of justification—the central point in the discussions of the time, a plant from the garden of St Augustine. Justification was the personal conviction of a lively (or living) faith, and was defined as "a true trust and confidence of the mercy of God through our Lord Jesus Christ, and a stedfast hope of all good things to be received at His hands." Without this justification there could be no good works. They were the signs of a lively faith and grew out of it. Apart from it, what seemed to be "good works" were of the nature of sin, phantom acts productive of nothing, "birds that were lost, unreal." So were the works of pagans and heretics. The relation of almsgiving to religion was thus entirely altered. The personal reward here or hereafter to the actor was eliminated. The deed was good only in the same sense in which the doer was good; it had in itself no merit. This was a great gain, quite apart from any question as to the sufficiency or insufficiency of the Protestant scheme of salvation. The deed, it was realized, was only the outcome of the doer, the expression of himself, what he was as a whole, neither better nor worse. Logically this led to the discipline of the intelligence and the emotions, and undoubtedly "justification" to very many was only consistent with such discipline and implied it. Thus under a new guise the old position of charity reasserted itself. But there were other differences.

The Reformation theory of charity.

The relation of charity to prayer, fasting, almsgiving and penance was altered. The prayerful contemplation of the Christ was preserved in the mysticism of Protestantism; but it was dissociated from the "historic Christ," from the fervent idealization of whom St Francis drew his inspiration and his active charitable impulse. The tradition did not die out, however. It remained with many, notably with George Herbert, of whom it made, not unlike St Francis, a poet as well as a practical parish priest; but the absence of it indicated in much post-Reformation endeavour a want, if not of devotion, yet of intensity of feeling which may in part account for the fact that sectarianism in relief has since proved itself stronger than charity, instead of yielding to charity as its superior and its organizer. Fasting was parted from prayer and almsgiving. It was "a thing not of its own proper nature good as the love of father or mother or neighbour, but according to its end." Almsgiving also as a "work" disappeared and with it a whole series of inducements that from the standpoint of the pecuniary and material supply of relief had long been active. It was no wonder that the preachers advocated it in vain, and reproached their hearers with their diminished bounty to the poor; the old personal incentive had gone, and could only gradually be superseded by the spontaneous activity of personal religion very slowly wedding itself to true views of social duty and purpose. Penance, once so closely related to almsgiving, passed out of sight. Charity, the love of God and our neighbour, had two offices, it was said, "to cherish good and harmless men" and "to correct and punish vice without regard to persons." Correction as a means of discipline takes the place of penance, and it becomes judicial, regulating and controlling church membership by the authority of the church, a congregation, minister or elder; or dealing with laziness or ill-doing through the municipality or state, in connexion with what now first appear, not prisons, but houses of correction.

The religious life was to be democratic—not in religious bodies, but in the whole people; and in a new sense—in relation to family and social life—it was to be moral. That was the significance of the Reformation for charity.

Consistently with this movement of religious activity towards a complete fulfilment of the duties of civic life, the older classical social theory, fostered by the Renaissance, assumed a new influence—the great conception of the state as a community bound together by charity and friendship. "We be not born to ourselves," it was said, "but partly to the use of our country, of our parents, of our kinsfolk, and partly of our friends and neighbours; and therefore all good virtues are grafted on us naturally, whose effects be to do good to others, when it showeth forth the image of God in man, whose property is ever to do good to others" (Lamond, p. 14). Economic theory also changed. Instead of the medieval opinion of the "theologian or social preacher," that "trade could only be defended on the ground that honestly conducted it made no profit" (Green, ii. 71), we have a recognition of the advantages resulting from exchange, and individual interests, it is argued, are not necessarily inconsistent with those of the state, but are, on the contrary, a source of solid good to the whole community.

The organization of municipal relief.

Municipal laws for the suppression of the mendicity of the able-bodied and the organization of relief on behalf of the infirm were common in England and on the continent (Colmar, 1362; Nuremberg, 1478; Strassburg, 1523; London, 1514). Vives (Ehrle, *Beiträge zur Geschichte und Reform der Armenpflege*, p. 26), a Spaniard, who had been at the court of Henry VIII., in a book translated into several languages and widely read, seems to have summed up the thought of the time in regard to the management of the poor. He divided them into three classes: those in hospitals and poor-houses, the public homeless beggars and the poor at home. He would have a census taken of the number of each class in the town, and information obtained as to the causes of their distress. Then he would establish a central organization of relief under the magistrates. Work was to be supplied for all, while begging was strictly forbidden. Non-settled poor who were able-bodied were to be sent to their homes. Able-bodied settled poor who knew no craft were to be put on some public work—the undeserving being set to hard labour. For others work was to be found, or they were to be assisted to become self-supporting. The hospitals provided with medical advice and necessaries were to be classified to meet the needs of the sick, the blind and lunatics. The poor living at home were to work with a view to their self-support. What they earned, if insufficient, might be supplemented. If a citizen found a case of distress he was not to help it, but to send it for inquiry to the magistrate. Children were to be taught. Private relief was to be obtained from the rich. The funds of endowed charities were to be the chief source of income; if more was wanted, bequests and church collections would suffice. The scheme was put in force in Yprès in 1524. The Sorbonne approved it, and similar plans were adopted in Paris and elsewhere. It is in outline the scheme of London municipal charity promoted by Edward VI., by which the poor were classified, St Bartholomew's and St Thomas's hospitals appropriated for the sick, Christ's hospital for the children of the poor, and Bridewell for the correction of the able-bodied. Less the institutional arrangements and plus the compulsory rate, the methods are those of the Poor Relief Act of Queen Elizabeth of 1601. At first the attempt had been made to introduce state relief in reliance on voluntary alms (1 Mary 13, 5 Eliz. 3, 1562–1563), subject to the right of assessment if alms were refused. But the position was anomalous. Charity is voluntary, and spontaneously meets the demands of distress. Such demands have always a tendency to increase with the supply. Hence the very

limitations of charitable finance are in the nature of a safeguard. At most economic trouble can only be assuaged by relief, and it can only be met or prevented by economic and social reforms. If a compulsory rate be not enforced, as in Scotland and formerly in some parishes in England, a voluntary rate may be made in supplementation of the local charities. In Scotland, where the compulsory clauses of the Poor Relief Act of James I. were not put in force, the country weathered the storm without them, and the compulsory rate, which was extended throughout the country by the Poor Act of 1844, came in very slowly in the 18th and 19th centuries. In France (1566) a similar act was passed and set aside. If a compulsory rate be enforced, it is inevitable that the resources of charity, unless kept apart from the poor-law and administered on different lines from it, will diminish, and at the same time, as has happened often in the case of endowed charities, the interest in charitable administration will lapse, while the charges for poor-law relief, drawn without much scruple from the taxation of the community, will mount to millions either to meet increasing demands or to provide more elaborate institutional accommodation. The principle once adopted, it was enacted (1572–1573) that the aged and infirm should be cared for by the overseers of the poor, a new authority; and in 1601 the duplicate acts were passed, that for the relief of the poor (43 Eliz. 2), and that for the furtherance and protection of endowed charities. Thus the poor were brought into the dependence of a legally recognized class, endowed with a claim for relief, on the fulfilment of which, after a time, they could without difficulty insist if they were so minded. The civic authority had indeed taken over the alms of the parish, and an *eleemosyna civica* had taken the place of the *annona civica*. It was a similar system under a different name.

A phrase of Robert Cecil's (1st earl of Salisbury) indicates the minute domestic character of the Elizabethan legislation (D'Ewes, 674). The question (1601) was the repeal of a statute of tillage. Cecil says: "If in Edward I.'s time a law was made for the maintenance of the fry of fish, and in Henry VII.'s for the preservation of the eggs of wild fowl, shall we now throw away a law of more consequence and import? If we debar tillage, we give scope to the depopulating. And then, if the poor being thrust out of their houses go to dwell with others, straight we catch them with the statute of inmates; if they wander abroad, they are within the danger of the statute of the poor to be whipt. So by this undo this statute, and you endanger many thousands." A strong central government, a local authority appointed directly by the government, and a network of legislation controlled the whole movement of economic life. On this reliance was placed to meet economic difficulties. The local authorities were the justices of the peace; and they had to carry out the statutes for this purpose, to assess the wages of artisans and labourers, and to enforce the payment of the wages they had fixed; to ensure that suitable provision was made for the relief of the poor at the expense of rates which they also fixed; and to suppress vagabondage. Since 23 Edw. III. there had been labour statutes, and in 1563 a new statute was passed, an "Act containing divers orders for Artificers, Labourers, Servants of Husbandry and Apprentices" (5 Eliz. c. 4). It recognized and upheld a social classification. On the one hand there was the gentleman or owner of property to which the act was not to apply; and on the other the artisan and labouring class. This class in turn was subdivided, and the justices were to assess their wages annually according to "the plenty and scarcity of the time and other circumstances." Persons between the ages of twelve and sixty, who were not apprentices or engaged in certain specified employments, were compelled to serve in husbandry by the year "with any person that keepeth husbandry." The length of the day's work and the conditions of apprenticeship were fixed. The assessed rate of wages was enforceable by fine and imprisonment, and refusal to be apprenticed by imprisonment. Thus there was created a life control over labour with an industrial settlement and a wage fixed by the justices annually. There are differences of opinion in regard to the extent to which this act was enforced; and the evidence on the point is comparatively scanty. It was enforced throughout the century in which it was passed, and it probably continued in force generally until the Restoration, while subsequently it was put in operation to meet special emergencies, such as times of distress when some settlement of wages seemed desirable (cf. Rogers, v. 611; Hewins, *English Trade and Finance*, p. 82; Cunningham, *Growth of English Industry and Commerce: Modern Times*, i. 168). It was not repealed till 1814.

Poor Relief Acts and statutory serfdom.

From 1585 to 1622 there was, it is said, a slight increase in labourers' wages, which fluctuated from 5s. ¾d. to 5s. 8¼d. a week, with a declining standard of comfort and at times great distress. Then there was a marked increase of wage till 1662 and "a very marked improvement; the rate of increase being very nearly double that of the earlier periods," and reaching 9s., "as the highest weekly rate for the whole period." Then from 1662 to 1702 there was "a slight improvement" (Hewins, p. 89). It would seem indeed that the stir of the times between 1622 and 1662 may have caused a great demand for labour. But with the Restoration, when the assessment system was falling into desuetude, came the Poor Relief Act of 1662 (13 & 14 Car. II. cap. 62), which brought in the law of settlement, and a settlement for relief of a very strict nature was added to the industrial settlement of the Artificers and Labourers Act. Thus, if the influence of that act, which had so long controlled labour, was waning, its place was now taken by an act which, though it had nothing to do with the assessment of wage, yet so settled the labourer within the bounds of his parish that he had practically to rely, if not upon a wage fixed by the justices, yet upon a customary wage limited and restricted as a result of the law of settlement. And the assessment by the justices, in so far as it may have continued, would therefore be of little or no consequence. Settlement also, like the Artificers and Labourers Act, would prevent the country labourer from passing to the towns, or the townsmen passing to other towns. At least they would do so at the risk of forfeiting their right to relief if they lost their settlement without acquiring a new one. Hence the industrial control, though under another name and other conditions, remained in force to a large extent in practice.

By the Artificers and Labourers Act then, in conjunction with other measures, the labouring classes were finally committed to a new bondage, when they had freed themselves from the serfdom of feudalism, and when the control exercised over them by the gild and municipality was relaxed. The statute was so enforced that to earn a year's livelihood would have taken a labourer not 52 weeks, but sometimes two years, or 58 weeks, or 80 weeks, or 72 weeks; sometimes, however, less—48 or 35. It followed that on such a system the country could only with the utmost good fortune free itself from the economic difficulties of the century, and that the need of a poor-law was felt the more as these difficulties persisted. A voluntary or a municipal system could not suffice, even as a palliative, while such statutes as these were in force to render labour immobile and unprogressive. Also, while wages were fixed by statute or order, whether chiefly in the interest of the employers or not, obviously any shortage on the wages had to be made good by the community. The community, by fixing the wages to be earned in a livelihood, made itself responsible for their sufficiency. And it is suggestive to find that in the year in which the Artificers and Labourers Act (1563) was passed, the act for the enforcement of assessments of poor-rate (5 Eliz. cap. 3) was also enacted. The Law of Settlement, to which we have referred, passed in the reign of Charles II., was due, it is said, to a migration of labourers southward from counties where less favourable statutory wages prevailed; but it was, in fact, only a corollary of the Artificers and Labourers Act of 1563 and the Poor Relief Act of 1601. These laws, it may be said, were the means of making the English labourer, until the poor-law reform of 1834, a settled but landless serf, supported by a fixed wage and a state bounty. By the poor-law it was possible to continue this state of things till, in consequence of an absolute economic breakdown, there was no alternative but reform.

The philanthropic nature of the poor-law is indicated by its antecedents: once enacted, its bounties became a right; its philanthropy disappeared in a quasi-legal claim. Its object was to relieve the poor by home industries, apprentice children, and provide necessary relief to the poor unable to work. The act was commonly interpreted so as to include the whole of that indefinite class, the "poor"; by a better and more rigid interpretation it

was, at least in the 19th century, held to apply only to the "destitute," that is, to those who required "necessary relief"—according to the actual wording of the statute. The economic fallacy of home industries founded on rate-supplied capital early declared itself, and the method could only have continued as long as it did because it formed part of a general system of industrial control. When in the 18th century workhouses were established, the same industrial fallacy, as records show, repeated itself under new conditions. Within the parish it resulted in the farmer paying the labourer as small a wage as possible, and leaving the parish to provide whatever he might require in addition during his working life and in his old age. Thus, indeed, a gigantic experiment in civic employment was made for at least two centuries on a vast scale throughout the country—and failed. As was natural, the lack of economic independence reacted on the morals of the people. With pauperism came want of energy, idleness and a disregard for chastity and the obligations of marriage. The law, it is true, recognized the mutual obligations of parents and grandparents, children and grandchildren; but in the general poverty which it was itself a means of perpetuating such obligations became practically obsolete, while at all times they are difficult to enforce. Still, the fact that they were recognized implies a great advance in charitable thought. The act, passed at first from year to year, was very slowly put in force. Even before it was passed the poor-rate first assessed under the act of 1563 was felt to be "a greater tax than some subsidies," and in the time of Charles II. it amounted to a third of the revenue of England and Wales (Rogers, v. 81).

The service of villein and cottar was, as we have now seen, in part superseded by what we have called a statutory wage-control, founded on a basis of wage supplemented by relief, provided by a rate-supported poor-law. But it follows that with the decay of this system the poor-law itself should have disappeared, or should have taken some new and very limited form. Unfortunately, as in Roman times, state relief proved to be a popular and vigorous parasite that outlived the tree on which it was rooted: assessments of wage under the Statute of Labourers fell into disuse after the Restoration, it is said, and the statute was finally repealed in 1814, and sixty years later the act against illegal combinations of working men; but the serfdom of the poor-law, the *eleemosyna civica*, remained, to work the gravest evil to the labouring classes, and even after the reform of 1834 greatly impeded the recovery of their independence. Nevertheless, by a new law of state alms for the aged, or by statutory outdoor relief with, as some would wish, a regulated wage, it is now proposed to bring them once again under a thraldom similar to that from which they have so slowly emancipated themselves.

The endowed charities.

The policy adopted by Queen Elizabeth for the relief of the poor (1601) included a scheme for the reorganization of voluntary charity as well as plans for the extension of rate-aided relief. During the century, as we have seen, endeavours had been made to create a system of voluntary charity. This it was proposed to safeguard and promote concurrently with the extension of the poor-rate. Accordingly, in the poor-law it was arranged that the overseers, the new civic authority, and the churchwardens, the old parochial and charitable authority, should act in conjunction, and, subject to magisterial approval, together "raise weekly or otherwise" the necessary means "by taxation of every inhabitant." The old charitable organization was based on endowment, and the churchwarden was responsible for the administration of many such endowments. What was not available from these and other sources was to be raised "by taxation." The object of the new act was to encourage charitable gifts.

Towards the end of the 18th century, when the administration of poor relief fell into confusion, many charities were lost, or were in danger of being lost, and many were mismanaged. In 1786 and 1788 a committee of the House of Commons reported on the subject. In 1818, chiefly through the instrumentality of Lord Brougham, a commission of inquiry on educational charities was appointed, and in 1819 another commission to investigate (with some exceptions) all the charities for the poor in England and Wales. These and subsequent commissions continued their inquiries till 1835, when a select committee of the House of Commons made a strong report, advocating the establishment of a permanent and independent board, to inquire, to compel the production of accounts, to secure the safe custody of charity property, to adapt it to new uses on cy-près lines, &c. A commission followed in 1849, and eventually in 1853 the first Charitable Trusts Act was passed, under which "The Charity Commissioners of England and Wales" were appointed.

The following are details of importance:—(1) *Definition.*—The definition of the act of 1601 (Charitable Uses, 43 Eliz. 4) still holds good. It enumerates as charitable objects all that was once called "alms": (*a*) "The relief of aged, impotent and poor people"—the normal poor; "the maintenance of sick and maimed soldiers and mariners"—the poor chiefly by reason of war, sometime a class of privileged mendicants; (*b*) education, "schools of learning, free schools and scholars in universities"; and then (*c*) a group of objects which include general civic and religious purposes, and the charities of gilds and corporations; "the repair of bridges, ports, havens, causeways, churches, sea-banks and highways; the education and preferment of orphans; the relief, stock, or maintenance for houses of correction; marriages of poor maids, supportation, aid, and help of young tradesmen, handicraftsmen, and persons decayed"; and there follows (*d*) "the relief or redemption of prisoners or captives"; and, lastly, (*e*) "the aid and ease of any poor inhabitants concerning payment of fifteens" (the property-tax of Tudor times), setting out of soldiers, and other taxes. The definition might be illustrated by the charitable bequests of the next 60, or indeed 225, years. It is a fair summary of them. (2) *Charitable Gifts.*—A public trust and a charitable trust are, as this definition shows, synonymous. It is a trust which relates to public charities, and is not held for the benefit of private persons, *e.g.* relations, but for the common good, and, subject to the instructions of the founder, by trustees responsible to the community. Gifts for charitable purposes, other than those affected by the law of mortmain, have always been viewed with favour. "Where a charitable bequest is capable of two constructions, one of which would make it void and the other would make it effectual, the latter will be adopted by the court" (Tudor's *Charitable Trusts*, ed. 1906, by Bristowe, Hunt and Burdett, p. 167). Gifts to the poor, or widows, or orphans, indefinitely, or in a particular parish, were valid under the act, or for any purpose or institution for the aid of the "poor." Thus practically the act covered the same field as the poor-law, though afterwards it was decided that, "as a rule, persons receiving parochial relief were not entitled to the benefit of a charity intended for the poor" (Tudor, p. 167). (3) *Religious Differences.*—In the administration of charities which are for the poor the broadest view is taken of religious differences. (4) *Superstitious Uses.*—The superstitious use is one that has for its object the propagation of the rights of a religion not tolerated by the law (Tudor, p. 4). Consequently, so far as charities were held or left subject to such rights, they were illegal, or became legal only as toleration was extended. Thus by degrees, since the Toleration Act of 1688, all charities to dissenters have become legal—that is, trusts for schools, places for religious instruction, education and charitable purposes generally. But bequests for masses for the soul of the donor, or for monastic orders, are still void. (5) *Administration.*—The duty of administering charitable trusts falls upon trustees or corporations, and under the term "eleemosynary corporations" are included endowed hospitals and colleges. Under schemes of the Charity Commissioners, where charities have been remodelled, besides trustees elected by corporations, there are now usually appointed *ex-officio* trustees who represent some office or institution of importance in connexion with the charity. (6) *Jurisdiction by Chancery and Charity Commission.*—The Court of Chancery has jurisdiction over charities, under the old principle that "charities are trusts of a public nature, in regard to which no one is entitled by an immediate and peculiar interest to prefer a complaint for compelling the performance by the trustees of their obligations." The court, accordingly, represents the crown as *parens patriae*. Now, by the Charitable Trusts Act 1853, and subsequent acts, a charity commission has been formed which is entrusted with large powers, formerly enforced only by the Court of Chancery. (7) *Jurisdiction by Visitor.*—A further jurisdiction is by the "visitor," a right inherent in the founder of any eleemosynary corporation, and his heirs, or those whom he appoints, or in their default, the king. The object of the visitor is "to prevent all perverting of the charity, or to compose differences among members of the corporation." Formerly the bishop's ordinary was the recognized visitor (2 Henry V. 1, 1414) of hospitals, apart from the founder. Subsequently his power was limited (14 Eliz. c. 5, 1572) to hospitals for which the founders had appointed no visitors. Then (1601) by the Charitable Uses Act commissions were issued for inquiry by county juries. Now, apart from the duty of visitors, inquiry is conducted by the charity commissioners and the assistant commissioners. By subsequent acts (see below) ecclesiastical and eleemosynary charities have been still further separated and defined. (8) *Advice.*—"Trustees, or other persons concerned in the management

of a charity, may apply to the charity commissioners for their opinion, advice or direction; and any person acting under such advice is indemnified, unless he has been guilty of misrepresentation in obtaining it." (9) *Limitation of Charity Commissioners' Powers.*—The commissioners cannot, however, make any order with respect to any charity of which the gross annual income amounts to £50 or upwards, except on the application (in writing) of the trustees or a majority of them. Their powers are thus very limited, except when put in motion by the trustees. If a parish is divided they can apportion the charities if the gross income does not exceed £20. (10) *General Powers of the Charity Commission.*—Subject to the limitation of £50, &c., the charity commissioners have power (Charitable Trusts Act 1860) to make orders for the appointment or removal of trustees, or of any officer, and for the transfer, payment and vesting of any real or personal estate, or "for the establishment of any scheme for the administration" of the charity. (11) *Schemes and Remodelling of Charities.*—Under this power charities are remodelled, and small and miscellaneous charities put into one fund and applied to new purposes. The cy-près doctrine is applied, by which if a testator leaves directions that are only indefinite, or if the objects for which a charity was founded are obsolete, the charity is applied to some purpose, as far as possible, in accordance with the charitable intention of the founder. This doctrine probably received its widest application in the City of London Parochial Charities Act of 1883. Under other acts doles have been applied to education and to allotments. About 380 schemes are issued in the course of a year. (12) *Objects adopted in remodelling Charities.*—In the remodelling of charities for the general benefit of the poor some one or more of thirteen objects are usually included in the scheme. These are subscriptions to a medical charity, to a provident club or coal or clothing society, to a friendly society; for nurses, for annuities, for outfit for service, &c.; for emigration; for recreation grounds, clubs, reading-rooms, museums, lectures; for temporary relief to a limited amount in each year; for clothes, fuel, tools, medical aid, food, &c., or in money "in cases of unexpected loss or sudden destitution"; for pensions. (13) *Parochial Charities.*—By the Local Government Act of 1892, local ecclesiastical charities, *i.e.* endowments for "any spiritual purpose that is a legal purpose" (for spiritual persons, church and other buildings, for spiritual uses, &c.), are separated from parochial charities, "the benefits of which are, or the separate distribution of the benefits of which is, confined to inhabitants of a single parish, or of a single ancient ecclesiastical parish, or not more than five neighbouring parishes." These charities, since the Local Government Act 1894, are under the supervision of the parish councils, who appoint trustees for their management in lieu of the former overseer or vestry trustees, or, under certain conditions, "additional trustees." The accounts have to be submitted to the parish meeting, and the names of the beneficiaries of dole charities published. (14) *Official Trustees.*—There is also "an official trustee of charity lands," who as "bare trustee" may hold the land or stock of the charity managed by the trustees or administrators. In 1905 the stock transferred to the official trustees amounted to £24,820,945. (15) *Audit.*—The charity commissioners have no power of audit, but the trustees of every charity have to prepare a statement of accounts annually, and transmit it to the commission. The accounts have to be "certified under the hand of one or more of the trustees and by the auditor of the charity." (16) *Taxation.*—In the case of rents and profits of lands, &c., belonging to hospitals or almshouses, or vested in trustees for charitable purposes, allowances are made in diminution of income-tax (56 Vict. 35 § 61). From the inhabited house duty any hospital charity school, or house provided for the reception or relief of poor persons, is exempted (House Tax Act 1808). Also there is an exemption from the land-tax in regard to land rents, &c., in possession of hospitals before 1693. (17) *The Digest.*—A digest of endowed charities in England and Wales was compiled in the years 1861 to 1876. A new digest of reports and financial particulars has since been completed.

The income of endowed charities in 1876 was returned at £2,198,463. It is now, no doubt, considerably larger than it was in 1876. Partial returns show that at least a million a year is now available in England and Wales for the assistance of the aged poor and for doles. Between the poor-law, which, as it is at present administered, is a permanent endowment provided from the rates for the support of a class of permanent "poor," and endowed charities, which are funds available for the poor of successive generations, there is no great difference. But in their resources and administration the difference is marked. Local endowed charities were constantly founded after Queen Elizabeth's time till about 1830, and the poor-rate was at first supplementary of the local charities. When corn and fuel were dear and clothes very expensive, what now seem trivial endowments for food, fuel, coal and clothes were important assets in the thrifty management of a parish. But when the poor were recognized as a class of dependants entitled by law to relief from the community, the rate increased out of all proportion to the charities. A distinction then made itself felt between the "parish" poor and the "second" poor, or the poor who were not relieved from the rates, and relief from the rates altogether overshadowed the charitable aid. Charitable endowments were ignored, ill-administered, and often were lost. After 1834 the poor-law was brought under the control of the central government. Poor relief was placed in the hands of boards of guardians in unions of parishes. The method of co-operation between poor-law and charity suggested by the acts of Queen Elizabeth was set aside, and, as a responsible partner in the public work of relief, charity was disestablished. In the parishes the endowed charities remained in general a disorganized medley of separate trusts, jealously guarded by incompetent administrators. To give unity to this mass of units, so long as the principles of charity are misunderstood or ignored, has proved an almost impossible and certainly an unpopular task. So far as it has been achieved, it has been accomplished by the piecemeal legislation of schemes cautiously elaborated to meet local prejudices. Active reform has been resented, and politicians have often accentuated this resentment. In 1894 a select committee was appointed to inquire whether it was desirable to take measures to bring the action of the Charity Commission more directly under the control of parliament, but no serious grievances were substantiated. The committees' reports are of interest, however, as an indication of the initial difficulties of all charitable work, the general ignorance that prevails in regard to the elementary conditions that govern it, the common disregard of these principles, and the absence of any accepted theory or constructive policy that should regulate its development and its administration.

Charity in the parish after 1601.

After the Poor-Law Act of 1601 the history of the voluntary parochial charities in a town parish is marked by their decreasing amount and utility, as poor-law relief and pauperism increased. The act, it would seem, was not adopted with much alacrity by the local authorities. From 1625 to 1646 there were many years of plague and sickness, but in St Giles's, London, as late as 1649, the amount raised by the "collectors" (or overseers) was only £176. They disbursed this to "the visited poor" as "pensions." In 1665 an extra levy of £600 is mentioned. In the accounts of St Martin's-in-the-Fields, where, as in St Giles's, gifts were received, the change wrought by another half-century (1714) is apparent. The sources of charitable relief are similar to those in all the Protestant churches—English, Scottish or continental: church collections and offertories; correctional fines, such as composition for bastards and conviction money for swearers; and besides these, income from annuities and legacies, the parish estate, the royal bounty, and "petitions to persons of quality." In all £2041 was collected, but, so far as relief was concerned, the parish relied not on it, but on the poor-rate, which produced £3765. All this was collected and disbursed on their own authority by collectors, to orphans, "pensioners" or the "known or standing" poor, or to casual poor (£1818), including nurse children and bastards. The begging poor were numerous and the infant death-rate enormous, and each year three-fourths of those christened were "inhumanly suffered to die by the barbarity of nurses." The whole administration was uncharitable, injurious to the community and the family, and inhuman to the child. If one may judge from later accounts of other parishes even up to 1834, usually it remained the same, purposeless and unintelligent; and it can hardly be denied that, generally speaking, only since the middle of the 19th century has any serious attention been paid to the charitable side of parochial work. Parallel to the parochial movement of the poor-law in England, in France (about 1617) were established the *bureaux de bienfaisance*, at first entirely voluntary institutions, then recognized by the state, and during the Revolution made the central administration for relief in the communes.

Charitable movements after 1601.

In the 17th century in England, as in France, opinion favoured the establishment of large hospitals or *maisons Dieu* for the reception of the poor of different classes. In France throughout the century there was a continuous struggle with mendicancy, and the hospitals were used as places into which offenders were summarily driven. A new humanity was, however, beginning its protest. The pitiful condition of abandoned children attracted sympathy in both countries. St Vincent de Paul established homes for the *enfants trouvés*, followed in England by the establishment of the Foundling hospital (1739). In both countries the method was applied inconsiderately and pushed to excess, and it affected family life most injuriously. Grants from parliament supported the foundling movement in England, and homes were opened in many parts of the country. The demand soon became overwhelming; the mortality was enormous, and the cost so large

that it outstripped all financial expedients. The lesson of the experiment is the same as that of the poor-law catastrophe before 1834; only, instead of the able-bodied poor of another age, infants were made the object of a compassionate but undiscerning philanthropy. With widespread relief there came widespread abandonment of duty and economic bankruptcy. Had the poor-rates instead of charitable relief been used in the same way, the moral injury would have been as great, but the annual draft from the rates would have concealed the moral and postponed the economic disaster. To amend the evil, changes were made by which the relation between child and mother was kept alive, and a personal application on her part was required; the character of the mother and her circumstances were investigated, and assistance was only given when it would be "the means of replacing the mother in the course of virtue and the way of an honest livelihood." General reforms were also made, especially through the instrumentality of Jonas Hanway, to check infant mortality, and metropolitan parishes were required to provide for their children outside London. A kindred movement led to the establishment of penitentiaries (1758), of lock hospitals and lying-in hospitals (1749–1752).

In Queen Anne's reign there was a new educational movement, "the charity school"—"to teach poor children the alphabet and the principles of religion," followed by the Sunday-school movement (1780), and about the same time (1788) by "the school of industry"—to employ children and teach them to be industrious. In 1844 the Ragged School Union was established, and until the Education Act of 1870 continued its voluntary educational work. As an outcome of these movements, through the efforts of Miss Mary Carpenter and many others, in 1854–1855 industrial and reformatory schools were established, to prevent crime and reform child criminals. The orphanage movement, beginning in 1758, when the Orphan Working Home was established, has been continued to the present day on a vastly extended scale. In 1772 a society for the discharge of persons imprisoned for small debts was established, and in 1773 Howard began his prison reforms. This raised the standard of work in institutional charities generally. After the civil wars the old hospital foundations of St Bartholomew and St Thomas, municipalized by Edward VI., became endowed charities partly supported by voluntary contributions. The same fate befell Christ's Hospital, in connexion with which the voting system, the admission of candidates by the vote of the whole body of subscribers—that peculiarly English invention—first makes its appearance.

A new interest in hospitals sprang up at the end of the 17th century. St Thomas's was rebuilt (1693) and St Bartholomew's (1739); Guy's was founded in 1724, and on the system of free "letters" obtainable in exchange for donations, voluntary hospitals and infirmaries were established in London (1733 and later) and in most of the large towns. Towards the end of the 18th century the dispensary movement was developed—a system of local dispensaries with fairly definite districts and home visiting, a substitute for attendance at a hospital, where "hospital fever" was dreaded, and an alternative to what was then a very ill-administered system of poor-law medical relief. After 1840 the provident dispensary was introduced, in order that the patients by small contributions in the time of health might provide for illness without having to meet large doctors' bills, and the doctor might receive some sufficient remuneration for his attendance on poor patients. This movement was largely extended after 1860. Three hospital funds for collecting contributions for hospitals and making them grants, a movement that originated in Birmingham in 1859, were established in London in 1873 and 1897.

Since 1868 the poor-law medical system of Great Britain has been immensely improved and extended, while at the same time the number of persons in receipt of free medical relief in most of the large towns has greatly increased. The following figures refer to London: at hospitals, 97 in number, in-patients (1904) during the year, 118,536; out-patients and casualty cases, 1,858,800; patients at free, part-pay, or provident dispensaries, about 280,000; orders issued for attendance at poor-law dispensaries and at home, 114,158. The number of beds in poor-law infirmaries (1904) was 16,976. There are in London 12 general hospitals with, 18 without, medical schools, and 67 special hospitals. Thus the population in receipt of public and voluntary medical relief is very large, indeed altogether excessive.

Each religious movement has brought with it its several charities. The Society of Friends, the Wesleyans, the Baptists have large charities. With the extension of the High Church movement there have been established many sisterhoods which support penitentiaries, convalescent homes and hospitals, schools, missions, &c.

The magnitude of this accumulating provision of charitable relief is evident, though it cannot be summed up in any single total.

At the beginning of the 19th century anti-mendicity societies were established; and later, about 1869, in England and Scotland a movement began for the organization of charitable relief, in connexion with which there are now societies and committees in most of the larger towns in Great Britain, in the colonies, and in the United States of America. More recently the movement for the establishment of settlements in poor districts, initiated by Canon Barnett at Toynbee Hall—"to educate citizens in the knowledge of one another, and to provide them with teaching and recreation"—has spread to many towns in England and America.

Progress of thought in 18th and 19th centuries.

These notes of charitable movements suggest an altogether new development of thought. On behalf of the charity school of Queen Anne's time were preached very formal sermons, which showed but little sympathy with child life. After the first half of the century a new humanism with which we connect the name of Rousseau, slowly superseded this formal beneficence. Rousseau made the world open its eyes and see nature in the child, the family and the community. He analysed social life, intent on explaining it and discovering on what its well-being depended; and he stimulated that desire to meet definite social needs which is apparent in the charities of the century. Little as it may appear to be so at first sight, it was a period of charitable reformation. Law revised the religious conception of charity, though he was himself so strangely devoid of social instinct that, like some of his successors, he linked the utmost earnestness in belief to that form of almsgiving which most effectually fosters beggardom. Howard introduced the era of inspection, the ardent apostle of a new social sagacity; and Bentham, no less sagacious, propounded opinions, plans and suggestions which, perhaps it may be said, in due course moulded the principles and methods of the poor-law of 1834. In the broader sense the turn of thought is religious, for while usually stress is laid on the religious scepticism of the century, the deeper, fervent, conscientious and evangelical charity in which Nonconformists, and especially "the Friends," took so large a part, is often forgotten. Sometimes, indeed, as often happens now, the feeling of charity passed into the merest sentimentality. This is evident, for instance, from so ill-considered a measure as Pitt's Bill for the relief of the poor. On the other hand, during the 18th century the poor-law was the object of constant criticism, though so long as the labour statutes and the old law of settlement were in force, and the relief of the labouring population as state "poor" prevailed, it was impossible to reform it. Indeed, the criticism itself was generally vitiated by a tacit acceptance of "the poor" as a class, a permanent and irrevocable charge on the funds of the community; and at the end of the 18th century, when the labour statutes were abrogated, but the conditions under which poor relief was administered remained the same, serfdom in its later stage, the serfdom of the poor-law, asserted itself in its extremest form in times of dearth and difficulty during the Napoleonic War. In 1802–1803 it was calculated (Marshall's *Digest*) that 28% of the population were in receipt of permanent or occasional relief. Those in receipt of the former numbered 734,817, including children—so real had this serfdom of the poor become.

In 1832 the expenditure on pauperism in England and Wales was £7,036,968. In the early years of the 19th century the mendicity societies, established in some of the larger towns, were a sign of the general discontent with existing methods of administration. The Society for Bettering the Condition of the

Poor—representing a group of men such as Patrick Colquhoun, Sir I. Bernard, Dr Lettsom, Dr Haygarth, James Neald, Count Rumford and others—took a more positive line and issued many useful publications (1796). After 1833 the very atmosphere of thought seems changed. There was a general desire to be quit of the serfdom of pauperism. The Poor-law Amendment Act was passed in 1834, and since then male able-bodied pauperism has dwindled to a minimum. The bad years of 1860–1870 revived the problem in England and Scotland, and the old spirit of reform for a time prevailed. Improved administration working with economic progress effected still further reductions of pauperism, till on the 1st of January 1905 (exclusive of lunatics in county asylums and casual paupers) the mean number of paupers stood at 764,589, or 22·6 per thousand of the population, instead of 41·8 per thousand as in 1859 (see POOR-LAW).

Charity organization societies were formed after 1869, with the object of "improving the condition of the poor," or, in other words, to promote independence by an ordered and co-operative charity; and the Association for Befriending Young Servants, and workhouse aid committees, in order to prevent relapse into pauperism on the part of those who as children or young women received relief from the poor-law. The Local Government Board adopted a restricted out-door relief policy, and a new interest was felt in all the chief problems of local administration. The movement was general. The results of the Elberfeld system of municipal relief administered by unpaid almoners, each dealing with but one or two cases, influenced thought both in England and America. The experience gained by Mr Joseph Tuckerman of Boston of the utility of registering applications for relief, and the teaching of Miss Octavia Hill, led to the foundation of the system of friendly visiting and associated charity at Boston (1880) and elsewhere. Since that time the influence of Arnold Toynbee and the investigations of Charles Booth have led to a better appreciation of the conditions of labour; and to some extent, in London and elsewhere, the spirit of charity has assumed the form of a new devotion to the duties of citizenship. But perhaps, in regard to charity in Great Britain, the most important change has been the revival of the teaching of Dr Chalmers (1780–1847), who (1819) introduced a system of parochial charity at St John's, Glasgow, on independent lines, consistent with the best traditions of the Scottish church. In the development of the theory of charitable relief on the economic side this has been a main factor. His view, which he tested by experience, may be summed up as follows: Society is a growing, self-supporting organism. It has within it, as between family and family, neighbour and neighbour, master and employee, endless links of sympathy and self-support. Poverty is not an absolute, but a relative term. Naturally the members of one class help one another; the poor help the poor. There is thus a large invisible fund available and constantly used by those who, by their proximity to one another, know best how to help. The philanthropist is an alien to this life around him. Moved by a sense of contrast between his own lot, as he understands it, and the lot of those about him, whom he but little understands, he concludes that he should relieve them. But his gift, unless it be given in such a way as to promote this self-support, instead of weakening it, is really injurious. In the first place, by his interference he puts a check on the charitable resources of another class and lessens their social energy. What he gives they do not give, though they might do so. But next, he does more harm than this. He stimulates expectation, so that by a false arithmetic his gift of a few shillings seems to those who receive it and to those who hear of it a possible source of help in any difficulty. To them it represents a large command of means; and where one has received what, though it be little, is yet, relative to wage, a large sum to be acquired without labour, many will seek more, and with that object will waste their time and be put off their work, or even be tempted to lie and cheat. So social energy is diverted from its proper use. Alms thus given weakens social ties, diminishes the natural relief funds of mutual help, and beggars a neighbour instead of benefiting him. By this argument a clear and well-defined purpose is placed before charity. Charity becomes a science based on social principles and observation. Not to give alms, but to keep alive the saving health of the family, becomes its problem: relief becomes altogether subordinate to this, and institutions or societies are serviceable or the reverse according as they serve or fail to serve this purpose. Not poverty, but distress is the plea for help; not almsgiving, but charity the means. To charity is given a definite social aim, and a desire to use consistently with this aim every method that increasing knowledge and trained ability can devise.

Under such influences as these, joined with better economic conditions, a great reform has been made. The poor-law, however, remains—the modern *eleemosyna civica*. It now, indeed, absorbs a proportionately lesser amount of the largely increased national income, but, excluding the maintenance of lunatics, it costs Great Britain more than twelve millions a year; and among the lower classes of the poor, directly or indirectly, it serves as a bounty on dependence and is a permanent obstacle to thrift and self-reliance. The number of those who are within the circle of its more immediate attraction is now perhaps, in different parts of the country or different districts in a town, not more than, say, 20% of the population. Upon that population the statistics of a day census would show a pauperism not of 2·63, the percentage of the mean day pauperism on the population in 1908, but of 13·15%; and the percentage would be much greater—twice as large, perhaps—if the total number of those who in some way received poor relief in the course of a year were taken into account. The English poor-law is thus among the lower classes, those most tempted to dependence—say some six or seven millions of the people—a very potent influence definitely antagonistic to the good development of family life, unless it be limited to very narrow proportions; as, for instance, to restricted indoor or institutional relief for the sick, for the aged and infirm, who in extreme old age require special care and nursing, and for the afflicted, for whom no sufficient charitable provision is procurable. As ample experience shows, only on these conditions can poor-law relief be justified from the point of view of charity and the common good. In marked contrast to this opinion is the English movement for Old Age pensions, which came to its first fruition in 1908—a huge charity started on the credit of the state, the extension of which might ultimately involve a cost comparable with that of the army or the navy. Schemes of the kind have been adopted in the Australasian colonies with limitations and safeguards; and they seem likely to develop into a new type of poor-relief organization for the aged and infirm (Report: Royal Commission on Old Age Pensions, Commonwealth of Australia, 1906). In England, partly to meet the demand for better state provision for the aged, the Local Government Board in 1900 urged the boards of guardians to give more adequate outdoor relief to aged deserving people, and laid no stress on the test of destitution, or, in other words, the limitation of relief to what was actually "necessary," the neglect of which has led to new difficulties. History has proved that demoralization results from the wholesale relief whether of the mass of the citizens, or of the able-bodied, or of the children, and the proposal to limit the endowment to the aged makes no substantial difference. The social results must be similar; but social forces work slowly, and usually only the unanswerable argument of financial bankruptcy suffices to convert a people habituated to dependence, though the inward decay of vitality and character may long before be manifest. Ultimately the distribution of pensions by way of out-door relief, corrupting a far more independent people, is calculated to work a far greater injury than the *annona civica*. Such an endowment of old age might indeed be justified as part of a system of regulated labour, which, as in earlier times, could not be enforced without some such extraneous help, but it could not be justified otherwise. It is naturally associated, therefore, with socialistic proposals for the regulation of wage.

In the light of the principles of charity, which we have considered historically, we have now to turn to two questions: charity and economics, and charity and socialism.

The object of charity is to render to our neighbour the services and duties of goodwill, friendship and love. To prevent distress

charity has for its further object to preserve and develop the manhood and womanhood of individuals and their self-maintenance in and through the family; and any form of state intervention is approved or disapproved by the same standard. By self-maintenance is meant self-support throughout life in its ordinary contingencies —sickness, widowhood, old age, &c. Political economy we would define as the science of exchange and exchange value. Here it has to be considered in relation to the purposes of charity. By way of illustration we take, accordingly, three points: distribution and use, supplementation of wage, and the standard of well-being or comfort in relation to wage.

The economics of charity.

(1) *Distribution and Use.*—Economy in the Greek sense begins at this point—the administration and the use of means and resources. Political economy generally ignores this part of the problem. Yet from the point of view of charity it is cardinal to the whole issue. The distribution of wage may or may not be largely influenced by trades unions; but the variation of wage, as is generally the case, by the increase or decrease of a few pence is of less importance than its use. Comparing a careful and an unthrifty family, the difference in use may amount to as much as a third on the total wage. Mere abstention from alcohol may make, in a normal family, a difference of 6s. in a wage of 25s. On the other hand, membership of a friendly society is at a time of sickness equivalent to the command of a large sum of money, for the common stock of capital is by that means placed at the disposal of each individual who has a share in it. Further, even a small amount saved may place the holder in a position to get a better market for his labour; he can wait when another man cannot. Rent may be high, but by co-operation that too may be reduced. Other points are obvious and need not be mentioned. It is evident that while the amount of wage is important, still more important is its use. In use it has a large expansive value. (2) *Supplementation of Wage.*—The exchange between skill and wage must be free if it is to be valid. The less the skill the greater is the temptation to philanthropists to supplement the lesser wage; and the more important is non-supplementation, for the skilled can usually look after their own interests in the market, while the less skilled, because their labour is less marketable, have to make the greater effort to avoid dependence. But the dole of endowed charities, outdoor relief, and any constant giving, tend to reduce wage, and thus to deprive the recipients of some part of the means of independence. The employer is pressed by competition himself, and in return he presses for profit through a reduced wage, if circumstances make it possible for the workman to take it. And thus a few individuals may lower the wages of a large class of poorly skilled or unskilled hands. In these conditions unionism, even if it were likely to be advantageous, is not feasible. Unionism can only create a coherent unit of workers where there is a limited market and a definite saleable skill. Except for the time, insufficient wage will not be remedied in the individual case by supplementation in any form—doles, clothes, or other kinds of relief; and in that case, too, the relief will probably produce lessened energy after a short time, or in other words lessened ability to live. An insufficient wage may be prevented by increasing the skill of the worker, who will then have the advantage of a better series of economic exchanges, but hardly otherwise. If the supplementation be not immediate, but postponed, as in the case of old-age pensions, its effect will be similar. To the extent of the prospective adventitious gain the attraction to the friendly society and to mutual help and saving will grow less. Necessity has been the inventor of these; and where wage is small, a little that would otherwise be saved is quickly spent if the necessity for saving it is removed. Only necessity schools most men, especially the weak, to whom it makes most difference ultimately, whether they are thrifty or whether or not they save for the future in any way. (3) *The Standard of Well-being or Comfort in Relation to Wage.*—With an increase of income there has to be an increase in the power to use income intelligently. Whatever is not so used reacts on the family to its undoing. Constantly when the wife can earn a few shillings a week, the husband will every week idle for two or three days; so also if the husband finds that in a few days he can earn enough to meet what he considers to be his requirements for the week. In these circumstances the standard of well-being falls below the standard of wage; the wage is in excess of the energy and intelligence necessary to its economic use, and in these cases ultimately pauperism often ensues. The family is demoralized. Thus, with a view to the prevention of distress in good times, when there is the less poverty there is the more need of charity, rightly understood; for charity would strive to promote the right use of wage, as the best means of preventing distress and preserving the economic well-being of the family.

The theory of charity separates it entirely from socialism, as that word is commonly used. Strictly socialism means, in questions affecting the community, a dominant regard for the common or social good in so far as it is contrary to private or individual advantage. But even so the antithesis is misleading, for the two need not be inconsistent. On the contrary, the common good is really and ultimately only individual good (not advantage) harmonized to a common end. The issue, indeed, is that of old Greek days, and the conditions of a settlement of it are not substantially different. Using modern terms one may say that charity is "interventionist." It has sought to transform the world by the transformation of the will and the inward life in the individual and in society. It would intensify the spirit and feeling of membership in society and would aim at improving social conditions, as science makes clear what the lines of reform should be. So it has constantly intervened in all kinds of ways, and, in the 19th century for instance, it has initiated many movements afterwards taken up by public authorities—such as prison reform, industrial schools, child protection, housing, food reform, &c., and it has been a friendly ally in many reforms that affect industry very closely, as, for instance, in the introduction of the factory acts. But it has never aimed at recasting society itself on a new economic plan, as does socialism. Socialism indeed offers the people a new state of social security. It recognizes that the *annona civica* and the old poor-law may have been bad, but it would meet the objection made against them by insisting on the gradual creation of a new industrial society in which wage would be regulated and all would be supported, some by wage in adult life, some by allowance in old age, and others by maintenance in childhood. Accordingly for it all schemes for the state maintenance of school children, old age pensions, or state provision for the unemployed are, like municipal trading, steps towards a final stage, in which none shall want because all shall be supported by society or be dependent on it industrially. To charity this position seems to exclude the ethical element in life and to treat the people primarily or chiefly as human animals. It seems also to exclude the motives for energy and endeavour that come from self-maintenance. Against it, on the other hand, socialism would urge, that only by close regulation and penalty will the lowest classes be improved, and that only the society that maintains them can control them. Charity from its experience doubts the possibility of such control without a fatal loss of initiative on the part of those controlled, and it believes both that there is constant improvement on the present conditions of society and that there will be constantly more as science grows and its conclusions are put in force. Thus charity and socialism, in the usual meaning of the word, imply ultimately two quite different theories of social life. The one would re-found society industrially, the other would develop it and allow it to develop.

Charity and socialism.

The springs of charity lie in sympathy and religion, and, one would now add, in science. To organize it is to give to it the "ordered nature" of an organic whole, to give it a definite social purpose, and to associate the members of the community for the fulfilment of that purpose. This in turn depends on the recognition of common principles, the adoption of a common method, self-discipline and training, and co-operation. In a mass of people there may be a large variation in motives coincident with much unity in action. Thus there may be acceptance of a common social purpose in charity, while in one the impulse is similar to that which moved St Francis or George Herbert, in another to that which moved Howard or Dr Chalmers, or a modern poor-law reformer like Sir G. Nicholls or E. Denison. Accepting, then, the principles of charity, we pass to the method in relation to assistance and relief. Details may vary, but on the following points there is general agreement among students and workers:—

The organization of charity.

(1) *The Committee or Conference.*—There are usually two kinds of local relief: the public or poor-law relief, and relief connected with religious agencies. Besides, there is the relief of endowments, societies and charitable persons. Therefore, as a condition precedent to all organization, there must be some local centre of association for information and common help. A town should be divided for this purpose into manageable areas coincident with parishes or poor-law divisions, or other districts. Subject to an acceptance of general principles, those engaged in charity should be members of a local conference or committee, or allied to it. The committee would thus be the rallying-point of a large and somewhat loosely knit

association of friends and workers. (2) *Inquiry, Aid and Registration.*—The object of inquiry is to ascertain the actual causes of distress or dependence, and to carry on the work there must usually be a staff of several honorary and one or two paid workers. Two methods may be adopted: to inquire in regard to applications for help with a view to forming some plan of material help or friendly aid, or both, which will lead to the ultimate self-support of the family and its members, and, under certain conditions, in the case of the aged or sick, to their continuous or their sufficient help; or to ascertain the facts partly at once, partly by degrees, and then to form and carry out some plan of help, or continue to befriend the family in need of help, in the hope of bringing them to conditions of self-support, leaving the work of relief entirely to other agencies. The committee in neither case should be a relief committee—itself a direct source of relief. On the former method it has usually no relief fund, but it raises from relations, employers, charities and charitable persons the relief required, according to the plan of help agreed upon, unless, indeed, it is better not to relieve the case, or to leave it to the poor-law. The committee thus makes itself responsible for endeavouring to the best of its ability to raise the necessary relief, and acts as trustee for those who co-operate without it, in such a way as to keep intact and to give play to all the natural obligations that lie within the inner circles of a self-supporting community. On the latter method the work of relief is left to general charity, or to private persons, or to the poor-law; and the effort is made to help the family to self-support by a friendly visitor. This procedure is that adopted by the associated charities in Boston, Mass., and other similar societies in America and elsewhere. It is akin also to that adopted in the municipal system of relief in Elberfeld—which has become with many variations in detail the standard method of poor relief in Germany. The method of associated help, combined with personal work, represents the usual practice of charity organization societies. *Mutatis mutandis*, the plan can be adopted on the simplest scale in parochial or other relief committees, subject to the safeguards of sufficient training and settled method. The inquiry should cover the following points: names and address, and ages of family, previous addresses, past employment and wages, present income, rent and liabilities, membership of friendly or other society, and savings, relations, relief (if any) from any source. These points should be verified, and reference should be made to the clergy, the poor-law authorities, and others, to ascertain if they know the applicant. The result should be to show how the applicant has been living, and what are the sources of possible help, and also what is his character. The problem, however, is not whether the person is "deserving" or "undeserving," but whether, granted the facts, the distress can be stayed and self-support attained. If the help can be given privately from within the circle of the family, so much the better. Often it may be best to advise, but not to interfere. In some cases but little help may be necessary; in others again the friendly relation between applicant and friend may last for months and even years. Usually in charitable work the question of the kind of relief available—money, tickets, clothes, &c.—governs the decision how the case should be assisted. But this is quite wrong: the opposite is the true rule. The wants of the case, rightly understood, should govern the decision as to what charity should do and what it should provide. Cases are overwhelming in number, as at the out-patient and casualty departments of a hospital, where the admissions are made without inquiry, and subject practically to no restrictions; but when there is inquiry, and each case is seriously considered and aided with a view to self-support, the numbers will seldom be overwhelming. On this plan appeal is made to the strength of the applicant, and requires an effort on his part. Indiscriminate relief, on the other hand, attracts the applicant by an appeal to his weakness, and it requires of him no effort. Hence, apart even from the differentiating effect of inquiry, one method makes applicants, the other limits their number, although on the latter plan much more strenuous endeavours be made to assist the lesser number of claimants. For the routine work of the office an extremely simple system of records with card index, &c., has been devised. In some cities, particularly in the United States of America, there is a central registration of cases, notified by individual charities, poor-relief authorities and private persons. The system of charity organization or associated charity, it will be seen, allows of the utmost variety of treatment, according to the difficulties in each instance and the remedies available, and the utmost scope for personal work. (3) *Training.*—If charitable work is an art, those who undertake it must needs be trained both in practice and method and in judgment. It requires, too, that self-discipline which blends intelligence with emotion, and so endows emotion with strength and purpose. In times of distress a reserve of trained workers is of the utmost service. At all times they do more and produce, socially, better results; but when there is general distress of any kind they do not lose their heads like new recruits, but prevent at least some of the mischief that comes of the panic which often takes possession of a community, when distress is apprehended, and leads to the wildest distribution of relief. Also trained workers make the most useful poor-law guardians, trustees of charities, secretaries of charitable societies and district visitors. All clergy and ministers and all medical men who have to be engaged in the administration of medical relief should learn the art of charity. Poor-law guardians are usually elected on political or general grounds, and have no special knowledge of good methods of charity; and trustees are seldom appointed on the score of their qualifications on this head. To provide the necessary education in charity there should be competent helpers and teachers at charity organization committees and elsewhere, and an alliance for this purpose should be formed between them and professors and teachers of moral science and economics and the "settlements." Those who study social problems in connexion with what a doctor would call "cases" or "practice" see the limits and the falsity of schemes that on paper seem logical enough. This puts a check on the influence of scheme-building and that literary sensationalism which makes capital out of social conditions. (4) *Co-operation.*—Organization in charity depends on extensive co-operation, and ultimately on the acceptance of common views. This comes but slowly. But with much tribulation the goal may be reached, if in case after case the effort is made to provide friendly help through charities and private persons,—unless, as may well be, it should seem best not to interfere, but to leave the applicant to apply to the administrators of public relief. Experience of what is right and wrong in charity is thus gained on both sides. Many sources may have to be utilized for aid of different kinds even in a single case, and for the prevention of distress co-operation with members of friendly societies and with co-operative and thrift agencies is indispensable.

The poor law.

Where there is accord between charity and the poor-law pauperism may be largely reduced. The poor-law in most countries has at its disposal certain institutional relief and out-door allowances, but it has no means of devising plans of help which may prevent application to the rates or "take" people "off the rates." Thus a widow in the first days of widowhood applies and receives an allowance according to the number of her children. Helped at the outset by charity on some definite plan, she may become self-supporting; and if her family be large one or two of her children may be placed in schools by the guardians, while she maintains the remaining children and herself. As far as possible there should be a division of labour between the poor-law and charity. Except where some plan such as that just mentioned is adopted, one or the other should take whole charge of the case relieved. There should be no supplementation of poor-law relief by charity. This will weaken the strength and dissipate the resources of charity without adding to the efficiency of the poor-law. Unless the guardians adopt a restrictive out-door relief policy, there is no scope for any useful division of labour between them and charity; for the many cases which, taken in time, charity might save from pauperism, they will draw into chronic dependence by their allowances a very much larger number. But if there is a restrictive out-door policy, so far as relief is necessary, charity may undertake to meet on its own lines distress which the poor-law would otherwise have met by allowances, and, subject to the assistance of urgent cases, poor-law relief may thus by degrees become institutional only. Then, in the main, natural social forces would come into play, and dependence on any form of *annona civica* would cease.

Hospitals.

Open-handed hospitality always creates mendicants. This is what the hospitals offer in the out-patient and casualty departments, and they have created a class of hospital mendicants. The cases are quickly dealt with, without inquiry and without regard to home conditions. The medical man in the hospital does not co-operate with any fellow-workers outside the hospital. Where his physic or advice ceases to operate his usefulness ceases. He regards no conditions of morality. In a large number of cases drink or vice is the cause of application, and the cure of the patient is dependent on moral conditions; but he returns home, drinks and may beat his wife, and then on another visit to the hospital he will again be physicked and so on. The man is not even referred to the poor-law infirmary for relief. Nor are conditions of home sanitation regarded. One cause of constant sickness is thus entirely overlooked, while drugs, otherwise unnecessary, are constantly given at the hospital. The hospitals are thus large isolated relief stations which are creating a new kind of pauperism. So far as the patients can pay—and many can do so—the general practitioners, to whom they would otherwise go, are deprived of their gains. Still worse is it when the hospital itself charges a fee in its out-patient department. The relief is then claimed even more absolutely as a right, and the general

practitioners are still further injured. The doctors, as a medical staff, are not only medical men, but whether they recognize the fact or not, they are also almsgivers or almoners; what they give is relief. Yet few or none of them have ever been trained for that work, and consequently they do not realize how very advantageous, even for the cure of their own patients, would be a thorough treatment of each case both at the hospital and outside it. Nor can they understand how their methods at present protract sickness and promote habitual dependence. Where this side of their work studied by them in any way they would be the first, probably, to press upon the governors of their hospitals the necessity for a change. Unfortunately, at present the governors are themselves untrained, and to finance the hospital and to make it a good institution is their sole object. Hospitals, however, are, after all, only a part of the general administration of charity, though as they are now managed they have seldom any systematic connexion with that administration. Nor is there any co-ordination between the several hospitals and dispensaries. If one rightly refuses further treatment to certain applicants, they have only to wander to some other hospital, there to be admitted with little or no scrutiny. For usually outpatients and casualty patients are not even registered, nor can they be identified if they apply again. Practically they come and go at will. The definite limitation of cases, according to some standard of effectual work, association with general charity, trained almonership and inquiry, and a just regard for the interests of general practitioners, are stepping-stones to reform. In towns where medical charities are numerous a representative board would promote mutual help and organization.

Like the poor-law, endowed charities may be permanent institutions established to meet what should be passing and decreasing needs (cf. the arguments in *The State and Charity*, by T. Mackay). Administered as they usually are in isolation—apart from the living voluntary charities of the generation, and consisting often of small trusts difficult to utilize satisfactorily, they tend to create a permanent demand which they meet by fixed quantities of relief. Also, as a rule, they make no systematic inquiries with a view to the verification of the statements of the applicants, for they have no staff for these purposes; nor have they the assistance of almoners or friendly visitors. Nor does the relief which they give form part of any plan of help in conjunction with other aid from without; nor is the administration subject to frequent inspection, as in the case of the poor-law. All these conditions have led to a want of progress in the actual administration of endowed charities, in regard to which it is often very difficult to prevent the exercise of an undue patronage. But there is no reason why these charities should not become a responsible part of the country's administration, aiding it to reduce outdoor pauperism. It was never intended that the poor-law should extinguish the endowed charities, still less, as statistics now prove, that where endowments abound the rate of pauperism should be considerably above the average of the rest of the country. This shows that these charities often foster pauperism instead of preventing it. As a step to reform, the publication of an annual register of endowed charities in England and Wales is greatly needed. The consolidating schemes of the charity commissioners have done much good; still more may be done in some counties by extending to the county the benefits of the charities of well-endowed towns, as has been accomplished by the extension of the eleemosynary endowments of the city of London to the metropolitan police area. Nor, again, until quite lately, and that as yet only in a few schemes, has the principle been adopted that pensions or other relief should be given only in supplementation of the relief of relations, former employers and friends, and not in substitution of it. This, coupled with good methods of inquiry and supervision, has proved very beneficial. Hitherto, however, to a large extent, endowed charities, it must be admitted, have tended to weaken the family and to pauperize.

Endowed charities.

In many places funds are raised for the relief of school children by the supply of meals during the winter and spring; and an act has now been passed in England (1906) enabling the cost to be put upon the rates. Usually a very large number of children are said to be underfed, but inquiry shows that such statements may be taken as altogether excessive. They are sometimes based on information drawn from the children at school; or sometimes on general deductions; they are seldom founded on any systematic and competent inquiry at the homes. When this has been made, the numbers dwindle to very small proportions. Teachers of experience have noted the effect of the meals in weakening the independence of the family. While they are forthcoming women sometimes give up cooking meals at home, use their money for other things, and tell the child he can get his meal at school. Great temptations are put before a parent to neglect her family, and very much distress is due to this. The meals—just at a time when, owing to the age of her children, the mother's care is most needed, and just in those families where the temptation is greatest, and where the family instinct should be strengthened—stimulate this neglect. Considered from the point of view of meeting by eleemosynary provision a normal economic demand for food, intervention can only have one result. The demand must continue to outstrip the supply, so long as there are resources available on the one side, and until on the other side the desire of the social class that is chiefly exposed to the temptations of dependence in relation to such relief has been satisfied. If the provision be made from the resources of local or general taxation the largeness of the fund available will allow practically of an unlimited expansion of the supply of food. If the provision be made from voluntary sources, in some measure limited therefore and less certain, this very fact will tend to circumscribe demand and limit the offer of relief. It is indeed the problem of poor-law relief in 1832 over again. The relief provided by local taxation practically unlimited will create a mass of constant claimants, with a kind of assumed right to aid based on the payment of rates; while voluntary relief, whatever its shortcomings, will be less injurious because it is less amply endowed. In Paris the municipal subvention for meals rose from 545,900 francs in 1892 to 1,000,000 in 1904. Between 1894 and 1904 there was an increase of 9% in the school population; and an increase of 28% in the municipal grant. In that period the contributions from the local school funds (*caisses des écoles*) decreased 36%; while the voluntary contributions otherwise received were insignificant; and the payments for meals increased 2%.

Relief to children at school.

The subject has been lately considered from a somewhat different standpoint (cf. the reports of the Scottish Royal Commission on Physical Education, 1903; of the Inter-departmental committees on Physical Deterioration, 1905, and on Medical Inspection and the Feeding of School Children, 1905; also the report of the special committee of the Charity Organization Society on "the assistance of school children," 1893). After careful investigations medical officers especially have drawn attention to the low physical condition of children in schools in the poorer parts of large English towns, their low stature, their physical defects, the improper food supplied to them at home, their uncleanliness, and their want of decent bringing-up, and sometimes their want of food. Other inquiries have shown that, as women more usually become breadwinners their children receive less attention, and the home and its duties are neglected, while in the lowest sections of the poorer classes social irresponsibility reaches its maximum. Cheap but often quite improper food is provided, and infant mortality, which is largely preventable, remains as high as ever, though adult life is longer. This, with a marked decrease in the birth-rate in recent years, has, it may be said, opened out a new field for charitable effort and social work. Science is at each revision of the problem making its task more definite. Actually the mere demand for meals stands for less; the reform of home conditions for more. So it was hoped that instead of making school meals a charge on taxation, as parliament has done, it would be content to leave it a voluntary charge, while the medical inspection of elementary schools will be made universal; representative relief committees formed for schools or groups of schools; the cases of want or distress among the school children dealt with individually in

connexion with their families, and, where necessary, day schools established on the lines of day industrial schools.

Exceptional distress.

At a time of exceptional distress the following suggestions founded on much English experience may be of service (cf. Report of special committee of the Charity Organization Society on the best means of dealing with exceptional distress, 1886). Usually at such a time proposals are made to establish special funds, and to provide employment to men and women out of work. But it is best, if possible and as long as possible, to rely on existing agencies, and to strengthen them. Round them there are usually workers more or less trained. A new fund usually draws to it new people, many of whom may not have had any special experience at all. If a new fund is inevitable, it is best that it should make its grants to existing agencies after consultation with them. In any case, a clear policy should be adopted, and people should keep their heads. The exaggeration of feeling at a time of apprehended or actual distress is sometimes extraordinary, and the unwise action which it prompts is often a cause of continuing pauperism afterwards. Where there is public or poor-law relief the following plan may be adopted:—In any large town there are usually different recognized poor-law, charitable or other areas. The local people already at work in these areas should be formed into local committees. In each case a quick inquiry should be made, and the relieving officer communicated with, some central facts verified, and the home visited. Roughly, cases may be divided into three classes: the irresponsible casual labouring class; a middle class of men with decent homes, who have made no provision for the future, and are not members of either friendly society or trades union; and a third class, who have made some provision. These usually are affected last of all; at all hazards they should be kept from receiving public relief, and should be helped, as far as possible, privately and personally. If there are public works, the second class might be referred to them; if there are not, probably some should be left to the poor-law, some assisted in the same way as members of class three. Much would turn upon the family and the home. The first class should be left to the poor-law. If there is no poor-law system at work they should be put on public works. Working men of independent position, not the creatures of any political club, but such as are respected members of a friendly society, or are otherwise well qualified for the task, should be called into consultation. The relief should be settled according to the requirements of each case, but if the pressure is great, at first at least it may be necessary to make grants according to some generally sufficient scale. There should be as constant a revision of cases as time permits. Great care should be taken to stop the relief as soon as possible, and to do nothing to make it the stepping-stone to permanent dependence.

If employment be provided it should be work within the skill of all; it should be fairly remunerated, so that at least the scantiness of the pay may not be an excuse for neglect; and it should be paid for according to measured or piece work. The discipline should be strict, though due regard should be paid at first to those unaccustomed to digging or earthwork. In England and Wales the guardians have power to open labour yards. These, like charities which provide work, tend to attract and keep in employment a low class of labourer or workman, who finds it pays him to use the institution as a convenience. It is best, therefore, to avoid the opening of a labour yard if possible. If it is opened, the discipline should be very strict, and when there is laziness or insubordination, relief in the workhouse should at once be offered. The relief furnished to men employed in a labour yard, of which in England at least half has to be given in kind, should, it has been said, be dealt out from day to day. This leads to the men giving up the work sooner than they otherwise would. They have less to spend.

Unemployment.

In Great Britain a great change has taken place in regard to the provision of employment in connexion with the state. Since about 1890 there has been a feeling that men in distress from want of employment should not be dealt with by the poor-law. A circular letter issued by the Local Government Board in 1886, and subsequently in 1895, coincided with this feeling. It was addressed to town councils and other local authorities, asking them to provide work (1) which will not involve the stigma of pauperism, (2) which all can perform whatever may have been their previous avocations, and (3) which does not compete with that of other labourers at present in employment. This circular led to the vestries and subsequently the borough councils in many districts becoming partially recognized relief authorities for the unemployed, concurrently with the poor-law. Much confusion resulted. The local authorities had seldom any suitable organization for the investigation of applications. It was difficult to supply work on the terms required; and the work was often ill-done and costly. Also it was found that the same set of people would apply year after year, unskilled labourers usually out of work part of the winter, or men habitually "unemployed." As on other occasions when public work was provided, very few of the applicants were found to be artisans, or members of trades unions or of friendly societies. In 1904 Mr Long, then president of the Local Government Board, proposed that local voluntary distress committees should be established in London consisting of poor-law guardians and town councillors and others, more or less supervised by a central committee and ultimately by the Local Government Board. This organization was set on foot and large sums were subscribed for its work. The report on the results of the movement was somewhat doubtful (Report, London Unemployed Fund, 1904–1905, p. 101, &c.), but in 1905 the Unemployed Workmen's Act was passed, and in London and elsewhere distress committees like the voluntary committees of the previous year were established by statute. It was enacted that for establishment expenses, emigration and removal, labour exchanges, and the acquisition of land a halfpenny rate might be levied, but that the rate would not be available for the remuneration of men employed. For this purpose (1905–1906) a large charitable fund was raised. A training farm at Hollesley Bay was acquired, and it was hoped to train Londoners there to become fit for agricultural work. It is impossible to judge this experiment properly, on the evidence available up to 1908. But one or two points are important: (1) something very like the "right to labour" has been granted by the legislature; (2) this has been done apart from the conditions required by the poor-laws and orders of the Local Government Board on poor relief and without imposing disfranchisement on the men employed; (3) a labour rate has not been levied, but a rate has been levied in aid of the provision of employment; (4) if the line of development that the act suggests were to be followed (as the renewed Labour agitation in 1908-1909 made probable) it must tend to create a class of "unemployed," unskilled labourers of varying grades of industry who may become the dependent and state-supported proletariat of modern urban life. Thus, unless the administration be extremely rigorous, once more will a kind of serfdom be established, to be, as some would say, taken over hereafter by the socialist state.

Vagrancy.

In some of the English colonies Homeric hospitality still prevails, but by degrees the station-house or some refuge is established in the towns as they grow more populous. Finally, some system of labour in exchange for relief is evolved. At first this is voluntary, afterwards it is officially recognized, and finally it may become part of the system of public relief. As bad years come, these changes are made step by step. In England the vagrant or wayfarer is tolerated and discouraged, but not kept employed. He should be under greater pressure to maintain himself, it is thought. The provision made for him in different parts of the country is far from uniform, and now, usually, at least in the larger towns, after he has had a bath and food, he is admitted to a separate room or cell in a casual ward. Before he leaves he has to do a task of work, and, subject to the discretion of the master, he is detained two nights. This plan has reduced vagrancy, and if it were universally adopted clean accommodation would everywhere be provided for the vagrant without the attractions of a common or "associated" ward; and probably vagrancy would diminish still further. It seems almost needless to say that, in these circumstances at any

rate, casual alms should not be given to vagrants. They know much better how to provide for themselves than the almsgiver imagines, for vagrancy is in the main a mode of life not the result of any casual difficulty. Vagrancy and criminality are also nearly allied. The magistrate, therefore, rather than the almsgiver, should usually interfere; and, as a rule, where the magistrates are strict, vagrancy in a county diminishes. An inter-departmental committee (1906) taking generally this line, reported in favour of vagrants being placed entirely under police control, and it recommended a system of wayfarers' tickets for men on the roads who are not habitual vagrants, and the committal of men likely to become habitual vagrants to certified labour colonies for not less than six months. Still undoubtedly vagrancy has its economic side. In a bad year the number of tramps is increased by the addition of unskilled and irresponsible labourers, who are soonest discharged when work is slack. As a part-voluntary system under official recognition the German *Arbeiter-colonien* are of interest. This in a measure has led to the introduction of labour homes in England, the justification of which should be that they recruit the energy of the men who find their way to them, and enable them to earn a living which they could not do otherwise. In a small percentage of cases their result may be achieved. Charitable refuges or philanthropic common lodging-houses, usually established in districts where this class already congregate, only aggravate the difficulty. They give additional attractions to a vagrant and casual life, and make it more endurable. They also make a comfortable avoidance of the responsibilities of family life comparatively easy, and in so far as they do this they are clearly injurious to the community.

American conditions and methods.

The English colonists of the New England states and Pennsylvania introduced the disciplinary religious and relief system of Protestantism and the Elizabethan poor-law. To the former reference has already been made. With an appreciation of the fact that the cause of distress is not usually poverty, but weakness of character and want of judgment, and that relief is in itself no remedy, those who have inherited the old Puritan traditions have, in the light of toleration and a larger social experience, organized the method of friendly visiting, the object of which is illustrated by the motto, "Not alms, but a friend." To the friendship of charity is thus given a disciplinary force, capable of immense expansion and usefulness, if the friendship on the side of those who would help is sincere and guided by practical knowledge and sagacity, and if on the side of those in distress there is awakened a reciprocal regard and a willingness to change their way of life by degrees. Visiting by "districts" is set aside, for "friendliness" is not a quality easily diffused over a wide area. To be real it must be limited as time and ability allow. Consequently, a friendly visitor usually befriends but one or two, or in any case only a few, families. The friendly visitor is the outcome of the movement for "associated charities," but in America charity organization societies have also adopted the term, and to a certain extent the method. Between the two movements there is the closest affinity. The registration of applicants for relief is much more complete in American cities than in England, where the plan meets with comparatively little support. At the office of the associated charities in Boston there is a central and practically a complete register of all the applications made to the public authority for poor relief, to the associated charities, and to many other voluntary bodies.

The Elizabethan poor-law system, with the machinery of overseers, poor-houses and out-door relief, is still maintained in New England, New York state and Pennsylvania, but with many modifications, especially in New York. A chief factor in these changes has been immigration. While the county or town remained the administrative area for local poor relief, the large number of immigrant and "unsettled" poor, and the business connected with their removal from the state, entailed the establishment of a secondary or state system of administration and aid, with special classes of institutions to which the counties or towns could send their poor, as, for instance, state reform schools, farms, almshouses, &c. For the oversight of these institutions, and often of prisons also and lunatic asylums, in many states there have been established state boards of "charity or corrections and charity." The members of these boards are selected by the state for a term of years, and give their services honorarily. There are state boards in Massachusetts, New York, Pennsylvania, Ohio, Illinois, Minnesota, Michigan, Wisconsin, Iowa, Colorado, North Carolina and elsewhere. There is also a district board of charities in the district of Columbia. These boards publish most useful and detailed reports. Besides the state board there is sometimes also, as in New York, a State Charities Aid Association, whose members, in the counties in which they reside, have a legal right of entry to visit and inspect any public or charitable institution owned by the state, and any county and other poor-house. A large association of visitors accustomed to inspect and report on institutions has thus been created. Further, the counties and towns in New York state, for instance, and Massachusetts, and the almshouse districts in Pennsylvania, are under boards of supervision. Usually the overseers give out-door relief, and the pauperism of some areas is as high as that in some English unions, 3, 4 and 5%. On the whole population of the United States, however, and of individual states, consisting to a great extent of comparatively young and energetic immigrants, the pauperism is insignificant. In Massachusetts "it has been the general policy of the state to order the removal to the state almshouse of unsettled residents of the several cities and towns in need of temporary aid, thus avoiding some of the abuses incident to out-door relief." In New York state, in the city of New York, including Brooklyn, the distribution of out-door relief by the department of charities is forbidden, except for purposes of transportation and for the adult blind. Most counties in the state have an almshouse, and the county superintendents and overseers of the poor "furnish necessary relief to such of the county poor as may require only temporary assistance, or are so disabled that they cannot be safely removed to the almshouse." Public attention is in many cases being drawn to the inutility and injury of out-door relief.

In some states and cities the system of subsidizing voluntary institutions is in full force, and it is in force also in many English colonies. At first sight it has the advantage of providing relief for public purposes without the creation of a new staff or establishment. There is thus an apparent economy. But the evils are many. Political partisanship and favour may influence the amount and disposition of the grants. The grants act as a bounty on the establishment and continuance of charitable institutions, homes for children, hospitals, &c., but not on the expansion of the voluntary charitable funds and efforts that should maintain them; and thus charitable homes exist in which charity in its truer sense may have little part, but in which the chief motive of the administration may be to support sectarian interests by public subsidies. Claimants for relief have little scruple in turning such institutions to their own account; and the institutions, being financially irresponsible, are not in these circumstances scrupulous on their side to prevent a misdirection of their bounties. "Parents unload their children upon the community more recklessly when they know that such children will be provided for in private orphan asylums and protectories, where the religious training that the parents prefer will be given them" (Amos G. Warner, in *International Congress: Charities and Correction*, 1893). Past history in New York city illustrates the same evil. The admission was entirely in the hands of the managers. They admitted; the city paid. In New York city the population between 1870 and 1890 increased about 80%; the subsidies for prisoners and public paupers increased by 43%, but those for paupers in private institutions increased from $334,828 to $1,845,872, or about 461%. The total was at that time $3,794,972; in 1898 it was rather less, $3,132,786. The alternative to this system is either the establishment of state or municipal institutions, and possibly in special cases payments to voluntary homes for the maintenance of inmates admitted at the request of a state authority, as at certified and other homes in England, with grants made conditional on the work being conducted on specified lines, and subject to a certain increasing

amount of voluntary financial support; or a close general and financial inspection of charitable institutions—the method of reform adopted in New York; or payment for only those inmates who are sent by public authorities and admitted on their request.

The enormous extent to which children's aid societies have been increased in the United States, sometimes with the help of considerable public grants, suggests the greatest need for caution from the point of the preservation of the family as the central element of social strength in the community. The problem of charity in relation to medical relief in the large towns of the United States is similar to that of England; its difficulties are alike.

LITERATURE.—As good translations of the classics become accessible it is easy for the general reader or student to combine a study of the principles of charity in relation to the community with a study of history. Thus, and in connexion with special investigations and the conditions of practical charity, social economics may best be studied. In N. Masterman, *Chalmers on Charity* (1900); T. Mackay, *Methods of Social Reform* (1896); B. Bosanquet and others, *Some Aspects of the Social Problem* (1894); and C. S. Loch, *Methods of Social Advance* (1904), this point of view is generally assumed. Special investigations of importance may be found in the reports of medical officers of health. See Report of Committee on Physical Deterioration referred to above, and, for instance, Dr Newsholme's *Vital Statistics* and Charles Booth's *Labour and Life in London*. For the history of charity there is no good single work. On details there are many good articles in Daremberg's *Dictionary of Classical Antiquities*, and similar works. *Modern Methods of Charity*, by C. H. Henderson and others (1904), supplies much general information in regard to poor relief and charity in different countries. Apart from books and official documents mentioned in the text as indicating the present state of charitable and public relief, or as aids to practical work, the following may be of service. England:—*Annual Charities' Register and Digest, with Introduction on "How to help Cases of Distress"*; the *Charity Organization Review; Occasional Papers* (3 vols.), published by the London Charity Organization Society (1896–1906); *Reports of Proceedings of Conferences of Poor-Law Guardians; The Strength of the People*, by Helen Bosanquet; *Homes of the London Poor* and *Our Common Land*, by Miss Octavia Hill; *The Queen's Poor*, by M. Joane. United States of America:—*The Proceedings of the International Conference on Charities and Correction* (1894), and the proceedings of the annual conferences; *Friendly Visiting among the Poor*, by Mary E. Richmond (1899); *American Charities*, by Amos G. Warner (1908); *The Practice of Charity*, by E. T. Devine; *Handwörterbuch der Staatswissenschaften*, by Dr J. Conrad, &c., vol. ii.; *Das Armenwesen in den Vereinigten Staaten von America*, by Dr Francis G. Peabody (1897); the *Charities Review*, published monthly by the New York Charity Organization Society; the Papers and Reports of the Boston and Baltimore societies. France:—*La Bibliographie charitable*, by Camille Granier (1891); *La Charité avant et depuis 1789*, by P. Hubert Valleroux; Fascicules of the *Conseil supérieur de l'assistance publique; Revue d'assistance*, published by the *Société internationale pour l'étude des questions d'assistance*. Germany:—Reports and Proceedings of the *Deutsche Vereine für Armenpflege und Wohltätigkeit; Die Armenpflege*, a practical handbook, by Dr E. Münsterberg (1897). Austria:—*Österreichs Wohlfahrtseinrichtungen, 1848–1898*, by Dr Ernest Mischler (1899). (C. S. L.)

CHARIVARI, a French term of uncertain origin, but probably onomatopoeic, for a mock serenade "rough music," made by beating on kettles, fire-irons, tea-trays or what not. The charivari was anciently in France a regular wedding custom, all bridal couples being thus serenaded. Later it was reserved for ill-assorted and unpopular marriages, for widows or widowers who remarried too soon, and generally as a mockery for all who were unpopular. At the beginning of the 17th century, wedding charivaris were forbidden by the Council of Tours under pain of excommunication, but the custom still lingers in rural districts. The French of Louisiana and Canada introduced the charivari into America, where it became known under the corrupted name of "shivaree."

CHARKHARI, a native state in the Bundelkhand agency of Central India. Area, 745 sq. m.; pop. (1901) 123,594; estimated revenue £33,000. It is surrounded on all sides by other states of Central India, except near Charkhari town, where it meets the United Provinces. It was founded by Bijai Bahadur (vikramaditya), a *sanad* being granted him in 1804 and another in 1811. The chief, whose title is maharaja, is a Rajput of the Bundela clan, descended from Chhatar Sal, the champion of the independence of Bundelkhand in the 18th century. In 1857 Raja Ratan Singh received a hereditary salute of 11 guns, a *khilat* and a perpetual *jagir* of £1300 a year in recognition of his services during the Mutiny. The town of Charkhari (locally *Maharajnagar*) is 40 m. W. of Banda; pop. (1901) 11,718.

CHARLATAN (Ital. *ciarlatano*, from *ciarlare*, to chatter), originally one who "patters" to a crowd to sell his wares, like a "cheap-jack" or "quack" doctor—"quack" being similarly derived from the noise made by a duck; so an impostor who pretends to have some special skill or knowledge.

CHARLEMAGNE [CHARLES THE GREAT] (*c.* 742–814), Roman emperor, and king of the Franks, was the elder son of Pippin the Short, king of the Franks, and Bertha, or Bertrada, daughter of Charibert, count of Laon. The place of his birth is unknown and its date uncertain, although some authorities give it as the 2nd of April 742; doubts have been cast upon his legitimacy, and it is just possible that the marriage of Pippin and Bertha took place subsequent to the birth of their elder son. When Pippin was crowned king of the Franks at St Denis on the 28th of July 754 by Pope Stephen II., Charles, and his brother Carloman were anointed by the pope as a sign of their kingly rank. The rough surroundings of the Frankish court were unfavourable to the acquisition of learning, and Charles grew up almost ignorant of letters, but hardy in body and skilled in the use of weapons.

In 761 he accompanied his father on a campaign in Aquitaine, and in 763 undertook the government of several counties. In 768 Pippin divided his dominions between his two sons, and on his death soon afterwards Charles became the ruler of the northern portion of the Frankish kingdom, and was crowned at Noyon on the 9th of October 768. Bad feeling had existed for some time between Charles and Carloman, and when Charles early in 769 was called upon to suppress a rising in Aquitaine, his brother refused to afford him any assistance. This rebellion, however, was easily crushed, its leader, the Aquitainian duke Hunold, was made prisoner, and his territory more closely attached to the Frankish kingdom. About this time Bertha, having effected a temporary reconciliation between her sons, overcame the repugnance with which Pope Stephen III. regarded an alliance between Frank and Lombard, and brought about a marriage between Charles and a daughter of Desiderius, king of the Lombards. Charles had previously contracted a union, probably of an irregular nature, with a Frankish lady named Himiltrude, who had borne him a son Pippin, the "Hunchback." The peace with the Lombards, in which the Bavarians as allies of Desiderius joined, was, however, soon broken. Charles thereupon repudiated his Lombard wife (Bertha or Desiderata) and married in 771 a princess of the Alamanni named Hildegarde. Carloman died in December 771, and Charles was at once recognized at Corbeny as sole king of the Franks. Carloman's widow Gerberga had fled to the protection of the Lombard king, who espoused her cause and requested the new pope, Adrian I., to recognize her two sons as the lawful Frankish kings. Adrian, between whom and the Lombards other causes of quarrel existed, refused to assent to this demand, and when Desiderius invaded the papal territories he appealed to the Frankish king for help. Charles, who was at the moment engaged in his first Saxon campaign, expostulated with Desiderius; but when such mild measures proved useless he led his forces across the Alps in 773. Gerberga and her children were delivered up and disappear from history; the siege of Pavia was undertaken; and at Easter 774 the king left the seat of war and visited Rome, where he was received with great respect.

During his stay in the city Charles renewed the donation which his father Pippin had made to the papacy in 754 or 756. This transaction has given rise to much discussion as to its trustworthiness and the extent of its operation. Our only authority, a passage in the *Liber Pontificalis*, describes the gift as including the whole of Italy and Corsica, except the lands north of the Po, Calabria and the city of Naples. The vast extent of this donation, which, moreover, included territories not owning Charles's authority, and the fact that the king did not execute, or apparently attempt to execute, its provisions, has caused many scholars to look upon the passage as a forgery; but the better

opinion would appear to be that it is genuine, or at least has a genuine basis. Various explanations have been suggested. The area of the grant may have been enlarged by later interpolations; or it may have dealt with property rather than with sovereignty, and have only referred to estates claimed by the pope in the territories named; or it is possible that Charles may have actually intended to establish an extensive papal kingdom in Italy, but was released from his promise by Adrian when the pope saw no chance of its fulfilment. Another supposition is that the author of the *Liber Pontificalis* gives the papal interpretation of a grant that had been expressed by Pippin in ambiguous terms; and this view is supported by the history of the subsequent controversy between king and pope.

Returning to the scene of hostilities, Charles witnessed the capitulation of Pavia in June 774, and the capture of Desiderius, who was sent into a monastery. He now took the title "king of the Lombards," to which he added the dignity of "Patrician of the Romans," which had been granted to his father. Adalgis, the son of Desiderius, who was residing at Constantinople, hoped the emperor Leo IV. would assist him in recovering his father's kingdom; but a coalition formed for this purpose was ineffectual, and a rising led by his ally Rothgaud, duke of Friuli, was easily crushed by Charles in 776. In 777 the king was visited at Paderborn by three Saracen chiefs who implored his aid against Abd-ar-Rahman, the caliph of Cordova, and promised some Spanish cities in return for help. Seizing this opportunity to extend his influence Charles marched into Spain in 778 and took Pampeluna, but meeting with some checks decided to return. As the Frankish forces were defiling through the passes of the Pyrenees they were attacked by the Wascones (probably Basques), and the rear-guard of the army was almost annihilated. It was useless to attempt to avenge this disaster, which occurred on the 15th of August 778, for the enemy disappeared as quickly as he came; the incident has passed from the domain of history into that of legend and romance, being associated by tradition with the pass of Roncesvalles. Among the slain was one Hruodland, or Roland, margrave of the Breton march, whose death gave rise to the *Chanson de Roland* (see ROLAND, LEGEND OF).

Charles now sought to increase his authority in Italy, where Frankish counts were set over various districts, and where Hildebrand, duke of Spoleto, appears to have recognized his overlordship. In 780 he was again in the peninsula, and at Mantua issued an important *capitulary* which increased the authority of the Lombard bishops, relieved freemen who under stress of famine had sold themselves into servitude, and condemned abuses of the system of vassalage. At the same time commerce was encouraged by the abolition of unauthorized tolls and by an improvement of the coinage; while the sale of arms to hostile peoples, and the trade in Christian slaves were forbidden. Proceeding to Rome, the king appears to have come to some arrangement with Adrian about the donation of 774. At Easter 781, Carloman, his second son by Hildegarde, was renamed Pippin and crowned king of Italy by Pope Adrian, and his youngest son Louis was crowned king of Aquitaine; but no mention was made at the time of his eldest son Charles, who was doubtless intended to be king of the Franks. In 783 the king, having lost his wife Hildegarde, married Fastrada, the daughter of a Frankish count named Radolf; and in the same year his mother Bertha died. The emperor Constantine VI. was at this time exhibiting some interest in Italian affairs, and Adalgis the Lombard was still residing at his court; so Charles sought to avert danger from this quarter by consenting in 781 to a marriage between Constantine and his own daughter Rothrude. In 786 the entreaties of the pope and the hostile attitude of Arichis II., duke of Benevento, a son-in-law of Desiderius, called the king again into Italy. Arichis submitted without a struggle, though the basis of Frankish authority in his duchy was far from secure; but in conjunction with Adalgis he sought aid from Constantinople. His plans were ended by his death in 787, and although the empress Irene, the real ruler of the eastern empire, broke off the projected marriage between her son and Rothrude, she appears to have given very little assistance to Adalgis, whose attack on Italy was easily repulsed. During this visit Charles had presented certain towns to Adrian, but an estrangement soon arose between king and pope over the claim of Charles to confirm the election to the archbishopric of Ravenna, and it was accentuated by Adrian's objection to the establishment by Charles of Grimoald III. as duke of Benevento, in succession to his father Arichis.

These journeys and campaigns, however, were but interludes in the long and stubborn struggle between Charles and the Saxons, which began in 772 and ended in 804 with the incorporation of Saxony in the Carolingian empire (see SAXONY). This contest, in which the king himself took a very active part, brought the Franks into collision with the Wiltzi, a tribe dwelling east of the Elbe, who in 789 was reduced to dependence. A similar sequence of events took place in southern Germany. Tassilo III., duke of the Bavarians, who had on several occasions adopted a line of conduct inconsistent with his allegiance to Charles, was deposed in 788 and his duchy placed under the rule of Gerold, a brother-in-law of Charles, to be governed on the Frankish system (see BAVARIA). Having thus taken upon himself the control of Bavaria, Charles felt himself responsible for protecting its eastern frontier, which had long been menaced by the Avars, a people inhabiting the region now known as Hungary. He accordingly ravaged their country in 791 at the head of an army containing Saxon, Frisian, Bavarian and Alamannian warriors, which penetrated as far as the Raab; and he spent the following year in Bavaria preparing for a second campaign against them, the conduct of which, however, he was compelled by further trouble in Saxony to entrust to his son king Pippin, and to Eric, margrave of Friuli. These deputies succeeded in 795 and 796 in taking possession of the vast treasures of the Avars, which were distributed by the king with lavish generosity to churches, courtiers and friends. A conspiracy against Charles, which his friend and biographer Einhard alleges was provoked by the cruelties of Queen Fastrada, was suppressed without difficulty in 792, and its leader, the king's illegitimate son Pippin, was confined in a monastery till his death in 811. Fastrada died in August 794, when Charles took for his fourth wife an Alamannian lady named Liutgarde.

The continuous interest taken by the king in ecclesiastical affairs was shown at the synod of Frankfort, over which he presided in 794. It was on his initiative that this synod condemned the heresy of *adoptianism* and the worship of images, which had been restored in 787 by the second council of Nicaea; and at the same time that council was declared to have been superfluous. This policy caused a further breach with Pope Adrian; but when Adrian died in December 795, his successor, Leo III., in notifying his elevation to the king, sent him the keys of St Peter's grave and the banner of the city, and asked Charles to send an envoy to receive his oath of fidelity. There is no doubt that Leo recognized Charles as sovereign of Rome. He was the first pope to date his acts according to the years of the Frankish monarchy, and a mosaic of the time in the Lateran palace represents St Peter bestowing the banners upon Charles as a token of temporal supremacy, while the coinage issued by the pope bears witness to the same idea. Leo soon had occasion to invoke the aid of his protector. In 799, after he had been attacked and maltreated in the streets of Rome during a procession, he escaped to the king at Paderborn, and Charles sent him back to Italy escorted by some of his most trusted servants. Taking the same journey himself shortly afterwards, the king reached Rome in 800 for the purpose (as he declared) of restoring discipline in the church. His authority was undisputed; and after Leo had cleared himself by an oath of certain charges made against him, Charles restored the pope and banished his leading opponents.

The great event of this visit took place on the succeeding Christmas Day, when Charles on rising from prayer in St Peter's was crowned by Leo and proclaimed emperor and *augustus* amid the acclamations of the crowd. This act can hardly have been unpremeditated, and some doubt has been cast upon the statement which Einhard attributes to Charles, that he would not

have entered the building had he known of the intention of Leo. He accepted the dignity at any rate without demur, and there seems little doubt that the question of assuming, or obtaining, this title had previously been discussed. His policy had been steadily leading up to this position, which was rather the emblem of the power he already held than an extension of the area of his authority. It is probable therefore that Charles either considered the coronation premature, as he was hoping to obtain the assent of the eastern empire to this step, or that, from fear of evils which he foresaw from the claim of the pope to crown the emperor, he wished to crown himself. All the evidence tends to show that it was the time or manner of the act rather than the act itself which aroused his temporary displeasure. Contemporary accounts lay stress upon the fact that as there was then no emperor, Constantinople being under the rule of Irene, it seemed good to Leo and his counsellors and the "rest of the Christian people" to choose Charles, already ruler of Rome, to fill the vacant office. However doubtful such conjectures concerning his intentions may be, it is certain that immediately after his coronation Charles sought to establish friendly relations with Constantinople, and even suggested a marriage between himself and Irene, as he had again become a widower in 800. The deposition and death of the empress foiled this plan; and after a desultory warfare in Italy between the two empires, negotiations were recommenced which in 810 led to an arrangement between Charles and the eastern emperor, Nicephorus I. The death of Nicephorus and the accession of Michael I. did not interfere with the relations, and in 812 an embassy from Constantinople arrived at Aix-la-Chapelle, when Charles was acknowledged as emperor, and in return agreed to cede Venice and Dalmatia to Michael.

Increasing years and accumulating responsibilities now caused the emperor to alter somewhat his manner of life. No longer leading his armies in person he entrusted the direction of campaigns in various parts of his empire to his sons and other lieutenants, and from his favourite residence at Aix watched their progress with a keen and sustained interest. In 802 he ordered that a new oath of fidelity to him as emperor should be taken by all his subjects over twelve years of age. In 804 he was visited by Pope Leo, who returned to Rome laden with gifts. Before his coronation as emperor, Charles had entered into communications with the caliph of Bagdad, Harun-al-Rashid, probably in order to protect the eastern Christians, and in 801 he had received an embassy and presents from Harun. In the same year the patriarch of Jerusalem sent him the keys of the Holy Sepulchre; and in 807 Harun not only sent further gifts, but appears to have confirmed the emperor's rights in Jerusalem, which, however, probably amounted to no more than an undefined protectorate over the Christians in that part of the world. While thus extending his influence even into Asia, there was scarcely any part of Europe where the power of Charles did not make itself felt. He had not visited Spain since the disaster of Roncesvalles, but he continued to take a lively interest in the affairs of that country. In 798 he had concluded an alliance with Alphonso II., king of the Asturias, and a series of campaigns mainly under the leadership of King Louis resulted in the establishment of the "Spanish march," a district between the Pyrenees and the Ebro stretching from Pampeluna to Barcelona, as a defence against the Saracens. In 799 the Balearic Islands had been handed over to Charles, and a long warfare was carried on both by sea and land between Frank and Saracen until 810, when peace was made between the emperor and El-Hakem, the emir of Cordova. Italy was equally the scene of continuous fighting. Grimoald of Benevento rebelled against his overlord; the possession of Venice and Dalmatia was disputed by the two empires; and Istria was brought into subjection.

With England the emperor had already entered into relations, and at one time a marriage was proposed between his son Charles and a daughter of Offa, king of the Mercians. English exiles were welcomed at his court; he was mainly instrumental in restoring Eardwulf to the throne of Northumbria in 809; and Einhard includes the Scots within the sphere of his influence. In eastern Europe the Avars had owned themselves completely under his power in 805; campaigns against the Czechs in 805 and 806 had met with some success, and about the same time the land of the Sorbs was ravaged; while at the western extremity of the continent the Breton nobles had done homage to Charles at Tours in 800. Thus the emperor's dominions now stretched from the Eider to the Ebro, and from the Atlantic to the Elbe, the Saale and the Raab, and they also included the greater part of Italy; while even beyond these bounds he exercised an acknowledged but shadowy authority. In 806 Charles arranged a division of his territories among his three legitimate sons, but this arrangement came to nothing owing to the death of Pippin in 810, and of the younger Charles in the following year. Charles then named his remaining son Louis as his successor; and at his father's command Louis took the crown from the altar and placed it upon his own head. This ceremony took place at Aix on the 11th of September 813. In 808 the Frankish authority over the Obotrites was interfered with by Gudrod (Godfrey), king of the Danes, who ravaged the Frisian coasts and spoke boastfully of leading his troops to Aix. To ward off these attacks Charles took a warm interest in the building of a fleet, which he reviewed in 811; but by this time Gudrod had been killed, and his successor Hemming made peace with the emperor.

In 811 Charles made his will, which shows that he contemplated the possibility of abdication. The bulk of his possessions were left to the twenty-one metropolitan churches of his dominions, and the remainder to his children, his servants and the poor. In his last years he passed most of his days at Aix, though he had sufficient energy to take the field for a short time during the Danish War. Early in 814 he was attacked by a fever which he sought to subdue by fasting; but pleurisy supervened, and after partaking of the communion, he died on the 28th of January 814, and on the same day his body was buried in the church of St Mary at Aix. In the year 1000 his tomb was opened by the emperor Otto III., but the account that Otto found the body upright upon a throne with a golden crown on the head and holding a golden sceptre in the hands, is generally regarded as legendary. The tomb was again opened by the emperor Frederick I. in 1165, when the remains were removed from a marble sarcophagus and placed in a wooden coffin. Fifty years later they were transferred by order of the emperor Frederick II. to a splendid shrine, in which the relics are still exhibited once in every six years. The sarcophagus in which the body originally lay may still be seen at Aix, and other relics of the great emperor are in the imperial treasury at Vienna. In 1165 Charles was canonized by the antipope Paschal III. at the instance of the emperor Frederick I., and Louis XI. of France gave strict orders that the feast of the saint should be observed.

The personal appearance of Charles is thus described by Einhard:—"Big and robust in frame, he was tall, but not excessively so, measuring about seven of his own feet in height. His eyes were large and lustrous, his nose rather long and his countenance bright and cheerful." He had a commanding presence, a clear but somewhat feeble voice, and in later life became rather corpulent. His health was uniformly good, owing perhaps to his moderation in eating and drinking, and to his love for hunting and swimming. He was an affectionate father, and loved to pass his time in the company of his children, to whose education he paid the closest attention. His sons were trained for war and the chase, and his daughters instructed in the spinning of wool and other feminine arts. His ideas of sexual morality were primitive. Many concubines are spoken of, he had several illegitimate children, and the morals of his daughters were very loose. He was a regular observer of religious rites, took great pains to secure decorum in the services of the church, and was generous in almsgiving both within his empire and without. He reformed the Frankish liturgy, and brought singers from Rome to improve the services of the church. He had considerable knowledge of theology, took a prominent part in the theological controversies of the time, and was responsible for the addition of the clause *filioque* to the Nicene Creed. The most

attractive feature of his character, however, was his love of learning. In addition to his native tongue he could read Latin and understood Greek, but he was unable to write, and Einhard gives an account of his futile efforts to learn this art in later life. He loved the reading of histories and astronomy, and by questioning travellers gained some knowledge of distant parts of the earth. He attended lectures on grammar, and his favourite work was St Augustine's *De civilale Dei*. He caused Frankish sagas to be collected, began a grammar of his native tongue, and spent some of his last hours in correcting a text of the Vulgate. He delighted in the society of scholars—Alcuin, Angilbert, Paul the Lombard, Peter of Pisa and others, and in this company the trappings of rank were laid aside and the emperor was known simply as David. Under his patronage Alcuin organized the school of the palace, where the royal children were taught in the company of others, and founded a school at Tours which became the model for many other establishments. Charles was unwearying in his efforts to improve the education of clergy and laity, and in 789 ordered that schools should be established in every diocese. The atmosphere of these schools was strictly ecclesiastical and the questions discussed by the scholars were often puerile, but the greatness of the educational work of Charles will not be doubted when one considers the rude condition of Frankish society half a century before. The main work of the Carolingian renaissance was to restore Latin to its position as a literary language, and to reintroduce a correct system of spelling and an improved handwriting. The manuscripts of the time are accurate and artistic, copies of valuable books were made and by careful collation the texts were purified.

Charles was not a great warrior. His victories were won rather by the power of organization, which he possessed in a marked degree, and he was eager to seize ideas and prompt in their execution. He erected a stone bridge with wooden piers across the Rhine at Mainz, and began a canal between the Altmühl and the Rednitz to connect the Rhine and the Danube, but this work was not finished. He built palaces at Aix (his favourite residence), Nijmwegen and Ingelheim, and erected the church of St Mary at Aix, modelled on that of St Vitalis at Ravenna and adorned with columns and mosaics brought from the same city. He loved the simple dress and manners of the Franks, and on two occasions only did he assume the more stately attire of a Roman noble. The administrative system of Charles in church and state was largely personal, and he brought to the work an untiring industry, and a marvellous grasp of detail. He admonished the pope, appointed the bishops, watched over the morals and work of the clergy, and took an active part in the deliberations of church synods; he founded bishoprics and monasteries, was lavish in his gifts to ecclesiastical foundations, and chose bishops and abbots for administrative work. As the real founder of the ecclesiastical state, he must be held mainly responsible for the evils which resulted from the policy of the church in exalting the ecclesiastical over the secular authority.

In secular affairs Charles abolished the office of duke, placed counts over districts smaller than the former duchies, and supervised their government by means of *missi dominici*, officials responsible to himself alone. Marches were formed on all the borders of the empire, and the exigencies of military service led to the growth of a system of land-tenure which contained the germ of feudalism. The assemblies of the people gradually changed their character under his rule. No longer did the nation come together to direct and govern, but the emperor summoned his people to assent to his acts. Taking a lively interest in commerce and agriculture, Charles issued various regulations for the organization of the one and the improvement of the other. He introduced a new system of weights and measures, which he ordered should be used throughout his kingdom, and took steps to reform the coinage. He was a voluminous lawgiver. Without abolishing the customary law of the German tribes, which is said to have been committed to writing by his orders, he added to it by means of *capitularies*, and thus introduced certain Christian principles and customs, and some degree of uniformity.

The extent and glamour of his empire exercised a potent spell on western Europe. The aim of the greatest of his successors was to restore it to its pristine position and influence, while many of the French rulers made its re-establishment the goal of their policy. Otto the Great to a considerable extent succeeded; Louis XIV. referred frequently to the empire of Charlemagne; and Napoleon regarded him as his prototype and predecessor. The empire of Charles, however, was not lasting. In spite of his own wonderful genius the seeds of weakness were sown in his lifetime. The church was too powerful, an incipient feudalism was present, and there was no real bond of union between the different races that acknowledged his authority. All the vigilance of the emperor could not restrain the dishonesty and the cupidity of his servants, and no sooner was the strong hand of their ruler removed than they began to acquire territorial power for themselves.

AUTHORITIES.—The chief authorities for the life and times of Charlemagne are Einhard's *Vita Karoli Magni*, the *Annales Laurissenses majores*, the *Annales Fuldenses*, and other annals, which are published in the *Monumenta Germaniae historica. Scriptores*, Band i. and ii., edited by G. H. Pertz (Hanover and Berlin, 1826–1892). For the capitularies see *Capitularia regum Francorum*, edited by A. Boretius in the *Monumenta. Leges*. Many of the songs of the period appear in the *Poetae Latini aevi Carolini*, edited by E. Dümmler (Berlin, 1881–1884). The *Bibliotheca rerum Germanicarum*, tome iv., edited by Ph. Jaffé (Berlin, 1864–1873), contains some of the emperor's correspondence, and Hincmar's *De ordine palatii*, edited by M. Prou (Paris, 1884), is also valuable.

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THE CHARLEMAGNE LEGENDS

Innumerable legends soon gathered round the memory of the great emperor. He was represented as a warrior performing superhuman feats, as a ruler dispensing perfect justice, and even as a martyr suffering for the faith. It was confidently believed towards the close of the 10th century that he had made a pilgrimage to Jerusalem; and, like many other great rulers, it was reported that he was only sleeping to awake in the hour of his country's need. We know from Einhard (*Vita Karoli*, cap. xxix.) that the Frankish heroic ballads were drawn up in writing by Charlemagne's order, and it may be accepted as certain that he was himself the subject of many such during his lifetime. The legendary element crept even into the Latin panegyrics produced by the court poets. Before the end of the 9th century a monk of St Gall drew up a chronicle *De gestis Karoli Magni*, which was based partly on oral tradition, received from an old soldier named Adalbert, who had served in Charlemagne's army. This recital contains various fabulous incidents. The author relates a conversation between Otkar the Frank (Ogier the Dane) and the Lombard king Desiderius (Didier) on the walls of Pavia in view of Charlemagne's advancing army. To Didier's repeated question "Is this the emperor?" Otkar continues to answer "Not yet," adding at last "When thou shalt see the fields bristling with an iron harvest, and the Po and the Ticino swollen with sea-floods, inundating the walls of the city

with iron billows, then shall Karl be nigh at hand." This episode, which bears the marks of popular heroic poetry, may well be the substance of a lost Carolingian *cantilena*.[1]

The legendary Charlemagne and his warriors were endowed with the great deeds of earlier kings and heroes of the Frankish kingdom, for the romancers were not troubled by considerations of chronology. National traditions extending over centuries were grouped round Charlemagne, his father Pippin, and his son Louis. The history of Charles Martel especially was absorbed in the Charlemagne legend. But if Charles's name was associated with the heroism of his predecessors he was credited with equal readiness with the weaknesses of his successors. In the earlier *chansons de geste* he is invariably a majestic figure and represents within limitations the grandeur of the historic Charles. But in the histories of the wars with his vassals he is often little more than a tyrannical dotard, who is made to submit to gross insult. This picture of affairs is drawn from later times, and the sympathies of the poet are generally with the rebels against the monarchy. Historical tradition was already dim when the hypothetical and much discussed *cantilenae*, which may be taken to have formed the repository of the national legends from the 8th to the 10th century, were succeeded in the 11th and the early 12th centuries by the *chansons de geste*. The early poems of the cycle sometimes contain curious information on the Frankish methods in war, in council and in judicial procedure, which had no parallels in contemporary institutions. The account in the *Chanson de Roland* of the trial of Ganelon after the battle of Roncesvalles must have been adopted almost intact from earlier poets, and provides a striking example of the value of the *chansons de geste* to the historian of manners and customs. In general, however, the trouvère depicted the feeling and manners of his own time.

Charlemagne's wars in Italy, Spain and Saxony formed part of the common epic material, and there are references to his wars against the Slavs; but especially he remained in the popular mind as the great champion of Christianity against the creed of Mahomet, and even his Norman and Saxon enemies became Saracens in current legend. He is the Christian emperor directly inspired by angels; his sword Joyeuse contained the point of the lance used in the Passion; his standard was Romaine, the banner of St Peter, which, as the oriflamme of Saint Denis, was later to be borne in battle before the kings of France; and in 1164 Charles was canonized at the desire of the emperor Frederick I. Barbarossa by the anti-pope Pascal III. This gave him no real claim to saintship, but his festival was observed in some places until comparatively recent times. Charlemagne was endowed with the good and bad qualities of the epic king, and as in the case of Agamemnon and Arthur, his exploits paled beside those of his chief warriors. These were not originally known as the twelve peers[2] famous in later Carolingian romance. The twelve peers were in the first instance the companions in arms of Roland in the Teutonic sense.[3] The idea of the paladins forming an association corresponding to the Arthurian Round Table first appears in the romance of *Fierabras*. The lists of them are very various, but all include the names of Roland and Oliver. The chief heroes who fought Charlemagne's battles were Roland; Ganelon, afterwards the traitor; Turpin, the fighting archbishop of Reims; Duke Naimes of Bavaria, the wise counsellor who is always on the side of justice; Ogier the Dane, the hero of a whole series of romances; and Guillaume of Toulouse, the defender of Narbonne. Gradually most of the *chansons de geste* were attached to the name of Charlemagne, whose poetical history falls into three cycles:—the *geste du roi*, relating his wars and the personal history of himself and his family; the southern cycle, of which Guillaume de Toulouse is the central figure; and the feudal epic, dealing with the revolts of the barons against the emperor, the rebels being invariably connected by the trouvères with the family of Doon de Mayence (*q.v.*).

The earliest poems of the cycle are naturally the closest to historical truth. The central point of the *geste du roi* is the 11th-century *Chanson de Roland* (see ROLAND, LEGEND OF), one of the greatest of medieval poems. Strangely enough the defeat of Roncesvalles, which so deeply impressed the popular mind, has not a corresponding importance in real history. But it chanced to find as its exponent a poet whose genius established a model for his successors, and definitely fixed the type of later heroic poems. The other early *chansons* to which reference is made in *Roland*—*Aspremont*, *Enfances Ogier*, *Guiteclin*, *Balan*, relating to Charlemagne's wars in Italy and Saxony—are not preserved in their original form, and only the first in an early recension. *Basin* or *Carl et Élégast* (preserved in Dutch and Icelandic), the *Voyage de Charlemagne à Jerusalem* and *Le Couronnement Looys* also belong to the heroic period. The purely fictitious and romantic tales added to the personal history of Charlemagne and his warriors in the 13th century are inferior in manner, and belong to the decadence of romance. The old tales, very much distorted in the 15th-century prose versions, were to undergo still further degradation in 18th-century compilations.

According to *Berte aus grans piés*, in the 13th-century *remaniement* of the Brabantine trouvère Adenès li Rois, Charlemagne was the son of Pippin and of Berte, the daughter of Flore and Blanchefleur, king and queen of Hungary. The tale bears marks of high antiquity, and presents one of the few incidents in the French cycle which may be referred to a mythic origin. On the night of Berte's marriage a slave, Margiste, is substituted for her, and reigns in her place for nine years, at the expiration of which Blanchefleur exposes the deception; whereupon Berte is restored from her refuge in the forest to her rightful place as queen. *Mainet* (12th century) and the kindred poems in German and Italian are perhaps based on the adventures of Charles Martel, who after his father's death had to flee to the Ardennes. They relate that, after the death of his parents, Charles was driven by the machinations of the two sons of Margiste to take refuge in Spain, where he accomplished his *enfances* (youthful exploits) with the Mussulman king Galafre under the feigned name of Mainet. He delivered Rome from the besieging Saracens, and returned to France in triumph. But his wife Galienne, daughter of Galafre, whom he had converted to the Christian faith, died on her way to rejoin him. Charlemagne then made an expedition to Italy (*Enfances Ogier* in the Venetian *Charlemagne*, and the first part of the *Chevalerie Ogier de Dannemarche* by Raimbert of Paris, 12th century) to raise the siege of Rome, which was besieged by the Saracen emir Corsuble. He crossed the Alps under the guidance of a white hart, miraculously sent to assist the passage of the army. *Aspremont* (12th century) describes a fictitious campaign against the Saracen King Agolant in Calabria, and is chiefly devoted to the *enfances* of Roland. The wars of Charlemagne with his vassals are described in *Girart de Roussillon*, *Renaus de Montaubon*, recounting the deeds of the four sons of Aymon, *Huon de Bordeaux*, and in the latter part of the *Chevalerie Ogier*, which belong properly to the cycle connected with Doon of Mayence.

The account of the pilgrimage of Charlemagne and his twelve paladins to the Holy Sepulchre must in its first form have been earlier than the Crusades, as the patriarch asks the emperor to

[1] A remnant of the popular poetry contemporary with Charlemagne and written in the vernacular has been thought to be discernible under its Latin translation in the description of a siege during Charlemagne's war against the Saracens, known as the "Fragment from the Hague" (Pertz, *Script.* iii. pp. 708-710).

[2] The words *douze pairs* were anglicized in a variety of forms ranging from douzepers to dosepers. The word even occurred as a singular in the metrical romance of *Octavian*:—"Ferst they sent out a doseper." At the beginning of the 13th century there existed a *cour des pairs* which exercised judicial functions and dated possibly from the 11th century, but their prerogatives at the beginning of the 14th century appear to have been mainly ceremonial and decorative. In 1257 the twelve peers were the chiefs of the great feudal provinces, the dukes of Normandy, Burgundy and Aquitaine, the counts of Toulouse, Champagne and Flanders, and six spiritual peers, the archbishop of Reims, the bishops of Laon, Châlons-sur-Marne, Beauvais, Langres and Noyon. (See Du Cange, *Glossarium*, *s.v.* "Par.").

[3] See J. Flach, *Le Compagnonnage dans les chansons de geste* (Paris, 1891).

free Spain, not the Holy Land, from the Saracens. The legend probably originated in a desire to authenticate the relics in the abbey of Saint Denis, supposed to have been brought to Aix by Charlemagne, and is preserved in a 12th-century romance, *Le Voyage de Charlemagne à Jérusalem et à Constantinople*.[1] This journey forms the subject of a window in the cathedral of Chartres, and there was originally a similar one at Saint-Denis. On the way home Charles and his paladins visited the emperor Hugon at Constantinople, where they indulged in a series of *gabs* which they were made to carry out. *Galien*, a favourite 15th-century romance, was attached to this episode, for Galien was the son of the amours of Oliver with Jacqueline, Hugon's daughter. The traditions of Charlemagne's fights with the Norsemen (Norois, Noreins) are preserved in *Aiquin* (12th century), which describes the emperor's reconquest of Armorica from the "Saracen" king Aiquin, and a disaster at Cézembre as terrible in its way as those of Roncesvalles and Aliscans. *La destruction de Rome* is a 13th-century version of the older *chanson* of the emir Balan, who collected an army in Spain and sailed to Rome. The defenders were overpowered and the city destroyed before the advent of Charlemagne, who, however, avenged the disaster by a great battle in Spain. The romance of *Fierabras* (13th century) was one of the most popular in the 15th century, and by later additions came to have pretensions to be a complete history of Charlemagne. The first part represents an episode in Spain three years before Roncesvalles, in which Oliver defeats the Saracen giant Fierabras in single combat, and converts him. The hero of the second part is Gui de Bourgogne, who recovers the relics of the Passion, lost in the siege of Rome. *Otinel* (13th century) is also pure fiction. *L' Entrêe en Espagne*, preserved in a 14th-century Italian compilation, relates the beginning of the Spanish War, the siege of Pampeluna, and the legendary combat of Roland with Ferragus. Charlemagne's march on Saragossa, and the capture of Huesca, Barcelona and Girone, gave rise to *La Prise de Pampelune* (14th century, based on a lost *chanson*); and *Gui de Bourgogne* (12th century) tells how the children of the barons, after appointing Guy as king of France, set out to find and rescue their fathers, who are represented as having been fighting in Spain for twenty-seven years. The *Chanson de Roland* relates the historic defeat of Roncesvalles on the 15th of August 778, and forms the very crown of the whole Carolingian legend. The two 13th-century romances, *Gaidon*, by Herbert Leduc de Dammartin, and *Anséis de Carthage*, contain a purely fictitious account of the end of the war in Spain, and of the establishment of a Frankish kingdom under the rule of Anséis. Charlemagne was recalled from Spain by the news of the outbreak of the Saxons. The contest between Charlemagne and Widukind (*Guiteclin*) offered abundant epic material. Unfortunately the original *Guiteclin* is lost, but the legend is preserved in *Les Saisnes* (*c.* 1300) of Jehan Bodel, which is largely occupied by the loves of Baudouin and Sibille, the wife of Guiteclin. The adventures of Blanchefleur, wife of Charlemagne, form a variation of the common tale of the innocent wife falsely accused, and are told in *Macaire* and in the extant fragments of *La Reine Sibille* (14th century). After the conquest of the Saracens and the Saxons, the defeat of the Northmen, and the suppression of the feudal revolts, the emperor abdicated in favour of his son Louis (*Le Couronnement Looys*, 12th century). Charles's harangue to his son is in the best tradition of epic romance. The memory of Roncesvalles haunts him on his death-bed, and at the moment of death he has a vision of Roland.

The mythic element is practically lacking in the French legends, but in Germany some part of the Odin myth was associated with Charles's name. The constellation of the Great Bear, generally associated with Odin, is Karlswagen in German, and Charles's Wain in English. According to tradition in Hesse, he awaits resurrection, probably symbolic of the triumph of the sun over winter, within the Gudensberg (Hill of Odin). Bavarian tradition asserts that he is seated in the Untersberg in a chair, as in his tomb at Aix-la-Chapelle. His white beard goes on growing, and when it has thrice encircled the stone table before him the end of the world will come; or, according to another version, Charles will arise and after fighting a great battle on the plain of Wals will reign over a new Germany. There were medieval chroniclers who did not fear to assert that Charles rose from the dead to take part in the Crusades. In the MS. *Annales S. Stephani Frisingenses* (15th century), which formerly belonged to the abbey of Weihenstephan, and is now at Munich, the childhood of Charlemagne is practically the same as that of many mythic heroes. This work, generally known as the chronicle of Weihenstephan, gives among other legends a curious history of the emperor's passion for a dead woman, caused by a charm given to Charles by a serpent to whom he had rendered justice. The charm was finally dropped into a well at Aix, which thenceforward became Charles's favourite residence. The story of Roland's birth from the union of Charles with his sister Gilles, also found in German and Scandinavian versions, has abundant parallels in mythology, and was probably transferred from mythology to Charlemagne.

The Latin chronicle, wrongly ascribed to Turpin (Tilpinus), bishop of Reims from 753 to 800, was in reality later than the earlier poems of the French cycle, and the first properly authenticated mention of it is in 1165. Its primary object was to authenticate the relics of St James at Compostella. Alberic Trium Fontium, a monk of the Cistercian monastery of Trois Fontanes in the diocese of Châlons, embodied much poetical fiction in his chronicle (*c.* 1249). A large section of the *Chronique rimée* (*c.* 1243) of Philippe Mousket is devoted to Charlemagne's exploits. At the beginning of the 14th century Girard of Amiens made a dull compilation known as *Charlemagne* from the *chansons de gests*, authentic history and the pseudo-Turpin. *La Conqueste que fit le grand roi Charlemaigne es Espaignes* (pr. 1486) is the same work as the prose compilation of *Fierabras* (pr. 1478), and Caxton's *Lyf of Charles the Grete* (1485).

The Charlemagne legend was fully developed in Italy, where it was to have later a great poetic development at the hands of Boiardo, Ariosto and Tasso. There are two important Italian compilations, MS. XIII. of the library of St Mark, Venice (*c.* 1200), and the *Reali di Francia* (*c.* 1400) of a Florentine writer, Andrea da Barberino (b. 1370), edited by G. Vandelli (Bologna, 1892). The six books of this work are rivalled in importance by the ten branches of the Norse *Karlamagnus saga*, written under the reign of Haakon V. This forms a consecutive legendary history of Charles, and is apparently based on earlier versions of the French Charlemagne poems than those which we possess. It thus furnishes a guide to the older forms of stories, and moreover preserves the substance of others which have not survived in their French form. A popular abridgment, the *Keiser Karl Magnus Krönike* (pr. Malmö, 1534), drawn up in Danish, serves in some cases to complete the earlier work. The 2000 lines of the German *Kaiserchronik* on the history of Charlemagne belong to the first half of the 12th century, and were perhaps the work of Conrad, the poet of the *Ruolantes Liet*. The German poet known as the Stricker used the same sources as the author of the chronicle of Weihenstephan for his *Karl* (*c.* 1230). The earliest important Spanish version was the *Chronica Hispaniae* (*c.* 1284) of Rodrigo de Toledo.

The French and Norman-French chansons circulated as freely in England as in France, and it was therefore not until the period of decadence that English versions were made. The English metrical romances of Charlemagne are:—*Rowlandes Song* (15th century); *The Taill of Rauf Coilyear* (*c.* 1475, pr. by R. Lekpreuik, St Andrews, 1472), apparently original; *Sir Ferumbras* (*c.* 1380) and the *Sowdone of Babylone* (*c.* 1400) from an early version of *Fierabras*; a fragmentary *Roland and Vernagu* (Ferragus); two versions of *Otuel* (Otinel); and a *Sege of Melayne* (*c.* 1390), forming a prologue to Otinel unknown in French.

[1] For clerical accounts of Charles's voyage to the Holy Land see the *Chronicon* (*c.* 968) of Benedict, a monk of St André, and *Descriptio qualiter Karolus Magnus clavum et coronam Domini . . . detulerit*, by an 11th-century writer.

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CHARLEMAGNE, JEAN ARMAND (1753–1838), French dramatic author, was born at Bourget (Seine) on the 30th of November 1753. Originally intended for the church, he turned first to being a lawyer's clerk and then a soldier. He served in the American War of Independence, and on returning to France (1783) began to employ his pen on economic subjects, and later in writing for the stage. He became the author of a large number of plays, poems and romances, among which may be mentioned the comedies *M. de Crac à Paris* (1793), *Le Souper des Jacobins* (1795) and *L'Agioteur* (1796), and *Observations de quelques patriotes sur la nécessité de conserver les monuments de la littérature et des arts* (1794), an essay written in collaboration with M.M. Chardin and Renouard, which induced the Convention to protect books adorned with the coats of arms of their former owners and other treasures from destruction at the hands of the revolutionists. He died in Paris on the 6th of March 1838.

CHARLEMONT, JAMES CAULFEILD, 1ST EARL OF (1728–1799), Irish statesman, son of the 3rd viscount Charlemont, was born in Dublin on the 18th of August 1728, and succeeded his father as 4th viscount in 1734. The title of Charlemont descended from Sir Toby Caulfeild (1565–1627) of Oxfordshire, England, who was given lands in Ireland, and created Baron Charlemont (the name of a fort on the Blackwater), for his services to King James I. in 1620, and the 1st viscount was the 5th baron (d. 1671), who was advanced by Charles II. Lord Charlemont is historically interesting for his political connexion with Flood and Grattan; he was a cultivated man with literary and artistic tastes, and both in Dublin and in London his amiable character gave him considerable social influence. For various early services in Ireland he was made an earl in 1763, but he disregarded court favours and cordially joined Grattan in 1780 in the assertion of Irish independence. He was president of the volunteer convention in Dublin in November 1783, having taken from the first a leading part in the embodiment of the volunteers; and he was a strong opponent of the proposals for the Union. He died on the 4th of August 1799; his eldest son, who succeeded him, being subsequently (1837) created an English baron.

His *Life*, by F. Hardy, appeared in 1810.

CHARLEROI (*Carolus Rex*), a town in the province of Hainaut, Belgium. Pop. (1904) 26,528. It was founded in 1666 on the site of a village called Charnoy by the Spanish governor Roderigo and named after his sovereign Charles II. of Spain. Charleroi is the centre of the iron industry of Belgium. It is connected by a canal with Brussels, and from its position on the Sambre enjoys facilities of communication by water with France as well as Belgium. It was ceded soon after its foundation to France by the treaty of Aix-la-Chapelle, and Vauban fortified it. During the French occupation the town was considerably extended, and the fortifications were made so strong that Charleroi twice successfully resisted the strenuous attacks of William of Orange. In 1794 Charleroi again fell into the hands of the French, and on this occasion instead of fortifying they dismantled it. In 1816 Charleroi was refortified under Wellington's direction, and it was finally dismantled in 1859. Some portions of the old ramparts are left near the railway station. There is an archaeological museum with a miscellaneous collection of Roman and Frank antiquities.

CHARLEROI, a borough of Washington county, Pennsylvania, U.S.A., on the Monongahela river, near the S.W. corner of the state, about 20 m. S. of Pittsburg. Pop. (1900) 5930, of whom 1749 were foreign-born. It is served by the Pennsylvania railway. The surrounding country has good farming land and large coal mines. In 1905 the borough ranked fifth among the cities of the United States in the manufacture of glass (plate-glass, lamp chimneys and bottles), its product (valued at $1,841,308) being 2·3% of that of the whole country. Charleroi was settled in 1890 and was incorporated in 1891.

CHARLES (Fr. *Charles*; Span. *Carlos*; Ital. *Carlo*; Ger. *Karl*; derived from O.H.G. *Charal*, latinized as *Carolus*, meaning originally "man": cf. Mod.Ger., *Kerl*, "fellow," A.S. *ceorl*, Mod. Eng. "churl"), a masculine proper name. It has been borne by many European princes, notices of the more important of whom are given below in the following order: (1) Roman emperors, (2) kings of England, (3) other kings in the alphabetical order of their states, (4) other reigning princes in the same order, (5) non-reigning princes. Those princes who are known by a name in addition to Charles (Charles Albert, &c.) will be found after the private individuals bearing Charles as a surname.

CHARLES II.[1] called THE BALD (823–877), Roman emperor and king of the West Franks, was the son of the emperor Louis the Pious and of his second wife Judith and was born in 823. The attempts made by his father to assign him a kingdom, first Alamannia (829), then the country between the Meuse and the Pyrenees (839), at the expense of his half-brothers Lothair and Louis led to a rising on the part of these two (see LOUIS I., the Pious). The death of the emperor in 840 was the signal for the outbreak of war between his sons. Charles allied himself with his brother Louis the German to resist the pretensions of the emperor Lothair, and the two allies conquered him in the bloody victory of Fontenoy-en-Puisaye (25 June 841). In the following year, the two brothers confirmed their alliance by the celebrated oaths of Strassburg, made by Charles in the Teutonic language spoken by the subjects of Louis, and by Louis in the Romance tongue of Charles's subjects. The war was brought to an end by the treaty of Verdun (August 843), which gave to Charles the Bald the kingdom of the western Franks, which practically corresponded with what

[1] For Charles I., Roman emperor, see CHARLEMAGNE; cf. under Charles I. of France below.

is now France, as far as the Meuse, the Saône and the Rhone, with the addition of the Spanish March as far as the Ebro. The first years of his reign up to the death of Lothair I. (855) were comparatively peaceful, and during them was continued the system of "confraternal government" of the sons of Louis the Pious, who had various meetings with one another, at Coblenz (848), at Meersen (851), and at Attigny (854). In 858 Louis the German, summoned by the disaffected nobles, invaded the kingdom of Charles, who fled to Burgundy, and was only saved by the help of the bishops, and by the fidelity of the family of the Welfs, who were related to Judith. In 860 he in his turn tried to seize the kingdom of his nephew, Charles of Provence, but met with a repulse. On the death of Lothair II. in 869 he tried to seize his dominions, but by the treaty of Mersen (870) was compelled to share them with Louis the German. Besides this, Charles had to struggle against the incessant rebellions in Aquitaine, against the Bretons, whose revolt was led by their chief Nomenoé and Erispoé, and who inflicted on the king the defeats of Ballon (845) and Juvardeil (851), and especially against the Normans, who devastated the country in the north of Gaul, the valleys of the Seine and Loire, and even up to the borders of Aquitaine. Charles was several times compelled to purchase their retreat at a heavy price. He has been accused of being incapable of resisting them, but we must take into account the unwillingness of the nobles, who continually refused to join the royal army; moreover, the Frankish army does not seem to have been sufficiently accustomed to war to make any headway against the pirates. At any rate, Charles led various expeditions against the invaders, and tried to put a barrier in their way by having fortified bridges built over all the rivers. In 875, after the death of the emperor Louis II., Charles the Bald, supported by Pope John VIII., descended into Italy, receiving the royal crown at Pavia and the imperial crown at Rome (29th December). But Louis the German, who was also a candidate for the succession of Louis II., revenged himself for Charles's success by invading and devastating his dominions. Charles was recalled to Gaul, and after the death of Louis the German (28th August 876), in his turn made an attempt to seize his kingdom, but at Andernach met with a shameful defeat (8th October 876). In the meantime, John VIII., who was menaced by the Saracens, was continually urging him to come to Italy, and Charles, after having taken at Quierzy the necessary measures for safeguarding the government of his dominions in his absence, again crossed the Alps, but this expedition had been received with small enthusiasm by the nobles, and even by Boso, Charles's brother-in-law, who had been entrusted by him with the government of Lombardy, and they refused to come with their men to join the imperial army. At the same time Carloman, son of Louis the German, entered northern Italy. Charles, ill and in great distress, started on his way back to Gaul, and died while crossing the pass of the Mont Cenis on the 5th or 6th of October 877. He was succeeded by his son Louis the Stammerer, the child of Ermentrude, daughter of a count of Orleans, whom he had married in 842, and who had died in 869. In 870 he had married Richilde, who was descended from a noble family of Lorraine, but none of the children whom he had by her played a part of any importance. Charles seems to have been a prince of education and letters, a friend of the church, and conscious of the support he could find in the episcopate against his unruly nobles, for he chose his councillors for preference from among the higher clergy, as in the case of Guenelon of Sens, who betrayed him, or of Hincmar of Reims. But his character and his reign have been judged very variously. The general tendency seems to have been to accept too easily the accounts of the chroniclers of the east Frankish kingdom, which are favourable to Louis the German, and to accuse Charles of cowardice and bad faith. He seems on the contrary not to have lacked activity or decision.

AUTHORITIES.—The most important authority for the history of Charles's reign is represented by the *Annales Bertiniani*, which were the work of Prudentius, bishop of Troyes, up to 861, then up to 882 of the celebrated Hincmar, archbishop of Reims. This prince's charters are to be found published in the collections of the *Académie des Inscriptions*, by M. M. Prou. The most complete history of the reign is found in E. Dümmler, *Geschichte des ostfränkischen Reiches* (3 vols., Leipzig, 1887–1888). See also J. Calmette, *La Diplomatie carolingienne du traité de Verdun à la mort de Charles le Chauve* (Paris, 1901), and F. Lot, "Une Année du règne de Charles le Chauve," in *Le Moyen-Âge*, (1902) pp. 393-438.

CHARLES III., THE FAT[1] (832–888), Roman emperor and king of the West Franks, was the youngest of the three sons of Louis the German, and received from his father the kingdom of Swabia (Alamannia). After the death of his two brothers in succession, Carloman (881) and Louis the Young (882), he inherited the whole of his father's dominions. In 880 he had helped his two cousins in the west Frankish realm, Louis III. and Carloman, in their struggle with the usurper Boso of Provence, but abandoned them during the campaign in order to be crowned emperor at Rome by Pope John VIII. (February 881). On his return he led an expedition against the Norsemen of Friesland, who were entrenched in their camp at Elsloo, but instead of engaging with them he preferred to make terms and paid them tribute. In 884 the death of Carloman brought into his possession the west Frankish realm, and in 885 he got rid of his rival Hugh of Alsace, an illegitimate son of Lothair II., taking him prisoner by treachery and putting out his eyes. However, in spite of his six expeditions into Italy, he did not succeed in pacifying the country, nor in delivering it from the Saracens. He was equally unfortunate in Gaul and in Germany against the Norsemen, who in 886–887 besieged Paris. The emperor appeared before the city with a large army (October 886), but contented himself by treating with them, buying the retreat of the invaders at the price of a heavy ransom, and his permission for them to ravage Burgundy without his interfering. On his return to Alamannia, however, the general discontent showed itself openly and a conspiracy was formed against him. He was first forced to dismiss his favourite, the chancellor Liutward, bishop of Vercelli. The dissolution of his marriage with the pious empress Richarde, in spite of her innocence as proved by the judicial examination, alienated his nobles still more from him. He was deposed by an assembly which met at Frankfort or at Tribur (November 887), and died in poverty at Neidingen on the Danube (18th January 888).

See E. Dümmler, *Geschichte des ostfränkischen Reiches* vol. iii. (Leipzig 1888).

CHARLES IV. (1316–1378), Roman emperor and king of Bohemia, was the eldest son of John of Luxemburg, king of Bohemia, and Elizabeth, sister of Wenceslas III., the last Bohemian king of the Premyslides dynasty. He was born at Prague on the 14th of May 1316, and in 1323 went to the court of his uncle, Charles IV., king of France, and exchanged his baptismal name of Wenceslas for that of Charles. He remained for seven years in France, where he was well educated and learnt five languages; and there he married Blanche, sister of King Philip VI., the successor of Charles IV. In 1331 he gained some experience of warfare in Italy with his father; and on his return to Bohemia in 1333 he was made margrave of Moravia. Three years later he undertook the government of Tirol on behalf of his brother John Henry, and was soon actively concerned in a struggle for the possession of this county. In consequence of an alliance between his father and Pope Clement VI., the relentless enemy of the emperor Louis IV., Charles was chosen German king in opposition to Louis by some of the princes at Rense on the 11th of July 1346. As he had previously promised to be subservient to Clement he made extensive concessions to the pope in 1347. Confirming the papacy in the possession of wide territories, he promised to annul the acts of Louis against Clement, to take no part in Italian affairs, and to defend and protect the church. Meanwhile he had accompanied his father into France and had taken part in the battle of Crecy in August 1346, when John was killed and Charles escaped wounded from the field. As king of Bohemia he returned to Germany, and after being crowned German king at Bonn on the 26th of November 1346, prepared to attack Louis. Hostilities were interrupted by the death of the emperor in October 1347, and Günther, count of Schwarzburg, who was chosen king by the

[1] This surname has only been applied to Charles since the 13th century.

partisans of Louis, soon abandoned the struggle. Charles, having made good use of the difficulties of his opponents, was recrowned at Aix-la-Chapelle on the 25th of July 1349, and was soon the undisputed ruler of Germany. Gifts or promises had won the support of the Rhenish and Swabian towns; a marriage alliance secured the friendship of the Habsburgs; and that of Rudolph II., count palatine of the Rhine, was obtained when Charles, who had become a widower in 1348, married his daughter Anna.

In 1350 the king was visited at Prague by Cola di Rienzi, who urged him to go to Italy, where the poet Petrarch and the citizens of Florence also implored his presence. Turning a deaf ear to these entreaties, Charles kept Rienzi in prison for a year, and then handed him as a prisoner to Clement at Avignon. Four years later, however, he crossed the Alps without an army, received the Lombard crown at Milan on the 6th of January 1355, and was crowned emperor at Rome by a cardinal on the 5th of April in the same year. His sole object appears to have been to obtain the imperial crown in peace, and in accordance with a promise previously made to Pope Clement he only remained in the city for a few hours, in spite of the expressed wishes of the Romans. Having virtually abandoned all the imperial rights in Italy, the emperor recrossed the Alps, pursued by the scornful words of Petrarch but laden with considerable wealth. On his return Charles was occupied with the administration of Germany, then just recovering from the Black Death, and in 1356 he promulgated the Golden Bull (*q.v.*) to regulate the election of the king. Having given Moravia to one brother, John Henry, and erected the county of Luxemburg into a duchy for another, Wenceslas, he was unremitting in his efforts to secure other territories as compensation and to strengthen the Bohemian monarchy. To this end he purchased part of the upper Palatinate of the Rhine in 1353, and in 1367 annexed Lower Lusatia to Bohemia and bought numerous estates in various parts of Germany. On the death in 1363 of Meinhard, duke of Upper Bavaria and count of Tirol, Upper Bavaria was claimed by the sons of the emperor Louis IV., and Tirol by Rudolph IV., duke of Austria. Both claims were admitted by Charles on the understanding that if these families died out both territories should pass to the house of Luxemburg. About the same time he was promised the succession to the margraviate of Brandenburg, which he actually obtained for his son Wenceslas in 1373. He also gained a considerable portion of Silesian territory, partly by inheritance through his third wife, Anna, daughter of Henry II., duke of Schweidnitz. In 1365 Charles visited Pope Urban V. at Avignon and undertook to escort him to Rome; and on the same occasion was crowned king of Burgundy, or Arles, at Arles on the 4th of June 1365.

His second journey to Italy took place in 1368, when he had a meeting with Urban at Viterbo, was besieged in his palace at Siena, and left the country before the end of the year 1369. During his later years the emperor took little part in German affairs beyond securing the election of his son Wenceslas as king of the Romans in 1376, and negotiating a peace between the Swabian league and some nobles in 1378. After dividing his lands between his three sons, he died on the 29th of November 1378 at Prague, where he was buried, and where a statue was erected to his memory in 1848.

Charles, who according to the emperor Maximilian I. was the step-father of the Empire, but the father of Bohemia, brought the latter country to a high state of prosperity. He reformed the finances, caused roads to be made, provided for greater security to life and property, and introduced or encouraged various forms of industry. In 1348 he founded the university of Prague, and afterwards made this city the seat of an archbishop, and beautified it by the erection of several fine buildings. He was an accomplished diplomatist, possessed a penetrating intellect, and was capable of much trickery in order to gain his ends. By refusing to become entangled in Italian troubles and confining himself to Bohemia, he proved that he preferred the substance of power to its shadow. Apparently the most pliant of men, he had in reality great persistence of character, and if foiled in one set of plans readily turned round and reached his goal by a totally different path. He was superstitious and peace-loving, had few personal wants, and is described as a round-shouldered man of medium height, with black hair and beard, and sallow cheeks.

His autobiography the "Vita Caroli IV.," which deals with events down to the year 1346, and various other documents relating to his life and times, are published in the *Fontes rerum Germanicarum*, Band I., edited by J. F. Böhmer (Leipzig, 1885). For other documents relating to the time see *Die Regesten des Kaiserreichs unter Kaiser Karl IV.*, edited by J. F. Böhmer and A. Huber (Innsbruck, 1889); *Acta Karoli IV. imperatoris inedita* (Innsbruck, 1891); E. Werunsky, *Excerpta ex registris Clementis VI. et Innocentii VI.* (Innsbruck, 1885). See also E. Werunsky, *Geschichte Kaiser Karls IV. und seiner Zeit* (Innsbruck, 1880–1892); H. Friedjung, *Kaiser Karl IV. und sein Antheil am geistigen Leben seiner Zeit* (Vienna, 1876); A. Gottlob, *Karls IV. private und politische Beziehungen zu Frankreich* (Innsbruck, 1883); O. Winckelmann, *Die Beziehungen Kaiser Karls IV. zum Königreich Arelat* (Strassburg, 1882); K. Palm, "Zu Karls IV. Politik gegen Baiern," in the *Forschungen zur deutschen Geschichte*, Band xv. (Göttingen, 1862–1866); Th. Lindner, "Karl IV. und die Wittelsbacher," and S. Stienherz, "Die Beziehungen Ludwigs I. von Ungarn zu Karl IV.," and "Karl IV. und die österreichischen Freiheitsbriefe," in the *Mittheilungen des Instituts für österreichische Geschichtsforschung* (Innsbruck, 1880).

CHARLES V. (1500–1558), Roman emperor and (as CHARLES I.) king of Spain, was born at Ghent on the 24th of February 1500. His parents were Philip of Burgundy and Joanna, third child of Ferdinand and Isabella. Philip died in 1506, and Charles succeeded to his Netherland possessions and the county of Burgundy (Franche Comté). His grandfather, the emperor Maximilian, as regent, appointed his daughter Margaret vice-regent, and under her strenuous guardianship Charles lived in the Netherlands until the estates declared him of age in 1515. In Castile, Ferdinand, king of Aragon, acted as regent for his daughter Joanna, whose intellect was already clouded. On the 23rd of January 1516 Ferdinand died. Charles's visit to Spain was delayed until the autumn of 1517, and only in 1518 was he formally recognized as king conjointly with his mother, firstly by the cortes of Castile, and then by those of Aragon. Joanna lived to the very eve of her son's abdication, so that he was only for some months technically sole king of Spain. During this Spanish visit Maximilian died, and Charles succeeded to the inheritance of the Habsburgs, to which was shortly added the duchy of Württemberg. Maximilian had also intended that he should succeed as emperor. In spite of the formidable rivalry of Francis I. and the opposition of Pope Leo X., pecuniary corruption and national feeling combined to secure his election in 1519. Charles hurriedly left Spain, and after a visit to Henry VIII. and his aunt Catherine, was crowned at Aix on the 23rd of October 1520.

The difficulty of Charles's reign consists in the complexity of interests caused by the unnatural aggregate of distinct territories and races. The crown of Castile brought with it the two recently conquered kingdoms of Navarre and Granada, together with the new colonies in America and scattered possessions in northern Africa. That of Aragon comprised the three distinct states of Aragon, Valencia and Catalonia, and in addition the kingdoms of Naples, Sicily and Sardinia, each with a separate character and constitution of its own. No less than eight independent cortes or parliaments existed in this Spanish-Italian group, adding greatly to the intricacy of government. In the Netherland provinces again the tie was almost purely personal; there existed only the rudiments of a central administration and a common representative system, while the county of Burgundy had a history apart. Much the same was true of the Habsburg group of states, but Charles soon freed himself from direct responsibility for their government by making them over, together with Württemberg, to his brother Ferdinand. The Empire entailed serious liabilities on its ruler without furnishing any reliable assets: only through the cumbrous machinery of the diet could Charles tap the military and financial resources of Germany. His problem here was complicated by the growth of Lutheranism, which he had to face at his very first diet in 1521. In addition to such administrative difficulties Charles had

inherited a quarrel with France, to which the rivalry of Francis I. for the Empire gave a personal character. Almost equally formidable was the advance of Sultan Suliman up the Danube, and the union of the Turkish naval power with that of the Barbary States of northern Africa. Against Lutheran Germany the Catholic emperor might hope to rely upon the pope, and against France on England. But the attitude of the popes was almost uniformly disagreeable, while from Henry VIII. and Edward VI. Charles met with more unpleasantness than favour.

The difficulty of Charles himself is also that of the historian and reader of his reign. It is probably more instructive to treat it according to the emperor's several problems than in strict chronological order. Yet an attempt to distinguish the several periods of his career may serve as a useful introduction. The two best dividing lines are, perhaps, the coronation as emperor at Bologna in 1530, and the peace of Crépy in 1544. Until his visit to Italy (1529) Charles remained in the background of the European stage, except for his momentous meeting with Luther at the diet of Worms (1521). This meeting in itself forms a subdivision. Previously to this, during his nominal rule in the Netherlands, his visit to Spain, and his candidature for the Empire, he seemed, as it was said, spell-bound under the ferule of his minister Chièvres. Almost every report represented him as colourless, reserved and weak. His dependence on his Flemish counsellors provoked the rising in Castile, the feebleness of his government the social war in Aragon. The religious question first gave him a living interest, and at this moment Chièvres died. Aleander, the papal nuncio at Worms, now recognized that public opinion had been wrong in its estimate of Charles. Never again was he under tutelage. The necessity, however, of residence in Spain prevented his taking a personal part in the great fight with Francis I. for Italy. He could claim no credit for the capture of his rival at Pavia. When his army sacked Rome and held Pope Clement VII. prisoner, he could not have known where this army was. And when later the French overran Naples, and all but deprived him of his hold on Italy, he had to instruct his generals that they must shift for themselves. The world had become afraid of him, but knew little of his character. In the second main division of his career Charles changed all this. No monarch until Napoleon was so widely seen in Europe and in Africa. Complexity of problems is the characteristic of this period. At the head of his army Charles forced the Turks backwards down the Danube (1532). He personally conquered Tunis (1535), and was only prevented by "act of God" from winning Algiers (1541). The invasion of Provence in 1536 was headed by the emperor. In person he crushed the rebellion of Ghent (1540). In his last war with Francis (1542–44) he journeyed from Spain to the Netherlands, brought the rebellious duke of Cleves to his knees, and was within easy reach of Paris when he made the peace of Crépy (1544). In Germany, meanwhile, from the diet of Augsburg (1530) onwards, he had presided at the diets or conferences, which, as he hoped, would effect the reunion of the church.

Peace with France and the Turk and a short spell of friendliness with Pope Paul III. enabled Charles at last to devote his whole energies to the healing of religious schism. Conciliation proving impossible, he led the army which received the submission of the Lutheran states, and then captured the elector of Saxony at Mühlberg, after which the other leader, Philip of Hesse, capitulated. The Armed Diet of 1548 was the high-water mark of Charles's power. Here, in defiance of the pope, he published the Interim which was meant to reconcile the Lutherans with the church, and the so-called Reform which was to amend its abuses. During the next four years, owing to ill-health and loss of insight, his power was ebbing. In 1552 he was flying over the Brenner from Maurice of Saxony, a princeling whose fortunes he had made. Once again the old complications had arisen. His old enemy's son, Henry II., had attacked him indirectly in Piedmont and Parma, and then directly in Germany in alliance with Maurice. Once more the Turk was moving in the Danube and in the western Mediterranean. The humiliation of his flight gave Charles new spirit, and he once more led an army through Germany against the French, only to be checked by the duke of Guise's defence of Metz. Henceforth the waves of his fortune plashed to and fro until his abdication without much ostensible loss or gain.

Charles had abundance of good sense, but little creative genius, and he was by nature conservative. Consequently he never sought to impose any new or common principles of administration on his several states. He took them as he found them, and at most, as in the Netherlands, improved upon what he found. So also in dealing with rival powers his policy may be called opportunist. He was indeed accused by his enemies of emulating Charlemagne, of aiming at universal empire. Historians have frequently repeated this charge. Charles himself in later life laughingly denied the imputation, and facts are in favour of his denial. When Francis I. was in his power he made no attempt to dismember France, in spite of his pledges to his allies Henry VIII. and the duke of Bourbon. He did, indeed, demand the duchy of Burgundy, because he believed this to have been unrighteously stolen by Louis XI. from his grandmother when a helpless girl. The claim was not pressed, and at the height of his fortunes in 1548 he advised his son never to surrender it, but also never to make it a cause of war. When Clement VII. was his prisoner, he was vehemently urged to overthrow the temporal power, to restore imperial dominion in Italy, at least to make the papacy harmless for the future. In reply he restored his enemy to the whole of his dominions, even reimposing him by force on the Florentine republic. To the end of his life his conscience was sensitive as to Ferdinand's expulsion of the house of Albret from Spanish Navarre, though this was essential to the safety of Spain. Though always at war he was essentially a lover of peace, and all his wars were virtually defensive. "Not greedy of territory," wrote Marcantonio Contarini in 1536, "but most greedy of peace and quiet." For peace he made sacrifices which angered his hot-headed brother Ferdinand. He would not aid in expelling the sultan's puppet Zapolya from Ferdinand's kingdom of Hungary, and he suffered the restoration of the ruffianly duke of Württemberg, to the grave prejudice of German Catholicism. In spite of his protests, Henry VIII. with impunity ill-treated his aunt Catherine, and the feeble government of Edward VI. bullied his cousin Mary, who had been his fiancée. No serious efforts were made to restore his brother-in-law, Christian II., to the throne of Denmark, and he advised his son Philip to make friends with the usurper. After the defeat of the Lutheran powers in 1547 he did not gain a palm's breadth of territory for himself. He resisted Ferdinand's claim for Württemberg, which the duke had deserved to forfeit; he disliked his acceptance of the voluntary surrender of the city of Constance; he would not have it said that he had gone to war for the benefit of the house of Habsburg.

On the other hand, Charles V.'s policy was not merely negative. He enlarged upon the old Habsburg practice of marriage as a means of alliance of influence. Previously to his election as emperor, his sister Isabella was married to Christian II. of Denmark, and the marriages of Mary and Ferdinand with the king of Hungary and his sister had been arranged. Before he was twenty Charles himself had been engaged some ten times with a view to political combinations. Naturally, therefore, he regarded his near relations as diplomatic assets. The federative system was equally familiar; Germany, the Netherlands, and even Spain, were in a measure federations. Combining these two principles, he would within his more immediate spheres of influence strengthen existing federations by intermarriage, while he hoped that the same means would convert the jarring powers of Europe into a happy family. He made it a condition of the treaty of Madrid (1526) that Francis I. should marry his sister Eleanor, Manuel of Portugal's widow, in the hope, not that she would be an ally or a spy within the enemy's camp, but an instrument of peace. His son's marriage with Mary Tudor would not only salve the rubs with England, but give such absolute security to the Netherlands that France would shrink from war. The personal union of all the Iberian kingdoms under a single ruler had long been an aim of Spanish statecraft. So Charles had married his sister Eleanor, much against her will, to the old king Manuel, and then his sister Catherine to his successor. The empress was a Portuguese

infanta, and Philip's first wife was another. It is thus small wonder that, within a quarter of a century of Charles's death, Philip became king of Portugal.

In the wars with Francis I. Italy was the stake. In spite of his success Charles for long made no direct conquests. He would convert the peninsula into a federation mainly matrimonial. Savoy, the important buffer state, was detached from France by the marriage of the somewhat feeble duke to Charles's capable and devoted sister-in-law, Beatrice of Portugal. Milan, conquered from France, was granted to Francesco Sforza, heir of the old dynasty, and even after his treason was restored to him. In the vain hope of offspring Charles sacrificed his niece, Christina of Denmark, to the valetudinarian duke. In the long negotiations for a Habsburg-Valois dynasty which followed Francesco's death, Charles was probably sincere. He insisted that his daughter or niece should marry the third rather than the second son of Francis I., in order, apart from other reasons, to run less risk of the duchy falling under French dominion. The final investiture of Philip was forced upon him, and does not represent his saner policy. The Medici of Florence, the Gonzaga of Mantua, the papal house of Farnese, were all attached by Habsburg marriages. The republics of Genoa and Siena were drawn into the circle through the agency of their chief noble families, the Doria and Piccolomini; while Charles behaved with scrupulous moderation towards Venice in spite of her active hostility before and after the League of Cognac. Occasional acts of violence there were, such as the participation in the murder of Pierluigi Farnese, and the measures which provoked the rebellion of Siena. These were due to the difficulty of controlling the imperial agents from a distance, and in part to the faults of the victim prince and republic. On the whole, the loose federation of viceroyalties and principalities harmonized with Italian interests and traditions. The alternative was not Italian independence, but French domination. At any rate, Charles's structure was so durable that the French met with no real success in Italy until the 18th century.

Germany offered a fine field for a creative intellect, since the evils of her disintegration stood confessed. On the other hand, princes and towns were so jealous of an increase of central authority that Charles, at least until his victory over the League of Schmalkalden, had little effective power. Owing to his wars with French and Turks he was rarely in Germany, and his visits were very short. His problem was infinitely complicated by the union of Lutheranism and princely independence. He fell back on the old policy of Maximilian, and strove to create a party by personal alliances and intermarriage. In this he met with some success. The friendship of the electors of Brandenburg, whether Catholic or Protestant, was unbroken. In the war of Schmalkalden half the Protestant princes were on Charles's side or friendly neutrals. At the critical moment which preceded this, the lately rebellious duke of Cleves and the heir of Bavaria were secured through the agency of two of Ferdinand's invaluable daughters. The relations, indeed, between the two old enemies, Austria and Bavaria, were permanently improved. The elector palatine, whose love affairs with his sister Eleanor Charles as a boy had roughly broken, received in compensation a Danish niece. Her sister, widow of Francesco Sforza, was utilized to gain a hold upon the French dynasty which ruled Lorraine. More than once there were proposals for winning the hostile house of Saxony by matrimonial means. After his victory over the League of Schmalkalden, Charles perhaps had really a chance of making the imperial power a reality. But he lacked either courage or imagination, contenting himself with proposals for voluntary association on the lines of the defunct Swabian League, and dropping even these when public opinion was against them. Now, too, he made his great mistake in attempting to foist Philip upon the Empire as Ferdinand's successor. Gossip reported that Ferdinand himself was to be set aside, and careless historians have given currency to this. Such an idea was impossible. Charles wished Philip to succeed Ferdinand, while he ultimately conceded that Ferdinand's son Maximilian should follow Philip, and even in his lifetime exercise the practical power in Germany. This scheme irritated Ferdinand and his popular and ambitious son at the critical moment when it was essential that the Habsburgs should hold together against princely malcontents. Philip was imprudently introduced to Germany, which had also just received a foretaste of the unpleasant characteristics of Spanish troops. Yet the person rather than the policy was, perhaps, at fault. It was natural that the quasi-hereditary succession should revert to the elder line. France proved her recuperative power by the occupation of Savoy and of Metz, Toul and Verdun, the military keys of Lorraine. The separation of the Empire and Spain left two weakened powers not always at accord, and neither of them permanently able to cope on equal terms with France. Nevertheless, this scheme did contribute in no small measure to the failure of Charles in Germany. The main cause was, of course, the religious schism, but his treatment of this requires separate consideration.

The characteristics of Charles's government, its mingled conservatism and adaptability, are best seen in Spain and the Netherlands, with which he was in closer personal contact than with Italy and Germany. In Spain, when once he knew the country, he never repeated the mistakes which on his first visit caused the rising of the communes. The cortes of Castile were regularly summoned, and though he would allow no encroachment on the crown's prerogatives, he was equally scrupulous in respecting their constitutional rights. They became, perhaps, during the reign slightly more dependent on the crown. This has been ascribed to the system of gratuities which in later reigns became a scandal, but was not introduced by Charles, and as yet amounted to little more than the payment of members' expenses. Indirectly, crown influence increased owing to the greater control which had gradually been exercised over the composition of the municipal councils, which often returned the deputies for the cortes. Charles was throughout nervous as to the power and wealth of the greater nobles. They rather than the crown had conquered the communes, and in the past they rather than the towns had been the enemies of monarchy. He earnestly warned his son against giving them administrative power, especially the duke of Alva, who in spite of his sanctimonious and humble bearing cherished the highest ambitions: in foreign affairs and war he might be freely used, for he was Spain's best soldier. In the cortes of 1538 Charles came into collision with the nobles as a class. They usually attended only on ceremonial occasions, since they were exempted from direct taxation, which was the main function of the cortes. Now, however, they were summoned, because Charles was bent upon a scheme of indirect taxation which would have affected all classes. They offered an uncompromising opposition, and Charles somewhat angrily dismissed them, nor did he ever summon them again. The peculiar Spanish system of departmental councils was further developed, so that it may be said that the bureaucratic element was slightly increasing just as the parliamentary element was on the wane. The evils of this tendency were as yet scarcely apparent owing to Charles's personal intervention in all departments. The councils presented their reports through the minister chiefly concerned; Charles heard their advice, and formed his own conclusions. He impressed upon Philip that he should never become the servant of his ministers: let him hear them all but decide himself. Naturally enough, he was well served by his ministers, whom he very rarely changed. After the death of the Piedmontese Gattinara he relied mainly on Nicolas Perrenot de Granvella for Netherland and German affairs, and on Francisco de los Cobos for Spanish, while the younger Granvella was being trained. From 1520 to 1555 these were the only ministers of high importance. Above all, Charles never had a court favourite, and the only women who exercised any influence were his natural advisers, his wife, his aunt Margaret and his sister Mary. In all these ladies he was peculiarly fortunate. Charles was never quite popular in Spain, but the empress whom he married at his people's request was much beloved. Complaints were made of his absenteeism, but until 1543 he spent the greater portion of his reign in Spain, or on expeditions

such as those against Tunis and Algiers which were distinctively in Spanish interests. Spaniards disliked his Netherland and German connexions, but without the vigorous blows which these enabled him to strike at France, it is improbable that Spain could have retained her hold on Italy, or her monopoly of commerce with the Indies. The wars with Francis I. were, in spite of the rival candidature for the Empire, Spanish wars entailed by Ferdinand's retention of Roussillon, his annexation of Navarre, his summary eviction of the French from Naples. The Netherlands had become convinced on commercial grounds of the wisdom of peace with France, and the German interest in Milan was not sufficiently active to be a standing cause of war. Charles and Francis had inherited the hostility of Ferdinand and Louis XII.

The reign of Charles was in America the age of conquest and organization. Upon his accession the settlements upon the mainland were insignificant; by 1556 conquest was practically complete, and civil and ecclesiastical government firmly established. Actual expansion was the work of great adventurers starting on their own impulse from the older colonies. To Charles fell the task of encouraging such ventures, of controlling the conquerors, of settling the relations between colonists and natives, which involved those between the colonists and the missionary colonial church. He must arrest depopulation, provide for the labour market, regulate oceanic trade, and check military preponderance by civil and ecclesiastical organization. In America Charles took an unceasing interest; he had a boundless belief in its possibilities, and a determination to safeguard the interests of the crown. Cortes, Alvarado and the brothers Pizarro were brought into close personal communication with the emperor. If he bestowed on Cortes the confidence which the loyal conqueror deserved, he showed the sternest determination in crushing the rebellious and autonomous instincts of Almagro and the Pizarros. But for this, Peru and Chile must have become independent almost as soon as they were conquered. Throughout he strove to protect the natives, to prevent actual slavery, and the consequent raids upon the natives. Legislation was not, indeed, always consistent, because the claims of the colonists could not always be resisted, but on the whole he gave earnest support to the missionaries, who upheld the cause of the natives against the military, and sometimes the civil and ecclesiastical elements. His humane care for his native subjects may well be studied in the instructions sent to Philip from Germany in 1548, when Charles was at the summit of his power. If Charles had had his will, he would have opened the colonial trade to the whole of his wide possessions. The Castilians, however, jealously confined it to the city of Seville, artificially fostering the indolence of the colonists to maintain the agricultural and manufacturing monopoly of Castile, and by extreme protective measures forcing them to live on smuggled goods from other countries. Charles did actually attempt to cure the exclusive interest of the colonists in mineral wealth by the establishment of peasant and artisan colonies. If in many respects he failed, yet the organization of Spanish America and the survival of the native races were perhaps the most permanent results of his reign. It is a proof of the complexity of his interests that the march of the Turk upon Vienna and of the French on Naples delayed until the following reign the foundation of Spain's eastern empire. Charles carefully organized the expedition of Magellan, which sailed for the Moluccas and discovered the Philippines. Unfortunately, his straits for money in 1529 compelled him to mortgage to Portugal his disputed claim to the Moluccas, and the Philippines consequently dropped out of sight.

If in the administration of Spain Charles did little more than mark time, in the Netherlands advance was rapid. Of the seven northern provinces he added five, containing more than half the area of the later United Provinces. In the south he freed Flanders and Artois from French suzerainty, annexed Tournai and Cambrai, and closed the natural line of French advance through the great bishopric of Liége by a line of fortresses across its western frontier. Much was done to convert the aggregate of jarring provinces into a harmonious unity by means of common principles of law and finance, and by the creation of a national army. While every province had its own assembly, there were at Charles's accession only the rudiments of estates general for the Netherlands at large. At the close of the reign the common parliamentary system was in full swing, and was fast converting the loosely knit provinces into a state. By these means the ruler had wished to facilitate the process of supply, but supply soon entailed redress, and the provinces could recognize their common interests and grievances. Under Philip II. all patriotic spirits passionately turned to this creation of his father as the palladium of Netherland liberty. This process of consolidation was infinitely difficult, and conflicts between local and central authorities were frequent. That they were safely tided over was due to Charles's moderation and his legal mind, which prompted him to draw back when his case was bad. The harshest act of his life was the punishment of the rebellion of Ghent. Yet the city met with little or no sympathy in other quarters, because she had refused to act in concert with the other members of Flanders and the other provinces. It was no mere local quarrel, but a breach of the growing national unity.

In the Netherlands Charles showed none of the jealousy with which he regarded the Spanish nobles. He encouraged the growth of large estates through primogeniture; he gave the nobles the provincial governorships, the great court offices, the command of the professional cavalry. In the Order of the Golden Fleece and the long established presence of the court at Brussels, he possessed advantages which he lacked in Spain. The nobility were utilized as a link between the court and the provinces. Very different was it with the church. By far the greater part of the Netherlands fell under foreign sees, which were peculiarly liable to papal exactions and to the intrigues of rival powers. Thus the usual conflict between civil and ecclesiastical jurisdiction was peculiarly acute. To remedy this dualism of authority and the consequent moral and religious abuses, Charles early designed the creation of a national diocesan system, and this was a darling project throughout his life. He was doing what every German territorial prince, Catholic or Lutheran, attempted, making bishoprics and abbeys dependent on the crown, with nomination and institution in his hands, and with reasonable control over taxation and jurisdiction. The papacy unfortunately thwarted him, and the scheme, which under Charles would have been carried with national assent, and created a national church, took the appearance under Philip of alien domination.

If in Germany Charles was emperor, he was in the Netherlands territorial prince, and thus his interests might easily be at disaccord with those of the Empire. Consequently, just as he had shaken off French suzerainty from Flanders and Artois, so he loosened the tie of the other provinces to Germany. In 1548 they were declared free and sovereign principalities not subject to imperial laws, and all the territories were incorporated in the Burgundian circle. It was, indeed, agreed that they should contribute to imperial taxation, and in return receive imperial protection. But this soon became a dead letter, and the Netherlands were really severed from the Empire, save for the nominal feudal tie in the case of some provinces. Thus some writers have dated their independence from Charles's convention of 1548 rather than from the peace of Westphalia, a century later. Having converted his heterogeneous territories into a self-sufficient state, Charles often contemplated the formation of a middle kingdom between France and Germany. At the last moment he spoiled his own work by granting the Netherlands to Philip. It was indeed hard to set aside the order of inheritance, and the commercial interests of the provinces were closely bound with Spain, and with England, whose queen Philip had married. Under any other ruler than Philip the breach might not have come so early. Yet it must be regretted that Charles had not the courage of his convictions, and that he lost the opportunity of completing the new nation which he had faithfully laboured to create.

Charles V. is in the eyes of many the very picture of a Catholic zealot. Popular opinion is probably mainly based upon the

letters written from Yuste in 1558, when two hot-beds of heresy had been discovered in Spain herself, and on the contemporary codicil to his will. These were, perhaps, really in part responsible for the later persecution. Yet the circumstances were far from being typical of the emperor's career. Death was very near him; devotional exercises were his main occupation. The letters, moreover, were cries of warning, and not edicts. Charles was not then the responsible authority. There is a long step between a violent letter and a violent act. Few men would care to have their lives judged by letters written in the last extremities of gout. Less pardonable was the earlier persecution of the Valencian Moriscoes in 1525–1526. They had fought for their landlords in the cause of order, had been forcibly converted by the revolutionaries, and on the suppression of revolution had naturally relapsed. But for this momentary conversion the Inquisition would have had no hold upon them. The edict of persecution was cruel and unnecessary, and all expert opinion in Valencia was against it. It was not, however, actually enforced until after the victory of Pavia. It seems likely that Charles in a fit of religious exaltation regarded the persecution as a sacrificial thank-offering for his miraculous preservation. It is characteristic that, when in the following year he was brought into personal contact with the Moors of Granada, he allowed them to buy themselves off from the more obnoxious measures of the Inquisition. Henceforth the reign was marked by extreme leniency. Spain enjoyed a long lull in the activity of her Inquisition. At Naples in 1547 a rumour that the Spanish Inquisition was to be introduced to check the growth of heresy in influential quarters produced a dangerous revolt. The briefs were, however, issued by Paul III., no friend of Charles, and when a Neapolitan deputation visited the emperor he disclaimed any intention of making innovations. Of a different type to all the above was the persecution in the Netherlands. Here it was deliberate, chronic, and on an ascending scale. It is not a sufficient explanation that heresy also was persistent, ubiquitous and increasing, for this was also the case in Germany where Charles's methods were neither uniform nor drastic. But in the Netherlands the heretics were his immediate subjects, and as in every other state, Catholic or Lutheran, they must conform to their prince's religion. But there was more than this. After the suppression of the German peasant revolt in 1525 many of the refugees found shelter in the teeming Netherland cities, and heresy took the form, not of Lutheranism, but of Anabaptism, which was believed to be perilous to society and the state. The government put down Anabaptism, as a modern government might stamp out Anarchism. The edicts were, indeed, directed against heresy in general, and were as harsh as they could be—at least on paper. Yet when Charles was assured that they were embarrassing foreign trade he let it be understood that they should not affect the foreign mercantile communities. Prudential considerations proved frequently a drag upon religious zeal.

The relations of Charles to heresy must be judged in the main by his treatment of German Lutheranism. Here he had to deal, not with drawing-room imprudences nor hole-and-corner conventicles, not with oriental survivals nor millenary aspirations, but with organized churches protected by their princes, supported by revenues filched from his own church and stiffened by formulae as rigid as those of Catholicism. The length and stubbornness of the conflict will serve to show that Charles's religious conservatism had a measure of elasticity, that he was not a bigot and nothing more. It should be remembered that all his principal ministers were inclined to be Erasmian or indifferent, that one of his favourite confessors, Loaysa, advised compromise, and that several intimate members of his court and chapel were, after his death, victims of the Inquisition. The two more obvious courses towards the restoration of Catholic unity were force and reconciliation, in other words, a religious war or a general council. Neither of these was a simple remedy. The latter was impossible without papal concurrence, inoperative without the assistance of the European powers, and merely irritant without the adhesion of the Lutherans. It was most improbable that the papacy, the powers and the Lutherans would combine in a measure so palpably advantageous to the emperor. Force was hopeless save in the absence of war with France and the Turk, and of papal hostility in Italian territorial politics. Charles must obtain subsidies from ecclesiastical sources, and the support of all German Catholics, especially of the traditional rival, Bavaria. Even so the Protestants would probably be the stronger, and therefore they must be divided by utilizing any religious split, any class distinction, any personal or traditional dislikes, or else by bribery. Force and reconciliation seeming equally difficult, could an alternative be found in toleration? The experiment might take the form either of individual toleration, or of toleration for the Lutheran states. The former would be equally objectionable to Lutheran and Catholic princes as loosening their grip upon their subjects. Territorial toleration might seem equally obnoxious to the emperor, for its recognition would strengthen the anti-imperial particularism so closely associated with Lutheranism. If Charles could find no permanent specific, he must apply a provisional palliative. It was absolutely necessary to patch, if not to cure, because Germany must be pulled together to resist French and Turks. Such palliatives were two—suspension and comprehension. Suspension deferred the execution of penalties incurred by heresy, either for a term of years, or until a council should decide. Thus it recognized the divorce of the two religions, but limited it by time. Comprehension instead of recognizing the divorce would strive to conceal the breach. It was a domestic remedy, German and national, not European and papal. To become permanent it must receive the sanction of pope and council, for the Roman emperor could not set up a church of Germany. Yet the formula adopted might conceivably be found to fall within the four corners of the faith, and so obviate the necessity alike of force or council. Such were the conditions of the emperor's task, and such the methods which he actually pursued. He would advance now on one line, now on another, now on two or three concurrently, but he never definitely abandoned any. This fusion of obstinacy and versatility was a marked feature of his character.

Suspension was of course often accidental and involuntary. The two chief stages of Lutheran growth naturally corresponded with the periods, each of nine years, when Charles was absent. Deliberate suspension was usually a consequence of the failure of comprehension. Thus at Augsburg in 1530 the wide gulf between the Lutheran confession and the Catholic confutation led to the definite suspensive treaty granted to the Lutherans at Nuremberg (1532). Charles dared not employ the alternative of force, because he needed their aid for the Turkish war. In 1541, after a series of religious conferences, he personally presented a compromise in the so-called Book of Regensburg, which was rejected by both parties. He then proposed that the articles agreed upon should be compulsory, while on others toleration should be exercised until a national council should decide. Never before nor after did he go so far upon the path of toleration, or so nearly accept a national settlement. He was then burning to set sail for Algiers. His last formal suspensive measure was that of Spires (Speyer) in 1544, when he was marching against Francis. He promised a free and general council to be held in Germany, and, as a preparation, a national religious congress. The Lutherans were privately assured that a measure of comprehension should be concluded with or without papal approval. Meanwhile all edicts against heresy were suspended. No wonder that Charles afterwards confessed that he could scarcely reconcile these concessions with his conscience, but he won Lutheran aid for his campaign. The peace of Crépy gave all the conditions required for the employment of force. He had peace with French and Turk, he won the active support of the pope, he had deeply divided the Lutherans and reconciled Bavaria. Finding that the Lutherans would not accept the council summoned by the pope to Trent, he resorted to force, and force succeeded. At the Armed Diet of 1548 reunion seemed within reach. But Paul III. in direct opposition to Charles's wish had withdrawn the council from Trent to Bologna. Charles could not force Lutherans to submit to a council which he did not himself recognize, and he could not

bring himself to national schism. Thus, falling back upon his old palliatives, he issued the Interim and the accompanying Reform of the Clergy, pending a final settlement by a satisfactory general council. These measures pleased neither party, and Charles at the very height of his power had failed. He was conscious of failure, and made few attempts even to enforce the Interim. Henceforward political complications gathered round him anew. The only remedy was toleration in some form, independent of the papacy and limitless in time. To this Charles could never assent. His ideal was shattered, but it was a great ideal, and the patience, the moderation, even at times the adroitness with which he had striven towards it, proved him to be no bigot.

The idea of abdication had long been present with Charles. After his failure to eject the French from Metz he had not shrunk from a wearisome campaign against Henry II., and he was now tired out. His mother's death removed an obstacle, for there could now be no question as to his son's succession to the Spanish kingdoms. Religious settlement in Germany could no longer be postponed, and he shrank from the responsibility; the hand that should rend the seamless raiment of God's church must not be his. To Ferdinand he gave his full authority as emperor, although at his brother's earnest request formal abdication was delayed until 1558. In the Hall of the Golden Fleece at Brussels on the 25th of October 1555 he formally resigned to Philip the sovereignty of his beloved Netherlands. Turning from his son to the representatives of the estates he said, "Gentlemen, you must not be astonished if, old and feeble as I am in all my members, and also from the love I bear you, I shed some tears." In the Netherlands at least the love was reciprocal, and tears were infectious among the thousand deputies who listened to their sovereign's last speech. On the 16th of January 1556, Charles resigned his Spanish kingdoms and that of Sicily, and shortly afterwards his county of Burgundy. On the 17th of September he sailed from Flushing on the last of his many voyages, an English fleet from Portland bearing him company down the Channel. In February 1557 he was installed in the home which he had chosen at Yuste in Estremadura.

The excellent books which have been written upon the emperor's retirement have inspired an interest out of all proportion to its real significance. His little house was attached to the monastery, but was not within it. He was neither an ascetic nor a recluse. Gastronomic indiscretions still entailed their inevitable penalties. Society was not confined to interchange of civilities with the brethren. His relations, his chief friends, his official historians, all found their way to Yuste. Couriers brought news of Philip's war and peace with Pope Paul IV., of the victories of Saint Quentin and Gravelines, of the French capture of Calais, of the danger of Oran. As head of the family he intervened in the delicate relations with the closely allied house of Portugal: he even negotiated with the house of Navarre for reparation for the wrong done by his grandfather Ferdinand, which appeared to weigh upon his conscience. Above all he was shocked by the discovery that Spain, his own court, and his very chapel were infected with heresy. His violent letters to his son and daughter recommending immediate persecution, his profession of regret at having kept his word when Luther was in his power, have weighed too heavily on his reputation. The feverish phrases of religious exaltation due to broken health and unnatural retirement cannot balance the deliberate humanity and honour of wholesome manhood. Apart from such occasional moments of excitement, the emperor's last years passed tranquilly enough. At first he would shoot pigeons in the monastery woods, and till his last illness tended his garden and his animal pets, or watched the operations of Torriani, maker of clocks and mechanical toys. After an illness of three weeks the call came in the early hours of the feast of St Matthew, who, as his chaplain said, had for Christ's sake forsaken wealth even as Charles had forsaken empire. The dying man clasped his wife's crucifix to his breast till his fingers lost their hold. The archbishop held it before his eyes, and with the cry of "*Ay Jesus!*" died, in the words of his faithful squire D. Luis de Quijada, "the chief of men that had ever been or would ever be." Posterity need not agree, but no great man can boast a more honest panegyric.

In character Charles stands high among contemporary princes. It consists of pairs of contrasts, but the better side is usually stronger than the worse. Steadfast honesty of purpose was occasionally warped by self-interest, or rather he was apt to think that his own course must needs be that of righteousness. Self-control would give way, but very rarely, to squalls of passion. Obstinacy and irresolution were fairly balanced, the former generally bearing upon ends, the latter upon means. His own ideals were constant, but he could gradually assimilate the views of others, and could bend to argument and circumstance; yet even here he had a habit of harking back to earlier schemes which he had seemed to have definitely abandoned. Intercourse with different nationalities taught him a certain versatility; he was dignified with Spaniards, familiar with Flemings, while the material Italians were pleased with his good sense. His sympathies were neither wide nor quick, but he was a most faithful friend, and the most considerate of masters. For all who sought him his courtesy and patience were unfailing. At his abdication he dwelt with reasonable pride upon his labours and his journeyings. Few monarchs have lived a more strenuous life. Yet his industry was broken by fits of indolence, which were probably due to health. In his prime his confessor warned him against this defect, and it caused, indeed, the last great disaster of his life. Fortunately he was conscious of his obstinacy, his irresolution and his indolence. He would accept admonition from the chapter of the Golden Fleece, would comment on his failings as a warning to his son. When Cardinal Contarini politely assured him that to hold fast to good opinions is not obstinacy but firmness, the emperor replied, "Ah! but I sometimes stick to bad ones." Charles was not cruel, indeed the character of his reign was peculiarly merciful. But he was somewhat unforgiving. He especially resented any slight upon his honour, and his unwise severity to Philip of Hesse was probably due to the unfounded accusation that he had imprisoned him in violation of his pledge. The excesses of his troops in Italy, in Guelders and on the Austrian frontiers caused him acute pain, although he called himself "hard to weep." No great nobleman, statesman or financier was executed at Charles's order. He was proud of his generalship, classing himself with Alva and Montmorenci as the best of his day. Yet his failures nearly balanced his successes. It is true that in his most important campaign, that against the League of Schmalkalden, the main credit must be ascribed to his well-judged audacity at the opening, and his dogged persistency at the close. As a soldier he must rank very high. It was said that his being emperor lost to Spain the best light horseman of her army. At every crisis he was admirably cool, setting a truly royal example to his men. His mettle was displayed when he was attacked on the burning sands of Tunis, when his troops were driven in panic from Algiers, when in spite of physical suffering he forded the Elbe at Mühlberg, and when he was bombarded by the vastly superior Lutheran artillery under the walls of Ingolstadt. When blamed for exposing himself on this last occasion, "I could not help it," he apologized; "we were short of hands, I could not set a bad example." Nevertheless he was by nature timid. Just before this very action he had a fit of trembling, and he was afraid of mice and spiders. The force of his example was not confined to the field. Melanchthon wrote from Augsburg in 1530 that he was a model of continence, temperance and moderation, that the old domestic discipline was now only preserved in the imperial household. He tenderly loved his wife, whom he had married for pecuniary and diplomatic reasons. Of his two well-known illegitimate children, Margaret was born before he married, and Don John long after his wife's death, but he felt this latter to be a child of shame. His sobriety was frequently contrasted with the universal drunkenness of the German and Flemish nobles, which he earnestly condemned. But on his appetite he could place no control, in spite of the ruinous effects of his gluttony upon his health. In dress, in his household, and in his stable he was simple and economical. He loved children, flowers, animals and birds. Professional

jesters amused him, and he was not above a joke himself. Maps and mechanical inventions greatly interested him, and in later life he became fond of reading. He takes his place indeed among authors, for he dictated the commentaries on his own career. Of music he possessed a really fine knowledge, and his high appreciation of Titian proves the purity of his feeling for art. The little collection of books and pictures which he carried to Yuste is an index of his tastes. Charles was undeniably plain. He confessed that he was by nature ugly, but that as artists usually painted him uglier than he was, strangers on seeing him were agreeably disappointed. The protruding lower jaw and the thin pale face were redeemed by the fine open brow and the bright speaking eyes. He was, moreover, well made, and in youth had an incomparable leg. Above all no man could doubt his dignity; Charles was every inch an emperor.

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CHARLES VI. (1685–1740), Roman emperor, was born on the 1st of October 1685 at Vienna. He was the second son of the emperor Leopold I. by his third marriage with Eleanore, daughter of Philip William of Neuburg, elector palatine of the Rhine. When the Spanish branch of the house of Habsburg became extinct in 1700, he was put forward as the lawful heir in opposition to Philip V., the Bourbon to whom the Spanish dominions had been left by the will of Charles II. of Spain. He was proclaimed at Vienna on the 19th of September 1703, and made his way to Spain by the Low Countries, England and Lisbon, remaining in Spain till 1711, mostly in Catalonia, where the Habsburg party was strong. Although he had a certain tenacity of purpose, which he showed in later life, he displayed none of the qualities required in a prince who had to gain his throne by the sword (see SPANISH SUCCESSION, WAR OF). He was so afraid of appearing to be ruled by a favourite that he would not take good advice, but was easily earwigged by flatterers who played on his weakness for appearing independent. In 1708 he was married at Barcelona to Elizabeth Christina of Brunswick-Wolfenbüttel (1691–1750), a Lutheran princess who was persuaded to accept Roman Catholicism by the assurances of Protestant divines and of the philosopher Leibnitz, that she could always give an Evangelical meaning to Catholic ceremonies. On the death of his elder brother Joseph I. on the 17th of April 1711, Charles inherited the hereditary possessions of the house of Habsburg, and their claims on the Empire. The death of Joseph without male issue had been foreseen, and Charles had at one time been prepared to give up Spain and the Indies on condition that he was allowed to retain Naples, Sicily and the Milanese. But when the case arose, his natural obstinacy led him to declare that he would not think of surrendering any of the rights of his family. It was with great difficulty that he was persuaded to leave Spain, months after the death of his brother (on the 27th of September 1711). Only the emphatic refusal of the European powers to tolerate the reconstruction of the empire of Charles V. forced him to give a sullen submission to necessity. He abandoned Spain and was crowned emperor in December 1711, but for a long time he would not recognize Philip V. It is to his honour that he was very reluctant to desert the Catalans who had fought for his cause. Some of their chiefs followed him to Vienna, and their advice had an unfortunate influence on his mind. They almost succeeded in arousing his suspicions of the loyalty of Prince Eugene at the very moment when the prince's splendid victories over the Turks had led to the peace of Passarowitz on the 28th of July 1718, and a great extension of the Austrian dominions eastward. Charles showed an enlightened, though not always successful, interest in the commercial prosperity of his subjects, but from the date of his return to Germany till his death his ruling passion was to secure his inheritance against dismemberment. As early as 1713 he had begun to prepare the "Pragmatic Sanction" which was to regulate the succession. An only son, born on the 13th of April 1716, died in infancy, and it became the object of his policy to obtain the recognition of his daughter Maria Theresa as his heiress. He made great concessions to obtain his aim, and embarked on complicated diplomatic negotiations. His last days were embittered by a disastrous war with Turkey, in which he lost almost all he had gained by the peace of Passarowitz. He died at Vienna on the 20th of October 1740, and with him expired the male line of his house. Charles VI. was an admirable representative of the tenacious ambition of the Habsburgs, and of their belief in their own "august greatness" and boundless rights.

For the personal character of Charles VI. see A. von Arneth, *Geschichte Maria Theresias* (Vienna, 1863–1879). Dr Franz Krones, R. v. Marchland, *Grundriss der österreichischen Geschichte* (Vienna, 1882), gives a very copious bibliography.

CHARLES VII. (1697–1745), Roman emperor, known also as Charles Albert, elector of Bavaria, was the son of the elector Maximilian Emanuel and his second wife, Theresa Cunigunda, daughter of John Sobieski, king of Poland. He was born on the 6th of August 1697. His father having taken the side of Louis XIV. of France in the War of the Spanish Succession (*q.v.*), Bavaria was occupied by the allies. Charles and his brother Clement, afterwards archbishop of Cologne, were carried prisoners to Vienna, and were educated by the Jesuits under the name of the counts of Wittelsbach. When his father was restored to his electorate, Charles was released, and in 1717 he led the Bavarian contingent of the imperial army which served under Prince Eugene against the Turks, and is said to have distinguished himself at Belgrade. On the 25th of September 1722 he was betrothed to Maria Amelia, the younger of the two orphan daughters of the emperor Joseph I. Her uncle Charles VI. insisted that the Bavarian house should recognize the Pragmatic Sanction which established his daughter Maria Theresa as heiress of the Habsburg dominions. They did so, but with secret protests and mental reservations of their rights, which were designed to render the recognition valueless. The electors of Bavaria had claims on the possessions of the Habsburgs under the will of the emperor Ferdinand I., who died in 1564.

Charles succeeded his father on the 26th of February 1726. As a ruler of Bavaria, he showed a vague disposition to improve the condition of his subjects, but his profuse habits and his efforts to rival the splendour of the French court crippled his finances. His policy was one of much duplicity, for he was constantly endeavouring to keep on good terms with the emperor while slipping out of his obligation to accept the Pragmatic Sanction and intriguing to secure French support for his claims whenever Charles VI. should die. On hearing of the emperor's last illness, he ordered his agent at Vienna to renew his claim to the Austrian inheritance. The claim was advanced immediately after the death of Charles VI. on the 20th of October 1740. Charles Albert now entered into the league against Maria Theresa, to the great misfortune of himself and his subjects. By the help of her enemies he was elected emperor in opposition to her husband Francis, grand duke of Tuscany, on the 24th of January 1742, under the title of Charles VII., and was crowned at Frankfort-on-Main on the 12th of February. But as his army had been neglected, he was utterly unable to resist the Austrian troops. While he was being crowned his hereditary dominions in Bavaria were being overrun. He described himself as attacked by stone and gout, ill, without money or land, and in distress comparable to the

sorrows of Job. During the War of the Austrian Succession (*q.v.*) he was a mere puppet in the hands of the anti-Austrian coalition, and was often in want of mere necessaries. In the changes of the war he was able to re-enter his capital, Munich, in 1743, but had immediately afterwards to take flight again. He was restored by Frederick the Great in October 1744, but died worn out at Munich on the 20th of January 1745.

See A. von Arneth, *Geschichte Maria Theresias* (Vienna, 1863–1879); and P. T. Heigel, *Der österreichische Erbfolgestreit und die Kaiserwahl Karls VII.* (Munich, 1877).

CHARLES I. (1600–1649), king of Great Britain and Ireland, second son of James I. and Anne of Denmark, was born at Dunfermline on the 19th of November 1600. At his baptism he was created duke of Albany, and on the 16th of January 1605 duke of York. In 1612, by the death of his elder brother Henry, he became heir-apparent, and was created prince of Wales on the 3rd of November 1616. In 1620 he took up warmly the cause of his sister the queen of Bohemia, and in 1621 he defended Bacon, using his influence to prevent the chancellor's degradation from the peerage. The prince's marriage with the infanta Maria, daughter of Philip III. of Spain, had been for some time the subject of negotiation, James desiring to obtain through Spanish support the restitution of his son-in-law, Frederick, to the Palatinate; and in 1623 Charles was persuaded by Buckingham, who now obtained a complete ascendancy over him in opposition to wiser advisers and the king's own wishes, to make a secret expedition himself to Spain, put an end to all formalities, and bring home his mistress himself: "a gallant and brave thing for his Highness." "Steenie" and "Baby Charles," as James called them, started on the 17th of February, arriving at Paris on the 21st and at Madrid on the 7th of March, where they assumed the unromantic names of Mr Smith, and Mr Brown. They found the Spanish court by no means enthusiastic for the marriage[1] and the princess herself averse. The prince's immediate conversion was expected, and a complete religious tolerance for the Roman Catholics in England demanded. James engaged to allow the infanta the right of public worship and to use his influence to modify the law, but Charles himself went much further. He promised the alteration of the penal laws within three years, conceded the education of the children to the mother till the age of twelve, and undertook to listen to the infanta's priests in matters of religion, signing the marriage contract on the 25th of July 1623. The Spanish, however, did not trust to words, and Charles was informed that his wife could only follow him to England when these promises were executed. Moreover, they had no intention whatever of aiding the Protestant Frederick. Meanwhile Buckingham, incensed at the failure of the expedition, had quarrelled with the grandees, and Charles left Madrid, landing at Portsmouth on the 5th of October, to the joy of the people, to whom the proposed alliance was odious. He now with Buckingham urged James to make war on Spain, and in December 1624 signed a marriage treaty with Henrietta Maria, daughter of Henry IV. of France. In April Charles had declared solemnly to the parliament that in case of his marriage to a Roman Catholic princess no concessions should be granted to recusants, but these were in September 1624 deliberately promised by James and Charles in a secret article, the first instance of the duplicity and deception practised by Charles in dealing with the parliament and the nation. The French on their side promised to assist in Mansfeld's expedition for the recovery of the Palatinate, but Louis in October refused to allow the men to pass through France; and the army, without pay or provisions, dwindled away in Holland to nothing.

On the 27th of March 1625 Charles I. succeeded to the throne by the death of his father, and on the 1st of May he was married by proxy to Henrietta Maria. He received her at Canterbury on the 13th of June, and on the 18th his first parliament assembled. On the day of his marriage Charles had given directions that the prosecutions of the Roman Catholics should cease, but he now declared his intention of enforcing the laws against them, and demanded subsidies for carrying on the war against Spain. The Commons, however, responded coldly. Charles had lent ships to Louis XIII. to be used against the Protestants at La Rochelle, and the Commons were not aware of the subterfuges and fictitious delays intended to prevent their employment. The Protestant feelings of the Commons were also aroused by the king's support of the royal chaplain, Richard Montagu, who had repudiated Calvinistic doctrine. They only voted small sums, and sent up a petition on the state of religion and reflecting upon Buckingham, whom they deemed responsible for the failure of Mansfeld's expedition, at the same time demanding counsellors in whom they could trust. Parliament was accordingly dissolved by Charles on the 12th of August. He hoped that greater success abroad would persuade the Commons to be more generous. On the 8th of September 1625 he made the treaty of Southampton with the Dutch against Spain, and sent an expedition to Cadiz under Sir Edward Cecil, which, however, was a failure. In order to make himself independent of parliament he attempted to raise money on the crown jewels in Holland, and to diminish the opposition in the Commons he excluded the chief leaders by appointing them sheriffs. When the second parliament met, however, on the 6th of February 1626, the opposition, led by Sir John Eliot, was more determined than before, and their attack was concentrated upon Buckingham. On the 29th of March, Charles, calling the Commons into his presence, accused them of leading him into the war and of taking advantage of his difficulties to "make their own game." "I pray you not to be deceived," he said, "it is not a parliamentary way, nor 'tis not a way to deal with a king. Remember that parliaments are altogether in my power for their calling, sitting, and dissolution; therefore as I find the fruits of them good or evil, they are to continue or not to be." Charles, however, was worsted in several collisions with the two houses, with a consequent loss of influence. He was obliged by the peers to set at liberty Thomas Howard, earl of Arundel, whom he had put into the Tower, and to send a summons to the earl of Bristol, whom he had attempted to exclude from parliament, while the Commons compelled him, with a threat of doing no business, to liberate Eliot and Digges, the managers of Buckingham's impeachment, whom he had imprisoned. Finally in June the Commons answered Charles's demand for money by a remonstrance asking for Buckingham's dismissal, which they decided must precede the grant of supply. They claimed responsible ministers, while Charles considered himself the executive and the sole and unfettered judge of the necessities of the state. Accordingly on the 15th Charles dissolved the parliament.

The king was now in great need of money. He was at war with Spain and had promised to pay £30,000 a month to Christian IV. of Denmark in support of the Protestant campaign in Germany. To these necessities was now added a war with France. Charles had never kept his promise concerning the recusants; disputes arose in consequence with his wife, and on the 31st of July 1626 he ordered all her French attendants to be expelled from Whitehall and sent back to France. At the same time several French ships carrying contraband goods to the Spanish Netherlands were seized by English warships. On the 27th of June 1627 Buckingham with a large expedition sailed to the Isle of Ré to relieve La Rochelle, then besieged by the forces of Louis XIII. Though the success of the French Protestants was an object much desired in England, Buckingham's unpopularity prevented support being given to the expedition, and the duke returned to Plymouth on the 11th of November completely defeated. Meanwhile Charles had endeavoured to get the money refused to him by parliament by means of a forced loan, dismissing Chief Justice Crewe for declining to support its legality, and imprisoning several of the leaders of the opposition for refusing to subscribe to it. These summary measures, however, only brought a small sum into the treasury. On the 2nd of January 1628 Charles ordered the release of all the persons imprisoned, and on the 17th of March summoned his third parliament.

Instead of relieving the king's necessities the Commons immediately proceeded to discuss the constitutional position and to formulate the Petition of Right, forbidding taxation without

[1] *Hist. MSS. Comm.* 11 Rep. app. Pt. iv. 21.

consent of parliament, arbitrary and illegal imprisonment, compulsory billeting in private houses, and martial law. Charles, on the 1st of May, first demanded that they should "rest on his royal word and promise." He obtained an opinion from the judges that the acceptance of the petition would not absolutely preclude in certain cases imprisonments without showing cause, and after a futile endeavour to avoid an acceptance by returning an ambiguous answer which only exasperated the Commons, he gave his consent on the 7th of June in the full and usual form. Charles now obtained his subsidies, but no real settlement was reached, and his relations with the parliament remained as unfriendly as before. They proceeded to remonstrate against his government and against his support of Buckingham, and denied his right to tonnage and poundage. Accordingly, on the 26th of June they were prorogued. New disasters befell Charles, in the assassination of Buckingham and in the failure of the fresh expedition sent to Ré. In January 1629 the parliament re-assembled, irritated by the exaction of the duties and seizure of goods during the interval, and suspicious of "innovations in religion," the king having forbidden the clergy to continue the controversy concerning Calvinistic and Arminian doctrines, the latter of which the parliament desired to suppress. While they were discussing these matters, on the 2nd of March 1629, the king ordered them to adjourn, but amidst a scene of great excitement the speaker, Sir John Finch, was held down in his chair and the doors were locked, whilst resolutions against innovations in religion and declaring those who levied or paid tonnage and poundage enemies to their country were passed. Parliament was immediately dissolved, and Charles imprisoned nine members, leaders of the opposition, Eliot, Holles, Strode, Selden, Valentine, Coryton, Heyman, Hobart and Long, his vengeance being especially shown in the case of Eliot, the most formidable of his opponents, who died in the Tower of consumption after long years of close and unhealthy confinement, and whose corpse even Charles refused to give up to his family.

For eleven years Charles ruled without parliaments and with some success. There seemed no reason to think that "that noise," to use Laud's expression concerning parliaments, would ever be heard again by those then living. A revenue of about £618,000 was obtained by enforcing the payment of tonnage and poundage, and while avoiding the taxes, loans, and benevolences forbidden by the petition of right, by monopolies, fines for knighthood, and for pretended encroachments on the royal domains and forests, which enabled the king to meet expenditure at home. In Ireland, Charles, in order to get money, had granted the Graces in 1628, conceding security of titles of more than sixty years' standing, and a more moderate oath of allegiance for the Roman Catholics, together with the renunciation of the shilling fine for non-attendance at church. He continued, however, to make various attempts to get estates into his possession on the pretext of invalid title, and on the 12th of May 1635 the city of London estates were sequestered. Charles here destroyed one of the most valuable settlements in Ireland founded by James I. in the interests of national defence, and at the same time extinguished the historic loyalty of the city of London, which henceforth steadily favoured the parliamentary cause. In 1633 Wentworth had been sent to Ireland to establish a medieval monarchy and get money, and his success in organization seemed great enough to justify the attempt to extend the system to England. Charles at the same time restricted his foreign policy to scarcely more than a wish for the recovery of the Palatinate, to further which he engaged in a series of numerous and mutually destructive negotiations with Gustavus Adolphus and with Spain, finally making peace with Spain on the 5th of November 1630, an agreement which was followed on the 2nd of January 1631 by a further secret treaty, the two kings binding themselves to make war on the Dutch and partition their territories. A notable feature of this agreement was that while in Charles's portion Roman Catholicism was to be tolerated, there was no guarantee for the security of Protestantism in the territory to be ceded to Spain.

In 1634 Charles levied ship-money from the seaport towns for the increase of the navy, and in 1635 the tax was extended to the inland counties, which aroused considerable opposition. In February 1637 Charles obtained an opinion in favour of his claims from the judges, and in 1638 the great Hampden case was decided in his favour. The apparent success, however, of Charles was imperilled by the general and growing resentment aroused by his exactions and whole policy, and this again was small compared with the fears excited by the king's attitude towards religion and Protestantism. He supported zealously Laud's rigid Anglican orthodoxy, his compulsory introduction of unwelcome ritual, and his narrow, intolerant and despotic policy, which was marked by several savage prosecutions and sentences in the Star Chamber, drove numbers of moderate Protestants out of the Church into Presbyterianism, and created an intense feeling of hostility to the government throughout the country. Charles further increased the popular fears on the subject of religion by his welcome given to Panzani, the pope's agent, in 1634, who endeavoured unsuccessfully to reconcile the two churches, and afterwards to George Conn, papal agent at the court of Henrietta Maria, while the favour shown by the king to these was contrasted with the severe sentences passed upon the Puritans.

The same imprudent neglect of the national sentiment was pursued in Scotland. Charles had already made powerful enemies there by a declaration announcing the arbitrary revocation of former church estates to the crown. On the 18th of June 1633 he was crowned at Edinburgh with full Anglican ceremonial, which lost him the hearts of numbers of his Scottish subjects and aroused hostility to his government in parliament. After his return to England he gave further offence by ordering the use of the surplice, by his appointment of Archbishop Spotiswood as chancellor of Scotland, and by introducing other bishops into the privy council. In 1636 the new *Book of Canons* was issued by the king's authority, ordering the communion table to be placed at the east end, enjoining confession, and declaring excommunicate any who should presume to attack the new prayer-book. The latter was ordered to be used on the 18th of October 1636, but it did not arrive in Scotland till May 1637. It was intensely disliked both as "popish" and as English. A riot followed its first use in St Giles' cathedral on the 23rd of July, and Charles's order to enforce it on the 10th of September was met by fresh disturbances and by the establishment of the "Tables," national committees which now became the real though informal government of Scotland. In 1638 the national covenant was drawn up, binding those that signed it to defend their religion to the death, and was taken by large numbers with enthusiasm all over the country. Charles now drew back, promised to enforce the canons and prayer-book only in a "fair and legal way," and sent the marquis of Hamilton as a mediator. The latter, however, a weak and incapable man, desirous of popularity with all parties, and unfaithful to the king's interests, yielded everything, without obtaining the return of Charles's subjects to their allegiance. The assembly met at Glasgow on the 21st of November, and in spite of Hamilton's opposition immediately proceeded to judge the bishops. On the 28th Hamilton dissolved it, but it continued to sit, deposed the bishops and re-established Presbyterianism. The rebellion had now begun, and an appeal to arms alone could decide the quarrel between Charles and his subjects. On the 28th of May 1639 he arrived at Berwick with a small and ill-trained force, thus beginning what is known as the first Bishops' War; but being confronted by the Scottish army at Duns Law, he was compelled to sign the treaty of Berwick on the 18th of June, which provided for the disbandment of both armies and the restitution to the king of the royal castles, referring all questions to a general assembly and a parliament. When the assembly met it abolished episcopacy, but Charles, who on the 3rd of August had returned to Whitehall, refused his consent to this and to other measures proposed by the Scottish parliament. His extreme financial necessities, and the prospect of renewed hostilities with the Scots, now moved Charles, at the instigation of Strafford, who in September had left Ireland to become the king's chief adviser, to turn again to parliament for assistance as the last resource,

and on the 13th of April 1640 the Short Parliament assembled. But on its discussing grievances before granting supplies and finally refusing subsidies till peace was made with the Scots, it was dissolved on the 5th of May. Charles returned once more to measures of repression, and on the 10th imprisoned some of the London aldermen who refused to lend money. He prepared for war, scraping together what money he could and obtaining a grant through Strafford from Ireland. His position, however, was hopeless; his forces were totally undisciplined, and the Scots were supported by the parliamentary opposition in England. On the 20th of August the Scots crossed the Tweed, beginning the so-called second Bishops' War, defeated the king's army at Newburn on the 28th, and subsequently occupied Newcastle and Durham. Charles at this juncture, on the 24th of September, summoned a great council of the peers; and on the 21st of October a cessation of arms was agreed to by the treaty of Ripon, the Scots receiving £850 a day for the maintenance of the army, and further negotiations being transferred to London. On the 3rd of November the king summoned the Long Parliament.

Such was the final issue of Charles's attempt to govern without parliaments—Scotland in triumphant rebellion, Ireland only waiting for a signal to rise, and in England the parliament revived with almost irresistible strength, in spite of the king, by the force of circumstances alone. At this great crisis, which would indeed have taxed the resolution and resource of the most cool-headed and sagacious statesman, Charles failed signally. Two alternative courses were open to him, either of which still offered good chances of success. He might have taken his stand on the ancient and undoubted prerogative of the crown, resisted all encroachments on the executive by the parliament by legal and constitutional means, which were probably ample, and in case of necessity have appealed to the loyalty of the nation to support him in arms; or he might have waived his rights, and, acknowledging the mistakes of his past administration, have united with the parliament and created once more that union of interests and sentiment of the monarchy with the nation which had made England so powerful. Charles, however, pretended to do both simultaneously or by turns, and therefore accomplished neither. The illegally imprisoned members of the last parliament, now smarting with the sense of their wrongs, were set free to stimulate the violence of the opposition to the king in the new assembly. Of Charles's double statecraft, however, the series of incidents which terminated the career of the great Strafford form the most terrible example. Strafford had come to London in November, having been assured by Charles that he "should not suffer in his person, honour or fortune," but was impeached and thrown into the Tower almost immediately. Charles took no steps to hinder the progress of the proceedings against him, but entered into schemes for saving him by bringing up an army to London, and this step exasperated Strafford's enemies and added new zeal to the prosecution. On the 23rd of April, after the passing of the attainder by the Commons, he repeated to Strafford his former assurances of protection. On the 1st of May he appealed to the Lords to spare his life and be satisfied with rendering him incapable of holding office. On the 2nd he made an attempt to seize the Tower by force. On the 10th, yielding to the queen's fears and to the mob surging round his palace, he signed his death-warrant. "If my own person only were in danger," he declared to the council, "I would gladly venture it to save my Lord Strafford's life; but seeing my wife, children, all my kingdom are concerned in it, I am forced to give way unto it." On the 11th he sent to the peers a petition for Strafford's life, the force of which was completely annulled by the strange postscript: "If he must die, it were a charity to reprieve him until Saturday." This tragic surrender of his great and devoted servant left an indelible stain upon the king's character, and he lived to repent it bitterly. One of his last admonitions to the prince of Wales was "never to give way to the punishment of any for their faithful service to the crown." It was regarded by Charles as the cause of his own subsequent misfortunes, and on the scaffold the remembrance of it disturbed his own last moments. The surrender of Strafford was followed by another stupendous concession by Charles, the surrender of his right to dissolve the parliament without its own consent, and the parliament immediately proceeded, with Charles's consent, to sweep away the star-chamber, high commission and other extra-legal courts, and all extra-parliamentary taxation. Charles, however, did not remain long or consistently in the yielding mood. In June 1641 he engaged in a second army plot for bringing up the forces to London, and on the 10th of August he set out for Scotland in order to obtain the Scottish army against the parliament in England; this plan was obviously doomed to failure and was interrupted by another appeal to force, the so-called Incident, at which Charles was suspected (in all probability unjustly) of having connived, consisting in an attempt to kidnap and murder Argyll, Hamilton and Lanark, with whom he was negotiating. Charles had also apparently been intriguing with Irish Roman Catholic lords for military help in return for concessions, and he was suspected of complicity in the Irish rebellion which now broke out. He left Scotland more discredited than ever, having by his concessions made, to use Hyde's words, "a perfect deed of gift of that kingdom," and without gaining any advantage.

Charles returned to London on the 25th of November 1641 and was immediately confronted by the Grand Remonstrance (passed on the 22nd), in which, after reciting the chief points of the king's misgovernment, the parliament demanded the appointment of acceptable ministers and the constitution of an assembly of divines to settle the religious question. On the 2nd of January 1642 Charles gave office to the opposition members Colepeper and Falkland, and at the same time Hyde left the opposition party to serve the king. Charles promised to take no serious step without their advice. Nevertheless, entirely without their knowledge, through the influence of the queen whose impeachment was intended, Charles on the 4th made the rash and fatal attempt to seize with an armed force the five members of the Commons, Pym, Hampden, Holles, Hesilrige and Strode, whom, together with Mandeville (afterwards earl of Manchester) in the Lords, he had impeached of high treason. No English sovereign ever had (or has since that time) penetrated into the House of Commons. So complete and flagrant a violation of parliamentary liberties, and an appeal so crude and glaring to brute force, could only be justified by complete success; but the court plans had been betrayed, and were known to the offending members, who, by order of the House, had taken refuge in the city before the king's arrival with the soldiers. Charles, on entering the House, found "the birds flown," and returned baffled, having thrown away the last chance of a peaceful settlement (see LENTHALL, WILLIAM). The next day Charles was equally unsuccessful in obtaining their surrender in the city. "The king had the worst day in London yesterday," wrote a spectator of the scene, "that ever he had, the people crying 'privilege of parliament' by thousands and prayed God to turn the heart of the king, shutting up their shops and standing at their doors with swords and halberds."[1] On the 10th, amidst general manifestations of hostility, Charles left Whitehall to prepare for war, destined never to return till he was brought back by his victorious enemies to die.

Several months followed spent in manœuvres to obtain the control of the forces and in a paper war of controversy. On the 23rd of April Charles was refused entry into Hull, and on the 2nd of June the parliament sent to him the "Nineteen Propositions," claiming the whole sovereignty and government for the parliament, including the choice of the ministers, the judges, and the control of the army, and the execution of the laws against the Roman Catholics. The military events of the war are described in the article GREAT REBELLION. On the 22nd of August the king set up his standard at Nottingham, and on the 23rd of October he fought the indecisive battle of Edgehill, occupying Oxford and advancing as far as Brentford. It seemed possible that the war might immediately be ended by Charles penetrating to the heart of the enemy's position and occupying London, but he drew back on the 13th of November before the parliamentary force at Turnham Green, and avoided a decisive contest.

[1] *Hist. MSS. Comm.*: *MSS. of Lord Montagu of Beaulieu*, 141.

Next year (1643) another campaign, for surrounding instead of penetrating into London, was projected. Newcastle and Hopton were to advance from the north and west, seize the north and south banks of the river below the city, destroy its commerce, and combine with Charles at Oxford. The royalist force, however, in spite of victories at Adwalton Moor (June 30th) and Roundway Down (July 13th), did not succeed in combining with Charles, Newcastle in the north being kept back by the Eastern Association and the presence of the enemy at Hull, and Hopton in the west being detained by their successful holding out at Plymouth. Being too weak to attempt anything alone against London, Charles marched to besiege Gloucester, Essex following him and relieving the place. Subsequently the rival forces fought the indecisive first battle of Newbury, and Charles failed in preventing the return of Essex to London. Meanwhile on the 1st of February the parliament had submitted proposals to Charles at Oxford, but the negotiations came to nothing, and Charles's unwise attempt at the same time to stir up a rising in his favour in the city, known as Waller's Plot, injured his cause considerably. He once more turned for help to Ireland, where the cessation of the campaign against the rebels was agreed upon on the 15th of September 1643, and several English regiments became thereby available for employment by the king in England. Charles also accepted the proposal for bringing over 2000 Irish. On the 22nd of January 1644 the king opened the rival parliament at Oxford.

The campaign of 1644 began far less favourably for Charles than the two last, principally owing to the alliance now made between the Scots and the parliament, the parliament taking the Solemn League and Covenant on the 25th of September 1643, and the Scottish army crossing the border on the 19th of January 1644. No attempt was this year made against London, and Rupert was sent to Newcastle's succour in the north, where the great disaster of Marston Moor on the 2nd of July ruined Charles's last chances in that quarter. Meanwhile Charles himself had defeated Waller at Cropredy Bridge on the 29th of June, and he subsequently followed Essex to the west, compelling the surrender of Essex's infantry at Lostwithiel on the 2nd of September. With an ill-timed leniency he allowed the men to go free after giving up their stores and arms, and on his return towards Oxford be was confronted again by Essex's army at Newbury, combined now with that of Waller and of Manchester. Charles owed his escape here from complete annihilation only to Manchester's unwillingness to inflict a total defeat, and he was allowed to get away with his artillery to Oxford and to revictual Donnington Castle and Basing House.

The negotiations carried on at Uxbridge during January and February 1645 failed to secure a settlement, and on the 14th of June the crushing defeat of the king's forces by the new model army at Naseby practically ended the civil war. Charles, however, refused to make peace on Rupert's advice, and considered it a point of honour "neither to abandon God's cause, injure my successors, nor forsake my friends." His chief hope was to join Montrose in Scotland, but his march north was prevented by the parliamentary forces, and on the 24th of September he witnessed from the walls of Chester the rout of his followers at Rowton Heath. He now entered into a series of intrigues, mutually destructive, which, becoming known to the different parties, exasperated all and diminished still further the king's credit. One proposal was the levy of a foreign force to reduce the kingdom; another, the supply through the marquis of Ormonde of 10,000 Irish. Correspondence relating to these schemes, fatally compromising as they were if Charles hoped ever to rule England again, was discovered by his enemies, including the Glamorgan treaty, which went much further than the instructions to Ormonde, but of which the full responsibility has never been really traced to Charles, who on the 29th of January 1646 disavowed his agent's proceedings. He simultaneously treated with the parliament, and promised toleration to the Roman Catholics if they and the pope would aid in the restoration of the monarchy and the church. Nor was this all. The parliamentary forces had been closing round Oxford. On the 27th of April the king left the city, and on the 5th of May gave himself up to the Scottish army at Newark, arriving on the 13th with them at Newcastle. On the 13th of July the parliament sent to Charles the "Newcastle Propositions," which included the extreme demands of Charles's acceptance of the Covenants, the abolition of episcopacy and establishment of Presbyterianism, severer laws against the Roman Catholics and parliamentary control of the forces, with the withdrawal of the Irish Cessation, and a long list of royalists to be exempted from pardon. Charles returned no definite answer for several months. He imagined that he might now find support in Scottish royalism, encouraged by Montrose's series of brilliant victories, but these hopes were destroyed by the latter's defeat at Philiphaugh on the 3rd of September. The Scots insisted on the Covenant and on the permanent establishment of Presbyterianism, while Charles would only consent to a temporary maintenance for three years. Accordingly the Scots, in return for the payment of part of their army arrears by the parliament, marched home on the 30th of January 1647, leaving Charles behind, who under the care of the parliamentary commissioners was conducted to Holmby House. Thence on the 12th of May he sent his answer to the Newcastle Propositions, offering the militia to the parliament for ten years and the establishment of Presbyterianism for three, while a final settlement on religion was to be reached through an assembly of twenty divines at Westminster. But in the midst of the negotiation with the parliament Charles's person was seized, on the 3rd of June 1647, by Cornet Joyce under instructions of the army, which soon afterwards occupied London and overpowered the parliament, placing Charles at Hampton Court.

If Charles could have remained firm to either one or the other faction, and have made concessions either to Presbyterianism or on the subject of the militia, he might even now have prevailed. But he had learned nothing by experience, and continued at this juncture his characteristic policy of intrigue and double-dealing, "playing his game," to use his own words, negotiating with both parties at once, not with the object or wish to arrive at a settlement with either, but to augment their disputes, gain time and profit ultimately by their divisions. The "Heads of the Proposals," submitted to Charles by the army on the 28th of July 1647, were terms conceived on a basis far broader and more statesmanlike than the Newcastle Propositions, and such as Charles might well have accepted. The proposals on religion anticipated the Toleration Act of 1689. There was no mention of episcopacy, and its existence was thereby indirectly admitted, but complete religious freedom for all Protestant denominations was provided, and the power of the church to inflict civil penalties abolished, while it was also suggested that dangers from Roman Catholics and Jesuits might be avoided by means other than enforcing attendance at church. The parliament was to dissolve itself and be succeeded by biennial assemblies elected on a reformed franchise, not to be dissolved without their own consent before 120 days, and not to sit more than 240 days in the two years. A council of state was to conduct the foreign policy of the state and conclude peace and war subject to the approval of parliament, and to control the militia for ten years, the commanders being appointed by parliament, as also the officers of state for ten years. No peer created since May the 21st, 1642, was to sit in parliament without consent of both Houses, and the judicial decisions of the House of Lords were to be ratified by the Commons. Only five persons were excepted from amnesty, but royalists were not to hold office for five years and not to sit in the Commons till the end of the second biennial parliament. Proposals for a series of reforms were also added. Charles, however, was at the same time negotiating with Lauderdale for an invasion of England by the Scots, and imagined he could win over Cromwell and Fairfax by "proffers of advantage to themselves." The precious opportunity was therefore allowed to slip by. On the 9th of September he rejected the proposals of the parliament for the establishment of Presbyterianism. His hopes of gaining advantages by plying upon the differences of his opponents proved a complete failure. Fresh terms were drawn up by the army and parliament together on the 10th of November, but before these could be presented, Charles, on the 11th, had escaped to Carisbrooke Castle in the Isle of Wight.

Thence on the 16th he sent a message offering Presbyterianism for three years and the militia for his lifetime to the parliament, but insisting on the maintenance of episcopacy. On the 28th of December he refused his assent to the Four Bills, which demanded the militia for parliament for twenty years and practically for ever, annulled the honours recently granted by the king and his declarations against the Houses, and gave to parliament the right to adjourn to any place it wished. On the 3rd of January 1648 the Commons agreed to a resolution to address the king no further, in which they were joined by the Lords on the 15th.

Charles had meanwhile taken a further fatal step which brought about his total destruction. On the 26th of December 1647 he had signed at Carisbrooke with the Scottish commissioners the secret treaty called the "Engagement," whereby the Scots undertook to invade England on his behalf and restore him to the throne on condition of the establishment of Presbyterianism for three years and the suppression of the sectarians. In consequence the second civil war broke out and the Scots invaded England under Hamilton. The royalist risings in England were soon suppressed, and Cromwell gained an easy and decisive victory over the Scots at Preston. Charles was now left alone to face his enemies, with the whole tale of his intrigues and deceptions unmasked and exposed. The last intrigue with the Scots was the most unpardonable in the eyes of his contemporaries, no less wicked and monstrous than his design to conquer England by the Irish soldiers; "a more prodigious treason," said Cromwell, "than any that had been perfected before; because the former quarrel was that Englishmen might rule over one another; this to vassalize us to a foreign nation." Cromwell, who up to this point had shown himself foremost in supporting the negotiations with the king, now spoke of the treaty of Newport, which he found the parliament in the act of negotiating on his return from Scotland, as "this ruining hypocritical agreement." Charles had engaged in these negotiations only to gain time and find opportunity to escape. "The great concession I made this day," he wrote on the 7th of October, "was made merely in order to my escape." At the beginning he had stipulated that no concession from him should be valid unless an agreement were reached upon every point. He had now consented to most of the demands of the parliament, including the repudiation of the Irish Cessation, the surrender of the delinquents and the cession of the militia for twenty years, and of the offices of state to parliament, but remained firm in his refusal to abolish episcopacy, consenting only to Presbyterianism for three years. Charles's devotion to the church is undoubted. In April 1646, before his flight from Oxford, inspired perhaps by superstitious fears as to the origin of his misfortunes, he had delivered to Sheldon, afterwards archbishop of Canterbury, a written vow (now in the library of St Paul's cathedral) to restore all church lands held by the crown on his restoration to the throne; and almost his last injunction to the prince of Wales was that of fidelity to the national church. His present firmness, however, in its support was caused probably less by his devotion to it than by his desire to secure the failure of the whole treaty, and his attempts to escape naturally weakened the chances of success. Cromwell now supported the petitions of the army against the treaty. On the 16th of November the council of officers demanded the trial of the king, "the capital and grand author of our troubles," and on the 27th of November the parliamentary commissioners returned from Newport without having secured Charles's consent. Charles was removed to Hurst Castle on the 1st of December, where he remained till the 19th, thence being taken to Windsor, where he arrived on the 23rd. On the 6th "Pride's Purge" had removed from the Commons all those who might show any favour to the king. On the 25th a last attempt by the council of officers to come to terms with him was repulsed. On the 1st of January the remnant of the Commons resolved that Charles was guilty of treason by "levying war against the parliament and kingdom of England"; on the 4th they declared their own power to make laws without the lords or the sovereign, and on the 6th established a "high court of justice" to try the king. On the 19th Charles was brought to St James's Palace, and on the next day his trial began in Westminster Hall, without the assistance of any of the judges, who all refused to take part in the proceedings. He laughed aloud at hearing himself called a traitor, and immediately demanded by what authority he was tried. He had been in treaty with the parliament in the Isle of Wight and taken thence by force; he saw no lords present. He was told by Bradshaw, the president of the court, that he was tried by the authority of the people of England, who had elected him king; Charles making the obvious reply that he was king by inheritance and not by election, that England had been for more than 1000 years an hereditary kingdom, and Bradshaw cutting short the discussion by adjourning the court. On the 22nd Charles repeated his reasoning, adding, "It is not my case alone; it is the freedom and liberty of the people of England, and do you pretend what you will, I stand more for their liberties, for if power without law may make laws . . . I do not know what subject he is in England that can be sure of his life or anything that he calls his own." On the 23rd he again refused to plead. The court was adjourned, and there were several signs that the army in their prosecution of the king had not the nation at their back. While the soldiers had shouted "Justice! justice!" as the king passed through their ranks, the civilian spectators from the end of the hall had cried "God save the king!" There was considerable opposition and reluctance to proceed among the members of the court. On the 26th, however, the court decided unanimously upon his execution, and on the 27th Charles was brought into court for the last time to hear his sentence. His request to be heard before the Lords and Commons was rejected, and his attempts to answer the charges of the president were silenced. Sentence was pronounced, and the king was removed by the soldiers, uttering his last broken protest: "I am not suffered to speak. Expect what justice other people will have."

In these last hours Charles, who was probably weary of life, showed a remarkable dignity and self-possession, and a firm resignation supported by religious faith and by the absolute conviction of his own innocence, which, says Burnet, "amazed all people and that so much the more because it was not natural to him. It was imputed to a very extraordinary measure of supernatural assistance . . .; it was owing to something within himself that he went through so many indignities with so much true greatness without disorder or any sort of affectation." Nothing in his life became Charles like the leaving it. "He nothing common did or mean Upon that memorable scene." On the morning of the 29th of January he said his last sad farewell to his younger children, Elizabeth and Henry, duke of Gloucester. On the 30th at ten o'clock he walked across from St James's to Whitehall, calling on his guard "in a pleasant manner" to walk apace, and at two he stepped upon the scaffold from a window, probably the middle one, of the Banqueting House (see ARCHITECTURE, Plate VI., fig. 75). He was separated from the people by large ranks of soldiers, and his last speech only reached Juxon and those with him on the scaffold. He declared that he had desired the liberty and freedom of the people as much as any; "but I must tell you that their liberty and freedom consists in having government. . . . It is not their having a share in the government; that is nothing appertaining unto them. A subject and a sovereign are clean different things." These, together with his declaration that he died a member of the Church of England, and the mysterious "Remember," spoken to Juxon, were Charles's last words. "It much discontents the citizens," wrote a spectator; "ye manner of his deportment was very resolutely with some smiling countenances, intimating his willingness to be out of his troubles."[1] "The blow I saw given," wrote another, Philip Henry, "and can truly say with a sad heart, at the instant whereof, I remember well, there was such a grone by the Thousands then present as I never heard before and desire I may never hear again. There was according to

[1] *Notes and Queries*, 7th ser., viii. 326.

order one Troop immediately marching fromwards Charing-Cross to Westminster and another fromwards Westminster to Charing-Cross, purposely to masker" (*i.e.* to overpower) "the people and to disperse and scatter them, so that I had much adoe amongst the rest to escape home without hurt."[1]

Amidst such scenes of violence was at last effected the destruction of Charles. "It is lawful," wrote Milton, "and hath been held so through all ages for any one who have the power to call to account a Tyrant or wicked King and after due conviction to depose and put him to death."[2] But here (it might well be contended) there had been no "due conviction." The execution had been the act of the king's personal enemies, of "only some fifty or sixty governing Englishmen with Oliver Cromwell in the midst of them" an act technically illegal, morally unjustifiable because the supposed crimes of Charles had been condoned by the later negotiations with him, and indefensible on the ground of public expediency, for the king's death proved a far greater obstacle to the re-establishment of settled government than his life could have been. The result was an extraordinary revulsion of feeling in favour of Charles and the monarchy, in which the incidents of his misgovernment were completely forgotten. He soon became in the popular veneration a martyr and a saint. His fate was compared with the Crucifixion, and his trials and sufferings to those of the Saviour. Handkerchiefs dipped in his blood wrought "miracles," and the *Eikon Basilike*, published on the day of his funeral, presented to the public a touching if not a genuine portrait of the unfortunate sovereign. At the Restoration the anniversary of his death was ordered to be kept as a day of fasting and humiliation, and the service appointed for use on the occasion was only removed from the prayer-book in 1859. The same conception of Charles as a martyr for religion appeals still to many, and has been stimulated by modern writers. "Had Charles been willing to abandon the church and give up episcopacy," says Bishop Creighton, "he might have saved his throne and his life. But on this point Charles stood firm, for this he died and by dying saved it for the future."[3] Gladstone, Keble, Newman write in the same strain. "It was for the Church," says Gladstone, "that Charles shed his blood upon the scaffold."[4] "I rest," says Newman, "on the scenes of past years, from the Upper Room in Acts to the Court of Carisbrooke and Uxbridge." The injustice and violence of the king's death, however, the pathetic dignity of his last days, and the many noble traits in his character, cannot blind us to the real causes of his downfall and destruction, and a sober judgment cannot allow that Charles was really a martyr either for the church or for the popular liberties.

The constitutional struggle between the crown and parliament had not been initiated by Charles I. It was in full existence in the reign of James I., and distinct traces appear towards the latter part of that of Elizabeth. Charles, therefore, in some degree inherited a situation for which he was not responsible, nor can he be justly blamed, according to the ideas of kingship which then prevailed, for defending the prerogatives of the crown as precious and sacred personal possessions which it was his duty to hand down intact to his successors. Neither will his persistence in refusing to yield up the control of the executive to the parliament or the army, or his zeal in defending the national church, be altogether censured. In the event the parliament proved quite incapable of governing, an army uncontrolled by the sovereign was shown to constitute a more grievous tyranny than Charles's most arbitrary rule, and the downfall of the church seen to make room only for a sectarian despotism as intolerable as the Laudian. The natural inference might be that both conceptions of government had much to support them, that they were bound sooner or later to come into collision, and that the actual individuals in the drama, including the king himself, were rather the victims of the greatness of events than real actors in the scene, still less the controllers of their own and the national destiny. A closer insight, however, shows that biographical more than abstract historical elements determined the actual course and issue of the Rebellion. The great constitutional and religious points of dispute between the king and parliament, though doubtless involving principles vital to the national interests, would not alone have sufficed to destroy Charles. Monarchy was too much venerated, was too deeply rooted in the national life, to be hastily and easily extirpated; the perils of removing the foundation of all government, law and order were too obvious not to be shunned at almost all costs. Still less can the crowning tragedy of the king's death find its real explanation or justification in these disputes and antagonisms. The real cause was the complete discredit into which Charles had brought himself and the monarchy. The ordinary routine of daily life and of business cannot continue without some degree of mutual confidence between the individuals brought into contact, far less could relations be maintained by subjects with a king endowed with the enormous powers then attached to the kingship, and with whom agreements, promises, negotiations were merely subterfuges and prevarications. We have seen the series of unhappy falsehoods and deceptions which constituted Charles's statecraft, beginning with the fraud concerning the concessions to the Roman Catholics at his marriage, the evasions with which he met the Petition of Right, the abandonment of Strafford, the simultaneous negotiation with, and betrayal of, all parties. Strafford's reported words on hearing of his desertion by Charles, "Put not your trust in princes," re-echo through the whole of Charles's reign. It was the degradation and dishonour of the kingship, and the personal loss of credit which Charles suffered through these transactions—which never appear to have caused him a moment's regret or uneasiness, but the fatal consequences of which were seen only too clearly by men like Hyde and Falkland—that were the real causes of the rebellion and of the king's execution. The constitutional and religious grievances were the outward and visible sign of the corroding suspicions which slowly consumed the national loyalty. In themselves there was nothing incapable of settlement either through the spirit of union which existed between Elizabeth and her subjects, or by the principle of compromise which formed the basis of the constitutional settlement in 1688. The bond of union between his people and himself Charles had, however, early broken, and compromise is only possible between parties both of whom can acknowledge to some extent the force of the other's position, which can trust one another, and which are sincere in their endeavour to reach agreement. Thus on Charles himself chiefly falls the responsibility for the catastrophe.

His character and motives fill a large place in English history, but they have never been fully understood and possibly were largely due to physical causes. His weakness as a child was so extreme that his life was despaired of. He outgrew physical defects, and as a young man excelled in horsemanship and in the sports of the times, but always retained an impediment of speech. At the time of his accession his reserve and reticence were especially noticed. Buckingham was the only person who ever enjoyed his friendship, and after his death Charles placed entire confidence in no man. This isolation was the cause of an ignorance of men and of the world, and of an incapacity to appreciate the ideas, principles and motives of others, while it prepared at the same time a fertile soil for receiving those exalted conceptions of kingship, of divine right and prerogative, which came into vogue at this period, together with those exaggerated ideas of his own personal supremacy and importance to which minds not quite normal are always especially inclined. His character was marked by a weakness which shirked and postponed the settlement of difficulties, by a meanness and ingratitude even when dealing with his most devoted followers, by an obstinacy which only feigned compliance and by an untruthfulness which differed widely from his son's unblushing deceit, which found always some reservation or excuse, but which while more scrupulous was also more dangerous and insidious because employed continually as a principle of conduct. Yet Charles, in

[1] *Letters and Diaries of P. Henry* (1882), 12.
[2] *Tenure of Kings and Magistrates.*
[3] *Lectures on Archbishop Laud* (1895), p. 25.
[4] *Remarks on the Royal Supremacy* (1850), p. 57.

spite of his failings, had many fine qualities. Clarendon, who was fully conscious of them, who does not venture to call him a good king, and allows that "his kingly virtues had some mixture and alloy that hindered them from shining in full lustre," declares that "he was if ever any, the most worthy of the title of an Honest Man, so great a lover of justice that no temptation could dispose him to a wrongful action except that it was disguised to him that he believed it just," "the worthiest of gentlemen, the best master, the best friend, the best husband, the best father and the best Christian that the age in which he lived produced." With all its deplorable mistakes and failings Charles I.'s reign belongs to a sphere infinitely superior to that of his unscrupulous, corrupt, selfish but more successful son. His private life was without a blemish. Immediately on his accession he had suppressed the disorder which had existed in the household of James I., and let it be known that whoever had business with him "must never approach him by backstairs or private doors."[1] He maintained a strict sobriety in food and dress. He had a fine artistic sense, and Milton reprehends him for having made Shakespeare "the closest companion of his solitudes." "Monsieur le Prince de Galles," wrote Rubens in 1625, "est le prince le plus amateur de la peinture qui soit au monde." He succeeded in bringing together during twenty years an unrivalled collection, of which a great part was dispersed at his death. He showed a noble insensibility to flattery. He was deeply and sincerely religious. He wished to do right, and was conscious of the purity of his motives. Those who came into contact with him, even the most bitter of his opponents, were impressed with his goodness. The great tragedy of his life, to be read in his well-known, dignified, but weak and unhappy features, and to be followed in his inexplicable and mysterious choice of baneful instruments, such as Rupert, Laud, Hamilton, Glamorgan, Henrietta Maria —all in their several ways working out his destruction—seems to have been inspired by a fateful insanity or infirmity of mind or will, recalling the great Greek dramas in which the poets depicted frenzied mortals rushing into their own destruction, impelled by the unseen and superior powers.

The king's body, after being embalmed, was buried by the few followers who remained with him to the last, hastily and without any funeral service, which was forbidden by the authorities, in the tomb of Henry VIII., in St George's Chapel, Windsor, where his coffin was identified and opened in 1813. An "account of what appeared" was published by Sir Henry Halford, and a bone abstracted on the occasion was replaced in the vault by the prince of Wales (afterwards Edward VII.) in 1888. Charles I. left, besides three children who died in infancy, Charles (afterwards Charles II.); James (afterwards James II.); Henry, duke of Gloucester (1639–1660); Mary (1631–1660), who married William of Orange; Elizabeth (1635–1650); and Henrietta, duchess of Orleans (1644–1670).

BIBLIOGRAPHY.—The leading authority for the life and reign of Charles I. is the *History of England* (1883) and *History of the Great Civil War* (1893), by S. R. Gardiner, with the references there given. Among recent works may be mentioned *Memoirs of the Martyr King*, by A. Fea (1905); *Life of Charles I, 1600–1625*, by E. B. Chancellor (1886); *The Visits of Charles I. to Newcastle*, by C. S. Terry (1898); *Charles I.*, by Sir J. Skelton, valuable for its illustrations (1898); *The Manner of the Coronation of King Charles I.*, ed. by C. Wordsworth (Henry Bradshaw Soc., 1892); *The Picture Gallery of Charles I.*, by C. Phillips (1896). See also *Calendars of State Papers, Irish* and *Domestic Series*; *Hist. MSS. Comm. Series*, esp. *MSS. of J. Eliot Hodgkin, F. J. Savile Foljambe, Lord Montagu of Beaulieu, Duke of Rutland at Belvoir Castle, Marquis of Ormonde, Earl Cowper (Coke MSS.), Earl of Lonsdale* (note-books of parliaments of 1626 and 1628), *Duke of Buccleuch at Montagu House, Duke of Portland*, 11th Rep. app. pt. vi., *Duke of Hamilton*, pt. i., *Salvetti Correspondence*, 10th Rep. pt. vi., *Lord Braye*; *Add. MSS.* Brit. Mus., 33,596 fols. 21-32 (keys to ciphers), 34,171, 35,297; *Notes and Queries*, ser. vi., vii., viii., ix. indexes; *Eng. Hist. Rev.* ii. 687 ("Charles and Glamorgan" by S. R. Gardiner), vii. 176; *Cornhill Mag.* vol. 75, January 1897, "Execution of Charles," by C. H. Firth. (P. C. Y.)

CHARLES II. (1630–1685), king of Great Britain and Ireland, second son of Charles I. and Queen Henrietta Maria, was born on the 29th of May 1630 at St James's Palace, and was brought up under the care successively of the countess of Dorset, William Cavendish, duke of Newcastle, and the marquess of Hertford. He accompanied the king during the campaigns of the Civil War, and sat in the parliament at Oxford, but on the 4th of March 1645 he was sent by Charles I. to the west, accompanied by Hyde and others who formed his council. Owing, however, to the mutual jealousies and misconduct of Goring and Grenville, and the prince's own disregard and contempt of the council, his presence was in no way advantageous, and could not prevent the final overthrow of the king's forces in 1646. He retired (17th of February) to Pendennis Castle at Falmouth, and on the approach of Fairfax (2nd of March) to Scilly, where he remained with Hyde till the 16th of April. Thence he fled to Jersey, and finally refusing all the overtures from the parliament, and in opposition to the counsels of Hyde, who desired the prince to remain on English territory, he repaired to the queen at Paris, where he remained for two years. He is described at this time by Mme de Motteville as "well-made, with a swarthy complexion agreeing well with his fine black eyes, a large ugly mouth, a graceful and dignified carriage and a fine figure"; and according to the description circulated later for his capture after the battle of Worcester, he was over six feet tall. He received instruction in mathematics from Hobbes, and was early initiated into all the vices of the age by Buckingham and Percy. In July 1648 the prince joined the royalist fleet and blockaded the Thames with a fleet of eleven ships, returning to Holland, where he received the news of the final royalist defeats and afterwards of the execution of his father. On the 14th of January 1649 he had forwarded to the council a signed *carte blanche*, granting any conditions provided his father's life were spared. He immediately assumed the title of king, and was proclaimed in Scotland (5th of February) and in some parts of Ireland. On the 17th of September, after a visit to his mother at St Germain, Charles went to Jersey and issued a declaration proclaiming his rights; but, owing to the arrival of the fleet at Portsmouth, he was obliged, on the 13th of February 1650, to return again to Breda. The projected invasion of Ireland was delayed through want of funds till it was too late; Hyde's mission to Spain, in the midst of Cromwell's successes, brought no assistance, and Charles now turned to Scotland for aid. Employing the same unscrupulous and treacherous methods which had proved so fatal to his father, he simultaneously supported and encouraged the expedition of Montrose and the royalists, and negotiated with the covenanters. On the 1st of May he signed the first draft of a treaty at Breda with the latter, in which he accepted the Solemn League and Covenant, conceded the control of public and church affairs to the parliament and the kirk, and undertook to establish Presbyterianism in the three kingdoms. He also signed privately a paper repudiating Ormonde and the loyal Irish, and recalling the commissions granted to them. In acting thus he did not scruple to desert his own royalist followers, and to repudiate and abandon the great and noble Montrose, whose heroic efforts he was apparently merely using in order to extort better terms from the covenanters, and who, having been captured on the 4th of May, was executed on the 21st in spite of some attempts by Charles to procure for him an indemnity.

Thus perjured and disgraced the young king embarked for Scotland on the 2nd of June; on the 11th when off Heligoland he signed the treaty, and on the 23rd, on his arrival at Speymouth, before landing, he swore to both the covenants. He proceeded to Falkland near Perth and passed through Aberdeen, where he saw the mutilated arm of Montrose suspended over the city gate. He was compelled to dismiss all his followers except Buckingham, and to submit to interminable sermons, which generally contained violent invectives against his parents and himself. To Argyll he promised the payment of £40,000 at his restoration, doubtless the sum owing as arrears of the Scottish army unpaid when Charles I. was surrendered to the English at Newcastle, and entered into negotiations for marrying his daughter. In August he was forced to sign a further declaration, confessing his own wickedness in dealing with the Irish, his father's blood-guiltiness, his mother's idolatry, and his abhorrence

[1] Salvetti's Corresp. in *Hist. MSS. Comm.* 11th Rep. app. pt. i. p. 6.

of prelacy, besides ratifying his allegiance to the covenants and to Presbyterianism. At the same time he declared himself secretly to King, dean of Tuam, "a true child of the Church of England," "a true Cavalier," and avowed that "what concerns Ireland is in no ways binding"; while to the Roman Catholics in England he promised concessions and expressed his goodwill towards their church to Pope Innocent X. His attempt, called "The Start," on the 4th of October 1650, to escape from the faction at Perth and to join Huntly and the royalists in the north failed, and he was overtaken and compelled to return. On the 1st of January 1651 he was crowned at Scone, when he was forced to repeat his oaths to both the covenants.

Meanwhile Cromwell had advanced and had defeated the Presbyterians at Dunbar on the 3rd of September 1650, subsequently occupying Edinburgh. This defeat was not wholly unwelcome to Charles in the circumstances; in the following summer, during Cromwell's advance to the north, he shook off the Presbyterian influence, and on the 31st of July 1651 marched south into England with an army of about 10,000 commanded by David Leslie. He was proclaimed king at Carlisle, joined by the earl of Derby in Lancashire, evaded the troops of Lambert and Harrison in Cheshire, marched through Shropshire, meeting with a rebuff at Shrewsbury, and entered Worcester with a small, tired and dispirited force of only 16,000 men (22nd of August). Here the decisive battle, which ruined his hopes, and in which Charles distinguished himself by conspicuous courage and fortitude, was fought on the 3rd of September. After leading an unsuccessful cavalry charge against the enemy he fled, about 6 P.M., accompanied by Buckingham, Derby, Wilmot, Lauderdale and others, towards Kidderminster, taking refuge at Whiteladies, about 25 m. from Worcester, where he separated himself from all his followers except Wilmot, concealing himself in the famous oak during the 6th of September, moving subsequently to Boscobel, to Moseley and Bentley Hall, and thence, disguised as Miss Lane's attendant, to Abbots Leigh near Bristol, to Trent in Somersetshire, and finally to the George Inn at Brighton, having been recognized during the forty-one days of his wanderings by about fifty persons, none of whom, in spite of the reward of £1000 offered for his capture, or of the death penalty threatened for aiding his concealment, had betrayed him.

He set sail from Shoreham on the 15th of October 1651, and landed at Fécamp in Normandy the next day. He resided at Paris at St Germain till June 1654, in inactivity, unable to make any further effort, and living with difficulty on a grant from Louis XIV. of 600 livres a month. Various missions to foreign powers met with failure; he was excluded from Holland by the treaty made with England in April 1654, and he anticipated his expulsion from France, owing to the new relations of friendship established with Cromwell, by quitting the country in July. He visited his sister, the princess of Orange, at Spa, and went to Aix-la-Chapelle, thence finally proceeding in November to Cologne, where he was hospitably received. The conclusion of Cromwell's treaty with France in October 1655, and the war between England and Spain, gave hope of aid from the latter power. In April 1656 Charles went to Bruges, and on the 7th of February 1658 to Brussels, where he signed a treaty with Don John of Austria, governor of the Spanish Netherlands, by which he received an allowance in place of his French pension and undertook to assemble all his subjects in France in aid of the Spanish against the French. This plan, however, came to nothing; projected risings in England were betrayed, and by the capture of Dunkirk in June 1658, after the battle of the Dunes, by the French and Cromwell's Ironsides, the Spanish cause in Flanders was ruined.

As long as Cromwell lived there appeared little hope of the restoration of the monarchy, and Charles and Hyde had been aware of the plots for his assassination, which had aroused no disapproval. By the protector's death on the 3rd of September 1658 the scene was wholly changed, and amidst the consequent confusion of factions the cry for the restoration of the monarchy grew daily in strength. The premature royalist rising, however, in August 1659 was defeated, and Charles, who had awaited the result on the coast of Brittany, proceeded to Fuenterrabia on the Spanish frontier, where Mazarin and Luis de Haro were negotiating the treaty of the Pyrenees, to induce both powers to support his cause; but the failure of the attempt in England ensured the rejection of his request, and he returned to Brussels in December, visiting his mother at Paris on the way. Events had meanwhile developed fast in favour of a restoration. Charles, by Hyde's advice, had not interfered in the movement, and had avoided inconvenient concessions to the various factions by referring all to a "free parliament." He left Brussels for Breda, and issued in April 1660, together with the letters to the council, the officers of the army and the houses of parliament and the city, the declaration of an amnesty for all except those specially excluded afterwards by parliament, which referred to parliament the settlement of estates and promised a liberty to tender consciences in matters of religion not contrary to the peace of the kingdom.

On the 8th of May Charles II. was proclaimed king in Westminster Hall and elsewhere in London. On the 24th he sailed from the Hague, landing on the 26th at Dover, where he was met by Monk, whom he saluted as father, and by the mayor, from whom he accepted a "very rich bible," "the thing that he loved above all things in the world." He reached London on the 29th, his thirtieth birthday, arriving with the procession, amidst general rejoicings and "through a lane of happy faces," at seven in the evening at Whitehall, where the houses of parliament awaited his coming, to offer in the name of the nation their congratulations and allegiance.

No event in the history of England had been attended with more lively and general rejoicing than Charles's restoration, and none was destined to cause greater subsequent disappointment and disillusion. Indolent, sensual and dissipated by nature, Charles's vices had greatly increased during his exile abroad, and were now, with the great turn of fortune which gave him full opportunity to indulge them, to surpass all the bounds of decency and control. A long residence till the age of thirty abroad, together with his French blood, had made him politically more of a foreigner than an Englishman, and he returned to England ignorant of the English constitution, a Roman Catholic and a secret adversary of the national religion, and untouched by the sentiment of England's greatness or of patriotism. Pure selfishness was the basis of his policy both in domestic and foreign affairs. Abroad the great national interests were eagerly sacrificed for the sake of a pension, and at home his personal ease and pleasure alone decided every measure, and the fate of every minister and subject. During his exile he had surrounded himself with young men of the same spirit as himself, such as Buckingham and Bennet, who, without having any claim to statesmanship, inattentive to business, neglectful of the national interests and national prejudices, became Charles's chief advisers. With them, as with their master, public office was only desirable as a means of procuring enjoyment, for which an absolute monarchy provided the most favourable conditions. Such persons were now, accordingly, destined to supplant the older and responsible ministers of the type of Clarendon and Ormonde, men of high character and patriotism, who followed definite lines of policy, while at the same time the younger men of ability and standing were shut out from office.

The first period of Charles II.'s reign (1660–1667) was that of the administration of Lord Clarendon, the principal author of the Restoration settlement. The king was granted the large revenue of £1,300,000. The naval and military forces were disbanded, but Charles managed to retain under the name of guards three regiments, which remained the nucleus of a standing army. The settlement of estates on a legal basis provided ill for a large number of the king's adherents who had impoverished themselves in his cause. The king's honour was directly involved in their compensation and, except for the gratification of a few individuals, was tarnished by his neglect to afford them relief. Charles used his influence to carry through parliament the act of indemnity, and the execution of some of the regicides was a measure not more severe than was to be expected in the times and circumstances;

but that of Sir Henry Vane, who was not a regicide and whose life Charles had promised the parliament to spare in case of his condemnation, was brought about by Charles's personal insistence in revenge for the victim's high bearing during his trial, and was an act of gross cruelty and perfidy. Charles was in favour of religious toleration, and a declaration issued by him in October 1660 aroused great hopes; but he made little effort to conciliate the Presbyterians or to effect a settlement through the Savoy conference, and his real object was to gain power over all the factions and to free his co-religionists, the Roman Catholics, in favour of whom he issued his first declaration of indulgence (26th of December 1662), the bill to give effect to it being opposed by Clarendon and defeated in the Lords, and being replied to by the passing of further acts against religious liberty. Meanwhile the plot of Venner and of the Fifth Monarchy men had been suppressed in January 1661, and the king was crowned on the 23rd of April. The convention parliament had been dissolved on the 29th of December 1660, and Charles's first parliament, the Long Parliament of the Restoration, which met on the 8th of May 1661 and continued till January 1679, declared the command of the forces inherent in the crown, repudiated the taking up of arms against the king, and repealed in 1664 the Triennial Act, adding only a provision that there should not be intermission of parliaments for more than three years. In Ireland the church was re-established, and a new settlement of land introduced by the Act of Settlement 1661 and the Act of Explanation 1665. The island was excluded from the benefit of the Navigation Laws, and in 1666 the importation of cattle and horses into England was forbidden. In Scotland episcopacy was set up, the covenant to which Charles had taken so many solemn oaths burnt by the common hangman, and Argyll brought to the scaffold, while the kingdom was given over to the savage and corrupt administration of Lauderdale. On the 21st of May 1662, in pursuance of the pro-French and anti-Spanish policy, Charles married Catherine of Braganza, daughter of John IV. of Portugal, by which alliance England obtained Tangier and Bombay. She brought him no children, and her attractions for Charles were inferior to those of his mistress, Lady Castlemaine, whom she was compelled to receive as a lady of her bedchamber. In February 1665 the ill-omened war with Holland was declared, during the progerss of which it became apparent how greatly the condition of the national services and the state of administration had deteriorated since the Commonwealth, and to what extent England was isolated and abandoned abroad, Michael de Ruyter, on the 13th of June 1667, carrying out his celebrated attack on Chatham and burning several warships. The disgrace was unprecedented. Charles did not show himself and it was reported that he had abdicated, but to allay the popular panic it was given out "that he was very cheerful that night at supper with his mistresses." The treaty of Breda with Holland (21st of July 1667) removed the danger, but not the ignominy, and Charles showed the real baseness of his character when he joined in the popular outcry against Clarendon, the upright and devoted adherent of his father and himself during twenty-five years of misfortune, and drove him into poverty and exile in his old age, recalling ominously Charles I.'s betrayal of Strafford.

To Clarendon now succeeded the ministry of Buckingham and Arlington, who with Lauderdale, Ashley (afterwards Lord Shaftesbury) and Clifford, constituted the so-called Cabal ministry in 1672. With these advisers Charles entered into those schemes so antagonistic to the national interests which have disgraced his reign. His plan was to render himself independent of parliament and of the nation by binding himself to France and the French policy of aggrandizement, and receiving a French pension with the secret intention as well of introducing the Roman Catholic religion again into England. In 1661 under Clarendon's rule, the evil precedent had been admitted of receiving money from France, in 1662 Dunkirk had been sold to Louis, and in February 1667 during the Dutch war a secret alliance had been made with Louis, Charles promising him a free hand in the Netherlands and Louis undertaking to support Charles's designs "in or out of the kingdom." In January 1668 Sir W. Temple had made with Sweden and Holland the Triple Alliance against the encroachments and aggrandizement of France, but this national policy was soon upset by the king's own secret plans. In 1668 the conversion of his brother James to Romanism became known to Charles. Already in 1662 the king had sent Sir Richard Bellings to Rome to arrange the terms of England's conversion, and now in 1668 he was in correspondence with Oliva, the general of the Jesuits in Rome, through James de la Cloche, the eldest of his natural sons, of whom he had become the father when scarcely sixteen during his residence at Jersey. On the 25th of January 1669, at a secret meeting between the two royal brothers, with Arlington, Clifford and Arundell of Wardour, it was determined to announce to Louis XIV. the projected conversion of Charles and the realm, and subsequent negotiations terminated in the two secret treaties of Dover. The first, signed only, among the ministers, by Arlington and Clifford, the rest not being initiated, on the 20th of May 1670, provided for the return of England to Rome and the joint attack of France and England upon Holland, England's ally, together with Charles's support of the Bourbon claims to the throne of Spain, while Charles received a pension of £200,000 a year. In the second, signed by Arlington, Buckingham, Lauderdale and Ashley on the 31st of December 1670, nothing was said about the conversion, and the pension provided for that purpose was added to the military subsidy, neither of these treaties being communicated to parliament or to the nation. An immediate gain to Charles was the acquisition of another mistress in the person of Louise de Kéroualle, the so-called "Madam Carwell," who had accompanied the duchess of Orleans, the king's sister, to Dover, at the time of the negotiations, and who joined Charles's seraglio, being created duchess of Portsmouth, and acting as the agent of the French alliance throughout the reign.

On the 24th of October 1670, at the very time that these treaties were in progress, Charles opened parliament and obtained a vote of £800,000 on the plea of supporting the Triple Alliance. Parliament was prorogued in April 1671, not assembling again till February 1673, and on the 2nd of January 1672 was announced the "stop of the exchequer," or national bankruptcy, one of the most blameworthy and unscrupulous acts of the reign, by which the payments from the exchequer ceased, and large numbers of persons who had lent to the government were thus ruined. On the reassembling of parliament on the 4th of February 1673 a strong opposition was shown to the Cabal ministry which had been constituted at the end of 1672. The Dutch War, declared on the 17th of March 1672, though the commercial and naval jealousies of Holland had certainly not disappeared in England, was unpopular because of the alliance with France and the attack upon Protestantism, while the king's second declaration of indulgence (15th of March 1672) aroused still further antagonism, was declared illegal by the parliament, and was followed up by the Test Act, which obliged James and Clifford to resign their offices. In February 1674 the war with Holland was closed by the treaty of London or of Westminster, though Charles still gave Louis a free hand in his aggressive policy towards the Netherlands, and the Cabal was driven from office. Danby (afterwards duke of Leeds) now became chief minister; but, though in reality a strong supporter of the national policy, he could not hope to keep his place without acquiescence in the king's schemes. In November 1675 Charles again prorogued parliament, and did not summon it again till February 1677, when it was almost immediately prorogued. On the 17th of February 1676, with Danby's knowledge, Charles concluded a further treaty with Louis by which he undertook to subordinate entirely his foreign policy to that of France, and received an annual pension of £100,000. On the other hand, Danby succeeded in effecting the marriage (4th of November 1677) between William of Orange and the princess Mary, which proved the most important political event in the whole reign. Louis revenged himself by intriguing with the Opposition and by turning his streams of gold in that direction, and a further treaty with France for the annual payment to Charles of £300,000 and the dismissal of his parliament, concluded on the 17th of May 1678, was not executed. Louis made peace with Holland

at Nijmwegen on the 10th of August, and punished Danby by disclosing his secret negotiations, thus causing the minister's fall and impeachment. To save Danby Charles now prorogued the parliament on the 30th of December, dissolving it on the 24th of January 1679.

Meanwhile the "Popish Plot," the creation of a band of impostors encouraged by Shaftesbury and the most violent and unscrupulous of the extreme Protestant party in order to exclude James from the throne, had thrown the whole country into a panic. Charles's conduct in this conjuncture was highly characteristic and was marked by his usual cynical selfishness. He carefully refrained from incurring suspicion and unpopularity by opposing the general outcry, and though he saw through the imposture from the beginning he made no attempt to moderate the popular frenzy or to save the life of any of the victims, his co-religionists, not even intervening in the case of Lord Stafford, and allowing Titus Oates to be lodged at Whitehall with a pension. His policy was to take advantage of the violence of the faction, to "give them line enough," to use his own words, to encourage it rather than repress it, with the expectation of procuring finally a strong royalist reaction. In his resistance to the great movement for the exclusion of James from the succession, Charles was aided by moderate men such as Halifax, who desired only a restriction of James's powers, and still more by the violence of the extreme exclusionists themselves, who headed by Shaftesbury brought about their own downfall and that of their cause by their support of the legitimacy and claims of Charles's natural son, the duke of Monmouth. In 1679 Charles denied, in council, his supposed marriage with Lucy Walter, Monmouth's mother, his declarations being published in 1680 to refute the legend of the black box which was supposed to contain the contract of marriage, and told Burnet he would rather see him hanged than legitimize him. He deprived him of his general's commission in consequence of his quasi-royal progresses about the country, and in December on Monmouth's return to England he was forbidden to appear at court. In February 1679 the king had consented to order James to go abroad, and even approved of the attempt of the primate and the bishop of Winchester to convert him to Protestantism. To weaken the opposition to his government Charles accepted Sir W. Temple's new scheme of governing by a council which included the leaders of the Opposition, and which might have become a rival to the parliament, but this was an immediate failure. In May 1679 he prorogued the new parliament which had attainted Danby, and in July dissolved it, while in October he prorogued another parliament of the same mind till January and finally till October 1680, having resolved "to wait till this violence should wear off." He even made overtures to Shaftesbury in November 1679, but the latter insisted on the departure of both the queen and James. All attempts at compromise failed, and on the assembling of the parliament in October 1680 the Exclusion Bill passed the Commons, being, however, thrown out in the Lords through the influence of Halifax. Charles dissolved the parliament in January 1681, declaring that he would never give his consent to the Exclusion Bill, and summoned another at Oxford, which met there on the 21st of March 1681, Shaftesbury's faction arriving accompanied by armed bands. Charles expressed his willingness to consent to the handing over of the administration to the control of a Protestant, in the case of a Roman Catholic sovereign, but the Opposition insisted on Charles's nomination of Monmouth as his successor, and the parliament was accordingly once more (28th of March) dissolved by Charles, while a royal proclamation ordered to be read in all the churches proclaimed the ill-deeds of the parliament and the king's affection for the Protestant religion.

Charles's tenacity and clever tact were now rewarded. A great popular reaction ensued in favour of the monarchy, and a large number of loyal addresses were sent in, most of them condemning the Exclusion Bill. Shaftesbury was imprisoned, and though the Middlesex jury threw out his indictment and he was liberated, he never recovered his power, and in October 1682 left England for ever. The Exclusion Bill and the limitation of James's powers were no more heard of, and full liberty was granted to the king to pursue the retrograde and arbitrary policy to which his disposition naturally inclined. In Scotland James set up a tyrannical administration of the worst type. The royal enmity towards William of Orange was increased by a visit of the latter to England in July. No more parliaments were called, and Charles subsisted on his permanent revenue and his French pensions. He continued the policy of double-dealing and treachery, deceiving his ministers as at the treaty of Dover, by pretending to support Holland and Spain while he was secretly engaged to Louis to betray them. On the 22nd of March 1681 he entered into a compact with Louis whereby he undertook to desert his allies and offer no resistance to French aggressions. In August he joined with Spain and Holland in a manifesto against France, while secretly for a million livres he engaged himself to Louis, and in 1682 he proposed himself as arbitrator with the intention of treacherously handing over Luxemburg to France, an offer which was rejected owing to Spanish suspicions of collusion. In the event, Charles's duplicity enabled Louis to seize Strassburg in 1681 and Luxemburg in 1684. The government at home was carried on principally by Rochester, Sunderland and Godolphin, while Guilford was lord chancellor and Jeffreys lord chief justice. The laws against the Nonconformists were strictly enforced. In order to obtain servile parliaments and also obsequious juries, who with the co-operation of judges of the stamp of Jeffreys could be depended upon to carry out the wishes of the court, the borough charters were confiscated, the charter of the city of London being forfeited on the 12th of June 1683.

The popularity of Charles, now greatly increased, was raised to national enthusiasm by the discovery of the Rye House plot in 1683, said to be a scheme to assassinate Charles and James at an isolated house on the high road near Hoddesdon in Hertfordshire as they returned from Newmarket to London, among those implicated being Algernon Sidney, Lord Russell and Monmouth, the two former paying the death penalty and Monmouth being finally banished to the Hague. The administration became more and more despotic, and Tangier was abandoned in order to reduce expenses and to increase the forces at home for overawing opposition. The first preliminary steps were now taken for the reintroduction of the Roman Catholic religion. Danby and those confined on account of participation in the popish plot were liberated, and Titus Oates thrown into prison. A scheme was announced for withdrawing the control of the army in Ireland from Rochester, the lord-lieutenant, and placing it in the king's own hands, and the commission to which the king had delegated ecclesiastical patronage was revoked. In May 1684 the office of lord high admiral, in spite of the Test Act, was again given to James, who had now returned from Scotland. To all appearances the same policy afterwards pursued so recklessly and disastrously by James was now cautiously initiated by Charles, who, however, not being inspired by the same religious zeal as his brother, and not desiring "to go on his travels again," would probably have drawn back prudently before his throne was endangered. The developments of this movement were, however, now interrupted by the death of Charles after a short illness on the 6th of February 1685. He was buried on the 17th in Henry VII.'s chapel in Westminster Abbey with funeral ceremonies criticized by contemporaries as mean and wanting in respect, but the scantiness of which was probably owing to the fact that he had died a Roman Catholic.

On his death-bed Charles had at length declared himself an adherent of that religion and had received the last rites according to the Romanist usage. There appears to be no trustworthy record of his formal conversion, assigned to various times and various agencies. As a youth, says Clarendon, "the ill-bred familiarity of the Scotch divines had given him a distaste" for Presbyterianism, which he indeed declared "no religion for gentlemen," and the mean figure which the fallen national church made in exile repelled him at the same time that he was attracted by the "genteel part of the Catholic religion." With Charles religion was not the serious matter it was with James, and was largely regarded from the political aspect and from that

of ease and personal convenience. Presbyterianism constituted a dangerous encroachment on the royal prerogative; the national church and the cavalier party were indeed the natural supporters of the authority of the crown, but on the other hand they refused to countenance the dependence upon France; Roman Catholicism at that moment was the obvious medium of governing without parliaments, of French pensions and of reigning without trouble, and was naturally the faith of Charles's choice. Of the two papers in defence of the Roman Catholic religion in Charles's own hand, published by James, Halifax says "though neither his temper nor education made him very fit to be an author, yet in this case . . . he might write it all himself and yet not one word of it his own. . . ."

Of his amours and mistresses the same shrewd observer of human character, who was also well acquainted with the king, declares "that his inclinations to love were the effects of health and a good constitution with as little mixture of the *seraphic* part as ever man had. . . . I am apt to think his stayed as much as any man's ever did in the *lower* region." His health was the one subject to which he gave unremitting attention, and his fine constitution and devotion to all kinds of sport and physical exercise kept off the effects of uncontrolled debauchery for thirty years. In later years the society of his mistresses seems to have been chiefly acceptable as a means to avoid business and petitioners, and in the case of the duchess of Portsmouth was the price paid for ease and the continuance of the French pensions. His ministers he never scrupled to sacrifice to his ease. The love of ease exercised an entire sovereignty in his thoughts. "The motive of his giving bounties was rather to make men less uneasy to him than more easy to themselves." He would rob his own treasury and take bribes to press a measure through the council. He had a natural affability, but too general to be much valued, and he was fickle and deceitful. Neither gratitude nor revenge moved him, and good or ill services left little impression on his mind. Halifax, however, concludes by desiring to moderate the roughness of his picture by emphasizing the excellence of his intellect and memory and his mechanical talent, by deprecating a too censorious judgment and by dwelling upon the disadvantages of his bringing up, the difficulties and temptations of his position, and on the fact that his vices were those common to human frailty. His capacity for king-craft, knowledge of the world, and easy address enabled him to surmount difficulties and dangers which would have proved fatal to his father or to his brother. "It was a common saying that he could send away a person better pleased at receiving nothing than those in the good king his father's time that had requests granted them,"[1] and his good-humoured tact and familiarity compensated for and concealed his ingratitude and perfidy and preserved his popularity. He had good taste in art and literature, was fond of chemistry and science, and the Royal Society was founded in his reign. According to Evelyn he was "débonnaire and easy of access, naturally kind-hearted and possessed an excellent temper," virtues which covered a multitude of sins.

These small traits of amiability, however, which pleased his contemporaries, cannot disguise for us the broad lines of Charles's career and character. How far the extraordinary corruption of private morals which has gained for the restoration period so unenviable a notoriety was owing to the king's own example of flagrant debauchery, how far to the natural reaction from an artificial Puritanism, is uncertain, but it is incontestable that Charles's cynical selfishness was the chief cause of the degradation of public life which marks his reign, and of the disgraceful and unscrupulous betrayal of the national interests which raised France to a threatening predominance and imperilled the very existence of Britain for generations. The reign of his predecessor Charles I., and even of that of his successor James II., with their mistaken principles and ideals, have a saving dignity wholly wanting in that of Charles II., and the administration of Cromwell, in spite of the popularity of the restoration, was soon regretted. "A lazy Prince," writes Pepys, "no Council, no money, no reputation at home or abroad. It is strange how . . . everybody do nowadays reflect upon Oliver and commend him, what brave things he did and made all the neighbour princes fear him; while here a prince, come in with all the love and prayers and good liking of his people . . . hath lost all so soon. . . ."

Charles II. had no children by his queen. By his numerous mistresses he had a large illegitimate progeny. By Barbara Villiers, Mrs Palmer, afterwards countess of Castlemaine and duchess of Cleveland, mistress *en titre* till she was superseded by the duchess of Portsmouth, he had Charles Fitzroy, duke of Southampton and Cleveland, Henry Fitzroy, duke of Grafton, George Fitzroy, duke of Northumberland, Anne, countess of Sussex, Charlotte, countess of Lichfield, and Barbara, a nun; by Louise de Kéroualle, duchess of Portsmouth, Charles Lennox, duke of Richmond; by Lucy Walter, James, duke of Monmouth and Buccleuch, and a daughter; by Nell Gwyn, Charles Beauclerk, duke of St Albans, and James Beauclerk; by Catherine Peg, Charles Fitz Charles, earl of Plymouth; by Lady Shannon, Charlotte, countess of Yarmouth; by Mary Davis, Mary Tudor, countess of Derwentwater.

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CHARLES I. and II., kings of France. By the French, Charles the Great, Roman emperor and king of the Franks, is reckoned the first of the series of French kings named Charles (see CHARLEMAGNE). Similarly the emperor Charles II. the Bald (*q.v.*) is reckoned as Charles II. of France. In some enumerations the emperor Charles III. the Fat (*q.v.*) is reckoned as Charles II. of France, Charlemagne not being included in the list, and Charles the Bald being styled Charles I.

CHARLES III., the Simple (879–929), king of France, was a posthumous son of Louis the Stammerer and of his second wife Adelaide. On the deposition of Charles the Fat in 887 he was excluded from the throne by his youth; but during the reign of Odo, who had succeeded Charles, he succeeded in gaining the recognition of a certain number of notables and in securing his coronation at Reims on the 28th of January 893. He now obtained the alliance of the emperor, and forced Odo to cede part of Neustria. In 898, by the death of his rival (Jan. 1), he obtained possession of the whole kingdom. His most important act was the treaty of Saint-Clair-sur-Epte with the Normans in 911. Some of them were baptized; the territory which was afterwards known as the duchy of Normandy was ceded to them; but the story of the marriage of their chief Rollo with a sister of the king, related by the chronicler Dudo of Saint Quentin, is very doubtful. The same year Charles, on the invitation of the barons, took possession of the kingdom of Lotharingia. In 920 the barons, jealous of the growth of the royal authority and discontented with the favour shown by the king to his counsellor Hagano, rebelled, and in 922 elected Robert, brother of King Odo, in place of Charles. Robert was killed in the battle of

[1] *Mem. of Thomas, earl of Ailesbury*, p. 95.

Soissons, but the victory remained with his party, who elected Rudolph, duke of Burgundy, king. In his extremity Charles trusted himself to Herbert, count of Vermandois, who deceived him, and threw him into confinement at Château-Thierry and afterwards at Péronne. In the latter town he died on the 7th of October 929. In 907 he had married Frederona, sister of Bovo, bishop of Chalons. After her death he married Eadgyfu (Odgiva), daughter of Edward the Elder, king of the English, who was the mother of Louis IV.

See A. Eckel, *Charles le Simple* (Paris, 1899).

CHARLES IV. (1294–1328), king of France, called THE FAIR, was the third and youngest son of Philip IV. and Jeanne of Navarre. In 1316 he was created count of La Marche, and succeeded his brother Philip V. as king of France and Navarre early in 1322. He followed the policy of his predecessors in enforcing the royal authority over the nobles, but the machinery of a centralized government strong enough to hold nobility in check increased the royal expenditure, to meet which Charles had recourse to doubtful financial expedients. At the beginning of his reign he ordered a recast of the coinage, with serious results to commerce; civil officials were deprived of offices, which had been conferred free, but were now put up to auction; duties were imposed on exported merchandise and on goods brought into Paris; the practice of exacting heavy fines was encouraged by making the salaries of the magistrates dependent on them; and on the pretext of a crusade to free Armenia from the Turks, Charles obtained from the pope a tithe levied on the clergy, the proceeds of which he kept for his own use; he also confiscated the property of the Lombard bankers who had been invited to France by his father at a time of financial crisis. The history of the assemblies summoned by Charles IV. is obscure, but in 1326, on the outbreak of war with England, an assembly of prelates and barons met at Meaux. Commissioners were afterwards despatched to the provinces to state the position of affairs and to receive complaints. The king justified his failure to summon the estates on the ground of the expense incurred by provincial deputies. The external politics of his reign were not marked by any striking events. He maintained excellent relations with Pope John XXII., who made overtures to him, indirectly, offering his support in case of his candidature for the imperial crown. Charles tried to form a party in Italy in support of the pope against the emperor Louis IV. of Bavaria, but failed. A treaty with the English which secured the district of Agenais for France was followed by a feudal war in Guienne. Isabella, Charles's sister and the wife of Edward II., was sent to France to negotiate, and with her brother's help arranged the final conspiracy against her husband. Charles's first wife was Blanche, daughter of Otto IV., count of Burgundy, and of Matilda (Mahaut), countess of Artois, to whom he was married in 1307. In May 1314, by order of King Philip IV., she was arrested and imprisoned in the Château-Gaillard with her sister-in-law Marguerite, daughter of Robert II., duke of Burgundy, and wife of Louis Hutin, on the charge of adultery with two gentlemen of the royal household, Philippe and Gautier d'Aunai. Jeanne, sister of Marguerite and wife of Philip the Tall, was also arrested for not having denounced the culprits, and imprisoned at Dourdan. The two knights were put to the torture and executed, and their goods confiscated. It is impossible to say how far the charges were true. Tradition has involved and obscured the story, which is the origin of the legend of the *tour de Nesle* made famous by the drama of A. Dumas the elder. Marguerite died shortly in prison; Jeanne was declared innocent by the parlement and returned to her husband. Blanche was still in prison when Charles became king. He induced Pope John XXII. to declare the marriage null, on the ground that Blanche's mother had been his godmother. Blanche died in 1326, still in confinement, though at the last in the abbey of Maubuisson.

In 1322, freed from his first marriage, Charles married his cousin Mary of Luxemburg, daughter of the emperor Henry VII., and upon her death, two years later, Jeanne, daughter of Louis, count of Evreux. Charles IV. died at Vincennes on the 1st of February 1328. He left no issue by his first two wives to succeed him, and daughters only by Jeanne of Evreux. He was the last of the direct line of Capetians.

See A. d'Herbomez, "Notes et documents pour servir à l'histoire des rois fils de Philippe le Bel," in *Bibl. de l'École des Chartes* (lix. pp. 479 seq. and 689 seq.); de Bréquigny, "Mémoire sur les différends entre la France et l'Angleterre sous le règne de Charles le Bel," in *Mém. de l'Acad. des Inscriptions* (xli. pp. 641-692); H. Lot, "Projets de crusade sous Charles le Bel et sous Philippe de Valois" (*Bibl. de l'École des Chartes*, xx. pp. 503-509); "Chronique parisienne anonyme de 1316 à 1339 . . ." ed. Hellot in *Mém. de la soc. de l'hist. de Paris* (xi., 1884, pp. 1-207).

CHARLES V. (1337–1380), king of France, called THE WISE, was born at the château of Vincennes on the 21st of January 1337, the son of John II. and Bonne of Luxemburg. In 1349 he became dauphin of the Viennois by purchase from Humbert II., and in 1355 he was created duke of Normandy. At the battle of Poitiers (1356) his father ordered him to leave the field when the battle turned against the French, and he was thus saved from the imprisonment that overtook his father. After arranging for the government of Normandy he proceeded to Paris, where he took the title of lieutenant of the kingdom. During the years of John II.'s imprisonment in England Charles was virtually king of France. He summoned the states-general of northern France (Langue d'oïl) to Paris in October 1356 to obtain men and money to carry on the war. But under the leadership of Étienne Marcel, provost of the Parisian merchants and president of the third estate, and Robert le Coq, bishop of Laon, president of the clergy, a partisan of Charles of Navarre, the states refused any "aid" except on conditions which Charles declined to accept. They demanded the dismissal of a number of the royal ministers; the establishment of a commission elected from the three estates to regulate the dauphin's administration, and of another board to act as council of war; also the release of Charles the Bad, king of Navarre, who had been imprisoned by King John. The estates of Languedoc, summoned to Toulouse, also made protests against misgovernment, but they agreed to raise a war-levy on terms to which the dauphin acceded. Charles sought the alliance of his uncle, the emperor Charles IV., to whom he did homage at Metz as dauphin of the Viennois, and he was also made imperial vicar of Dauphiné, thus acknowledging the imperial jurisdiction. But he gained small material advantage from these proceedings. The states-general were again convoked in February 1357. Their demands were more moderate than in the preceding year, but they nominated members to replace certain obnoxious persons on the royal council, demanded the right to assemble without the royal summons, and certain administrative reforms. In return they promised to raise and finance an army of 30,000 men, but the money—a tithe levied on the annual revenues of the clergy and nobility—voted for this object was not to pass through the dauphin's hands. Charles appeared to consent, but the agreement was annulled by letters from King John, announcing at the same time the conclusion of a two years' truce, and the reformers failed to secure their ends. Charles had escaped from their power by leaving Paris, but he returned for a new meeting of the estates in the autumn of 1357.

Meanwhile Charles of Navarre had been released by his partisans, and allying himself with Marcel had become a popular hero in Paris. The dauphin was obliged to receive him and to undergo an apparent reconciliation. In Paris Étienne Marcel was supreme. He forced his way into the dauphin's palace (February 1358), and Charles's servant, Jean de Conflans, marshal of Champagne, and Robert de Clermont, marshal of Normandy, were murdered before his eyes. Charles was powerless openly to resent these outrages, but he obtained from the provincial assemblies the money refused him by the states-general, and deferred his vengeance until the dissensions of his enemies should offer him an opportunity. Charles of Navarre, now in league with the English and master of lower Normandy and of the approaches to Paris, returned to the immediate neighbourhood of the city, and Marcel found himself driven to avowed co-operation with the dauphin's enemies, the English

and the Navarrese. Charles had been compelled in March to take the title of regent to prevent the possibility of further intervention from King John. In defiance of a recent ordinance prohibiting provincial assemblies, he presided over the estates of Picardy and Artois, and then over those of Champagne. The states-general of 1358 were summoned to Compiègne instead of Paris, and granted a large aid. The condition of northern France was rendered more desperate by the outbreak (May-June 1358) of the peasant revolt known as the Jacquerie, which was repressed with a barbarity far exceeding the excesses of the rebels. Within the walls of Paris Jean Maillart had formed a royalist party; Marcel was assassinated (31st July 1358), and the dauphin entered Paris in the following month. A reaction in Charles's favour had set in, and from the estates of 1359 he regained the authority he had lost. It was with their full concurrence that he restored their honours to the officials who had been dismissed by the estates of 1356 and 1357. They supported him in repudiating the treaty of London (1359), which King John had signed in anxiety for his personal freedom, and voted money unconditionally for the continuation of the war. From this time the estates were only once convoked by Charles, who contented himself thenceforward by appeals to the assembly of notables or to the provincial bodies. Charles of Navarre was now at open war with the regent; Edward III. landed at Calais in October; and a great part of the country was exposed to double depredations from the English and the Navarrese troops. In the scarcity of money Charles had recourse to the debasement of the coinage, which suffered no less than twenty-two variations in the two years before the treaty of Brétigny. This disastrous financial expedient was made good later, the coinage being established on a firm basis during the last sixteen years of Charles's reign in accordance with the principles of Nicolas Oresme. On the conclusion of peace King John was restored to France, but, being unable to raise his ransom, he returned in 1364 to England, where he died in April, leaving the crown to Charles, who was crowned at Reims on the 19th of May.

The new king found an able servant in Bertrand du Guesclin, who won a victory over the Navarrese troops at Cocherel and took prisoner their best general, Jean de Grailli, captal of Buch. The establishment of Charles's brother, Philip the Bold, in the duchy of Burgundy, though it constituted in the event a serious menace to the monarchy, put an end to the king of Navarre's ambitions in that direction. A treaty of peace between the two kings was signed in 1365, by which Charles of Navarre gave up Mantes, Meulan and the county of Longueville in exchange for Montpellier. Negotiations were renewed in 1370 when Charles of Navarre did homage for his French possessions, though he was then considering an offensive and defensive alliance with Edward III. Du Guesclin undertook to free France from the depredations of the "free companies," mercenary soldiers put out of employment by the cessation of the war. An attempt to send them on a crusade against the Turks failed, and Du Guesclin led them to Spain to put Henry of Trastamara on the throne of Castile. By the marriage of his brother Philip the Bold with Margaret of Flanders, Charles detached the Flemings from the English alliance, and as soon as he had restored something like order in the internal affairs of the kingdom he provoked a quarrel with the English. The text of the treaty of Brétigny presented technical difficulties of which Charles was not slow to avail himself. The English power in Guienne was weakened by the disastrous Spanish expedition of the Black Prince, whom Charles summoned before the parlement of Paris in January 1369 to answer the charges preferred against him by his subjects, thus expressly repudiating the English supremacy in Guienne. War was renewed in May after a meeting of the states-general. Between 1371 and 1373 Poitou and Saintonge were reconquered by Du Guesclin, and soon the English had to abandon all their territory north of the Garonne. John IV. of Brittany (Jean de Montfort) had won his duchy with English help by the defeat of Charles of Blois, the French nominee, at Auray in 1364. His sympathies remained English, but he was now (1373) obliged to take refuge in England, and later in Flanders, while the English only retained a footing in two or three coast towns. Charles's generals avoided pitched battles, and contented themselves with defensive and guerrilla tactics, with the result that in 1380 only Bayonne, Bordeaux, Brest and Calais were still in English hands.

Charles had in 1378 obtained proof of Charles of Navarre's treasonable designs. He seized the Norman towns held by the Navarrese, while Henry of Trastamara invaded Navarre, and imposed conditions of peace which rendered his lifelong enemy at last powerless. A premature attempt to amalgamate the duchy of Brittany with the French crown failed. Charles summoned the duke to Paris in 1378, and on his non-appearance committed one of his rare errors of policy by confiscating his duchy. But the Bretons rose to defend their independence, and recalled their duke. The matter was still unsettled when Charles died at Vincennes on the 16th of September 1380. His health, always delicate, had been further weakened, according to popular report, by a slow poison prepared for him by the king of Navarre. His wife, Jeanne of Bourbon, died in 1378, and the succession devolved on their elder son Charles, a boy of twelve. Their younger son was Louis, duke of Orleans.

Personally Charles was no soldier. He owed the signal successes of his reign partly to his skilful choice of advisers and administrators, to his chancellors Jean and Guillaume de Dormans and Pierre d'Orgemont, to Hugues Aubriot, provost of Paris, Bureau de la Rivière and others; partly to a singular coolness and subtlety in the exercise of a not over-scrupulous diplomacy, which made him a dangerous enemy. He had learnt prudence and self-restraint in the troubled times of the regency, and did not lose his moderation in success. He modelled his private life on that of his predecessor Saint Louis, but was no fanatic in religion, for he refused his support to the violent methods of the Inquisition in southern France, and allowed the Jews to return to the country, at the same time confirming their privileges. His support of the schismatic pope Clement VII. at Avignon was doubtless due to political considerations, as favouring the independence of the Gallican church. Charles V. was a student of astrology, medicine, law and philosophy, and collected a large and valuable library at the Louvre. He gathered round him a group of distinguished writers and thinkers, among whom were Raoul de Presles, Philippe de Mézières, Nicolas Oresme and others. The ideas of these men were applied by him to the practical work of administration, though he confined himself chiefly to the consolidation and improvement of existing institutions. The power of the nobility was lessened by restrictions which, without prohibiting private wars, made them practically impossible. The feudal fortresses were regularly inspected by the central authority, and the nobles themselves became in many cases paid officers of the king. Charles established a merchant marine and a formidable navy, which under Jean de Vienne threatened the English coast between 1377 and 1380. The states-general were silenced and the royal prerogative increased; the royal domains were extended, and the wealth of the crown was augmented; additions were made to the revenue by the sale of municipal charters and patents; and taxation became heavier, since Charles set no limits to the gratification of his tastes either in the collection of jewels and precious objects, of books, or of his love of building, examples of which are the renovation of the Louvre and the erection of the palace of Saint Paul in Paris.

See the chronicles of Froissart, and of Pierre d'Orgemont (*Grandes Chroniques de Saint Denis*, Paris, vol. vi., 1838); Christine de Pisan, *Le Livre des fais et bonnes mœurs du sage roy Charles V*, written in 1404, ed. Michaud and Poujoulat, vol. ii. (1836); L. Delisle, *Mandements et actes divers de Charles V* (1886); letters of Charles V. from the English archives in Champollion-Figeac, *Lettres de rois et de reines*, ii. pp. 167 seq.; the anonymous *Songe du vergier* or *Somnium viridarii*, written in 1376 and giving the political ideas of Charles V. and his advisers; "Relation de la mort de Charles V" in Hauréau, *Notices et extraits*, xxxi. pp. 278-284; Ch. Benoist, *La Politique du roi Charles V* (1874); S. Luce, *La France pendant la guerre de cent ans*; G. Clément Simon, *La Rupture du traité de Brétigny* (1898); A. Vuitry, *Études sur le régime financier de la France*, vols. i. and ii. (1883); and R. Delachenal, *Histoire de Charles V* (Paris. 1908).

CHARLES VI. (1368–1422), king of France, son of Charles V. and Jeanne of Bourbon, was born in Paris on the 3rd of December 1368. He received the appanage of Dauphiné at his birth, and was thus the first of the princes of France to bear the title of dauphin from infancy. Charles V. had entrusted his education to Philippe de Mézières, and had fixed his majority at fourteen. He succeeded to the throne in 1380, at the age of twelve, and the royal authority was divided between his paternal uncles, Louis, duke of Anjou, John, duke of Berry, Philip the Bold, duke of Burgundy, and his mother's brother, Louis II., duke of Bourbon. In accordance with an ordinance of the late king the duke of Anjou became regent, while the guardianship of the young king, together with the control of Paris and Normandy, passed to the dukes of Burgundy and Bourbon, who were to be assisted by certain of the councillors of Charles V. The duke of Berry, excluded by this arrangement, was compensated by the government of Languedoc and Guienne. Anjou held the regency for a few months only, until the king's coronation in November 1380. He enriched himself from the estate of Charles V. and by excessive exactions, before he set out in 1382 for Italy to effect the conquest of Naples. Considerable discontent existed in the south of France at the time of the death of Charles V., and when the duke of Anjou re-imposed certain taxes which the late king had remitted at the end of his reign, there were revolts at Puy and Montpellier. Paris, Rouen, the cities of Flanders, with Amiens, Orleans, Reims and other French towns, also rose (1382) in revolt against their masters. The *Maillotins*, as the Parisian insurgents were named from the weapon they used, gained the upper hand in Paris, and were able temporarily to make terms, but the commune of Rouen was abolished, and the *Tuchins*, as the marauders in Languedoc were called, were pitilessly hunted down. Charles VI. marched to the help of the count of Flanders against the insurgents headed by Philip van Artevelde, and gained a complete victory at Roosebeke (November 27th, 1382). Strengthened by this success the king, on his return to Paris in the following January, exacted vengeance on the citizens by fines, executions and the suppression of the privileges of the city. The help sent by the English to the Flemish cities resulted in a second Flemish campaign. In 1385 Jean de Vienne made an unsuccessful descent on the Scottish coast, and Charles equipped a fleet at Sluys for the invasion of England, but a series of delays ended in the destruction of the ships by the English.

In 1385 Charles VI. married Elizabeth, daughter of Stephen II., duke of Bavaria, her name being gallicized as Isabeau. Three years later, with the help of his brother, Louis of Orleans, duke of Touraine, he threw off the tutelage of his uncles, whom he replaced by Bureau de la Rivière and others among his father's counsellors, nicknamed by the royal princes the *marmousets* because of their humble origin. Two years later he deprived the duke of Berry of the government of Languedoc. The opening years of Charles VI.'s effective rule promised well, but excess in gaiety of all kinds undermined his constitution, and in 1392 he had an attack of madness at Le Mans, when on his way to Brittany to force from John V. the surrender of his cousin Pierre de Craon, who had tried to assassinate the constable Olivier de Clisson in the streets of Paris. Other attacks followed, and it became evident that Charles was unable permanently to sustain the royal authority. Clisson, Bureau de la Rivière, Jean de Mercier, and the other *marmousets* were driven from office, and the royal dukes regained their power. The rivalries between the most powerful of these—the duke of Burgundy, who during the king's attacks of madness practically ruled the country, and the duke of Orleans—were a constant menace to peace. In 1396 peace with England seemed assured by the marriage of Richard II. with Charles VI.'s daughter Isabella, but the Lancastrian revolution of 1399 destroyed the diplomatic advantages gained by this union. In France the country was disturbed by the papal schism. At an assembly of the clergy held in Paris in 1398 it was resolved to refuse to recognize the authority of Benedict XIII., who succeeded Clement VII. as schismatic pope at Avignon. The question became a party one; Benedict was supported by Louis of Orleans, while Philip the Bold and the university of Paris opposed him. Obedience to Benedict's authority was resumed in 1403, only to be withdrawn again in 1408, when the king declared himself the guardian and protector of the French church, which was indeed for a time self-governing. Edicts further extending the royal power in ecclesiastical affairs were even issued in 1418, after the schism was at an end.

The king's intelligence became yearly feebler, and in 1404 the death of Philip the Bold aggravated the position of affairs. The new duke, John the Fearless, did not immediately replace his father in general affairs, and the influence of the duke of Orleans increased. Queen Isabeau, who had generally supported the Burgundian party, was now practically separated from her husband, whose madness had become pronounced. She was replaced by a young Burgundian lady, Odette de Champdivers, called by her contemporaries *la petite reine*, who rescued the king from the state of neglect into which he had fallen. Isabeau of Bavaria was freely accused of intrigue with the duke of Orleans. She was from time to time regent of France, and as her policy was directed by personal considerations and by her love of splendour she further added to the general distress. The relations between John the Fearless and the duke of Orleans became more embittered, and on the 23rd of November 1407 Orleans was murdered in the streets of Paris at the instigation of his rival. The young duke Charles of Orleans married the daughter of the Gascon count Bernard VII. of Armagnac, and presently formed alliances with the dukes of Berry, Bourbon and Brittany, and others who formed the party known as the Armagnacs (see ARMAGNAC), against the Burgundians who had gained the upper hand in the royal council. In 1411 John the Fearless contracted an alliance with Henry IV. of England, and civil war began in the autumn, but in 1412 the Armagnacs in their turn sought English aid, and, by promising the sovereignty of Aquitaine to the English king, gave John the opportunity of posing as defender of France. In Paris the Burgundians were hand in hand with the corporation of the butchers, who were the leaders of the Parisian populace. The malcontents, who took their name from one of their number, Caboche, penetrated into the palace of the dauphin Louis, and demanded the surrender of the unpopular members of his household. A royal ordinance, promising reforms in administration, was promulgated on the 27th of May 1413, and some of the royal advisers were executed. The king and the dauphin, powerless in the hands of Duke John and the Parisians, appealed secretly to the Armagnac princes for deliverance. They entered Paris in September; the ordinance extracted by the Cabochiens was rescinded; and numbers of the insurgents were banished the city.

In the next year Henry V. of England, after concluding an alliance with Burgundy, resumed the pretensions of Edward III. to the crown of France, and in 1415 followed the disastrous battle of Agincourt. The two elder sons of Charles VI., Louis, duke of Guienne, and John, duke of Touraine, died in 1415 and 1417, and Charles, count of Ponthieu, became heir apparent. Paris was governed by Bernard of Armagnac, constable of France, who expelled all suspected of Burgundian sympathies and treated Paris like a conquered city. Queen Isabeau was imprisoned at Tours, but escaped to Burgundy. The capture of Paris by the Burgundians on the 29th of May 1418 was followed by a series of horrible massacres of the Armagnacs; and in July Duke John and Isabeau, who assumed the title of regent, entered Paris. Meanwhile Henry V. had completed the conquest of Normandy. The murder of John the Fearless in 1419 under the eyes of the dauphin Charles threw the Burgundians definitely into the arms of the English, and his successor Philip the Good, in concert with Queen Isabeau, concluded (1420) the treaty of Troyes with Henry V., who became master of France. Charles VI. had long been of no account in the government, and the state of neglect in which he existed at Senlis induced Henry V. to undertake the re-organization of his household. He came to Paris in September 1422, and died on the 21st of October.

The chief authorities for the reign of Charles VI. are:—*Chronica Caroli VI.*, written by a monk of Saint Denis, commissioned officially to write the history of his time, edited by C. Bellaguet with a French translation (6 vols., 1839–1852); Jean Juvénal des Ursins, *Chronique*, printed by D. Godefroy in *Histoire de Charles VI* (1653), chiefly an abridgment of the monk of St Denis's narrative; a fragment of the *Grandes Chroniques de Saint Denis* covering the years 1381 to 1383 (ed. J. Pichon 1864); correspondence of Charles VI. printed by Champollion-Figeac in *Lettres de rois*, vol. ii.; *Choix de pièces inédites rel. au règne de Charles VI* (2 vols., 1863–1864), edited by L. Douët d'Arcq for the Société de l'Histoire de France; J. Froissart, *Chroniques*; Enguerrand de Monstrelet, *Chroniques*, covering the first half of the 15th century (Eng. trans., 4 vols., 1809); *Chronique des quatre premiers Valois*, by an unknown author, ed. S. Luce (1862). See also E. Lavisse, *Hist. de France*, iv. 267 seq.; E. Petit, "Séjours de Charles VI," *Bull. du com. des travaux hist.* (1893); Vallet de Viriville, "Isabeau de Bavière," *Revue française* (1858–1859); M. Thibaut, *Isabeau de Bavière* (1903).

CHARLES VII. (1403–1461), king of France, fifth son of Charles VI. and Isabeau of Bavaria, was born in Paris on the 22nd of February 1403. The count of Ponthieu, as he was called in his boyhood, was betrothed in 1413 to Mary of Anjou, daughter of Louis II., duke of Anjou and king of Sicily, and spent the next two years at the Angevin court. He received the duchy of Touraine in 1416, and in the next year the death of his brother John made him dauphin of France. He became lieutenant-general of the kingdom in 1417, and made active efforts to combat the complaisance of his mother. He assumed the title of regent in December 1418, but his authority in northern France was paralysed in 1419 by the murder of John the Fearless, duke of Burgundy, in his presence at Montereau. Although the deed was not apparently premeditated, as the English and Burgundians declared, it ruined Charles's cause for the time. He was disinherited by the treaty of Troyes in 1420, and at the time of his father's death in 1422 had retired to Mehun-sur-Yèvre, near Bourges, which had been the nominal seat of government since 1418. He was recognized as king in Touraine, Berry and Poitou, in Languedoc and other provinces of southern France; but the English power in the north was presently increased by the provinces of Champagne and Maine, as the result of the victories of Crevant (1423) and Verneuil (1424). The Armagnac administrators who had been driven out of Paris by the duke of Bedford gathered round the young king, nicknamed the "king of Bourges," but he was weak in body and mind, and was under the domination of Jean Louvet and Tanguy du Chastel, the instigators of the murder of John the Fearless, and other discredited partisans. The power of these favourites was shaken by the influence of the queen's mother, Yolande of Aragon, duchess of Anjou. She sought the alliance of John V., duke of Brittany, who, however, vacillated throughout his life between the English and French alliance, concerned chiefly to maintain the independence of his duchy. His brother, Arthur of Brittany, earl of Richmond (comte de Richemont), was reconciled with the king, and became constable in 1425, with the avowed intention of making peace between Charles VII. and the duke of Burgundy. Richemont caused the assassination of Charles's favourites Pierre de Giac and Le Camus de Beaulieu, and imposed one of his own choosing, Georges de la Trémoille, an adventurer who rapidly usurped the constable's power. For five years (1427–1432) a private war between these two exhausted the Armagnac forces, and central France returned to anarchy.

Meanwhile Bedford had established settled government throughout the north of France, and in 1428 he advanced to the siege of Orleans. For the movement which was to lead to the deliverance of France from the English invaders, see JOAN OF ARC. The siege of Orleans was raised by her efforts on the 8th of May 1429, and two months later Charles VII. was crowned at Reims. Charles's intimate counsellors, La Trémoille and Regnault de Chartres, archbishop of Reims, saw their profits menaced by the triumphs of Joan of Arc, and accordingly the court put every difficulty in the way of her military career, and received the news of her capture before Compiègne (1430) with indifference. No measures were taken for her deliverance or her ransom, and Normandy and the Isle of France remained in English hands. Fifteen years of anarchy and civil war intervened before peace was restored. Bands of armed men fighting for their own hand traversed the country, and in the ten years between 1434 and 1444 the provinces were terrorized by these *écorcheurs*, who, with the decline of discipline in the English army, were also recruited from the ranks of the invaders. The duke of Bedford died in 1435, and in the same year Philip the Good of Burgundy concluded a treaty with Charles VII. at Arras, after fruitless negotiations for an English treaty. From this time Charles's policy was strengthened. La Trémoille had been assassinated in 1433 by the constable's orders, with the connivance of Yolande of Aragon. For his former favourites were substituted energetic advisers, his brother-in-law Charles of Anjou, Dunois (the famous bastard of Orleans), Pierre de Brézé, Richemont and others. Richemont entered Paris on the 13th of April 1436, and in the next five years the finance of the country was re-established on a settled basis. Charles himself commanded the troops who captured Pontoise in 1441, and in the next year he made a successful expedition in the south.

Meanwhile the princes of the blood and the great nobles resented the ascendancy of councillors and soldiers drawn from the smaller nobility and the *bourgeoisie*. They made a formidable league against the crown in 1440 which included Charles I., duke of Bourbon, John II., duke of Alençon, John IV. of Armagnac, and the dauphin, afterwards Louis XI. The revolt broke out in Poitou in 1440 and was known as the *Praguerie*. Charles VII. repressed the rising, and showed great skill with the rebel nobles, finally buying them over individually by considerable concessions. In 1444 a truce was concluded with England at Tours, and Charles proceeded to organize a regular army. The central authority was gradually made effective, and a definite system of payment, by removing the original cause of brigandage, and the establishment of a strict discipline learnt perhaps from the English troops, gradually stamped out the most serious of the many evils under which the country had suffered. Pierre Bessonneau, and the brothers Gaspard and Jean Bureau created a considerable force of artillery. Domestic troubles in their own country weakened the English in France. The conquest of Normandy was completed by the battle of Formigny (15th of April 1450). Guienne was conquered in 1451 by Duncis, but not subdued, and another expedition was necessary in 1453, when Talbot was defeated and slain at Castillon. Meanwhile in 1450 Charles VII. had resolved on the rehabilitation of Joan of Arc, thus rendering a tardy recognition of her services. This was granted in 1456 by the Holy See. The only foothold retained by the English on French ground was Calais. In its earlier stages the deliverance of France from the English had been the work of the people themselves. The change which made Charles take an active part in public affairs is said to have been largely due to the influence of Agnes Sorel, who became his mistress in 1444 and died in 1450. She was the first to play a public and political rôle as mistress of a king of France, and may be said to have established a tradition. Pierre de Brézé, who had had a large share in the repression of the Praguerie, obtained through her a dominating influence over the king, and he inspired the monarch himself and the whole administration with new vigour. Charles and René of Anjou retired from court, and the greater part of the members of the king's council were drawn from the bourgeois classes. The most famous of all these was Jacques Cœur (*q.v.*). It was by the zeal of these councillors that Charles obtained the surname of "The Well-Served."

Charles VII. continued his father's general policy in church matters. He desired to lessen the power of the Holy See in France and to preserve as far as possible the liberties of the Gallican church. With the council of Constance (1414–1418) the great schism was practically healed. Charles, while careful to protest against its renewal, supported the anti-papal contentions of the French members of the council of Basel (1431–1449), and in 1438 he promulgated the Pragmatic Sanction at Bourges, by which the patronage of ecclesiastical benefices was removed from the Holy See, while certain interventions of the royal power were admitted. Bishops and abbots were to be elected, in accordance with ancient custom, by their clergy.

After the English had evacuated French territory Charles still had to cope with feudal revolt, and with the hostility of the dauphin, who was in open revolt in 1446, and for the next ten years ruled like an independent sovereign in Dauphiné. He took refuge in 1457 with Charles's most formidable enemy, Philip of Burgundy. Charles VII. nevertheless found means to prevent Philip from attaining his ambitions in Lorraine and in Germany. But the dauphin succeeded in embarrassing his father's policy at home and abroad, and had his own party in the court itself. Charles VII. died at Mehun-sur-Yèvre on the 22nd of July 1461. He believed that he was poisoned by his son, who cannot, however, be accused of anything more than an eager expectation of his death.

AUTHORITIES.—The history of the reign of Charles VII. has been written by two modern historians,—Vallet de Viriville, *Histoire de Charles VII . . . et de son époque* (Paris, 3 vols., 1862–1865), and G. du Fresne de Beaucourt, *Hist. de Charles VII* (Paris, 6 vols., 1881–1891). There is abundant contemporary material. The herald, Jacques le Bouvier or Berry (b. 1386), whose *Chronicques du feu roi Charles VII* was first printed in 1528 as the work of Alain Chartier, was an eye-witness of many of the events he described. His *Recouvrement de Normandie*, with other material on the same subject, was edited for the "Rolls" series (*Chronicles and Memorials*) by Joseph Stevenson in 1863. The *Histoire de Charles VII* by Jean Chartier, historiographer-royal from 1437, was included in the *Grandes Chroniques de Saint-Denis*, and was first printed under Chartier's name by Denis Godefroy, together with other contemporary narratives, in 1661. It was re-edited by Vallet de Viriville (Paris, 3 vols., 1858–1859). With these must be considered the Burgundian chroniclers Enguerrand de Monstrelet, whose chronicle (ed. L. Douët d'Arcq; Paris, 6 vols., 1857–1862) covers the years 1400–1444, and Georges Chastellain, the existing fragments of whose chronicle are published in his *Œuvres* (ed. Kervyn de Lettenhove; Brussels, 8 vols., 1863–1866). For a detailed bibliography and an account of printed and MS. documents see du Fresne de Beaucourt, already cited, also A. Molinier, *Manuel de bibliographie historique*, iv. 240-306.

CHARLES VIII. (1470–1498), king of France, was the only son of Louis XI. During the whole of his childhood Charles lived far from his father at the château of Amboise, which was throughout his life his favourite residence. On the death of Louis XI. in 1483 Charles, a lad of thirteen, was of age, but was absolutely incapable of governing. Until 1492 he abandoned the government to his sister Anne of Beaujeu. In 1491 he married Anne, duchess of Brittany, who was already betrothed to Maximilian of Austria. Urged by his favourite, Étienne de Vesc, he then, at the age of twenty-two, threw off the yoke of the Beaujeus, and at the same time discarded their wise and able policy. But he was a thoroughly worthless man with a weak and ill-balanced intellect. He had a romantic imagination and conceived vast projects. He proposed at first to claim the rights of the house of Anjou, to which Louis XI. had succeeded, on the kingdom of Naples, and to use this as a stepping-stone to the capture of Constantinople from the Turks and his own coronation as emperor of the East. He sacrificed everything to this adventurous policy, signed disastrous treaties to keep his hands free, and set out for Italy in 1494. The ceremonial side of the expedition being in his eyes the most important, he allowed himself to be intoxicated by his easy triumph and duped by the Italians. On the 12th of May 1495 he entered Naples in great pomp, clothed in the imperial insignia. A general coalition was, however, formed against him, and he was forced to return precipitately to France. It cannot be denied that he showed bravery at the battle of Fornovo (the 5th of July 1495). He was preparing a fresh expedition to Italy, when he died on the 8th of April 1498, from the results of an accident, at the château of Amboise.

See *Histoire de Charles VIII, roy de France*, by G. de Jaligny, André de la Vigne, &c., edited by Godefroy (Paris, 1684); De Cherrier, *Histoire de Charles VIII* (Paris, 1868); H. Fr. Delaborde, *Expédition de Charles VIII en Italie* (Paris, 1888). For a complete bibliography see H. Hauser, *Les Sources de l'histoire de France, 1494–1610*, vol. i. (Paris, 1906); and E. Lavisse, *Histoire de France*, vol. v. part i., by H. Lemonnier (Paris, 1903).

CHARLES IX. (1550–1574), king of France, was the third son of Henry II. and Catherine de' Medici. At first he bore the title of duke of Orleans. He became king in 1560 by the death of his brother Francis II., but as he was only ten years old the power was in the hands of the queen-mother, Catherine. Charles seems to have been a youth of good parts, lively and agreeable, but he had a weak, passionate and fantastic nature. His education had spoiled him. He was left to his whims—even the strangest—and to his taste for violent exercises; and the excesses to which he gave himself up ruined his health. Proclaimed of age on the 17th of August 1563, he continued to be absorbed in his fantasies and his hunting, and submitted docilely to the authority of his mother. In 1570 he was married to Elizabeth of Austria, daughter of Maximilian II. It was about this time that he dreamed of making a figure in the world. The successes of his brother, the duke of Anjou, at Jarnac and Moncontour had already caused him some jealousy. When Coligny came to court, he received him very warmly, and seemed at first to accept the idea of an intervention in the Netherlands against the Spaniards. For the upshot of this adventure see the article ST BARTHOLOMEW, MASSACRE OF. Charles was in these circumstances no hypocrite, but weak, hesitating and ill-balanced. Moreover, the terrible events in which he had played a part transformed his character. He became melancholy, severe and taciturn. "It is feared," said the Venetian ambassador, "that he may become cruel." Undermined by fever, at the age of twenty he had the appearance of an old man, and night and day he was haunted with nightmares. He died on the 30th of May 1574. By his mistress, Marie Touchet, he had one son, Charles, duke of Angoulême. Charles IX. had a sincere love of letters, himself practised poetry, was the patron of Ronsard and the poets of the Pleiad, and granted privileges to the first academy founded by Antoine de Baïf (afterwards the Académie du Palais). He left a work on hunting, *Traité de la chasse royale*, which was published in 1625, and reprinted in 1859.

AUTHORITIES.—The principal sources are the contemporary memoirs and chronicles of T. A. d'Aubigné, Brantôme, Castelnau, Haton, la Place, Montluc, la Noue, l'Estoile, Ste Foy, de Thou, Tavannes, &c.; the published correspondence of Catherine de' Medici, Marguerite de Valois, and the Venetian ambassadors; and Calendars of State Papers, &c. See also Abel Desjardins, *Charles IX, deux années de règne* (Paris, 1873); de la Ferrière, *Le XVIe siècle et les Valois* (Paris, 1879); H. Mariéjol, *La Réforme et la Ligue* (Paris, 1904), in vol. v. of the *Histoire de France*, by E. Lavisse, which contains a bibliography for the reign.

CHARLES X. (1757–1836), king of France from 1824 to 1830, was the fourth child of the dauphin, son of Louis XV. and of Marie Josephe of Saxony, and consequently brother of Louis XVI. He was known before his accession as Charles Philippe, count of Artois. At the age of sixteen he married Marie Thérèse of Savoy, sister-in-law of his brother, the count of Provence (Louis XVIII.). His youth was passed in scandalous dissipation, which drew upon himself and his coterie the detestation of the people of Paris. Although lacking military tastes, he joined the French army at the siege of Gibraltar in 1772, merely for distraction. In a few years he had incurred a debt of 56 million francs, a burden assumed by the impoverished state. Prior to the Revolution he took only a minor part in politics, but when it broke out he soon became, with the queen, the chief of the reactionary party at court. In July 1789 he left France, became leader of the *émigrés*, and visited several of the courts of Europe in the interest of the royalist cause. After the execution of Louis XVI. he received from his brother, the count of Provence, the title of lieutenant-general of the realm, and, on the death of Louis XVII., that of "Monsieur." In 1795 he attempted to aid the royalist rising of La Vendée, landing at the island of Yeu. But he refused to advance farther and to put himself resolutely at the head of his party, although warmly acclaimed by it, and courage failing him, he returned to England, settling first in London, then in Holyrood Palace at Edinburgh and afterwards at Hartwell. There he remained until 1813, returning to France in February 1814, and entering Paris in April, in the track of the Allies.

During the reign of his brother, Louis XVIII., he was the leader of the ultra-royalists, the party of extreme reaction. On succeeding to the throne in September 1824 the dignity of his address and his affable condescension won him a passing popularity. But his coronation at Reims, with all the gorgeous

ceremonial of the old régime, proclaimed his intention of ruling, as the Most Christian King, by divine right. His first acts, indeed, allayed the worst alarms of the Liberals; but it was soon apparent that the weight of the crown would be consistently thrown into the scale of the reactionary forces. The *émigrés* were awarded a milliard as compensation for their confiscated lands; and Gallicans and Liberals alike were offended by measures which threw increased power into the hands of the Jesuits and Ultramontanes. In a few months there were disquieting signs of the growing unpopularity of the king. The royal princesses were insulted in the streets; and on the 29th of April 1825 Charles, when reviewing the National Guard, was met with cries from the ranks of "Down with the ministers!" His reply was, next day, a decree disbanding the citizen army.

It was not till 1829, when the result of the elections had proved the futility of Villèle's policy of repression, that Charles consented unwillingly to try a policy of compromise. It was, however, too late. Villèle's successor was the vicomte de Martignac, who took Decazes for his model; and in the speech from the throne Charles declared that the happiness of France depended on "the sincere union of the royal authority with the liberties consecrated by the charter." But Charles had none of the patience and common-sense which had enabled Louis XVIII. to play with decency the part of a constitutional king. "I would rather hew wood," he exclaimed, "than be a king under the conditions of the king of England"; and when the Liberal opposition obstructed all the measures proposed by a ministry not selected from the parliamentary majority, he lost patience. "I told you," he said, "that there was no coming to terms with these men." Martignac was dismissed; and Prince Jules de Polignac, the very incarnation of clericalism and reaction, was called to the helm of state.

The inevitable result was obvious to all the world. "There is no such thing as political experience," wrote Wellington, certainly no friend of Liberalism; "with the warning of James II. before him, Charles X. was setting up a government by priests, through priests, for priests." A formidable agitation sprang up in France, which only served to make the king more obstinate. In opening the session of 1830 he declared that he would "find the power" to overcome the obstacles placed in his path by "culpable manœuvres." The reply of the chambers was a protest against "the unjust distrust of the sentiment and reason of France"; whereupon they were first prorogued, and on the 16th of May dissolved. The result of the new elections was what might have been foreseen: a large increase in the Opposition; and Charles, on the advice of his ministers, determined on a virtual suspension of the constitution. On the 25th of July were issued the famous "four ordinances" which were the immediate cause of the revolution that followed.

With singular fatuity Charles had taken no precautions in view of a violent outbreak. Marshal Marmont, who commanded the scattered troops in Paris, had received no orders, beyond a jesting command from the duke of Angoulême to place them under arms "as some windows might be broken." At the beginning of the revolution Charles was at St Cloud, whence on the news of the fighting he withdrew first to Versailles and then to Rambouillet. So little did he understand the seriousness of the situation that, when the laconic message "All is over!" was brought to him, he believed that the insurrection had been suppressed. On realizing the truth he hastily abdicated in favour of his grandson, the duke of Bordeaux (comte de Chambord), and appointed Louis Philippe, duke of Orleans, lieutenant-general of the kingdom (July 30th). But, on the news of Louis Philippe's acceptance of the crown, he gave up the contest and began a dignified retreat to the sea-coast, followed by his suite, and surrounded by the infantry, cavalry and artillery of the guard. Beyond sending a corps of observation to follow his movements, the new government did nothing to arrest his escape. At Maintenon Charles took leave of the bulk of his troops, and proceeding with an escort of some 1200 men to Cherbourg, took ship there for England on the 16th of August. For a time he returned to Holyrood Palace at Edinburgh, which was again placed at his disposal. He died at Goritz, whither he had gone for his health, on the 6th of November 1836.

The best that can be said of Charles X. is that, if he did not know how to rule, he knew how to cease to rule. The dignity of his exit was more worthy of the ancient splendour of the royal house of France than the theatrical humility of Louis Philippe's entrance. But Charles was an impossible monarch for the 19th century, or perhaps for any other century. He was a typical Bourbon, unable either to learn or to forget; and the closing years of his life he spent in religious austerities, intended to expiate, not his failure to grasp a great opportunity, but the comparatively venial excesses of his youth.[1]

See Achille de Vaulabelle, *Chute de l'empire: histoire des deux restaurations* (Paris, 1847–1857); Louis de Vielcastel, *Hist. de la restauration* (Paris, 1860–1878); Alphonse de Lamartine, *Hist. de la restauration* (Paris, 1851–1852); Louis Blanc, *Hist. de dix ans, 1830–1840* (5 vols., 1842–1844); G. I. de Montbel, *Dernière Époque de l'hist. de Charles X* (5th ed., Paris, 1840); Théodore Anne, *Mémoires, souvenirs, et anecdotes sur l'intérieur du palais de Charles X et les évènements de 1815 à 1830* (2 vols., Paris, 1831); *ib.*, *Journal de Saint-Cloud à Cherbourg*; Védrenne, *Vie de Charles X* (3 vols., Paris, 1879); Petit, *Charles X* (Paris, 1886); Villeneuve, *Charles X et Louis XIX en exil. Mémoires inédits* (Paris, 1889); Imbert de Saint-Amand, *La Cour de Charles X* (Paris, 1892).

CHARLES I. (1288–1342), king of Hungary, the son of Charles Martell of Naples, and Clemencia, daughter of the emperor Rudolph, was known as Charles Robert previously to being enthroned king of Hungary in 1309. He claimed the Hungarian crown, as the grandson of Stephen V., under the banner of the pope, and in August 1300 proceeded from Naples to Dalmatia to make good his claim. He was crowned at Esztergom after the death of the last Arpad, Andrew III. (1301), but was forced the same year to surrender the crown to Wenceslaus II. of Bohemia (1289–1306). His failure only made Pope Boniface VIII. still more zealous on his behalf, and at the diet of Pressburg (1304) his Magyar adherents induced him to attempt to recover the crown of St Stephen from the Czechs. But in the meantime (1305) Wenceslaus transferred his rights to Duke Otto of Bavaria, who in his turn was taken prisoner by the Hungarian rebels. Charles's prospects now improved, and he was enthroned at Buda on the 15th of June 1309, though his installation was not regarded as valid till he was crowned with the sacred crown (which was at last recovered from the robber-barons) at Székesfehérvár on the 27th of August 1310. For the next three years Charles had to contend with rebellion after rebellion, and it was only after his great victory over all the elements of rapine and disorder at Rozgony (June 15, 1312) that he was really master in his own land. His foreign policy aimed at the aggrandizement of his family, but his plans were prudent as well as ambitious, and Hungary benefited by them greatly. His most successful achievement was the union with Poland for mutual defence against the Habsburgs and the Czechs. This was accomplished by the convention of Trencsén (1335), confirmed the same year at the brilliant congress of Visegrád, where all the princes of central Europe met to compose their differences and were splendidly entertained during the months of October and November. The immediate result of the congress was a combined attack by the Magyars and Poles upon the emperor Louis and his ally Albert of Austria, which resulted in favour of Charles in 1337. Charles's desire to unite the kingdoms of Hungary and Naples under the eldest son Louis was frustrated by Venice and the pope, from fear lest Hungary might become the dominant

[1] This, at any rate, represents the general verdict of history. It is interesting, however, to note that so liberal-minded and shrewd a critic of men as King Leopold I. of the Belgians formed a different estimate. In a letter of the 18th of November 1836 addressed to Princess (afterwards Queen) Victoria he writes:—"History will state that Louis XVIII. was a most liberal monarch, reigning with great mildness and justice to his end, but that his brother, from his despotic and harsh disposition, upset all the other had done, and lost the throne. Louis XVIII. was a clever, hard-hearted man, shackled by no principle, very proud and false. Charles X. an honest man, a kind friend, an honourable master, sincere in his opinions, and inclined to do everything that is right. That teaches us what we ought to believe in history as it is compiled according to ostensible events and results known to the generality of people."

Adriatic power. He was, however, more than compensated for this disappointment by his compact (1339) with his ally and brother-in-law, Casimir of Poland, whereby it was agreed that Louis should succeed to the Polish throne on the death of the childless Casimir. For an account of the numerous important reforms effected by Charles see HUNGARY: *History*. A statesman of the first rank, he not only raised Hungary once more to the rank of a great power, but enriched and civilized her. In character he was pious, courtly and valiant, popular alike with the nobility and the middle classes, whose increasing welfare he did so much to promote, and much beloved by the clergy. His court was famous throughout Europe as a school of chivalry.

Charles was married thrice. His first wife was Maria, daughter of Duke Casimir of Teschen, whom he wedded in 1306. On her death in 1318 he married Beatrice, daughter of the emperor Henry VII. On her decease two years later he gave his hand to Elizabeth, daughter of Wladislaus Lokietek, king of Poland. Five sons were the fruit of these marriages, of whom three, Louis, Andrew and Stephen, survived him. He died on the 16th of July 1342, and was laid beside the high altar at Székesfehérvár, the ancient burial-place of the Arpads.

See Béla Kerékgyartó, *The Hungarian Royal Court under the House of Anjou* (Hung.) (Budapest, 1881); *Rationes Collectorum Pontif. in Hungaria* (Budapest, 1887); *Diplomas of the Angevin Period*, edited by Imre Nagy (Hung. and Lat.), vols. i.-iii. (Budapest, 1878, &c.). (R. N. B.)

CHARLES I. (1226–1285), king of Naples and Sicily and count of Anjou, was the seventh child of Louis VIII. of France and Blanche of Castile. Louis died a few months after Charles's birth and was succeeded by his son Louis IX. (St Louis), and on the death in 1232 of the third son John, count of Anjou and Maine, those fiefs were conferred on Charles. In 1246 he married Beatrice, daughter and heiress of Raymond Bérenger V., the last count of Provence, and after defeating James I. of Aragon and other rivals with the help of his brother the French king, he took possession of his new county. In 1248 he accompanied Louis in the crusade to Egypt, but on the defeat of the Crusaders he was taken prisoner with his brother. Shortly afterwards he was ransomed, and returned to Provence in 1250. During his absence several towns had asserted their independence; but he succeeded in subduing them without much difficulty and gradually suppressed their communal liberties. Charles's ambition aimed at wider fields, and when Margaret, countess of Flanders, asked help of the French court against the German king William of Holland, by whom she had been defeated, he gladly accepted her offer of the county of Hainaut in exchange for his assistance (1253); this arrangement was, however, rescinded by Louis of France, who returned from captivity in 1254, and Charles gave up Hainaut for an immense sum of money. He extended his influence by the subjugation of Marseilles in 1257, then one of the most important maritime cities of the world, and two years later several communes of Piedmont recognized Charles's suzerainty In 1262 Pope Urban IV. determined to destroy the power of the Hohenstaufen in Italy, and offered the kingdoms of Naples and Sicily, in consideration of a yearly tribute, to Charles of Anjou, in opposition to Manfred, the bastard son of the late emperor Frederick II. The next year Charles succeeded in getting himself elected senator of Rome, which gave him an advantage in dealing with the pope. After long negotiations he accepted the Sicilian and Neapolitan crowns, and in 1264 he sent a first expedition of Provençals to Italy; he also collected a large army and navy in Provence and France with the help of King Louis, and by an alliance with the cities of Lombardy was able to send part of his force overland. Pope Clement IV. confirmed the Sicilian agreement on conditions even more favourable to Charles, who sailed in 1265, and conferred on the expedition all the privileges of a crusade. After narrowly escaping capture by Manfred's fleet he reached Rome safely, where he was crowned king of the Two Sicilies. The land army arrived soon afterwards, and on the 26th of February 1266 Charles encountered Manfred at Benevento, where after a hard-fought battle Manfred was defeated and killed, and the whole kingdom was soon in Charles's possession. Then Conradin, Frederick's grandson and last legitimate descendant of the Hohenstaufen, came into Italy, where he found many partisans among the Ghibellines of Lombardy and Tuscany, and among Manfred's former adherents in the south. He gathered a large army consisting partly of Germans and Saracens, but was totally defeated by Charles at Tagliacozzo (23rd of August 1268); taken prisoner, he was tried as a rebel and executed at Naples. Charles, in a spirit of the most vindictive cruelty, had large numbers of Conradin's barons put to death and their estates confiscated, and the whole population of several towns massacred.

He was now one of the most powerful sovereigns of Europe, for besides ruling over Provence and Anjou and the kingdom of the Two Sicilies, he was imperial vicar of Tuscany, lord of many cities of Lombardy and Piedmont, and as the pope's favourite practically arbiter of the papal states, especially during the interregnum between the death of Clement IV. (1268) and the election of Gregory X. (1272). But his ambition was by no means satisfied, and he even aspired to the crown of the East Roman empire. In 1272 he took part with Louis IX. in a crusade to north Africa, where the French king died of fever, and Charles, after defeating the soldan of Tunis, returned to Sicily. The election of Rudolph of Habsburg as German king after a long interregnum, and that of Nicholas III. to the Holy See (1277), diminished Charles's power, for the new pope set himself to compose the difference between Guelphs and Ghibellines in the Italian cities, but at his death Charles secured the election of his henchman Martin IV. (1281), who recommenced persecuting the Ghibellines, excommunicated the Greek emperor, Michael Palaeologus, proclaimed a crusade against the Greeks, filled every appointment in the papal states with Charles's vassals, and reappointed the Angevin king senator of Rome. But the cruelty of the French rulers of Sicily drove the people of the island to despair, and a Neapolitan nobleman, Giovanni da Procida, organized the rebellion known as the Sicilian Vespers (see VESPERS, SICILIAN), in which the French in Sicily were all massacred or expelled (1282). Charles determined to subjugate the island and sailed with his fleet for Messina. The city held out until Peter III. of Aragon, whose wife Constance was a daughter of Manfred, arrived in Sicily, and a Sicilian-Catalan fleet under the Calabrese admiral, Ruggiero di Lauria, completely destroyed that of Charles. "If thou art determined, O God, to destroy me," the unhappy Angevin exclaimed, "let my fall be gradual!" He was forced to abandon all attempts at reconquest, but proposed to decide the question by single combat between himself and Peter, to take place at Bordeaux under English protection. The Aragonese accepted, but fearing treachery, as the French army was in the neighbourhood, he failed to appear on the appointed day. In the meanwhile Ruggiero di Lauria appeared before Naples and destroyed another Angevin fleet commanded by Charles's son, who was taken prisoner (May 1284). Charles came to Naples with a new fleet from Provence, and was preparing to invade Sicily again, when he contracted a fever and died at Foggia on the 7th of January 1285. He was undoubtedly an extremely able soldier and a skilful statesman, and much of his legislation shows a real political sense; but his inordinate ambition, his oppressive methods of government and taxation, and his cruelty created enemies on all sides, and led to the collapse of the edifice of dominion which he had raised.

CHARLES II. (1250–1309), king of Naples and Sicily, son of Charles I., had been captured by Ruggiero di Lauria in the naval battle at Naples in 1284, and when his father died he was still a prisoner in the hands of Peter of Aragon. In 1288 King Edward I. of England had mediated to make peace, and Charles was liberated on the understanding that he was to retain Naples alone, Sicily being left to the Aragonese; Charles was also to induce his cousin Charles of Valois to renounce for twenty thousand pounds of silver the kingdom of Aragon which had been given to him by Pope Martin IV. to punish Peter for having invaded Sicily, but which the Valois had never effectively occupied. The Angevin king was thereupon set free, leaving

three of his sons and sixty Provençal nobles as hostages, promising to pay 30,000 marks and to return a prisoner if the conditions were not fulfilled within three years. He went to Rieti, where the new pope Nicholas IV. immediately absolved him from all the conditions he had sworn to observe, crowned him king of the Two Sicilies (1289), and excommunicated Alphonso, while Charles of Valois, in alliance with Castile, prepared to take possession of Aragon. Alphonso III , the Aragonese king, being hard pressed, had to promise to withdraw the troops he had sent to help his brother James in Sicily, to renounce all rights over the island, and pay a tribute to the Holy See. But Alphonso died childless in 1291 before the treaty could be carried out, and James took possession of Aragon, leaving the government of Sicily to the third brother Frederick. The new pope Boniface VIII., elected in 1294 at Naples under the auspices of King Charles, mediated between the latter and James, and a most dishonourable treaty was signed : James was to marry Charles's daughter Bianca and was promised the investiture by the pope of Sardinia and Corsica, while he was to leave the Angevin a free hand in Sicily and even to assist him if the Sicilians resisted. An attempt was made to bribe Frederick into consenting to this arrangement, but being backed up by his people he refused, and was afterwards crowned king of Sicily. The war was fought with great fury on land and sea, but Charles, although aided by the pope, by Charles of Valois, and by James II. of Aragon, was unable to conquer the island, and his son the prince of Taranto was taken prisoner at the battle of La Falconara in 1299. Peace was at last made in 1302 at Caltabellotta, Charles II. giving up all rights to Sicily and agreeing to the marriage of his daughter Leonora to King Frederick; the treaty was ratified by the pope in 1303. Charles spent his last years quietly in Naples, which city he improved and embellished. He died in August 1309, and was succeeded by his son Robert.

Bibliography.—A. de Saint-Priest, *Histoire de la conquête de Naples par Charles d'Anjou* (4 vols., Paris, 1847–1849), is still of use for the documents from the archives of Barcelona, but it needs to be collated with more recent works; S. de Sismondi, in vol. ii. of his *Histoire des républiques italiennes* (Brussels, 1838), gives a good general sketch of the reigns of Charles I. and II., but is occasionally inaccurate as to details; the best authority on the early life of Charles I. is R. Sternfeld, *Karl von Anjou als Graf von Provence* (Berlin, 1888); Charles's connexion with north Italy is dealt with in Merkel's *La Dominazione di Carlo d'Angiò in Piemonte e in Lombardia* (Turin, 1891), while the R. Deputazione di Storia Patria Toscana has recently published a *Codice diplomatico delle relazioni di Carlo d'Angiò con la Toscana*; the contents of the Angevin archives at Naples have been published by Durrien, *Archives angevines de Naples* (Toulouse, 1866–1867). M. Amari's *La Guerra del Vespro Siciliano* (8th ed., Florence, 1876) is a valuable history, but the author is too bitterly prejudiced against the French to be quite impartial; his work should be compared with L. Cadier's *Essai sur l'administration du royaume de Sicile sous Charles I et Charles II d'Anjou* (Paris, 1891, *Bibl. des écoles françaises d'Athènes et de Rome*, fasc. 59), which contains many documents, and tends somewhat to rehabilitate the Angevin rule.

CHARLES II. (1332–1387), called The Bad, king of Navarre and count of Evreux, was a son of Jeanne II., queen of Navarre, by her marriage with Philip, count of Evreux (d. 1343). Having become king of Navarre on Jeanne's death in 1349, he suppressed a rising at Pampeluna with much cruelty, and by this and similar actions thoroughly earned his surname of "The Bad." In 1352 he married Jeanne (d. 1393), a daughter of John II., king of France, a union which made his relationship to the French crown still more complicated. Through his mother he was a grandson of Louis X. and through his father a great-grandson of Philip III., having thus a better claim to the throne of France than Edward III. of England; and, moreover, he held lands under the suzerainty of the French king, whose son-in-law he now became. Charles was a man of great ability, possessing popular manners and considerable eloquence, but he was singularly unscrupulous, a quality which was revealed during the years in which he played an important part in the internal affairs of France. Trouble soon arose between King John and his son-in-law. The promised dowry had not been paid, and the county of Angoulême, which had formerly belonged to Jeanne of Navarre, was now in the possession of the French king's favourite, the constable Charles la Cerda. In January 1354 the constable was assassinated by order of Charles, and preparations for war were begun. The king of Navarre, who defended this deed, had, however, many friends in France and was in communication with Edward III.; and consequently John was forced to make a treaty at Mantes and to compensate him for the loss of Angoulême by a large grant of lands, chiefly in Normandy. This peace did not last long, and in 1355 John was compelled to confirm the treaty of Mantes. Returning to Normandy, Charles was partly responsible for some unrest in the duchy, and in April 1356 he was treacherously seized by the French king at Rouen, remaining in captivity until November 1357, when John, after his defeat at Poitiers, was a prisoner in England. Charles was regarded with much favour in France, and the states-general demanded his release, which, however, was effected by a surprise. Owing to his popularity he was considered by Étienne Marcel and his party as a suitable rival to the dauphin, afterwards King Charles V., and on entering Paris he was well received and delivered an eloquent harangue to the Parisians. Subsequently peace was made with the dauphin, who promised to restore to Charles his confiscated estates. This peace was not enduring, and as his lands were not given back Charles had some ground for complaint. War again broke out, quickly followed by a new treaty, after which the king of Navarre took part in suppressing the peasant rising known as the *Jacquerie*. Answering the entreaties of Marcel he returned to Paris on June 1358, and became captain-general of the city, which was soon besieged by the dauphin. This position, however, did not prevent him from negotiating both with the dauphin and with the English; terms were soon arranged with the former, and Charles, having lost much of his popularity, left Paris just before the murder of Marcel in July 1358. He continued his alternate policy of war and peace, meanwhile adding if possible by his depredations to the misery of France, until the conclusion of the treaty of Brétigny in May 1360 deprived him of the alliance of the English, and compelled him to make peace with King John in the following October. A new cause of trouble arose when the duchy of Burgundy was left without a ruler in November 1361, and was claimed by Charles; but, lacking both allies and money, he was unable to prevent the French king from seizing Burgundy, while he himself returned to Navarre.

In his own kingdom Charles took some steps to reform the financial and judicial administration and so to increase his revenue; but he was soon occupied once more with foreign entanglements, and in July 1362, in alliance with Peter the Cruel, king of Castile, he invaded Aragon, deserting his new ally soon afterwards for Peter IV., king of Aragon. Meanwhile the war with the dauphin had been renewed. Still hankering after Burgundy, Charles saw his French estates again seized; but after some desultory warfare, chiefly in Normandy, peace was made in March 1365, and he returned to his work of interference in the politics of the Spanish kingdoms. In turn he made treaties with the kings of Castile and Aragon, who were at war with each other; promising to assist Peter the Cruel to regain his throne, from which he had been driven in 1366 by his half-brother Henry of Trastamara, and then assuring Henry and his ally Peter of Aragon that he would aid them to retain Castile. He continued this treacherous policy when Edward the Black Prince advanced to succour Peter the Cruel; then signed a treaty with Edward of England, and then in 1371 allied himself with Charles V. of France. His next important move was to offer his assistance to Richard II. of England for an attack upon France. About this time serious charges were brought against him. Accused of attempting to poison the king of France and other prominent persons, and of other crimes, his French estates were seized by order of Charles V., and soon afterwards Navarre was invaded by the Castilians. Won over by the surrender of Cherbourg in July 1378, the English under John of Gaunt, duke of Lancaster, came to his aid; but a heavy price had to be paid for the neutrality of the king of Castile. After the death of Charles V. in 1380, the king of Navarre did not interfere in the internal affairs of France, although he endeavoured vainly again to obtain aid from Richard II., and to regain Cherbourg. His lands in France were handed

over to his eldest son Charles, who governed them with the consent of the new king Charles VI. Charles died on the 1st of January 1387, and many stories are current regarding the manner of his death. Froissart relates that he was burned to death through his bedclothes catching fire; Secousse says that he died in peace with many signs of contrition; another story says he died of leprosy; and a popular legend tells how he expired by a divine judgment through the burning of the clothes steeped in sulphur and spirits in which he had been wrapped as a cure for a loathsome disease caused by his debauchery. He had three sons and four daughters, and was succeeded by his eldest son Charles; one of his daughters, Jeanne, became the wife of Henry IV. of England.

See Jean Froissart, *Chroniques*, edited by S. Luce and G. Raynaud (Paris, 1869–1897); D. F. Secousse, *Mémoires pour servir à l'histoire de Charles II, roi de Navarre* (Paris, 1755–1768); E. Meyer, *Charles II, roi de Navarre et la Normandie au XIVe siècle* (Paris, 1898); F. T. Perrens, *Étienne Marcel* (Paris, 1874); R. Delachenal, *Premières négociations de Charles le Mauvais avec les Anglais* (Paris, 1900); and E. Lavisse, *Histoire de France*, tome iv. (Paris, 1902).

CHARLES III. (1361–1425), called THE NOBLE, king of Navarre and count of Evreux, was the eldest son of Charles II. the Bad, king of Navarre, by his marriage with Jeanne, daughter of John II., king of France, and was married in 1375 to Leonora (d. 1415), daughter of Henry II., king of Castile. Having passed much of his early life in France, he became king of Navarre on the death of Charles II. in January 1387, and his reign was a period of peace and order, thus contrasting sharply with the long and calamitous reign of his father. In 1393 he regained Cherbourg, which had been handed over by Charles II. to Richard II. of England, and in 1403 he came to an arrangement with the representatives of Charles VI. of France concerning the extensive lands which he claimed in that country. Cherbourg was given to the French king; certain exchanges of land were made; and in the following year Charles III. surrendered the county of Evreux, and was created duke of Nemours and made a peer of France. After this his only interference in the internal affairs of France was when he sought to make peace between the rival factions in that country. Charles sought to improve the condition of Navarre by making canals and rendering the rivers navigable, and in other ways. He died at Olite on the 8th of September 1425 and was buried at Pampeluna. After the death of his two sons in 1402 the king decreed that his kingdom should pass to his daughter Blanche (d. 1441), who took for her second husband John, afterwards John II., king of Aragon; and the cortes of Navarre swore to recognize Charles (*q.v.*), prince of Viana, her son by this marriage, as king after his mother's death.

CHARLES (KARL EITEL ZEPHYRIN LUDWIG; in Rum. CAROL), king of Rumania (1839–), second son of Prince Karl Anton of Hohenzollern-Sigmaringen, was born on the 20th of April 1839. He was educated at Dresden (1850–1856), and passed through his university course at Bonn. Entering the Prussian army in 1857, he won considerable distinction in the Danish war of 1864, and received instruction in strategy from General von Moltke. He afterwards travelled in France, Italy, Spain and Algeria. He was a captain in the 2nd regiment of Prussian Dragoon Guards when he was elected *hospodar* or prince of Rumania on the 20th of April 1866, after the compulsory abdication of Prince Alexander John Cuza. Regarded at first with distrust by Turkey, Russia and Austria, he succeeded in gaining general recognition in six months; but he had to contend for ten years with fierce party struggles between the Conservatives and the Liberals.

During this period, however, Charles displayed great tact in his dealings with both parties, and kept his country in the path of administrative and economic reform, organizing the army, developing the railways, and establishing commercial relations with foreign powers. The sympathy of Rumania with France in the Franco-Prussian War of 1870, and the consequent interruption of certain commercial undertakings, led to a hostile movement against Prince Charles, which, being fostered by Russia, made him resolve to abdicate; and it was with difficulty that he was persuaded to remain. In the Russo-Turkish War of 1877–78 he joined the Russians before Plevna (*q.v.*), and being placed in command of the combined Russian and Rumanian forces, forced Osman Pasha to surrender. As a consequence of the prince's vigorous action the independence of Rumania, which had been proclaimed in May 1877, was confirmed by various treaties in 1878, and recognized by Great Britain, France and Germany in 1880. On the 26th of March 1881 he was proclaimed king of Rumania, and, with his consort, was crowned on the 22nd of May following. From that time he pursued a successful career in home and foreign policy, and greatly improved the financial and military position of his country; while his appreciation of the fine arts was shown by his formation of an important collection of paintings of all schools in his palaces at Sinaïa and Bucharest. For a detailed account of his reign, see RUMANIA. On the 1st of November 1869 he married Princess Elizabeth (*q.v.*), a daughter of Prince Hermann of Wied, widely known under her literary name of "Carmen Sylva." As the only child of the marriage, a daughter, died in 1874, the succession was finally settled upon the king's nephew, Prince Ferdinand of Hohenzollern-Sigmaringen, who was created prince of Rumania on the 18th of March 1889, and married, on the 10th of January 1893, Princess Marie, daughter of Alfred, duke of Saxe-Coburg, their children being Prince Carol (b. 1893) and Princess Elizabeth (b. 1894).

The official life of King Charles, mainly his own composition, *Aus dem Leben König Karls von Rumänien* (Stuttgart, 1894–1900, 4 vols.), deals mainly with political history. See for an account of his domestic life, M. Kremnitz, *König Karl von Rumänien. Ein Lebensbild* (Breslau, 1903).

CHARLES II. (1661–1700), king of Spain, known among Spanish kings as "The Desired" and "The Bewitched," was the son of Philip IV. by his second marriage with Maria, daughter of the emperor Ferdinand III., his niece. He was born on the 11th of November 1661, and was the only surviving son of his father's two marriages—a child of old age and disease, in whom the constant intermarriages of the Habsburgs had developed the family type to deformity. His birth was greeted with joy by the Spaniards, who feared the dispute as to the succession which must have ensued if Philip IV. left no male issue. The boy was so feeble that till the age of five or six he was fed only from the breast of a nurse. For years afterwards it was not thought safe to allow him to walk. That he might not be overtaxed he was left entirely uneducated, and his indolence was indulged to such an extent that he was not even expected to be clean. When his brother, the younger Don John of Austria, a natural son of Philip IV., obtained power by exiling the queen mother from court he insisted that at least the king's hair should be combed. Charles made the malicious remark that nothing was safe from Don John—not even vermin. The king was then fifteen, and, according to Spanish law, of age. But he never became a man in body or mind. The personages who ruled in his name arranged a marriage for him with Maria Louisa of Orleans. The French princess, a lively young woman of no sense, died in the stifling atmosphere of the Spanish court, and from the attendance of Spanish doctors. Again his advisers arranged a marriage with Maria Ana of Neuburg. The Bavarian wife stood the strain and survived him. Both marriages were merely political—the first a victory for the French, and the second for the Austrian party. France and Austria were alike preparing for the day when the Spanish succession would have to be fought for. The king was a mere puppet in the hands of each alternately. By natural instinct he hated the French, but there was no room in his nearly imbecile mind for more than childish superstition, insane pride of birth, and an interest in court etiquette. The only touch of manhood was a taste for shooting which he occasionally indulged in the preserves of the Escorial. In his later days he suffered much pain, and was driven wild by the conflict between his wish to transmit his inheritance to "the illustrious house of Austria," his own kin, and the belief instilled into him by the partisans of the French claimant that only the power of Louis IV. could avert the dismemberment of the empire. A silly fanatic made the discovery that the king was bewitched, and his confessor Froilan Diaz supported the

belief. The king was exorcised, and the exorcists of the kingdom were called upon to put stringent questions to the devils they cast out. The Inquisition interfered, and the dying king was driven mad among them. Very near his end he had the lugubrious curiosity to cause the coffins of his embalmed ancestors to be opened at the Escorial. The sight of the body of his first wife, at whom he also insisted on looking, provoked a passion of tears and despair. Under severe pressure from the cardinal archbishop of Toledo, Portocarrero, he finally made a will in favour of Philip, duke of Anjou, grandson of Louis XIV., and died on the 1st of November 1700, after a lifetime of senile decay.

The best picture of Charles II. is to be found in *Les Mémoires de la cour d'Espagne* of the Marquis de Villars (London, 1861), and the *Letters* of the Marquise de Villars (Paris, 1868).

CHARLES III. (1716–1788), king of Spain, born on the 20th January 1716, was the first son of the second marriage of Philip V. with Elizabeth Farnese of Parma. It was his good fortune to be sent to rule as duke of Parma by right of his mother at the age of sixteen, and thus came under more intelligent influence than he could have found in Spain. In 1734 he made himself master of Naples and Sicily by arms. Charles had, however, no military tastes, seldom wore uniform, and could with difficulty be persuaded to witness a review. The peremptory action of the British admiral commanding in the Mediterranean at the approach of the War of the Austrian Succession, who forced him to promise to observe neutrality under a threat to bombard Naples, made a deep impression on his mind. It gave him a feeling of hostility to England which in after-times influenced his policy.

As king of the Two Sicilies Charles began there the work of internal reform which he afterwards continued in Spain. Foreign ministers who dealt with him agreed that he had no great natural ability, but he was honestly desirous to do his duty as king, and he showed good judgment in his choice of ministers. The chief minister in Naples, Tanucci, had a considerable influence over him. On the death of his half-brother Ferdinand VI. he became king of Spain, and resigned the Two Sicilies to his third son Ferdinand. As king of Spain his foreign policy was disastrous. His strong family feeling and his detestation of England, which was unchecked after the death of his wife, Maria Amelia, daughter of Frederick Augustus II. of Saxony, led him into the Family Compact with France. Spain was entangled in the close of the Seven Years' War, to her great loss. In 1770 he almost ran into another war over the barren Falkland Islands. In 1779 he was, somewhat reluctantly, led to join France and the American insurgents against England, though he well knew that the independence of the English colonies must have a ruinous influence on his own American dominions. For his army he did practically nothing, and for his fleet very little except build fine ships without taking measures to train officers and men.

But his internal government was on the whole beneficial to the country. He began by compelling the people of Madrid to give up emptying their slops out of the windows, and when they objected he said they were like children who cried when their faces were washed. In 1766 his attempt to force the Madrileños to adopt the French dress led to a riot during which he did not display much personal courage. For a long time after it he remained at Aranjuez, leaving the government in the hands of his minister Aranda. All his reforms were not of this formal kind. Charles was a thorough despot of the benevolent order, and had been deeply offended by the real or suspected share of the Jesuits in the riot of 1766. He therefore consented to the expulsion of the order, and was then the main advocate for its suppression. His quarrel with the Jesuits, and the recollection of some disputes with the pope he had had when king of Naples, turned him towards a general policy of restriction of the overgrown power of the church. The number of the idle clergy, and more particularly of the monastic orders, was reduced, and the Inquisition, though not abolished, was rendered torpid. In the meantime much antiquated legislation which tended to restrict trade and industry was abolished; roads, canals and drainage works were carried out. Many of his paternal ventures led to little more than waste of money, or the creation of hotbeds of jobbery. Yet on the whole the country prospered. The result was largely due to the king, who even when he was ill-advised did at least work steadily at his task of government. His example was not without effect on some at least of the nobles. In his domestic life King Charles was regular, and was a considerate master, though he had a somewhat caustic tongue and took a rather cynical view of mankind. He was passionately fond of hunting. During his later years he had some trouble with his eldest son and his daughter-in-law. If Charles had lived to see the beginning of the French Revolution he would probably have been frightened into reaction. As he died on the 14th of December 1788 he left the reputation of a philanthropic and "philosophic" king. In spite of his hostility to the Jesuits, his dislike of friars in general, and his jealousy of the Inquisition, he was a very sincere Roman Catholic, and showed much zeal in endeavouring to persuade the pope to proclaim the Immaculate Conception as a dogma necessary to salvation.

See the *Reign of Charles III.*, by M. Danvila y Collado (6 vols.), in the *Historia General de España de la Real Academia de la Historia* (Madrid, 1892, &c.); and F. Rousseau, *Règne de Charles III d'Espagne* (Paris, 1907).

CHARLES IV. (1748–1819), king of Spain, second son of Charles III. and his wife Maria Amelia of Saxony, was born at Portici on the 11th of November 1748, while his father was king of the Two Sicilies. The elder brother was set aside as imbecile and epileptic. Charles had inherited a great frame and immense physical strength from the Saxon line of his mother. When young he was fond of wrestling with the strongest countrymen he could find. In character he was not malignant, but he was intellectually torpid, and of a credulity which almost passes belief. His wife, Maria Luisa of Parma, his first cousin, a thoroughly coarse and vicious woman, ruled him completely, though he was capable of obstinacy at times. During his father's lifetime he was led by her into court intrigues which aimed at driving the king's favourite minister, Floridablanca, from office, and replacing him by Aranda, the chief of the "Aragonese" party. After he succeeded to the throne in 1788 his one serious occupation was hunting. Affairs were left to be directed by his wife and her lover Godoy (*q.v.*). For Godoy the king had an unaffected liking, and the lifelong favour he showed him is almost pathetic. When terrified by the French Revolution he turned to the Inquisition to help him against the party which would have carried the reforming policy of Charles III. much further. But he was too slothful to have more than a passive part in the direction of his own government. He simply obeyed the impulse given him by the queen and Godoy. If he ever knew his wife's real character he thought it more consistent with his dignity to shut his eyes. For he had a profound belief in his divine right and the sanctity of his person. If he understood that his kingdom was treated as a mere dependence by France, he also thought it due to his "face" to make believe that he was a powerful monarch. Royalty never wore a more silly aspect than in the person of Charles IV., and it is highly credible that he never knew what his wife was, or what was the position of his kingdom. When he was told that his son Ferdinand was appealing to the emperor Napoleon against Godoy, he took the side of the favourite. When the populace rose at Aranjuez in 1808 he abdicated to save the minister. He took refuge in France, and when he and Ferdinand were both prisoners of Napoleon's, he was with difficulty restrained from assaulting his son. Then he abdicated in favour of Napoleon, handing over his people like a herd of cattle. He accepted a pension from the French emperor and spent the rest of his life between his wife and Godoy. He died at Rome on the 20th of January 1819, probably without having once suspected that he had done anything unbecoming a king by divine right and a gentleman.

See *Historia del Reinado de Carlos IV.*, by General Gomez de Arteche (3 vols.), in the *Historia General de España de la Real Academia de la Historia* (Madrid, 1892, &c.).

CHARLES IX. (1550–1611), king of Sweden, was the youngest son of Gustavus Vasa and Margareto Lejonhufrud. By his father's will he got, by way of appanage, the duchy of Södermanland, which included the provinces of Neriké and Vermland; but he did not come into actual possession of them till after the fall of Eric XIV. (1569). In 1568 he was the real leader of the rebellion against Eric, but took no part in the designs of his brother John against the unhappy king after his deposition. Indeed, Charles's relations with John III. were always more or less strained. He had no sympathy with John's high-church tendencies on the one hand, and he sturdily resisted all the king's endeavours to restrict his authority as duke of Södermanland (Sudermania) on the other. The nobility and the majority of the *Riksdag* supported John, however, in his endeavours to unify the realm, and Charles had consequently (1587) to resign his pretensions to autonomy within his duchy; but, fanatical Calvinist as he was, on the religious question he was immovable. The matter came to a crisis on the death of John III. (1592). The heir to the throne was John's eldest son, Sigismund, already king of Poland and a devoted Catholic. The fear lest Sigismund might re-catholicize the land alarmed the Protestant majority in Sweden, and Charles came forward as their champion, and also as the defender of the Vasa dynasty against foreign interference. It was due entirely to him that Sigismund was forced to confirm the resolutions of the council of Upsala, thereby recognizing the fact that Sweden was essentially a Protestant state (see SWEDEN: *History*). In the ensuing years Charles's task was extraordinarily difficult. He had steadily to oppose Sigismund's reactionary tendencies; he had also to curb the nobility, which he did with cruel rigour. Necessity compelled him to work rather with the people than the gentry; hence it was that the *Riksdag* assumed under his government a power and an importance which it had never possessed before. In 1595 the *Riksdag* of Söderköping elected Charles regent, and his attempt to force Klas Flemming, governor of Finland, to submit to his authority, rather than to that of the king, provoked a civil war. Technically Charles was, without doubt, guilty of high treason, and the considerable minority of all classes which adhered to Sigismund on his landing in Sweden in 1598 indisputably behaved like loyal subjects. But Sigismund was both an alien and a heretic to the majority of the Swedish nation, and his formal deposition by the *Riksdag* in 1599 was, in effect, a natural vindication and legitimation of Charles's position. Finally, the diet of Linköping (Feb. 24, 1600) declared that Sigismund and his posterity had forfeited the Swedish throne, and, passing over duke John, the second son of John III., a youth of ten, recognized duke Charles as their sovereign under the title of Charles IX.

Charles's short reign was an uninterrupted warfare. The hostility of Poland and the break up of Russia involved him in two overseas contests for the possession of Livonia and Ingria, while his pretensions to Lapland brought upon him a war with Denmark in the last year of his reign. In all these struggles he was more or less unsuccessful, owing partly to the fact that he had to do with superior generals (*e.g.* Chodkiewicz and Christian IV.) and partly to sheer ill-luck. Compared with his foreign policy, the domestic policy of Charles IX. was comparatively unimportant. It aimed at confirming and supplementing what had already been done during his regency. Not till the 6th of March 1604, after Duke John had formally renounced his rights to the throne, did Charles IX. begin to style himself king. The first deed in which the title appears is dated the 20th of March 1604; but he was not crowned till the 15th of March 1607. Four and a half years later Charles IX. died at Nyköping (Oct. 30, 1611). As a ruler he is the link between his great father and his still greater son. He consolidated the work of Gustavus Vasa, the creation of a great Protestant state: he prepared the way for the erection of the Protestant empire of Gustavus Adolphus. Swedish historians have been excusably indulgent to the father of their greatest ruler. Indisputably Charles was cruel, ungenerous and vindictive; yet he seems, at all hazards, strenuously to have endeavoured to do his duty during a period of political and religious transition, and, despite his violence and brutality, possessed many of the qualities of a wise and courageous statesman. By his first wife Marie, daughter of the elector palatine Louis VI., he had six children, of whom only one daughter, Catherine, survived; by his second wife, Christina, daughter of Adolphus, duke of Holstein-Gottorp, he had five children, including Gustavus Adolphus and Charles Philip, duke of Finland.

See *Sveriges Historia*, vol. iii. (Stockholm, 1878); Robert Nisbet Bain, *Scandinavia* (Cambridge, 1905), caps. 5-7. (R. N. B.)

CHARLES X. [CHARLES GUSTAVUS] (1622–1660), king of Sweden, son of John Casimir, count palatine of Zweibrücken, and Catherine, sister of Gustavus Adolphus, was born at Nyköping Castle on the 8th of November 1622. He learnt the art of war under the great Lennart Torstensson, being present at the second battle of Breitenfeld and at Jankowitz. From 1646 to 1648 he frequented the Swedish court. It was supposed that he would marry the queen regnant, Christina, but her unsurmountable objection to wedlock put an end to these anticipations, and to compensate her cousin for a broken half-promise she declared him (1649) her successor, despite the opposition of the senate headed by the venerable Axel Oxenstjerna. In 1648 he was appointed generalissimo of the Swedish forces in Germany. The conclusion of the treaties of Westphalia prevented him from winning the military laurels he so ardently desired, but as the Swedish plenipotentiary at the executive congress of Nuremberg, he had unrivalled opportunities of learning diplomacy, in which science he speedily became a past-master. As the recognized heir to the throne, his position on his return to Sweden was not without danger, for the growing discontent with the queen turned the eyes of thousands to him as a possible deliverer. He therefore withdrew to the isle of Öland till the abdication of Christina (June 5, 1654) called him to the throne.

The beginning of his reign was devoted to the healing of domestic discords, and the rallying of all the forces of the nation round his standard for a new policy of conquest. He contracted a political marriage (Oct. 24, 1654) with Hedwig Leonora, the daughter of Frederick III., duke of Holstein-Gottorp, by way of securing a future ally against Denmark. The two great pressing national questions, war and the restitution of the alienated crown lands, were duly considered at the *Riksdag* which assembled at Stockholm in March 1655. The war question was decided in three days by a secret committee presided over by the king, who easily persuaded the delegates that a war with Poland was necessary and might prove very advantageous; but the consideration of the question of the subsidies due to the crown for military purposes was postponed to the following *Riksdag* (see SWEDEN: *History*). On the 10th of July Charles quitted Sweden to engage in his Polish adventure. By the time war was declared he had at his disposal 50,000 men and 50 warships. Hostilities had already begun with the occupation of Dünaburg (Dvinsk) in Polish Livonia by the Swedes (July 1, 1655), and the Polish army encamped among the marshes of the Netze concluded a convention (July 25) whereby the palatinates of Posen and Kalisz placed themselves under the protection of the Swedish king. Thereupon the Swedes entered Warsaw without opposition and occupied the whole of Great Poland. The Polish king, John Casimir, fled to Silesia. Meanwhile Charles pressed on towards Cracow, which was captured after a two months' siege. The fall of Cracow extinguished the last hope of the boldest Pole; but before the end of the year an extraordinary reaction began in Poland itself. On the 18th of October the Swedes invested the fortress-monastery of Czenstochowa, but the place was heroically defended; and after a seventy days' siege the besiegers were compelled to retire with great loss.

This astounding success elicited an outburst of popular enthusiasm which gave the war a national and religious character. The tactlessness of Charles, the rapacity of his generals, the barbarity of his mercenaries, his refusal to legalize his position by summoning the Polish diet, his negotiations for the partition of the very state he affected to befriend, awoke the long slumbering public spirit of the country. In the beginning of 1656 John Casimir returned from exile and the Polish army was reorganized

and increased. By this time Charles had discovered that it was easier to defeat the Poles than to conquer Poland. His chief object, the conquest of Prussia, was still unaccomplished, and a new foe arose in the elector of Brandenburg, alarmed by the ambition of the Swedish king. Charles forced the elector, indeed, at the point of the sword to become his ally and vassal (treaty of Königsberg, Jan. 17, 1656); but the Polish national rising now imperatively demanded his presence in the south. For weeks he scoured the interminable snow-covered plains of Poland in pursuit of the Polish guerillas, penetrating as far south as Jaroslau in Galicia, by which time he had lost two-thirds of his 15,000 men with no apparent result. His retreat from Jaroslau to Warsaw, with the fragments of his host, amidst three converging armies, in a marshy forest region, intersected in every direction by well-guarded rivers, was one of his most brilliant achievements. But his necessities were overwhelming. On the 21st of June Warsaw was retaken by the Poles, and four days later Charles was obliged to purchase the assistance of Frederick William by the treaty of Marienburg. On July 18-20 the combined Swedes and Brandenburgers, 18,000 strong, after a three days' battle, defeated John Casimir's army of 100,000 at Warsaw and reoccupied the Polish capital; but this brilliant feat of arms was altogether useless, and when the suspicious attitude of Frederick William compelled the Swedish king at last to open negotiations with the Poles, they refused the terms offered, the war was resumed, and Charles concluded an offensive and defensive alliance with the elector of Brandenburg (treaty of Labiau, Nov. 20) whereby it was agreed that Frederick William and his heirs should henceforth possess the full sovereignty of East Prussia.

This was an essential modification of Charles's Baltic policy; but the alliance of the elector had now become indispensable on almost any terms. So serious, indeed, were the difficulties of Charles X. in Poland that it was with extreme satisfaction that he received the tidings of the Danish declaration of war (June 1, 1657). The hostile action of Denmark enabled him honourably to emerge from the inglorious Polish imbroglio, and he was certain of the zealous support of his own people. He had learnt from Torstensson that Denmark was most vulnerable if attacked from the south, and, imitating the strategy of his master, he fell upon her with a velocity which paralysed resistance. At the end of June 1657, at the head of 8000 seasoned veterans, he broke up from Bromberg in Prussia and reached the borders of Holstein on the 18th of July. The Danish army at once dispersed and the duchy of Bremen was recovered by the Swedes, who in the early autumn swarmed over Jutland and firmly established themselves in the duchies. But the fortress of Fredriksodde (Fredericia) held Charles's little army at bay from mid-August to mid-October, while the fleet of Denmark, after a stubborn two days' battle, compelled the Swedish fleet to abandon its projected attack on the Danish islands. The position of the Swedish king had now become critical. In July an offensive and defensive alliance was concluded between Denmark and Poland. Still more ominously, the elector of Brandenburg, perceiving Sweden to be in difficulties, joined the league against her and compelled Charles to accept the proffered mediation of Cromwell and Mazarin. The negotiations foundered, however, upon the refusal of Sweden to refer the points in dispute to a general peace-congress, and Charles was still further encouraged by the capture of Fredriksodde (Oct. 23-24), whereupon he began to make preparations for conveying his troops over to Fünen in transport vessels. But soon another and cheaper expedient presented itself. In the middle of December 1657 began the great frost which was to be so fatal to Denmark. In a few weeks the cold had grown so intense that even the freezing of an arm of the sea with so rapid a current as the Little Belt became a conceivable possibility; and henceforth meteorological observations formed an essential part of the strategy of the Swedes. On the 28th of January 1658, Charles X. arrived at Hadersley (Hadersleben) in South Jutland, when it was estimated that in a couple of days the ice of the Little Belt would be firm enough to bear even the passage of a mail-clad host. The cold during the night of the 29th of January was most severe; and early in the morning of the 30th the Swedish king gave the order to start, the horsemen dismounting where the ice was weakest, and cautiously leading their horses as far apart as possible, when they swung into their saddles again, closed their ranks and made a dash for the shore. The Danish troops lining the opposite coast were quickly overpowered, and the whole of Fünen was won with the loss of only two companies of cavalry, which disappeared under the ice while fighting with the Danish left wing. Pursuing his irresistible march, Charles X., with his eyes fixed steadily on Copenhagen, resolved to cross the frozen Great Belt also. After some hesitation, he accepted the advice of his chief engineer officer Eric Dahlberg, who acted as pioneer throughout and chose the more circuitous route from Svendborg, by the islands of Langeland, Laaland and Falster, in preference to the direct route from Nyborg to Korsör, which would have been across a broad, almost uninterrupted expanse of ice. Yet this second adventure was not embarked upon without much anxious consideration. A council of war, which met at two o'clock in the morning to consider the practicability of Dahlberg's proposal, at once dismissed it as criminally hazardous. Even the king wavered for an instant; but, Dahlberg persisting in his opinion, Charles overruled the objections of the commanders. On the night of the 5th of February the transit began, the cavalry leading the way through the snow-covered ice, which quickly thawed beneath the horses' hoofs so that the infantry which followed after had to wade through half an ell of sludge, fearing every moment lest the rotting ice should break beneath their feet. At three o'clock in the afternoon, Dahlberg leading the way, the army reached Grimsted in Laaland without losing a man. On the 8th of February Charles reached Falster. On the 11th he stood safely on the soil of Sjaelland (Zealand). Not without reason did the medal struck to commemorate "the glorious transit of the Baltic Sea" bear the haughty inscription: *Natura hoc debuit uni.* An exploit unique in history had been achieved.

The crushing effect of this unheard-of achievement on the Danish government found expression in the treaties of Taastrup (Feb. 18) and Roskilde (Feb. 26, 1658), whereby Denmark sacrificed nearly half her territory to save the rest (see DENMARK: *History*). But even this was not enough for the conqueror. Military ambition and greed of conquest moved Charles X. to what, divested of all its pomp and circumstance, was an outrageous act of political brigandage. At a council held at Gottorp (July 7), Charles X. resolved to wipe from the map of Europe an inconvenient rival, and without any warning, in defiance of all international equity, let loose his veterans upon Denmark a second time. For the details of this second struggle, with the concomitant diplomatic intervention of the western powers, see DENMARK: *History*, and SWEDEN: *History*. Only after great hesitation would Charles X. consent to reopen negotiations with Denmark direct, at the same time proposing to exercise pressure upon the enemy by a simultaneous winter campaign in Norway. Such an enterprise necessitated fresh subsidies from his already impoverished people, and obliged him in December 1659 to cross over to Sweden to meet the estates, whom he had summoned to Gothenburg. The lower estates murmured at the imposition of fresh burdens; and Charles had need of all his adroitness to persuade them that his demands were reasonable and necessary. At the very beginning of the *Riksdag*, in January 1660, it was noticed that the king was ill; but he spared himself as little in the council-chamber as in the battle-field, till death suddenly overtook him on the night of the 13th of February 1660, in his thirty-eighth year. The abrupt cessation of such an inexhaustible fount of enterprise and energy was a distinct loss to Sweden; and signs are not wanting that, in his latter years, Charles had begun to feel the need and value of repose. Had he lived long enough to overcome his martial ardour, and develop and organize the empire he helped to create, Sweden might perhaps have remained a great power to this day. Even so she owes her natural frontiers in the Scandinavian peninsula to Charles X.

See Martin Veibull, *Sveriges Storhedstid* (Stockholm, 1881); Frederick Ferdinand Carlson, *Sveriges Historia under Konungarne af Pfalziska Huset* (Stockholm, 1883–1885); E. Haumant, *La Guerre du nord et la paix d'Oliva* (Paris, 1893); Robert Nisbet Bain, *Scandinavia* (Cambridge, 1905); G. Jones, *The Diplomatic Relations between Cromwell and Charles X.* (Lincoln, Nebraska, 1897). (R.N.B.)

CHARLES XI. (1655–1697), king of Sweden, the only son of Charles X., and Hedwig Leonora of Holstein-Gottorp, was born in the palace at Stockholm, on the 24th of November 1655. His father, who died when the child was in his fourth year, left the care of his education to the regents whom he had appointed. So shamefully did they neglect their duty that when, at the age of seventeen, Charles XI. attained his majority, he was ignorant of the very rudiments of state-craft and almost illiterate. Yet those nearest to him had great hopes of him. He was known to be truthful, upright and God-fearing; if he had neglected his studies it was to devote himself to manly sports and exercises; and in the pursuit of his favourite pastime, bear-hunting, he had already given proofs of the most splendid courage. It was the general disaster produced by the speculative policy of his former guardians which first called forth his sterling qualities and hardened him into a premature manhood. With indefatigable energy he at once attempted to grapple with the difficulties of the situation, waging an almost desperate struggle with sloth, corruption and incompetence. Amidst universal anarchy, the young king, barely twenty years of age, inexperienced, ill-served, snatching at every expedient, worked day and night in his newly-formed camp in Scania (Skåne) to arm the nation for its mortal struggle. The victory of Fyllebro (Aug. 17, 1676), when Charles and his commander-in-chief S. G. Helmfeld routed a Danish division, was the first gleam of good luck, and on the 4th of December, on the tableland of Helgonabäck, near Lund, the young Swedish monarch defeated Christian V. of Denmark, who also commanded his army in person. After a ferocious contest, the Danes were practically annihilated. The battle of Lund was, relatively to the number engaged, one of the bloodiest engagements of modern times. More than half the combatants (8357, of whom 3000 were Swedes) actually perished on the battle-field. All the Swedish commanders showed remarkable ability, but the chief glory of the day indisputably belongs to Charles XI. This great victory restored to the Swedes their self-confidence and prestige. In the following year, Charles with 9000 men routed 12,000 Danes near Malmö (July 15, 1678). This proved to be the last pitched battle of the war, the Danes never again venturing to attack their once more invincible enemy in the open field. In 1679 Louis XIV. dictated the terms of a general pacification, and Charles XI., who bitterly resented "the insufferable tutelage" of the French king, was forced at last to acquiesce in a peace which at least left his empire practically intact. Charles devoted the rest of his life to the gigantic task of rehabilitating Sweden by means of a *reduktion*, or recovery of alienated crown lands, a process which involved the examination of every title deed in the kingdom, and resulted in the complete readjustment of the finances. But vast as it was, the *reduktion* represents only a tithe of Charles XI.'s immense activity. The constructive part of his administration was equally thorough-going, and entirely beneficial. Here, too, everything was due to his personal initiative. Finance, commerce, the national armaments by sea and land, judicial procedure, church government, education, even art and science—everything, in short—emerged recast from his shaping hand. Charles XI. died on the 5th of April 1697, in his forty-first year. By his beloved consort Ulrica Leonora of Denmark, from the shock of whose death in July 1693 he never recovered, he had seven children, of whom only three survived him, a son Charles, and two daughters, Hedwig Sophia, duchess of Holstein, and Ulrica Leonora, who ultimately succeeded her brother on the Swedish throne. After Gustavus Vasa and Gustavus Adolphus Charles XI. was, perhaps, the greatest of all the kings of Sweden. His modest, homespun figure has indeed been unduly eclipsed by the brilliant and colossal shapes of his heroic father and his meteoric son; yet in reality Charles XI. is far worthier of admiration than either Charles X. or Charles XII. He was in an eminent degree a great master-builder. He found Sweden in ruins, and devoted his whole life to laying the solid foundations of a new order of things which, in its essential features, has endured to the present day.

See Martin Veibull, *Sveriges Storhedstid* (Stockholm, 1881); Frederick Ferdinand Carlson, *Sveriges Historia under Konungarne af Pfalziska Huset* (Stockholm, 1883–1885); Robert Nisbet Bain, *Scandinavia* (Cambridge, 1905); O. Sjögren, *Karl den Elfte och Svenska Folket* (Stockholm, 1897); S. Jacobsen, *Den nordiske Kriegs Krönicke*, 1675–1679 (Copenhagen, 1897); J. A. de Mesmes d'Avaux, *Négociations du comte d'Avaux*, 1693, 1697, 1698 (Utrecht, 1882, &c.). (R. N. B.)

CHARLES XII. (1682–1718), king of Sweden, the only surviving son of Charles XI. and Ulrica Leonora, daughter of Frederick III. of Denmark, was born on the 17th of June 1682. He was carefully educated by excellent tutors under the watchful eyes of his parents. His natural parts were excellent; and a strong bias in the direction of abstract thought, and mathematics in particular, was noticeable at an early date. His memory was astonishing. He could translate Latin into Swedish or German, or Swedish or German into Latin at sight. Charles XI. personally supervised his son's physical training. He was taught to ride before he was four, at eight was quite at home in his saddle, and when only eleven, brought down his first bear at a single shot. As he grew older his father took him on all his rounds, reviewing troops, inspecting studs, foundries, dockyards and granaries. Thus the lad was gradually initiated into all the *minutiae* of administration. The influence of Charles XI. over his son was, indeed, far greater than is commonly supposed, and it accounts for much in Charles XII.'s character which is otherwise inexplicable, for instance his precocious reserve and taciturnity, his dislike of everything French, and his inordinate contempt for purely diplomatic methods. On the whole, his early training was admirable; but the young prince was not allowed the opportunity of gradually gaining experience under his guardians. At the *Riksdag* assembled at Stockholm in 1697, the estates, jealous of the influence of the regents, offered full sovereignty to the young monarch, the senate acquiesced, and, after some hesitation, Charles at last declared that he could not resist the urgent appeal of his subjects and would take over the government of the realm "in God's name." The subsequent coronation was marked by portentous novelties, the most significant of which was the king's omission to take the usual coronation oath, which omission was interpreted to mean that he considered himself under no obligation to his subjects. The general opinion of the young king was, however, still favourable. His conduct was evidently regulated by strict principle and not by mere caprice. His refusal to countenance torture as an instrument of judicial investigation, on the ground that "confessions so extorted give no sure criteria for forming a judgment," showed him to be more humane as well as more enlightened than the majority of his council, which had defended the contrary opinion. His intense application to affairs is noted by the English minister, John Robinson (1650–1723), who informed his court that there was every prospect of a happy reign in Sweden, provided his majesty were well served and did not injure his health by too much work.

The coalition formed against Sweden by Johann Reinhold Patkul, which resulted in the outbreak of the Great Northern War (1699), abruptly put an end to Charles XII.'s political apprenticeship, and forced into his hand the sword he was never again to relinquish. The young king resolved to attack the nearest of his three enemies—Denmark—first. The timidity of the Danish admiral Ulrik C. Gyldenlöve, and the daring of Charles, who forced his nervous and protesting admiral to attempt the passage of the eastern channel of the Sound, the dangerous *flinterend*, hitherto reputed to be unnavigable, enabled the Swedish king to effect a landing at Humleback in Sjaelland (Zealand), a few miles north of Copenhagen (Aug. 4, 1700). He now hoped to accomplish what his grandfather, fifty years before, had vainly attempted—the destruction of the Danish-Norwegian monarchy by capturing its capital. But for once prudential considerations prevailed, and the short and bloodless war was terminated by the peace of Travendal (Aug. 18), whereby

Frederick IV. conceded full sovereignty to Charles's ally and kinsman the duke of Gottorp, besides paying him an indemnity of 200,000 rix-dollars and solemnly engaging to commit no hostilities against Sweden in future. From Sjaelland Charles now hastened to Livonia with 8000 men. On the 6th of October he had reached Pernau, with the intention of first relieving Riga, but, hearing that Narva was in great straits, he decided to turn northwards against the tsar. He set out for Narva on the 13th of November, against the advice of all his generals, who feared the effect on untried troops of a week's march through a wasted land, along boggy roads guarded by no fewer than three formidable passes which a little engineering skill could easily have made impregnable. Fortunately, the two first passes were unoccupied; and the third, Pyhäjoggi, was captured by Charles, who with 400 horsemen put 6000 Russian cavalry to flight. On the 19th of November the little army reached Lagena, a village about 9 m. from Narva, whence it signalled its approach to the beleaguered fortress, and early on the following morning it advanced in battle array. The attack on the Russian fortified camp began at two o'clock in the afternoon, in the midst of a violent snowstorm; and by nightfall the whole position was in the hands of the Swedes: the Russian army was annihilated. The triumph was as cheap as it was crushing; it cost Charles less than 2000 men.

After Narva, Charles XII. stood at the parting of ways. His best advisers urged him to turn all his forces against the panic-stricken Muscovites; to go into winter-quarters amongst them and live at their expense; to fan into a flame the smouldering discontent caused by the reforms of Peter the Great, and so disable Russia for some time to come. But Charles's determination promptly to punish the treachery of Augustus prevailed over every other consideration. It is easy from the vantage-point of two centuries to criticize Charles XII. for neglecting the Russians to pursue the Saxons; but at the beginning of the 18th century his decision was natural enough. The real question was, which of the two foes was the more dangerous, and Charles had many reasons to think the civilized and martial Saxons far more formidable than the imbecile Muscovites. Charles also rightly felt that he could never trust the treacherous Augustus to remain quiet, even if he made peace with him. To leave such a foe in his rear, while he plunged into the heart of Russia would have been hazardous indeed. From this point of view Charles's whole Polish policy, which has been blamed so long and so loudly—the policy of placing a nominee of his own on the Polish throne—takes quite another complexion: it was a policy not of overvaulting ambition, but of prudential self-defence.

First, however, Charles cleared Livonia of the invader (July 1701), subsequently occupying the duchy of Courland and converting it into a Swedish g[o]vernor-generalship. In January 1702 Charles established himself at Bielowice in Lithuania, and, after issuing a proclamation declaring that "the elector of Saxony" had forfeited the Polish crown, set out for Warsaw, which he reached on the 14th of May. The cardinal-primate was then sent for and commanded to summon a diet, for the purpose of deposing Augustus. A fortnight later Charles quitted Warsaw, to seek the elector; on the 2nd of July routed the combined Poles and Saxons at Klissow; and three weeks later, captured the fortress of Cracow by an act of almost fabulous audacity. Thus, within four months of the opening of the campaign, the Polish capital and the coronation city were both in the possession of the Swedes. After Klissow, Augustus made every effort to put an end to the war, but Charles would not even consider his offers. By this time, too, he had conceived a passion for the perils and adventures of warfare. His character was hardening, and he deliberately adopted the most barbarous expedients for converting the Augustan Poles to his views. Such commands as "ravage, singe, and burn all about, and reduce the whole district to a wilderness!" "sweat contributions well out of them!" "rather let the innocent suffer than the guilty escape!" became painfully frequent in the mouth of the young commander, not yet 21, who was far from being naturally cruel.

The campaign of 1703 was remarkable for Charles's victory at Pultusk (April 21) and the long siege of Thorn, which occupied him eight months but cost him only 50 men. On the 2nd of July 1704, with the assistance of a bribing fund, Charles's ambassador at Warsaw, Count Arvid Bernard Horn, succeeded in forcing through the election of Charles's candidate to the Polish throne, Stanislaus Leszczynski, who could not be crowned however till the 24th of September 1705, by which time the Saxons had again been defeated at Punitz. From the autumn of 1705 to the spring of 1706, Charles was occupied in pursuing the Russian auxiliary army under Ogilvie through the forests of Lithuania. On the 5th of August, he recrossed the Vistula and established himself in Saxony, where his presence in the heart of Europe at the very crisis of the war of the Spanish Succession, fluttered all the western diplomats. The allies, in particular, at once suspected that Louis XIV. had bought the Swedes. Marlborough was forthwith sent from the Hague to the castle of Altranstädt near Leipzig, where Charles had fixed his headquarters, "to endeavour to penetrate the designs" of the king of Sweden. He soon convinced himself that western Europe had nothing to fear from Charles, and that no bribes were necessary to turn the Swedish arms from Germany to Russia. Five months later (Sept. 1707) Augustus was forced to sign the peace of Altranstädt, whereby he resigned the Polish throne and renounced every anti-Swedish alliance. Charles's departure from Saxony was delayed for twelve months by a quarrel with the emperor. The court of Vienna had treated the Silesian Protestants with tyrannical severity, in direct contravention of the treaty of Osnabrück, of which Sweden was one of the guarantors; and Charles demanded summary and complete restitution so dictatorially that the emperor prepared for war. But the allies interfered in Charles's favour, lest he might be tempted to aid France, and induced the emperor to satisfy all the Swedish king's demands, the maritime Powers at the same time agreeing to guarantee the provisions of the peace of Altranstädt.

Nothing now prevented Charles from turning his victorious arms against the tsar; and on the 13th of August 1707, he evacuated Saxony at the head of the largest host he ever commanded, consisting of 24,000 horse and 20,000 foot. Delayed during the autumn months in Poland by the tardy arrival of reinforcements from Pomerania, it was not till November 1707 that Charles was able to take the field. On New Year's Day 1708 he crossed the Vistula, though the ice was in a dangerous condition. On the 4th of July 1708 he cut in two the line of the Russian army, 6 m. long, which barred his progress on the Wabis, near Holowczyn, and compelled it to retreat. The victory of Holowczyn, memorable besides as the last pitched battle won by Charles XII., opened up the way to the Dnieper. The Swedish army now began to suffer severely, bread and fodder running short, and the soldiers subsisting entirely on captured bullocks. The Russians slowly retired before the invader, burning and destroying everything in his path. On the 20th of December it was plain to Charles himself that Moscow was inaccessible. But the idea of a retreat was intolerable to him, so he determined to march southwards instead of northwards as suggested by his generals, and join his forces with those of the hetman of the Dnieperian Cossacks, Ivan Mazepa, who had 100,000 horsemen and a fresh and fruitful land at his disposal. Short of falling back upon Livonia, it was the best plan adoptable in the circumstances, but it was rendered abortive by Peter's destruction of Mazepa's capital Baturin, so that when Mazepa joined Charles at Horki, on the 8th of November 1708, it was as a ruined man with little more than 1300 personal attendants (see MAZEPA-KOLEDINSKY). A still more serious blow was the destruction of the relief army which Levenhaupt was bringing to Charles from Livonia, and which, hampered by hundreds of loaded wagons, was overtaken and almost destroyed by Peter at Lyesna after a two days' battle against fourfold odds (October). The very elements now began to fight against the perishing but still unconquered host. The winter of 1708 was the severest that Europe had known for a century. By the 1st of November

firewood would not ignite in the open air, and the soldiers warmed themselves over big bonfires of straw. By the time the army reached the little Ukrainian fortress of Hadjacz in January 1709, wine and spirits froze into solid masses of ice; birds on the wing fell dead; saliva congealed on its passage from the mouth to the ground. "Nevertheless," says an eye-witness, "though earth, sea and sky were against us, the king's orders had to be obeyed and the daily march made."

Never had Charles XII. seemed so superhuman as during these awful days. It is not too much to say that his imperturbable equanimity, his serene *bonhomie* kept the host together. The frost broke at the end of February 1709, and then the spring floods put an end to all active operations till May, when Charles began the siege of the fortress of Poltava, which he wished to make a base for subsequent operations while awaiting reinforcements from Sweden and Poland. On the 7th of June a bullet wound put Charles *hors de combat*, whereupon Peter threw the greater part of his forces over the river Vorskla, which separated the two armies (June 19–25). On the 26th of June Charles held a council of war, at which it was resolved to attack the Russians in their entrenchments on the following day. The Swedes joyfully accepted the chances of battle and, advancing with irresistible *élan*, were, at first, successful on both wings. Then one or two tactical blunders were committed; and the tsar, taking courage, enveloped the little band in a vast semicircle bristling with the most modern guns, which fired five times to the Swedes' once, and swept away the guards before they could draw their swords. The Swedish infantry was well nigh annihilated, while the 14,000 cavalry, exhausted and demoralized, surrendered two days later at Perevolochna on Dnieper. Charles himself with 1500 horsemen took refuge in Turkish territory.

For the first time in his life Charles was now obliged to have recourse to diplomacy; and his pen proved almost as formidable as his sword. He procured the dismissal of four Russo-phil grand-viziers in succession, and between 1710 and 1712 induced the Porte to declare war against the tsar three times. But after November 1712 the Porte had no more money to spare; and, the tsar making a show of submission, the sultan began to regard Charles as a troublesome guest. On the 1st of February 1713 he was attacked by the Turks in his camp at Bender, and made prisoner after a contest which reads more like an extravagant episode from some heroic folk-tale than an incident of sober 18th-century history. Charles lingered on in Turkey fifteen months longer, in the hope of obtaining a cavalry escort sufficiently strong to enable him to restore his credit in Poland. Disappointed of this last hope, and moved by the despairing appeals of his sister Ulrica and the senate to return to Sweden while there was still a Sweden to return to, he quitted Demotika on the 20th of September 1714, and attended by a single squire arrived unexpectedly at midnight, on the 11th of November, at Stralsund, which, excepting Wismar, was now all that remained to him on German soil.

For the diplomatic events of these critical years see SWEDEN: *History*. Here it need only be said that Sweden, during the course of the Great Northern War, had innumerable opportunities of obtaining an honourable and even advantageous peace, but they all foundered on the dogged refusal of Charles to consent to the smallest concession to his despoilers. Even now he would listen to no offers of compromise, and after defending Stralsund with desperate courage till it was a mere rubbish heap, returned to Sweden after an absence of 14 years. Here he collected another army of 20,000 men, with which he so strongly entrenched himself on the Scanian coast in 1716 that his combined enemies shrank from attacking him, whereupon he assumed the offensive by attacking Norway in 1717, and again in 1718, in order to conquer sufficient territory to enable him to extort better terms from his enemies. It was during this second adventure that he met his death. On the 11th of December, when the Swedish approaches had come within 280 paces of the fortress of Fredriksten, which the Swedes were closely besieging, Charles looked over the parapet of the foremost trench, and was shot through the head by a bullet from the fortress.

See Charles XII., *Die eigenhändigen Briefe König Karls XII.* (Berlin, 1894); Friedrich Ferdinand Carlson, *Sveriges Historia under Konungarne af Pfalziska Huset* (Stockholm, 1883–1885); Robert Nisbet Bain, *Charles XII. and the Collapse of the Swedish Empire* (London and Oxford, 1895); *Bidrag til den Store Nordiske Krigs Historie* (Copenhagen, 1899–1900); G. Syveton, *Louis XIV et Charles XII* (Paris, 1900); Daniel Krmann, *Historia ablegationis D. Krmann ad regem Sueciae Carolum XII.* (Budapest, 1894); Oscar II., *Några bidrag till Sveriges Krigshistoria åren 1711–1713* (Stockholm, 1892); Martin Weibull, *Sveriges Storhedstid* (Stockholm, 1881). (R. N. B.)

CHARLES XIII. (1748–1818), king of Sweden and Norway, the second son of Adolphus Frederick, king of Sweden, and Louisa Ulrica, sister of Frederick the Great, was born at Stockholm on the 7th of October 1748. In 1772 he co-operated in the revolutionary plans of his brother Gustavus III. (*q.v.*). On the outbreak of the Russo-Swedish War of 1788 he served with distinction as admiral of the fleet, especially at the battles of Hogland (June 17, 1788) and Öland (July 26, 1789). On the latter occasion he would have won a signal victory but for the unaccountable remissness of his second-in-command, Admiral Liljehorn. On the death of Gustavus III., Charles, now duke of Sudermania, acted as regent of Sweden till 1796; but the real ruler of the country was the narrow-minded and vindictive Gustaf Adolf Reuterholm (*q.v.*), whose mischievous influence over him was supreme. These four years were perhaps the most miserable and degrading in Swedish history (an age of lead succeeding an age of gold, as it has well been called) and may be briefly described as alternations of fantastic jacobinism and ruthless despotism. On the accession of Gustavus IV. (November 1796), the duke became a mere cipher in politics till the 13th of March 1809, when those who had dethroned Gustavus IV. appointed him regent, and finally elected him king. But by this time he was prematurely decrepit, and Bernadotte (see CHARLES XIV.) took over the government as soon as he landed in Sweden (1810). By the union of 1814 Charles became the first king of Sweden and Norway. He married his cousin Hedwig Elizabeth Charlotte of Holstein-Gottorp (1759–1818), but their only child, Carl Adolf, duke of Vermland, died in infancy (1798). Charles XIII., who for eight years had been king only in title, died on the 5th of February 1818.

See *Sveriges Historia* vol. v. (Stockholm, 1884); *Drottning Hedwig Charlottes Dagbokshandteckningar* (Stockholm, 1898); Robert Nisbet Bain, *Gustavus III. and his Contemporaries* (London, 1895); *ib. Scandinavia* (Cambridge, 1905). (R. N. B.)

CHARLES XIV. (1763–1844), king of Sweden and Norway, born at Pau on the 26th of January 1763, was the son of Henri Bernadotte (1711–1780), procurator at Pau, and Jeanne St Jean (1725–1809). The family name was originally Deu Pouey, but was changed into Bernadotte in the beginning of the 17th century. Bernadotte's christian names were Jean Baptiste; he added the name Jules subsequently. He entered the French army on the 3rd of September 1780, and first saw service in Corsica. On the outbreak of the Revolution his eminent military qualities brought him speedy promotion. In 1794 we find him as brigadier attached to the army of the Sambre et Meuse, and after Jourdan's victory at Fleurus he was appointed a general of division. At the battle of Theiningen, 1796, he contributed, more than any one else, to the successful retreat of the French army over the Rhine after its defeat by the archduke Charles. In 1797 he brought reinforcements from the Rhine to Bonaparte's army in Italy, distinguishing himself greatly at the passage of the Tagliamento, and in 1798 was sent as ambassador to Vienna, but was compelled to quit his post owing to the disturbances caused by his hoisting the tricolor over the embassy. On the 16th of August 1798 he married Désirée Clary (1777–1860), the daughter of a Marseilles banker, and sister of Joseph Bonaparte's wife. From the 2nd of July to the 14th of September he was war minister, in which capacity he displayed great ability. About this time he held aloof from Bonaparte, but though he declined to help Napoleon in the preparations for the *coup d'état* of November 1799, he accepted employment from the Consulate, and from April 1800 till the 18th of August 1801 commanded the army in La Vendée. On the introduction of the empire he

was made one of the eighteen marshals of France, and, from June 1804 to September 1805, acted as governor of the recently-occupied Hanover. During the campaign of 1805, Bernadotte with an army corps from Hanover co-operated in the great movement which resulted in the shutting up of Mack in Ulm. He was rewarded for his services at Austerlitz (December 2, 1805) by the principality of Ponte Corvo (June 5, 1806), but during the campaign against Prussia, the same year, was severely reproached by Napoleon for not participating with his army corps in the battles of Jena and Auerstädt, though close at hand. In 1808, as governor of the Hanse towns, he was to have directed the expedition against Sweden, via the Danish islands, but the plan came to nought because of the want of transports and the defection of the Spanish contingent. In the war against Austria, Bernadotte led the Saxon contingent at the battle of Wagram, on which occasion, on his own initiative he issued an order of the day, attributing the victory principally to the valour of his Saxons, which Napoleon at once disavowed.

Bernadotte, considerably piqued, thereupon returned to Paris, where the council of ministers entrusted him with the defence of the Netherlands against the English. In 1810 he was about to enter upon his new post of governor of Rome when he was, unexpectedly, elected successor to the Swedish throne, partly because a large part of the Swedish army, in view of future complications with Russia, were in favour of electing a soldier, and partly because Bernadotte was very popular in Sweden, owing to the kindness he had shown to the Swedish prisoners during the late war with Denmark. The matter was decided by one of the Swedish couriers, Baron Karl Otto Mörner, who, entirely on his own initiative, offered the succession to the Swedish crown to Bernadotte. Bernadotte communicated Mörner's offer to Napoleon, who treated the whole affair as an absurdity. Bernadotte thereupon informed Mörner that he would not refuse the honour if he were duly elected. Although the Swedish government, amazed at Mörner's effrontery, at once placed him under arrest on his return to Sweden, the candidature of Bernadotte gradually gained favour there, and, on the 21st of August 1810, he was elected crown-prince.

On the 2nd of November Bernadotte made his solemn entry into Stockholm, and on the 5th he received the homage of the estates and was adopted by Charles XIII. under the name of Charles John. The new crown-prince was very soon the most popular and the most powerful man in Sweden. The infirmity of the old king and the dissensions in the council of state placed the government, and especially the control of foreign affairs, entirely in his hands. The keynote of his whole policy was the acquisition of Norway, a policy which led him into many tortuous ways (see SWEDEN: *History*), and made him a very tricky ally during the struggle with Napoleon in 1813. Great Britain and Prussia very properly insisted that Charles John's first duty was to them, the former power rigorously protesting against the expenditure of her subsidies on the nefarious Norwegian adventure before the common enemy had been crushed. After the defeats of Lützen and Bautzen, it was the Swedish crown-prince who put fresh heart into the allies; and at the conference of Trachenberg he drew up the general plan for the campaign which began after the expiration of the truce of Pläswitz. Though undoubtedly sparing his Swedes unduly, to the just displeasure of the allies, Charles John, as commander-in-chief of the northern army, successfully defended the approaches to Berlin against Oudinot in August and against Ney in September; but after Leipzig he went his own way, determined at all hazards to cripple Denmark and secure Norway. For the events which led to the union of Norway and Sweden, see SWEDEN: *History* and NORWAY: *History*. As unional king, Charles XIV. (who succeeded to that title in 1818 on the death of Charles XIII.) was popular in both countries. Though his ultra-conservative views were detested, and as far as possible opposed (especially after 1823), his dynasty was never in serious danger, and Swedes and Norsemen alike were proud of a monarch with a European reputation. It is true that the *Riksdag* of 1840 meditated compelling him to abdicate, but the storm blew over and his jubilee was celebrated with great enthusiasm in 1843. He died at Stockholm on the 8th of March 1844. His reign was one of uninterrupted peace, and the great material development of the two kingdoms during the first half of the 19th century was largely due to his energy and foresight.

See J. E. Sars, *Norges politiske historia* (Christiania, 1899); Yngvar Nielsen, *Carl Johan som han virkelig var* (Christiania, 1897); Johan Almén, *Ätten Bernadotte* (Stockholm, 1893); C. Schefer, *Bernadotte roi* (Paris, 1899); G. R. Lagerhjelm, *Napoleon och Carl Johan under Kriget i Tyskland, 1813* (Stockholm, 1891). (R. N. B.)

CHARLES XV. (1826–1872), king of Sweden and Norway, eldest son of Oscar I., king of Sweden and Norway, and Josephine Beauharnais of Leuchtenberg, was born on the 3rd of May 1826. On the 19th of June 1850 he married Louisa, daughter of Prince Frederick of the Netherlands. He became regent on the 25th of September 1857, and king on the death of his father (8th of July 1859). As crown-prince, Charles's brusque and downright manners had led many to regard his future accession with some apprehension, yet he proved to be one of the most popular of Scandinavian kings and a constitutional ruler in the best sense of the word. His reign was remarkable for its manifold and far-reaching reforms. Sweden's existing communal law (1862), ecclesiastical law (1863) and criminal law (1864) were enacted appropriately enough under the direction of a king whose motto was: "Build up the land upon the laws!" Charles XV. also materially assisted De Geer (*q.v.*) to carry through his memorable reform of the constitution in 1863. Charles was a warm advocate of "Scandinavianism" and the political solidarity of the three northern kingdoms, and his warm friendship for Frederick VII., it is said, led him to give half promises of help to Denmark on the eve of the war of 1864, which, in the circumstances, were perhaps misleading and unjustifiable. In view, however, of the unpreparedness of the Swedish army and the difficulties of the situation, Charles was forced to observe a strict neutrality. He died at Malmö on the 18th of September 1872. Charles XV. was highly gifted in many directions. He attained to some eminence as a painter, and his *Digte* show him to have been a true poet. He left but one child, a daughter, Louisa Josephina Eugenia, who in 1869 married the crown-prince Frederick of Denmark.

See Cecilia Bååth-Holmberg, *Carl XV., som enskild man, konung och konstnär* (Stockholm, 1891); Yngvar Nielsen, *Det norske og svenske Kongehus fra 1818* (Christiania, 1883). (R. N. B.)

CHARLES (*c.* 1319–1364), duke of Brittany, known as CHARLES OF BLOIS and CHARLES OF CHÂTILLON, was the son of Guy of Châtillon, count of Blois (d. 1342), and of Marguerite of Valois, sister of Philip VI. of France. In 1337 he married Jeanne of Penthièvre (d. 1384), daughter of Guy of Brittany, count of Penthièvre (d. 1331), and thus acquired a right to the succession of the duchy of Brittany. On the death of John III., duke of Brittany, in April 1341, his brother John, count of Montfort-l'Amaury, and his niece Jeanne, wife of Charles of Blois, disputed the succession. Charles of Blois, sustained by Philip VI., captured John of Montfort, who was supported by King Edward III. at Nantes, besieged his wife Jeanne of Flanders at Hennebont, and took Quimper and Guérande (1344). But next year his partisans were defeated at Cadoret, and in June 1347 he was himself wounded and taken prisoner at Roche-Derrien. He was not liberated until 1356, when he continued the war against the young John of Montfort, and perished in the battle of Auray, on the 29th of September 1364. Charles bore a high reputation for piety, and was believed to have performed miracles. The Roman Church has canonized him.

See Siméon Luce, *Histoire de Bertrand du Guesclin et de son époque* (Paris, 1876).

CHARLES, called THE BOLD (1433–1477), duke of Burgundy, son of Philip the Good of Burgundy and Isabella of Portugal, was born at Dijon on the 10th of November 1433. In his father's lifetime he bore the title of count of Charolais. He was brought up under the direction of the seigneur d'Auxy, and early showed great application to study and also to warlike exercises. Although he was on familiar terms with the dauphin (afterwards Louis XI.), when the latter was a refugee at the court of Burgundy, he could

not but view with chagrin the repurchase by the king of France of the towns on the Somme, which had been temporarily ceded to Philip the Good by the treaty of Arras; and when his father's failing health enabled him to take into his hands the reins of government (which Philip abandoned to him completely by an act of the 12th of April 1465), he entered upon his lifelong struggle against Louis XI., and became one of the principal leaders of the League of the Public Weal. His brilliant bravery at the battle of Montlhéry (16th of July 1465), where he was wounded and was left master of the field, neither prevented the king from re-entering Paris nor assured Charles a decisive victory. He succeeded, however, in forcing upon Louis the treaty of Conflans (1466), by which the king restored to him the towns on the Somme, and promised him the hand of his infant daughter Catherine, with Champagne as dowry. In the meanwhile the count of Charolais obtained the surrender of Ponthieu. The revolt of Liége and Dinant intervened to divert his attention from the affairs of France. On the 25th of August 1466 Charles took possession of Dinant, which he pillaged and sacked, and succeeded in treating at the same time with the Liégeois. After the death of Philip the Good (15th June 1467), the Liégeois renewed hostilities, but Charles defeated them at St Trond, and made a victorious entry into Liége, which he dismantled and deprived of some of its privileges.

Alarmed by these early successes of the duke of Burgundy, and anxious to settle various questions relating to the execution of the treaty of Conflans, Louis requested a meeting with Charles and placed himself in his hands at Péronne. In the course of the negotiations the duke was informed of a fresh revolt of the Liégeois secretly fomented by Louis. After deliberating for four days how to deal with his adversary, who had thus maladroitly placed himself at his mercy, Charles decided to respect the parole he had given and to treat with Louis (October 1468), at the same time forcing him to assist in quelling the revolt. The town was carried by assault and the inhabitants were massacred, Louis not having the courage to intervene on behalf of his ancient allies. At the expiry of the one year's truce which followed the treaty of Péronne, the king accused Charles of treason, cited him to appear before the parlement, and seized some of the towns on the Somme (1471). The duke retaliated by invading France with a large army, taking possession of Nesle and massacring its inhabitants. He failed, however, in an attack on Beauvais, and had to content himself with ravaging the country as far as Rouen, eventually retiring without having attained any useful result.

Other matters, moreover, engaged his attention. Relinquishing, if not the stately magnificence, at least the gay and wasteful profusion which had characterized the court of Burgundy under the preceding duke, he had bent all his efforts towards the development of his military and political power. Since the beginning of his reign he had employed himself in reorganizing his army and the administration of his territories. While retaining the principles of feudal recruiting, he had endeavoured to establish a system of rigid discipline among his troops, which he had strengthened by taking into his pay foreign mercenaries, particularly Englishmen and Italians, and by developing his artillery. Furthermore, he had lost no opportunity of extending his power. In 1469 the archduke of Austria, Sigismund, had sold him the county of Ferrette, and the landgraviate of Alsace and some other towns, reserving to himself the right to repurchase. In 1472–1473 Charles bought the reversion of the duchy of Gelderland from its old duke, Arnold, whom he had supported against the rebellion of his son. Not content with being "the grand duke of the West," he conceived the project of forming a kingdom of Burgundy or Arles with himself as independent sovereign, and even persuaded the emperor Frederick to assent to crown him king at Trier. The ceremony, however, did not take place owing to the emperor's precipitate flight by night (September 1473), occasioned by his displeasure at the duke's attitude. In the following year Charles involved himself in a series of difficulties and struggles which ultimately brought about his downfall. He embroiled himself successively with Sigismund of Austria, to whom he refused to restore his possessions in Alsace for the stipulated sum; with the Swiss, who supported the free towns of Alsace in their revolt against the tyranny of the ducal governor, Peter von Hagenbach (who was condemned and executed by the rebels in May 1474); and finally, with René of Lorraine, with whom he disputed the succession of Lorraine, the possession of which had united the two principal portions of Charles's territories—Flanders and the duchy and county of Burgundy. All these enemies, incited and supported as they were by Louis, were not long in joining forces against their common adversary. Charles suffered a first rebuff in endeavouring to protect his kinsman, the archbishop of Cologne, against his rebel subjects. He spent ten months (July 1474–June 1475) in besieging the little town of Neuss on the Rhine, but was compelled by the approach of a powerful imperial army to raise the siege. Moreover, the expedition he had persuaded his brother-in-law, Edward IV. of England, to undertake against Louis was stopped by the treaty of Picquigny (29th of August 1475). He was more successful in Lorraine, where he seized Nancy (30th of November 1475). From Nancy he marched against the Swiss, hanging and drowning the garrison of Granson in spite of the capitulation. Some days later, however, he was attacked before Granson by the confederate army and suffered a shamful defeat, being compelled to fly with a handful of attendants, and leaving his artillery and an immense booty in the hands of the allies (February 1476). He succeeded in raising a fresh army of 30,000 men, with which he attacked Morat, but he was again defeated by the Swiss army, assisted by the cavalry of René of Lorraine (22nd of June 1476). On the 6th of October Charles lost Nancy, which was re-entered by René. Making a last effort, Charles formed a new army and arrived in the depth of winter before the walls of Nancy. Having lost many of his troops through the severe cold, it was with only a few thousand men that he met the joint forces of the Lorrainers and the Swiss, who had come to the relief of the town (6th of January 1477). He himself perished in the fight, his mutilated body being discovered some days afterwards.

Charles the Bold has often been regarded as the last representative of the feudal spirit—a man who possessed no other quality than a blind bravery—and accordingly has often been contrasted with his rival Louis XI. as representing modern politics. In reality, he was a prince of wide knowledge and culture, knowing several languages and austere in morals; and although he cannot be acquitted of occasional harshness, he had the secret of winning the hearts of his subjects, who never refused him their support in times of difficulty. He was thrice married—to Catherine (d. 1446), daughter of Charles VII. of France, by whom he had one daughter, Mary, afterwards the wife of the Emperor Maximilian I.; to Isabella (d. 1465), daughter of Charles I., duke of Bourbon; and to Margaret of York, sister of Edward IV. of England, whom he married in 1468.

The original authorities for the life and times of Charles the Bold are the numerous French, Burgundian and Flemish chroniclers of the latter part of the 15th century. Special mention may be made of the *Mémoires* of Philippe de Comines, and of the *Mémoires* and other writings of Olivier de la Marche. See also A. Molinier, *Les Sources de l'histoire de France*, tome iv. (1904), and the compendious bibliography in U. Chevalier's *Répertoire des sources historiques*, part iii. (1904). *Charles the Bold*, by J. F. Kirk (1863–1868), is a good English biography for its date; a more recent life is R. Putnam's *Charles the Bold* (1908). For a general sketch of the relations between France and Burgundy at this time see E. Lavisse, *Histoire de France*, tome iv. (1902). (R. Po.)

CHARLES, called THE GOOD (le Bon), or THE DANE (*c.* 1084–1127), count of Flanders, only son of St Canute or Knut IV., king of Denmark, by Adela, daughter of Robert the Frisian, count of Flanders, was born about 1084. After the assassination of Canute in 1086, his widow took refuge in Flanders, taking with her her son. Charles was brought up by his mother and grandfather, Robert the Frisian, on whose death he did great services to his uncle, Robert II., and his cousin, Baldwin VII., counts of Flanders. Baldwin died of a wound received in battle in 1119, and, having no issue, left by will the succession to his countship to Charles the Dane. Charles did not secure his

heritage without a civil war, but he was speedily victorious and made his position secure by treating his opponents with great clemency. He now devoted himself to promoting the welfare of his subjects, and did his utmost to support the cause of Christianity, both by his bounty and by his example. He well deserved the surname of *Le Bon*, by which he is known to posterity. He refused the offer of the crown of Jerusalem on the death of Baldwin, and declined to be nominated as a candidate for the imperial crown in succession to the emperor Henry V. He was murdered in the church of St Donat at Bruges on the 2nd of March 1127.

See J. Perneel, *Histoire du règne de Charles le Bon, précédé d'un résumé de l'histoire de Flandres* (Brussels, 1830).

CHARLES I. (*c.* 950–*c.* 992), duke of Lower Lorraine, was a younger son of the Frankish king Louis IV., and consequently a member of the Carolingian family. Unable to obtain the duchy of Burgundy owing to the opposition of his brother, King Lothair, he went to the court of his maternal uncle, the emperor Otto the Great, about 965, and in 977 received from the emperor Otto II. the duchy of Lower Lorraine. His authority in Lorraine was nominal; but he aided Otto in his struggle with Lothair, and on the death of his nephew, Louis V., made an effort to secure the Frankish crown. Hugh Capet, however, was the successful candidate and war broke out. Charles had gained some successes and had captured Reims, when in 991 he was treacherously seized by Adalberon, bishop of Laon, and handed over to Hugh. Imprisoned with his wife and children at Orleans, Charles did not long survive his humiliation. His eldest son Otto, duke of Lower Lorraine, died in 1005.

CHARLES II. (d. 1431), duke of Lorraine, called THE BOLD, is sometimes referred to as Charles I. A son of Duke John I., he succeeded his father in 1390; but he neglected his duchy and passed his life in warfare. He died on the 25th of January 1431, leaving two daughters, one of whom, Isabella (d. 1453), married René I. of Anjou (1409–1480), king of Naples, who succeeded his father-in-law as duke of Lorraine.

CHARLES III. or **II.** (1543–1608), called THE GREAT, duke of Lorraine, was a son of Duke Francis I. (d. 1545), and a descendant of René of Anjou. He was only an infant when he became duke, and was brought up at the court of Henry II. of France, marrying Henry's daughter Claude in 1559. He took part in the wars of religion in France, and was a member of the League; but he was overshadowed by his kinsmen the Guises, although he was a possible candidate for the French crown in 1589. The duke, who was an excellent ruler of Lorraine, died at Nancy on the 14th of May 1608. He had three sons: Henry (d. 1624) and Francis (d. 1632), who became in turn dukes of Lorraine, and Charles (d. 1607), bishop of Metz and Strassburg.

CHARLES IV. or **III.** (1604–1675), duke of Lorraine, was a son of Duke Francis II., and was born on the 5th of April 1604. He became duke on the abdication of his father in 1624, and obtained the duchy of Bar through his marriage with his cousin Nicole (d. 1657), daughter of Duke Henry. Mixing in the tortuous politics of his time, he was in continual conflict with the crown of France, and spent much of his time in assisting her enemies and in losing and regaining his duchies (see LORRAINE). He lived an adventurous life, and in the intervals between his several struggles with France fought for the emperor Ferdinand II. at Nordlingen and elsewhere; talked of succouring Charles I. in England; and after the conclusion of the treaty of Westphalia in 1648 entered the service of Spain. He died on the 18th of September 1675, leaving by his second wife, Béatrix de Cusance (d. 1663), a son, Charles Henry, count of Vaudemont (1642–1723).

CHARLES V. or **IV.** (1643–1690), duke of Lorraine, nephew of Duke Charles IV., was born on the 3rd of April 1643, and in 1664 received a colonelcy in the emperor's army. In the same year he fought with distinction at the battle of St Gotthard, in which he captured a standard from the Turks. He was a candidate for the elective crown of Poland in 1668. In 1670 the emperor made him general of horse, and during the following years he was constantly on active service, first against the Turks and subsequently against the French. At Seneff (1674) he was wounded. In the same year he was again a candidate for the Polish crown, but was unsuccessful, John Sobieski, who was to be associated with him in his greatest feat of arms, being elected. In 1675, on the death of Charles IV., he rode with a cavalry corps into the duchy of Lorraine, then occupied by the French, and secured the adhesion of the Lorraine troops to himself; a little after this he succeeded Montecucculi as general of the imperial army on the Rhine, and was made a field marshal. The chief success of his campaign of 1676 was the capture of Philipsburg, after a long and arduous siege. The war continued without decisive result for some time, and the fate of the duchy, which was still occupied by the French, was the subject of endless diplomacy. At the general peace Charles had to accept the hard conditions imposed by Louis XIV., and he never entered into effective possession of his sovereignty. In 1678 he married the widowed queen of Poland, Eleonora Maria of Austria, and for nearly five years they lived quietly at Innsbruck. The Turkish invasion of 1683, the last great effort of the Turks to impose their will on Europe, called Charles into the field again. At the head of a weak imperial army the duke offered the best resistance he could to the advance of the Turks on Vienna. But he had to fall back, contesting every position, and the Turks finally invested Vienna (July 13th, 1683). At this critical moment other powers came to the assistance of Austria, reinforcements poured into Charles's camp, and John Sobieski, king of Poland, brought 27,000 Poles. Sobieski and Charles had now over 80,000 men, Poles, Austrians and Germans, and on the morning of the 12th of September they moved forward to the attack. By nightfall the Turks were in complete disorder, Vienna was relieved, and the danger was at an end. Soon the victors took the offensive and reconquered part of the kingdom of Hungary. The Germans and Poles went home in the winter, but Charles continued his offensive with the imperialists alone. Ofen (Buda) resisted his efforts in 1684, but in the campaign of 1685 Neuhaüsel was taken by storm, and in 1686 Charles, now reinforced by German auxiliaries, resumed the siege of Ofen. All attempts to relieve the place were repulsed, and Ofen was stormed on the 2nd of September. In the following campaign the Austrians won a decisive victory on the famous battle-ground of Mohacs (August 18th, 1687). In 1689 Charles took the field on the Rhine against the forces of Louis XIV., the enemy of his house. Mainz and Bonn were taken in the first campaign, but Charles in travelling from Vienna to the front died suddenly at Wels on the 18th of April 1690.

His eldest son, Leopold Joseph (1679–1729), at the peace of Ryswick in 1697 obtained the duchy, of which his father had been dispossessed by France, and was the father of Francis Stephen, duke of Lorraine, who became the husband of Maria Theresa (*q.v.*), and of Charles (Karl Alexander), a distinguished Austrian commander in the wars with Frederick the Great. The duchy was ceded by Francis Stephen to Stanislaus Leczynski, the dethroned king of Poland, in 1736, Francis receiving instead the grand-duchy of Tuscany.

CHARLES II. [CHARLES LOUIS DE BOURBON] (1799–1883), duke of Parma, succeeded his mother, Maria Louisa, duchess of Lucca, as duke of Lucca in 1824. He introduced economy into the administration, increased the schools, and in 1832 as a reaction against the bigotry of the priests and monks with which his mother had surrounded him, he became a Protestant. He at first evinced Liberal tendencies, gave asylum to the Modenese political refugees of 1831, and was indeed suspected of being a Carbonaro. But his profligacy and eccentricities soon made him the laughing-stock of Italy. In 1842 he returned to the Catholic Church and made Thomas Ward, an English groom, his prime minister, a man not without ability and tact. Charles gradually abandoned all his Liberal ideas, and in 1847 declared himself hostile to the reforms introduced by Pius IX. The Lucchesi demanded the constitution of 1805, promised them by the treaty of Vienna, and a national guard, but the duke, in spite of the warnings of Ward, refused all concessions. A few weeks later he retired to Modena, selling his life-interest

in the duchy to Tuscany. On the 17th of October Maria Louisa of Austria, duchess of Parma, died, and Charles Louis succeeded to her throne by the terms of the Florence treaty, assuming the style of Charles II. His administration of Parma was characterized by ruinous finance, debts, disorder and increased taxation, and he concluded an offensive and defensive alliance with Austria. But on the outbreak of the revolution of 1848 there were riots in his capital (19th of March), and he declared his readiness to throw in his lot with Charles Albert, the pope, and Leopold of Tuscany, repudiated the Austrian treaty and promised a constitution. Then he again changed his mind, abdicated in April, and left Parma in the hands of a provisional government, whereupon the people voted for union with Piedmont. After the armistice between Charles Albert and Austria (August 1848) the Austrian general Thurn occupied the duchy, and Charles II. issued an edict from Weistropp annulling the acts of the provisional government. When Piedmont attacked Austria again in 1849, Parma was evacuated, but reoccupied by General d'Aspre in April.

In May 1849 Charles confirmed his abdication, and was succeeded by his son CHARLES III. (1823–1854), who, protected by Austrian troops, placed Parma under martial law, inflicted heavy penalties on the members of the late provisional government, closed the university, and instituted a regular policy of persecution. A violent ruler, a drunkard and a libertine, he was assassinated on the 26th of March 1854. At his death his widow Maria Louisa, sister of the comte de Chambord, became regent, during the minority of his son Robert. The duchess introduced some sort of order into the administration, seemed inclined to rule more mildly and dismissed some of her husband's more obnoxious ministers, but the riots of the Mazzinians in July 1854 were repressed with ruthless severity, and the rest of her reign was characterized by political trials, executions and imprisonments, to which the revolutionists replied with assassinations.

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CHARLES [KARL LUDWIG] (1771–1847), archduke of Austria and duke of Teschen, third son of the emperor Leopold II., was born at Florence (his father being then grand-duke of Tuscany) on the 5th of September 1771. His youth was spent in Tuscany, at Vienna and in the Austrian Netherlands, where he began his career of military service in the war of the French Revolution. He commanded a brigade at Jemappes, and in the campaign of 1793 distinguished himself at the action of Aldenhoven and the battle of Neerwinden. In this year he became *Statthalter* in Belgium and received the army rank of lieutenant field marshal, which promotion was soon followed by that to Feldzeugmeister. In the remainder of the war in the Low Countries he held high commands, and he was present at Fleurus. In 1795 he served on the Rhine, and in the following year was entrusted with the chief control of all the Austrian forces on that river. His conduct of the operations against Jourdan and Moreau in 1796 marked him out at once as one of the greatest generals in Europe. At first falling back carefully and avoiding a decision, he finally marched away, leaving a mere screen in front of Moreau; falling upon Jourdan he beat him in the battles of Amberg and Würzburg, and drove him over the Rhine with great loss. He then turned upon Moreau's army, which he defeated and forced out of Germany. For this campaign, one of the most brilliant in modern history, see FRENCH REVOLUTIONARY WARS. In 1797 he was sent to arrest the victorious march of General Bonaparte in Italy, and he conducted the retreat of the over-matched Austrians with the highest skill. In the campaign of 1799 he was once more opposed to Jourdan, whom he defeated in the battles of Osterach and Stokach, following up his success by invading Switzerland and defeating Masséna in the (first) battle of Zürich, after which he re-entered Germany and drove the French once more over the Rhine. Ill-health, however, forced him to retire to Bohemia, whence he was soon recalled to undertake the task of checking Moreau's advance on Vienna. The result of the battle of Hohenlinden had, however, foredoomed the attempt, and the archduke had to make the armistice of Steyer. His popularity was now such that the diet of Regensburg, which met in 1802, resolved to erect a statue in his honour and to give him the title of saviour of his country; but Charles refused both distinctions.

In the short and disastrous war of 1805 the archduke Charles commanded what was intended to be the main army, in Italy, but events made Germany the decisive theatre of operations, and the defeats sustained on the Danube neutralized the success obtained by the archduke over Masséna in the desperately fought battle of Caldiero. With the conclusion of peace began his active work of army reorganization, which was first tested on the field in 1809. As generalissimo of the army he had been made field marshal some years before. As president of the Council of War, and supported by the prestige of being the only general who had proved capable of defeating the French, he promptly initiated a far-reaching scheme of reform, which replaced the obsolete methods of the 18th century, the chief characteristics of the new order being the adoption of the "nation in arms" principle and of the French war organization and tactics. The new army was surprised in the process of transition by the war of 1809, in which Charles commanded in chief; yet even so it proved a far more formidable opponent than the old, and, against the now heterogeneous army of which Napoleon disposed (see NAPOLEONIC CAMPAIGNS) it succumbed only after a desperate struggle. Its initial successes were neutralized by the reverses of Abensberg, Landshut and Eckmühl; but, after the evacuation of Vienna, the archduke won the great battle of Aspern-Essling (*q.v.*) and soon afterwards fought the still more desperate battle of Wagram (*q.v.*), at the close of which the Austrians were defeated but not routed; they had inflicted upon Napoleon a loss of over 50,000 men in the two battles. At the end of the campaign the archduke gave up all his military offices, and spent the rest of his life in retirement, except a short time in 1815, when he was governor of Mainz. In 1822 he succeeded to the duchy of Saxe-Teschen. The archduke Charles married, in 1815, Princess Henrietta of Nassau-Weilburg (d. 1829). He had four sons, the eldest of whom, the archduke Albert (*q.v.*) became one of the most celebrated generals in Europe, and two daughters, the elder of whom became queen of Naples. He died at Vienna on the 30th of April 1847. An equestrian statue was erected to his memory in Vienna, 1860.

The caution which the archduke preached so earnestly in his strategical works, he displayed in practice only when the situation seemed to demand it, though his education certainly prejudiced him in favour of the defensive at all costs. He was at the same time capable of forming and executing the most daring offensive strategy, and his tactical skill in the handling of troops, whether in wide turning movements, as at Würzburg and Zürich, or in masses, as at Aspern and Wagram, was certainly equal to that of any leader of his time, Napoleon only excepted. The campaign of 1796 is considered almost faultless. That he sustained defeat in 1809 was due in part to the great numerical superiority of the French and their allies, and in part to the condition of his newly reorganized troops. His six weeks' inaction after the victory of Aspern is, however, open to unfavourable criticism. As a military writer, his position in the evolution of the art of war is very important, and his doctrines had naturally the greatest weight. Nevertheless they cannot but be considered as antiquated even in 1806. Caution and the importance of "strategic points" are the chief features of his system. The rigidity of his geographical strategy may be gathered from the prescription that "this principle is *never* to be departed from." Again and again he repeats the advice that nothing should be hazarded unless one's army is *completely* secure, a rule which he himself neglected with such brilliant results in 1796. "Strategic points," he says (not the defeat of the enemy's army), "decide the fate of one's own country, and must

constantly remain the general's main solicitude"—a maxim which was never more remarkably disproved than in the war of 1809. The editor of the archduke's work is able to make but a feeble defence against Clausewitz's reproach that Charles attached more value to ground than to the annihilation of the foe. In his tactical writings the same spirit is conspicuous. His reserve in battle is designed to "cover a retreat." The baneful influence of these antiquated principles was clearly shown in the maintenance of Königgrätz-Josefstadt in 1866 as a "strategic point," which was preferred to the defeat of the separated Prussian armies; in the strange plans produced in Vienna for the campaign of 1859, and in the "almost unintelligible" battle of Montebello in the same year. The theory and the practice of the archduke Charles form one of the most curious contrasts in military history. In the one he is unreal, in the other he displayed, along with the greatest skill, a vivid activity which made him for long the most formidable opponent of Napoleon.

His writings were edited by the archduke Albert and his brother the archduke William in the *Ausgewählte Schriften weiland Sr. K. Hoheit Erzh. Carl v. Österreich* (1862; reprinted 1893, Vienna and Leipzig), which includes the *Grundsätze der Kriegskunst für die Generäle* (1806), *Grundsätze der Strategie erläutert durch die Darstellung des Feldzugs 1796* (1814), *Gesch. des Feldzugs von 1799* (1819)—the two latter invaluable contributions to the history of the war, and papers "on the higher art of war," "on practical training in the field," &c. See, besides the histories of the period, C. von B(inder)-K(rieglstein), *Geist und Stoff im Kriege* (Vienna, 1895); Caemmerer, *Development of Strategical Science* (English transl.), ch. iv.; M. Edler v. Angeli, *Erzherzog Carl v. Österr.* (Vienna and Leipzig, 1896); Duller, *Erzh. Karl v. Österr.* (Vienna, 1845); Schneidawind, *Karl, Erzherzog v. Österr. und die österr. Armee* (Vienna, 1840); *Das Buch vom Erzh. Carl* (1848); Thielen, *Erzh. Karl v. Österr.* (1858); Wolf, *Erzh. Carl* (1860); H. von Zeissberg, *Erzh. Karl v. Österr.* (Vienna, 1895); M. von Angeli, *Erzh. Karl als Feldherr und Organisator* (Vienna, 1896).

CHARLES (1525–1574), cardinal of Lorraine, French statesman, was the second son of Claude of Lorraine, duke of Guise, and brother of Francis, duke of Guise. He was archbishop of Reims in 1538, and cardinal in 1547. At first he was called the cardinal of Guise, but in 1550, on the death of his uncle John, cardinal of Lorraine, he in his turn took the style of cardinal of Lorraine. Brilliant, cunning and a master of intrigue, he was, like all the Guises, devoured with ambition and devoid of scruples. He had, said Brantôme, "a soul exceeding smirched," and, he adds, "by nature he was exceeding craven." Together with his brother, Duke Francis, the cardinal of Lorraine was all-powerful during the reigns of Henry II. and Francis II.; in 1558 and 1559 he was one of the negotiators of the treaty of Cateau-Cambrésis; he fought and pitilessly persecuted the reformers, and by his intolerant policy helped to provoke the crisis of the wars of religion. The death of Francis II. deprived him of power, but he remained one of the principal leaders of the Catholic party. In 1561, at the Colloquy of Poissy, he was commissioned to reply to Theodore Beza. In 1562 he went to the council of Trent, where he at first defended the rights of the Gallican Church against the pretensions of the pope; but after the assassination of his brother, he approached the court of Rome, and on his return to France he endeavoured, but without success, to obtain the promulgation of the decrees of the council (1564). In 1567, when the Protestants took up arms, he held for some time the first place in the king's council, but Catherine de' Medici soon grew weary of his arrogance, and in 1570 he had to leave the court. He endeavoured to regain favour by negotiating at Rome the dispensation for the marriage of Henry of Navarre with Margaret of Valois (1572). He died on the 26th of December 1574, at the beginning of the reign of Henry III. An orator of talent, he left several harangues or sermons, among them being *Oraison prononcée au Colloque de Poissy* (Paris, 1562) and *Oratio habita in Concil. Trident.* (*Concil. Trident. Orationes*, Louvain, 1567).

A large amount of correspondence is preserved in the Bibliothèque Nationale, Paris. See also René de Bouillé, *Histoire des ducs de Guise* (Paris, 1849); H. Forneron, *Les Guises et leur époque* (Paris, 1877); Guillemin, *Le Cardinal de Lorraine* (1847).

CHARLES [KARL ALEXANDER] (1712–1780), prince of Lorraine, was the youngest son of Leopold, duke of Lorraine, and grandson of Charles V., duke of Lorraine (see above), the famous general. He was born at Lunéville on the 12th of December 1712, and educated for a military career. After his elder brother Francis, the duke, had exchanged Lorraine for Tuscany and married Maria Theresa, Charles became an Austrian officer, and he served in the campaigns of 1737 and 1738 against the Turks. At the outbreak of the Silesian wars in 1740 (see AUSTRIAN SUCCESSION, WAR OF THE), the queen made her brother-in-law a field marshal, though he was not yet thirty years old, and in 1742 Charles encountered Frederick the Great for the first time at the battle of Chotusitz (May 17th). The victory of the Prussians on that field was far from decisive, and Charles drew off his forces in good order. His conduct of the successful campaign of 1743 against the French and Bavarians heightened his reputation. He married, in January 1744, Marianne of Austria, sister of Maria Theresa, who made them jointly governors-general of the Austrian Netherlands. Very soon the war broke out afresh, and Charles, at the head of the Austrian army on the Rhine, won great renown by his brilliant crossing of the Rhine. Once more a Lorraine prince at the head of Austrian troops invaded the duchy and drove the French before him, but at this moment Frederick resumed the Silesian war, all available troops were called back to oppose him, and the French maintained their hold on Lorraine. Charles hurried to Bohemia, whence, aided by the advice of the veteran field marshal Traun, he quickly expelled the Prussians. At the close of his victorious campaign he received the news that his wife, to whom he was deeply attached, had died in childbirth on the 16th of December 1744 at Brussels. He took the field again in 1745 in Silesia, but this time without the advice of Traun, and he was twice severely defeated by Frederick, at Hohenfriedberg and at Soor. Subsequently, as commander-in-chief in the Low Countries he received, at Roucoux, a heavy defeat at the hands of Marshal Saxe. His government of the Austrian Netherlands during the peace of 1749–1756 was marked by many reforms, and the prince won the regard of the people by his ceaseless activity on their behalf. After the first reverses of the Seven Years' War (*q.v.*), Maria Theresa called Charles again to the supreme command in the field. The campaign of 1757 opened with Frederick's great victory of Prague, and Prince Charles was shut up with his army in that fortress. In the victory of the relieving army under Daun at Kolin Charles had no part. Nevertheless the battle of Breslau, in which the Prussians suffered a defeat even more serious than that of Kolin, was won by him, and great enthusiasm was displayed in Austria over the victory, which seemed to be the final blow to Frederick. But soon afterwards the king of Prussia routed the French at Rossbach, and, swiftly returning to Silesia, he inflicted on Charles the complete and crushing defeat of Leuthen (December 5, 1757). A mere remnant of the Austrian army reassembled after the pursuit, and Charles was relieved of his command. He received, however, from the hands of the empress the grand cross of the newly founded order of Maria Theresa. For a year thereafter Prince Charles acted as a military adviser at Vienna, he then returned to Brussels, where, during the remainder of his life, he continued to govern in the same liberal spirit as before. The affection of the people for the prince was displayed during his dangerous illness in 1765, and in 1775 the estates of Brabant erected a statue in his honour at Brussels. He died on the 4th of July 1780 at the castle of Tervoeren, and was buried with his Lorraine ancestors at Nancy.

CHARLES (1270–1325), count of Valois, of Maine, and of Anjou, third son of Philip III., king of France, surnamed the Bold, and of Isabella of Aragon, was born on the 12th of March 1270. By his father's will he inherited the four lordships of Crépy, La Ferté-Milon, Pierrefonds and Béthisy, which together formed the countship of Valois. In 1284 Martin IV., having excommunicated Pedro III., king of Aragon, offered that kingdom to Charles. King Philip failed in an attempt to place his son on this throne, and died on the return of the expedition. In 1290 Charles married Margaret, daughter of Charles II., king of Naples, and renounced his pretensions to Aragon. In

1294, at the beginning of the hostilities against England, he invaded Guienne and took La Réole and Saint-Sever. During the war Flanders (1300), he took Douai, Béthune and Dam, received the submission of Guy of Dampierre, and aided King Philip IV., the Fair, to gain the battle of Mons-en-Pévèle, on the 18th of August 1304. Asked by Boniface VIII. for his aid against the Ghibellines, he crossed the Alps in June 1301, entered Florence, and helped Charles II., the Lame, king of Sicily, to reconquer Calabria and Apulia from the house of Aragon, but was defeated in Sicily. As after the death of his first wife Charles had married Catherine de Courtenay, a granddaughter of Baldwin II., the last Latin emperor of Constantinople, he tried to assert his rights to that throne. Philip the Fair also wished to get him elected emperor; but Clement V. quashed his candidature in favour of Henry of Luxemburg, afterwards the emperor Henry VII. Under Louis X. Charles headed the party of feudal reaction, and was among those who compassed the ruin of Enguerrand de Marigny. In the reign of Charles IV., the Fair, he fought yet again in Guienne (1324), and died at Perray (Seine-et-Oise) on the 16th of December 1325. His second wife had died in 1307, and in July 1308 he had married a third wife, Mahaut de Châtillon, countess of Saint-Pol. Philip, his eldest son, ascended the French throne in 1328, and from him sprang the royal house of Valois.

See Joseph Petit, *Charles de Valois* (Paris, 1900).

CHARLES (1421–1461), prince of Viana, sometimes called Charles IV. king of Navarre, was the son of John, afterwards John II., king of Aragon, by his marriage with Blanche, daughter and heiress of Charles III., king of Navarre. Both his grandfather Charles and his mother, who ruled over Navarre from 1425 to 1441, had bequeathed this kingdom to Charles, whose right had also been recognized by the Cortes; but when Blanche died in 1441 her husband John seized the government to the exclusion of his son. The ill-feeling between father and son was increased when in 1447 John took for his second wife Joanna Henriquez, a Castilian princess, who soon bore him a son, afterwards Ferdinand I. king of Spain, and who regarded her stepson as an interloper. When Joanna began to interfere in the internal affairs of Navarre civil war broke out; and in 1452 Charles, although aided by John II., king of Castile, was defeated and taken prisoner. Released upon promising not to take the kingly title until after his father's death, the prince, again unsuccessful in an appeal to arms, took refuge in Italy with Alphonso V., king of Aragon, Naples and Sicily. In 1458 Alphonso died and John became king of Aragon, while Charles was offered the crowns of Naples and Sicily. He declined these proposals, and having been reconciled with his father returned to Navarre in 1459. Aspiring to marry a Castilian princess, he was then thrown into prison by his father, and the Catalans rose in his favour. This insurrection soon became general and John was obliged to yield. He released his son, and recognized him as perpetual governor of Catalonia, and heir to the kingdom. Soon afterwards, however, on the 23rd of September 1461, the prince died at Barcelona, not without a suspicion that he had been poisoned by his stepmother. Charles was a cultured and amiable prince, fond of music and literature. He translated the *Ethics* of Aristotle into Spanish, a work first published at Saragossa in 1509, and wrote a chronicle of the kings of Navarre, *Crônica de los reyes de Navarra*, an edition which, edited by J. Yangues y Miranda, was published at Pampeluna in 1843.

See J. de Moret and F. de Aleson, *Anales del reyno de Navarra*, tome iv. (Pampeluna, 1866); M. J. Quintana, *Vidas de españoles célebres* (Paris, 1827); and G. Desdevises du Dézert, *Carlos d'Aragon* (Paris, 1889).

CHARLES, ELIZABETH (1828–1896), English author, was born at Tavistock on the 2nd of January 1828, the daughter of John Rundle, M.P. Some of her youthful poems won the praise of Tennyson, who read them in manuscript. In 1851 she married Andrew Paton Charles. Her best known book, written to order for an editor who wished for a story about Martin Luther, *The Chronicles of the Schönberg-Cotta Family*, was published in 1862, and was translated into most of the European languages, into Arabic, and into many Indian dialects. Mrs Charles wrote in all some fifty books, the majority of a semi-religious character. She took an active part in the work of various charitable institutions, and among her friends and correspondents were Dean Stanley, Archbishop Tait, Charles Kingsley, Jowett and Pusey. She died at Hampstead on the 28th of March 1896.

CHARLES, JACQUES ALEXANDRE CÉSAR (1746–1823), French mathematician and physicist, was born at Beaugency, Loiret, on the 12th of November 1746. After spending some years as a clerk in the ministry of finance, he turned to scientific pursuits, and attracted considerable attention by his skilful and elaborate demonstrations of physical experiments. He was the first, in 1783, to employ hydrogen for the inflation of balloons (see AERONAUTICS), and about 1787 he anticipated Gay Lussac's law of the dilatation of gases with heat, which on that account is sometimes known by his name. In 1785 he was elected to the Academy of Sciences, and subsequently he became professor of physics at the Conservatoire des Arts et Métiers. He died in Paris on the 7th of April 1823. His published papers are chiefly concerned with mathematical topics.

CHARLES, THOMAS (1755–1814), Welsh Nonconformist divine, was born of humble parentage at Longmoor, in the parish of Llanfihangel Abercywyn, near St Clears, Carmarthenshire, on the 14th of October 1755. He was educated for the Anglican ministry at Llanddowror and Carmarthen, and at Jesus College, Oxford (1775–1778). In 1777 he studied theology under the evangelical John Newton at Olney. He was ordained deacon in 1778 on the title of the curacies of Shepton Beauchamp and Sparkford, Somerset; and took priest's orders in 1780. He afterwards added to his charge at Sparkford, Lovington, South Barrow and North Barrow, and in September 1782 was presented to the perpetual curacy of South Barrow by the Rev. John Hughes, Coln St Denys. But he never left Sparkford, though the contrary has been maintained, until he resigned all his curacies in June 1783, and returned to Wales, marrying (on August 20th) Sarah Jones of Bala, the orphan of a flourishing shopkeeper. He had early fallen under the influence of the great revival movement in Wales, and at the age of seventeen had been "converted" by a sermon of Daniel Rowland's. This was enough to make him unpopular with many of the Welsh clergy, and being denied the privilege of preaching for nothing at two churches, he helped his old Oxford friend John Mayor, now vicar of Shawbury, Shropshire, from October until January 11th, 1784. On the 25th of January he took charge of Llan yn Mowddwy (14 m. from Bala), but was not allowed to continue there more than three months. Three influential people, among them the rector of Bala, agitated some of the parishioners against him, and persuaded his rector to dismiss him. His preaching, his catechizing of the children after evensong, and his connexion with the Bala Methodists—his wife's stepfather being a Methodist preacher—gave great offence. After a fortnight more at Shawbury, he wrote to John Newton and another clergyman friend in London for advice. The Church of England denied him employment, and the Methodists desired his services. His friends advised him to return to England, but it was too late. By September he had crossed the Rubicon, Henry Newman (his rector at Shepton Beauchamp and Sparkford) accompanying him on a tour in Carnarvonshire. In December, he was preaching at the Bont Uchel Association; so that he joined the Methodists (see CALVINISTIC METHODISTS) in 1784.

Before taking this step, he had been wont in his enforced leisure to gather the poor children of Bala into his house for instruction, and so thickly did they come that he had to adjourn with them to the chapel. This was the origin of the Welsh Circulating Schools, which he developed on the lines adopted by Griffith Jones (d. 1761), formerly vicar of Llanddowror. First one man was trained for the work by himself, then he was sent to a district for six months, where, (for £8 a year) he taught gratis the children and young people (in fact, all comers) reading and Christian principles. Writing was added later. The expenses were met by collections made in the Calvinistic Methodist Societies, and as the funds increased masters were multiplied,

until in 1786 Charles had seven masters to whom he paid £10 per annum; in 1787, twelve; in 1789, fifteen; in 1794, twenty. By this time the salary had been increased to £12; in 1801 it was £14. He had learnt of Raikes's Sunday Schools before he left the Establishment, but he rightly considered the system set on foot by himself far superior; the work and object being the same, he gave six days' tuition for every one given by them, and many people not only objected to working as teachers on Sunday, but thought the children forgot in the six days what they learnt on the one. But Sunday Schools were first adopted by Charles to meet the case of young people in service who could not attend during the week, and even in that form much opposition was shown to them because teaching was thought to be a form of Sabbath breaking. His first Sunday School was in 1787. Wilberforce, Charles Grant, John Thornton and his son Henry, were among the philanthropists who contributed to his funds; in 1798 the Sunday School Society (established 1785) extended its operations to Wales, making him its agent, and Sunday Schools grew rapidly in number and favour. A powerful revival broke out at Bala in the autumn of 1791, and his account of it in letters to correspondents, sent without his knowledge to magazines, kindled a similar fire at Huntly. The scarcity of Welsh bibles was Charles's greatest difficulty in his work. John Thornton and Thomas Scott helped him to secure supplies from the Society for the Promotion of Christian Knowledge from 1787 to 1789, when the stock became all but exhausted. In 1799 a new edition was brought out by the Society, and he managed to secure 700 copies of the 10,000 issued; the Sunday School Society got 3000 testaments printed, and most of them passed into his hands in 1801.

In 1800, when a frost-bitten thumb gave him great pain and much fear for his life, his friend, Rev. Philip Oliver of Chester, died, leaving him director and one of three trustees over his chapel at Boughton; and this added much to his anxiety. The Welsh causes at Manchester and London, too, gave him much uneasiness, and burdened him with great responsibilities at this juncture. In November 1802 he went to London, and on the 7th of December he sat at a committee meeting of the Religious Tract Society, as a country member, when his friend, Joseph Tarn—a member of the Spa Fields and Religious Tract Society committees—introduced the subject of a regular supply of bibles for Wales. Charles was asked to state his case to the committee, and so forcibly did he impress them, that it was there and then decided to move in the matter of a general dispersion of the bible. When he visited London a year later, his friends were ready to discuss the name of a new Society, and the sole object of which should be to supply bibles. Charles returned to Wales on the 30th of January 1804, and the British and Foreign Bible Society was formally and publicly inaugurated on March the 7th. The first Welsh testament issued by that Society appeared on the 6th of May 1806, the bible on the 7th of May 1807—both being edited by Charles.

Between 1805 and 1811 he issued his Biblical Dictionary in four volumes, which still remains the standard work of its kind in Welsh. Three editions of his Welsh catechism were published for the use of his schools (1789, 1791 and 1794); an English catechism for the use of schools in Lady Huntingdon's Connexion was drawn up by him in 1797; his shorter catechism in Welsh appeared in 1799, and passed through several editions, in Welsh and English, before 1807, when his *Instructor* (still the Connexional catechism) appeared. From April 1799 to December 1801 six numbers of a Welsh magazine called *Trysorfa Ysprydol* (Spiritual Treasury) were edited by Thomas Jones of Mold and himself; in March 1809 the first number of the second volume appeared, and the twelfth and last in November 1813.

The London Hibernian Society asked him to accompany Dr David Bogue, the Rev. Joseph Hughes, and Samuel Mills to Ireland in August 1807, to report on the state of Protestant religion in the country. Their report is still extant, and among the movements initiated as a result of their visit was the Circulating School system. In 1810, owing to the growth of Methodism and the lack of ordained ministers, he led the Connexion in the movement for connexionally ordained ministers, and his influence was the chief factor in the success of that important step. From 1811 to 1814 his energy was mainly devoted to establishing auxiliary Bible Societies. By correspondence he stimulated some friends in Edinburgh to establish charity schools in the Highlands, and the Gaelic School Society (1811) was his idea. His last work was a corrected edition of the Welsh Bible issued in small pica by the Bible Society. As a preacher he was in great request, though possessing but few of the qualities of the popular preacher. All his work received very small remuneration; the family was maintained by the profits of a business managed by Mrs Charles—a keen, active and good woman. He died on the 5th of October 1814. His influence is still felt, and he is rightly claimed as one of the makers of modern Wales. (D. E. J.)

CHARLES ALBERT [CARLO ALBERTO] (1798–1849), king of Sardinia (Piedmont), son of Prince Charles of Savoy-Carignano and Princess Albertine of Saxe-Courland, was born on the 2nd of October 1798, a few days before the French occupied Piedmont and forced his cousin King Charles Emmanuel to take refuge in Sardinia. Although Prince and Princess Carignano adhered to the French Republican régime, they soon fell under suspicion and were summoned to Paris. Prince Charles died in 1800, and his widow married a Count de Montléart and for some years led a wandering existence, chiefly in Switzerland, neglecting her son and giving him mere scraps of education, now under a devotee of J. J. Rousseau, now under a Genevan Calvinist. In 1802 King Charles Emmanuel abdicated in favour of his brother Victor Emmanuel I.; the latter's only son being dead, his brother Charles Felix was heir to the throne, and after him Charles Albert. On the fall of Napoleon in 1814 the Piedmontese court returned to Turin and the king was anxious to secure the succession for Charles Albert, knowing that Austria meditated excluding him from it in favour of an Austrian archduke, but at the same time he regarded him as an objectionable person on account of his revolutionary upbringing. Charles Albert was summoned to Turin, given tutors to instruct him in legitimist principles, and on the 1st of October 1817 married the archduchess Maria Theresa of Tuscany, who, on the 14th of March 1820, gave birth to Victor Emmanuel, afterwards king of Italy.

The Piedmontese government at this time was most reactionary, and had made a clean sweep of all French institutions. But there were strong Italian nationalists and anti-Austrian tendencies among the younger nobles and army officers, and the Carbonari and other revolutionary societies had made much progress.

Their hopes centred in the young Carignano, whose agreeable manners had endeared him to all, and who had many friends among the Liberals and Carbonari. Early in 1820 a revolutionary movement was set on foot, and vague plans of combined risings all over Italy and a war with Austria were talked of. Charles Albert no doubt was aware of this, but he never actually became a Carbonaro, and was surprised and startled when after the outbreak of the Neapolitan revolution of 1820 some of the leading conspirators in the Piedmontese army, including Count Santorre di Santarosa and Count San Marzano, informed him that a military rising was ready and that they counted on his help (2nd March 1821). He induced them to delay the outbreak and informed the king, requesting him, however, not to punish anyone. On the 10th the garrison of Alessandria mutinied, and two days later Turin was in the hands of the insurgents, the people demanding the Spanish constitution. The king at once abdicated and appointed Charles Albert regent. The latter, pressed by the revolutionists and abandoned by his ministers, granted the constitution and sent to inform Charles Felix, who was now king, of the occurrence. Charles Felix, who was then at Modena, repudiated the regent's acts, accepted Austrian military assistance, with which the rising was easily quelled, and exiled Charles Albert to Florence. The young prince found himself the most unpopular man in Italy, for while the Liberals looked on him as a traitor, to the king and the Conservatives he was a dangerous revolutionist. At the Congress of Verona (1822) the Austrian chancellor, Prince Metternich, tried to induce Charles Felix to set aside Charles Albert's rights of succession.

But the king was piqued by Austria's interference, and as both the grand-duke of Tuscany and the duke of Wellington supported him, Charles Albert's claims were respected. France having decided to intervene in the Spanish revolution on the side of autocracy, Charles Albert asked permission to join the duc d'Angoulême's expedition. The king granted it and the young prince set out for Spain, where he fought with such gallantry at the storming of the Trocadero (1st of September 1823) that the French soldiers proclaimed him the "first Grenadier of France." But it was not until he had signed a secret undertaking binding himself, as soon as he ascended the throne, to place himself under the tutelage of a council composed of the higher clergy and the knights of the Annunziata, and to maintain the existing forms of the monarchy (D. Berti, *Cesare Alfieri*, xi. 77, Rome, 1871), that he was allowed to return to Turin and forgiven.

On the death of Charles Felix (27th of April 1831) Charles Albert succeeded; he inherited a kingdom without an army, with an empty treasury, a chaotic administration and medieval laws. His first task was to set his house in order; he reorganized the finances, created the army, and started Piedmont on a path which if not liberalism was at least progress. "He was," wrote his reactionary minister, Count della Margherita, "hostile to Austria from the depths of his soul and full of illusions as to the possibility of freeing Italy from dependence on her. . . . As for the revolutionaries, he detested them but feared them, and was convinced that sooner or later he would be their victim." In 1833 a conspiracy of the *Giovane Italia* Society, organized by Mazzini, was discovered, and a number of its members punished with ruthless severity. On the election in 1846 of Pius IX., who appeared to be a Liberal and an Italian patriot, the eyes of all Italy were turned on him as the heaven-born leader who was to rescue the country from the foreigner. This to some extent reconciled the king to the Liberal movement, for it accorded with his religious views. "I confess," he wrote to the marquis of Villamarina, in 1847, "that a war of national independence which should have for its object the defence of the pope would be the greatest happiness that could befall me." On the 30th of October he issued a decree granting wide reforms, and when risings broke out in other parts of Italy early in 1848 and further liberties were demanded, he was at last induced to grant the constitution (8th February).

When the news of the Milanese revolt against the Austrians reached Turin (19th of March) public opinion demanded that the Piedmontese should succour their struggling brothers; and after some hesitation the king declared war. But much time had been wasted and many precious opportunities lost. With an army of 60,000 Piedmontese troops and 30,000 men from other parts of Italy the king took the field, and after defeating the Austrians at Pastrengo on the 30th of April, and at Goito on the 30th of May, where he was himself slightly wounded, more time was wasted in useless operations. Radetzky, the Austrian general, having received reinforcements, drove the centre of the extended Italian line back across the Mincio (23rd of July), and in the two days' fighting at Custozza (24th and 25th of July) the Piedmontese were beaten, forced to retreat, and to ask for an armistice. On re-entering Milan Charles Albert was badly received and reviled as a traitor by the Republicans, and although he declared himself ready to die defending the city the municipality treated with Radetzky for a capitulation; the mob, urged on by the demagogues, made a savage demonstration against him at the Palazzo Greppi, whence he escaped in the night with difficulty and returned to Piedmont with his defeated army. The French Republic offered to intervene in the spring of 1848, but Charles Albert did not desire foreign aid, the more so as in this case it would have had to be paid for by the cession of Nice and Savoy. The revolutionary movement throughout Italy was breaking down, but Charles Albert felt that while he possessed an army he could not abandon the Lombards and Venetians, and determined to stake all on a last chance. On the 12th of March 1849 he denounced the armistice and took the field again with an army of 80,000 men, but gave the chief command to the Polish general Chrzanowski. General Ramorino commanding the Lombard division proved unable to prevent the Austrians from crossing the Ticino (20th of April), and Chrzanowski was completely out-generalled and defeated at La Bicocca near Novara on the 23rd. The Piedmontese fought with great bravery, and the unhappy king sought death in vain. After the battle he asked terms of Radetzky, who demanded the occupation by Austria of a large part of Piedmont and the heir to the throne as a hostage. Thereupon, feeling himself to be the obstacle to better conditions, Charles Albert abdicated in favour of his son Victor Emmanuel. That same night he departed alone and made his way to Oporto, where he retired into a monastery and died on the 28th of July 1849.

Charles Albert was not a man of first-rate ability; he was of a hopelessly vacillating character. Devout and mystical to an almost morbid degree, hating revolution and distrusting Liberalism, he was a confirmed pessimist, yet he had many noble qualities: he was brave to the verge of foolhardiness, devoted to his country, and ready to risk his crown to free Italy from the foreigner. To him the people of Italy owe a great debt, for if he failed in his object he at least materialized the idea of the Risorgimento in a practical shape, and the charges which the Republicans and demagogues brought against him were monstrously unjust.

BIBLIOGRAPHY.—Besides the general works on modern Italy, see the Marquis Costa de Beauregard's interesting volumes *La Jeunesse du roi Charles Albert* (Paris, 1899) and *Novare et Oporto* (1890), based on the king's letters and the journal of Sylvain Costa, his faithful equerry, though the author's views are those of an old-fashioned Savoyard who dislikes the idea of Italian unity; Ernesto Masi's *Il Segreto del Re Carlo Alberto* (Bologna, 1891) is a very illuminating essay; Domenico Perrero, *Gli Ultimi Reali di Savoia* (Turin, 1889); L. Cappelletti, *Storia di Carlo Alberto* (Rome, 1891); Nicomede Bianchi, *Storia della diplomazia europea in Italia* (8 vols., Turin, 1865, &c.), a most important work of a general character, and the same author's *Scritti e lettere di Carlo Alberto* (Rome, 1879) and his *Storia della monarchia piemontese* (Turin, 1877); Count S. della Margherita, *Memorandum storico-politico* (Turin, 1851).

CHARLES AUGUSTUS [KARL AUGUST] (1757–1828), grand-duke of Saxe-Weimar, son of Constantine, duke of Saxe-Weimar-Eisenach, and Anna Amalia of Brunswick, was born on the 3rd of September 1757. His father died when he was only nine months old, and the boy was brought up under the regency and supervision of his mother, a woman of enlightened but masterful temperament. His governor was Count Eustach von Görz, a German nobleman of the old strait-laced school; but a more humane element was introduced into his training when, in 1771, Wieland was appointed his tutor. In 1774 the poet Karl Ludwig von Knebel came to Weimar as tutor to the young Prince Constantine; and in the same year the two princes set out, with Count Görz and Knebel, for Paris. At Frankfort, Knebel introduced Karl August to the young Goethe: the beginning of a momentous friendship. In 1775 Karl August returned to Weimar, and the same year came of age and married Princess Louise of Hesse-Darmstadt.

One of the first acts of the young grand-duke was to summon Goethe to Weimar, and in 1776 he was made a member of the privy council. "People of discernment," he said, "congratulate me on possessing this man. His intellect, his genius is known. It makes no difference if the world is offended because I have made Dr Goethe a member of my most important *collegium* without his having passed through the stages of minor official professor and councillor of state." To the undiscerning, the beneficial effect of this appointment was not at once apparent. With Goethe the "storm and stress" spirit descended upon Weimar, and the stiff traditions of the little court dissolved in a riot of youthful exuberance. The duke was a deep drinker, but also a good sportsman; and the revels of the court were alternated with break-neck rides across country, ending in nights spent round the camp fire under the stars. Karl August, however, had more serious tastes. He was interested in literature, in art, in science; critics, unsuspected of flattery, praised his judgment in painting; biologists found in him an expert in anatomy. Nor did he neglect the government of his little state. His reforms were the outcome of something more than the spirit of the

"enlightened despots" of the 18th century; for from the first he had realized that the powers of the prince to play "earthly providence" were strictly limited. His aim, then, was to educate his people to work out their own political and social salvation, the object of education being in his view, as he explained later to the dismay of Metternich and his school, to help men to "independence of judgment." To this end Herder was summoned to Weimar to reform the educational system; and it is little wonder that, under a patron so enlightened, the university of Jena attained the zenith of its fame, and Weimar became the intellectual centre of Germany.

Meanwhile, in the affairs of Germany and of Europe the character of Karl August gave him an influence out of all proportion to his position as a sovereign prince. He had early faced the problem presented by the decay of the Empire, and began to work for the unity of Germany. The plans of the emperor Joseph II., which threatened to absorb a great part of Germany into the heterogeneous Habsburg monarchy, threw him into the arms of Prussia, and he was the prime mover in the establishment of the league of princes (*Fürstenbund*) in 1785, by which, under the leadership of Frederick the Great, Joseph's intrigues were frustrated. He was, however, under no illusion as to the power of Austria, and he wisely refused the offer of the Hungarian crown, made to him in 1787 by Prussia at the instance of the Magyar malcontents, with the dry remark that he had no desire to be another "Winter King." In 1788 Karl August took service in the Prussian army as major-general in active command of a regiment. As such he was present, with Goethe, at the cannonade of Valmy in 1792, and in 1794 at the siege of Mainz and the battles of Pirmasenz (September 14) and Kaiserslautern (October 28-30). After this, dissatisfied with the attitude of the powers, he resigned; but rejoined on the accession of his friend King Frederick William III. to the Prussian throne. The disastrous campaign of Jena (1806) followed; on the 14th of October, the day after the battle, Weimar was sacked; and Karl August, to prevent the confiscation of his territories, was forced to join the Confederation of the Rhine. From this time till after the Moscow campaign of 1812 his contingent fought under the French flag in all Napoleon's wars. In 1813, however, he joined the Grand Alliance, and at the beginning of 1814 took the command of a corps of 30,000 men operating in the Netherlands.

At the congress of Vienna Karl August was present in person, and protested vainly against the narrow policy of the powers in confining their debates to the "rights of the princes" to the exclusion of the "rights of the people." His services in the war of liberation were rewarded with an extension of territory and the title of grand-duke; but his liberal attitude had already made him suspect, and his subsequent action brought him still further into antagonism to the reactionary powers. He was the first of the German princes to grant a liberal constitution to his state under Article XIII. of the Act of Confederation (May 5, 1816); and his concession of full liberty to the press made Weimar for a while the focus of journalistic agitation against the existing order. Metternich dubbed him contemptuously "der grosse Bursche" for his patronage of the "revolutionary" *Burschenschaften*; and the celebrated "festival" held at the Wartburg by his permission in 1818, though in effect the mildest of political demonstrations, brought down upon him the wrath of the great powers. Karl August, against his better judgment, was compelled to yield to the remonstrances of Prussia, Austria and Russia; the liberty of the press was again restricted in the grand-duchy, but, thanks to the good understanding between the grand-duke and his people, the régime of the Carlsbad Decrees pressed less heavily upon Weimar than upon other German states.

Karl August died on the 14th of June 1828. Upon his contemporaries of the most various types his personality made a great impression. Karl von Dalberg, the prince-primate, who owed the coadjutorship of Mainz to the duke's friendship, said that he had never met a prince "with so much understanding, character, frankness and true-heartedness"; the Milanese, when he visited their city, called him the "uomo principe"; and Goethe himself said of him "he had the gift of discriminating intellects and characters and setting each one in his place. He was inspired by the noblest good-will, the purest humanity, and with his whole soul desired only what was best. There was in him something of the divine. He would gladly have wrought the happiness of all mankind. And finally, he was greater than his surroundings.... Everywhere he himself saw and judged, and in all circumstances his surest foundation was in himself." He left two sons: Charles Frederick (d. 1853), by whom he was succeeded, and Bernhard, duke of Saxe-Weimar (1792–1862), a distinguished soldier, who, after the congress of Vienna, became colonel of a regiment in the service of the king of the Netherlands, distinguished himself as commander of the Dutch troops in the Belgian campaign of 1830, and from 1847 to 1850 held the command of the forces in the Dutch East Indies. Bernhard's son, William Augustus Edward, known as Prince Edward of Saxe-Weimar (1823–1902), entered the British army, served with much distinction in the Crimean War, and became colonel of the 1st Life Guards and a field marshal; in 1851 he contracted a morganatic marriage with Lady Augusta Gordon-Lennox (d. 1904), daughter of the 5th duke of Richmond and Gordon, who in Germany received the title of countess of Dornburg, but was granted the rank of princess in Great Britain by royal decree in 1866. Karl August's only daughter, Caroline, married Frederick Louis, hereditary grand-duke of Mecklenburg-Schwerin, and was the mother of Helene (1814–1858), wife of Ferdinand, duke of Orleans, eldest son of King Louis Philippe.

Karl August's correspondence with Goethe was published in 2 vols. at Weimar in 1863. See the biography by von Wegele in the *Allgem. deutsche Biographie*.

CHARLES EDWARD [CHARLES EDWARD LOUIS PHILIP CASIMIR STUART] (1720–1788), English prince, called the "Young Pretender" and also the "Young Chevalier," was born at Rome on December 31st, 1720. He was the grandson of King James II. of England and elder son of James, the "Old Pretender," by whom (as James III.) he was created at his birth prince of Wales, the title he bore among the English Jacobites during his father's lifetime. The young prince was educated at his father's miniature court in Rome, with James Murray, Jacobite earl of Dunbar, for his governor, and under various tutors, amongst whom were the learned Chevalier Ramsay, Sir Thomas Sheridan and the abbé Légoux. He quickly became conversant with the English, French and Italian languages, but all his extant letters written in English appear singularly ill-spelt and illiterate. In 1734 his cousin, the duke of Liria, afterwards duke of Berwick, who was proceeding to join Don Carlos in his struggle for the crown of Naples, passed through Rome. He offered to take Charles on his expedition, and the boy of thirteen, having been appointed general of artillery by Don Carlos, shared with credit the dangers of the successful siege of Gaeta.

The handsome and accomplished youth, whose doings were eagerly reported by the English ambassador at Florence and by the spy, John Walton, at Rome, was now introduced by his father and the pope to the highest Italian society, which he fascinated by the frankness of his manner and the grace and dignity of his bearing. In 1737 James despatched his son on a tour through the chief Italian cities, that his education as a prince and man of the world might be completed. The distinction with which he was received on his journey, the royal honours paid to him in Venice, and the jealous interference of the English ambassador in regard to his reception by the grand-duke of Tuscany, show how great was the respect in which the exiled house was held at this period by foreign Catholic powers, as well as the watchful policy of England in regard to its fortunes. The Old Pretender himself calculated upon foreign aid in his attempts to restore the monarchy of the Stuarts; and the idea of rebellion unassisted by invasion or by support of any kind from abroad was one which it was left for Charles Edward to endeavour to realize. Of all the European nations France was the one on which Jacobite hopes mainly rested, and the warm

sympathy which Cardinal Tencin, who had succeeded Fleury as French minister, felt for the Old Pretender resulted in a definite scheme for an invasion of England to be timed simultaneously with a prearranged Scottish rebellion. Charles was secretly despatched to Paris in January 1744. A squadron under Admiral Roquefeuil sailed from the coast of France. Transports containing 7000 troops, to be led by Marshal Saxe, accompanied by the young prince, were in readiness to set sail for England. A severe storm effected, however, a complete disaster without any actual engagement taking place.

The loss in ships of the line, in transports, and in lives was a crushing blow to the hopes of Charles, who remained in France for over a year in a retirement which he keenly felt. He had at Rome already made the acquaintance of Lord Elcho and of John Murray of Broughton; at Paris he had seen many supporters of the Stuart cause; he was aware that in every European court the Jacobites were represented in earnest intrigue; and he had now taken a considerable share in correspondence and other actual work connected with the promotion of his own and his father's interests. Although dissuaded by all his friends, on the 13th of July 1745 he sailed from Nantes for Scotland on board the small brig "La Doutelle," which was accompanied by a French man-of-war, the "Elisabeth," laden with arms and ammunition. The latter fell in with an English man-of-war, the "Lion," and had to return to France; Charles escaped during the engagement, and at length arrived on the 2nd of August off Erisca, a little island of the Hebrides. Receiving, however, but a cool reception from Macdonald of Boisdale, he set sail again and arrived at the bay of Lochnanuagh on the west coast of Inverness-shire.

The Macdonalds of Clanranald and Kinloch Moidart, along with other chieftains, again attempted to dissuade him from the rashness of an unaided rising, but they yielded at last to the enthusiasm and charm of his manner, and Charles landed on Scottish soil in the company of the "Seven Men of Moidart" who had come with him from France. Everywhere, however, he met with discouragement among the chiefs, whose adherence he wished to secure; but at last, by enlisting the support of Cameron of Lochiel, he gained a footing for a serious rebellion. With secrecy and speed communications were entered into with the known leaders of the Highland clans, and on the 19th of August, in the valley of Glenfinnan, the standard of James III. and VIII. was raised in the midst of a motley but increasing crowd. On the same day Sir John Cope at the head of 1500 men left Edinburgh in search of Charles; but, fearing an attack in the Pass of Corryarrick, he changed his proposed route to Inverness, and Charles thus had the undefended south country before him. In the beginning of September he entered Perth, having gained numerous accessions to his forces on his march. Crossing the Forth unopposed at the Fords of Frew and passing through Stirling and Linlithgow, he arrived within a few miles of the astonished metropolis, and on the 16th of September a body of his skirmishers defeated the dragoons of Colonel Gardiner in what was known as the "Canter of Coltbrig." His success was still further augmented by his being enabled to enter the city, a few of Cameron's Highlanders having on the following morning, by a happy ruse, forced their way through the Canongate. On the 18th he publicly proclaimed James VIII. of Scotland at the Market Cross and occupied Holyrood.

Cope had by this time brought his disappointed forces by sea to Dunbar. On the 20th Charles met and defeated him at Prestonpans, and returned to prosecute the siege of Edinburgh Castle, which, however, he raised on General Guest's threatening to lay the city in ruins. In the beginning of November Charles left Edinburgh, never to return. He was at the head of at least 6000 men; but the ranks were being gradually thinned by the desertion of Highlanders, whose traditions had led them to consider war merely as a raid and an immediate return with plunder. Having passed through Kelso, on the 9th of November he laid siege to Carlisle, which capitulated in a week. Manchester received the prince with a warm welcome and with 150 recruits under Francis Towneley. On the 4th of December he had reached Derby and was within ten days' march of London, where the inhabitants were terror-struck and a commercial panic immediately ensued. Two armies under English leadership were now in the field against him, one under Marshal Wade, whom he had evaded by entering England by the west, and the other under William, duke of Cumberland, who had returned from the continent. London was not to be supposed helpless in such an emergency; Manchester, Glasgow and Dumfries, rid of his presence, had risen against him, and Charles paused. There was division among his advisers and desertion among his men, and on the 6th of December he reluctantly was forced to begin his retreat northward. Closely pursued by Cumberland, he marched by way of Carlisle across the border, and at last stopped to invest Stirling Castle. At Falkirk, on the 17th of January 1746, he defeated General Hawley, who had marched from Edinburgh to intercept his retreat. A fortnight later, however, Charles raised the siege of Stirling, and after a weary though successful march rested his troops at Inverness. Having taken Forts George and Augustus, and after varying success against the supporters of the government in the north, he at last prepared to face the duke of Cumberland, who had passed the early spring at Aberdeen. On the 8th of April the duke marched thence to meet Charles, whose little army, exhausted with a futile night march, half-starving, and broken by desertion, was completely worsted at Culloden on the 16th of April 1746.

This decisive and cruel defeat sealed the fate of Charles Edward and the house of Stuart. Accompanied by the faithful Ned Burke and a few other followers, Charles at last gained the wild western coast. Hunted hither and thither, he wandered on foot or cruised restlessly in open boats among the many barren isles of the Scottish shore, enduring the greatest hardships with marvellous courage and cheerfulness. Charles, upon whose head a reward of £30,000 had a year before been set, was thus for over five months relentlessly pursued by the troops and spies of the government. Disguised in female attire and aided by a passport obtained by the devoted Flora Macdonald, he passed through Skye and parted from his gallant conductress at Portree. Towards the end of July he took refuge in the cave of Coiraghoth in the Braes of Glenmoriston, and in August he joined Lochiel and Cluny Macpherson, with whom he remained in hiding until the news was brought that two French ships were in waiting for him at the place of his first arrival in Scotland—Lochnanuagh. He embarked with speed and sailed for France, reaching the little port of Roscoff, near Morlaix, on the 29th of September 1746. He was warmly welcomed by Louis XV., and ere long he was again vigorously intriguing in Paris, and even in Madrid. So far as political assistance was concerned, his efforts proved fruitless, but he became at once the popular hero and idol of the people of Paris. So enraged was he with his brother Henry's acceptance of a cardinal's hat in July 1747, that he deliberately broke off communication with his father in Rome (who had approved the step), nor did he ever see him again. The enmity of the British government to Charles Edward made peace with France an impossibility so long as she continued to harbour the young prince. A condition of the treaty of Aix-la-Chapelle, concluded in October 1748, was that every member of the house of Stuart should be expelled the French dominions. Charles had forestalled the proclamation of the treaty by an indignant protest against its injustice, and a declaration that he would not be bound by its provisions. But his indignation and persistent refusal to comply with the request that he should voluntarily leave France had to be met at last with force: he was apprehended, imprisoned for a week at Vincennes, and on the 17th of December conducted to the French border. He lingered at Avignon; but the French, compelled to hard measures by the English, refused to be satisfied; and Pope Benedict XIV., alarmed by the threat of a bombardment of Civita Vecchia, advised the prince to withdraw. Charles quietly disappeared; for years Europe watched for him in vain. It is now established, almost with certainty, that he returned to the neighbourhood of Paris; and it is supposed that his residence was known to the French ministers, who, however, firmly

proclaimed their ignorance. In 1750, and again, it is thought, in 1754, he was in London, hatching futile plots and risking his safety for his hopeless cause, and even abjuring the Roman Catholic faith in order to further his political interests.

During the next ten years of his life Charles Edward's illicit connexion with Miss Clementina Walkinshaw (d. 1802), whom he had first met at Bannockburn House while conducting the siege of Stirling, his imperious fretful temper, his drunken habits and debauched life, could no longer be concealed. He wandered over Europe in disguise, alienating the friends and crushing the hopes of his party; and in 1766, on returning to Rome at the death of his father, he was treated by Pope Clement XIII. with coldness, and his title as heir to the British throne was openly repudiated by all the great Catholic powers. It was probably through the influence of the French court, still intriguing against England, that the marriage between Charles (now self-styled count of Albany) and Princess Louise of Stolberg was arranged in 1772. The union proved childless and unhappy, and in 1780 the countess fled for refuge from her husband's drunken violence to a convent in Florence, where Charles had been residing since 1774. Later, the countess of Albany (*q.v.*) threw herself on the protection of her brother-in-law Henry, Cardinal York, at Rome, and the formal separation between the ill-matched pair was finally brought about in 1784, chiefly through the kind offices of King Gustavus III. of Sweden. Charles, lonely, ill, and evidently near death, now summoned to Florence his natural daughter, Charlotte Stuart, the child of Clementina Walkinshaw, born at Liége in October 1753 and hitherto neglected by the prince. Charlotte Stuart, who was declared legitimate and created duchess of Albany, tended her father for the remaining years of his life, during which she contrived to reconcile the two Stuart brothers, so that in 1785 Charles returned to Rome, where he died in the old Palazzo Muti on the 30th of January 1788. He was buried in his brother's cathedral church at Frascati, but in 1807 his remains were removed to the *Grotte Vaticane* of St Peter's. His daughter Charlotte survived her father less than two years, dying unmarried at Bologna in November 1789, at the early age of thirty-six.

See A. C. Ewald, *Life and Times of Charles Stuart, the Young Pretender* (2 vols., 1875); C. S. Terry, *Life of the Young Pretender*, and *The Rising of 1745; with Bibliography of Jacobite History 1689–1788* (Scott. Hist. fr. Contemp. Writers, iii.) (1900); Earl Stanhope, *History of England* (1836) and *Decline of the Last Stuarts* (1854); Bishop R. Forbes, *The Lyon in Mourning* (1895–1896); Andrew Lang, *Pickle, the Spy* (1897), and *Prince Charles Edward* (1900); R. Chambers, *History of the Rebellion in Scotland*, &c. &c.

(H. M. V.)

CHARLES EMMANUEL I. [Carlo Emanuele] (1562–1630), duke of Savoy, succeeded his father, Emmanuel Philibert, in 1580. He continued the latter's policy of profiting by the rivalry of France and Spain in order to round off and extend his dominions. His three chief objects were the conquest of Geneva, of Saluzzo and of Monferrato. Saluzzo he succeeded in wresting from France in 1588. He intervened in the French religious wars, and also fought with Bern and other Swiss cantons, and on the murder of Henry III. of France in 1589 he aspired to the French throne on the strength of the claims of his wife Catherine, sister of Henry of Navarre, afterwards King Henry IV. In 1590 he sent an expedition to Provence in the interests of the Catholic League, and followed it himself later, but the peace of 1593, by which Henry of Navarre was recognized as king of France, put an end to his ambitions. In the war between France and Spain Charles sided with the latter, with varying success. Finally, by the peace of Lyons (1601), he gave up all territories beyond the Rhône, but his possession of Saluzzo was confirmed. He now meditated a further enterprise against Geneva; but his attempt to capture the city by treachery and with the help of Spain (the famous *escalade*) in 1602 failed completely. The next few years were filled with negotiations and intrigues with Spain and France which did not lead to any particular result, but on the death in 1612 of Duke Francesco Gonzaga of Mantua, who was lord of Monferrato, Charles Emmanuel made a successful *coup de main* on that district. This arrayed the Venetians, Tuscany, the Empire and Spain against him, and he was obliged to relinquish his conquest. The Spaniards invaded the duchy from Lombardy, and although the duke was defeated several times he fought bravely, gained some successes, and the terms of the peace of 1618 left him more or less in the *status quo ante*. We next find Charles Emmanuel aspiring to the imperial crown in 1619, but without success. In 1628 he was in alliance with Spain in the war against France; the French invaded the duchy, which, being abandoned by Spain, was overrun by their armies. The duke fought desperately, but was taken ill at Savigliano and died in 1630. He was succeeded by his son Victor Amedeo I., while his third son Tommaso founded the line of Savoy-Carignano from which the present royal house of Italy is descended. Charles Emmanuel achieved a great reputation as a statesman and warrior, and increased the prestige of Savoy, but he was too shifty and ingenious, and his schemes ended in disaster.

See E. Ricotti, *Storia della monarchia piemontese*, vols. iii. and iv. (Florence, 1865); T. Raulich, *Storia di Carlo Emanuele I.* (Milan, 1896–1902); G. Curti, *Carlo Emanuele I. secondo; più recenti studii* (Milan, 1894).

CHARLES MARTEL[1] (*c.* 688–741), Frankish ruler, was a natural son of Pippin II., mayor of the palace, and Chalpaïda. Charles was baptized by St Rigobert, bishop of Reims. At the death of his father in 714, Pippin's widow Plectrude claimed the government in Austrasia and Neustria in the name of her grandchildren, and had Charles thrown into prison. But the Neustrians threw off the Austrasian yoke and entered into an offensive alliance with the Frisians and Saxons. In the general anarchy Charles succeeded in escaping, defeated the Neustrians at Amblève, south of Liége, in 716, and at Vincy, near Cambrai, in 717, and forced them to come to terms. In Austrasia he wrested the power from Plectrude, and took the title of mayor of the palace, thus prejudicing the interests of his nephews. According to the Frankish custom he proclaimed a king in Austrasia in the person of the young Clotaire IV., but in reality Charles was the sole master—the entry in the annals for the year 717 being "Carolus regnare coepit." Once in possession of Austrasia, Charles sought to extend his dominion over Neustria also. In 719 he defeated Ragenfrid, the Neustrian mayor of the palace, at Soissons, and forced him to retreat to Angers. Ragenfrid died in 731, and from that time Charles had no competitor in the western kingdom. He obliged the inhabitants of Burgundy to submit, and disposed of the Burgundian bishoprics and countships to his *leudes*. In Aquitaine Duke Odo (Eudes) exercised independent authority, but in 719 Charles forced him to recognize the suzerainty of northern France, at least nominally. After the alliance between Charles and Odo on the field of Poitiers, the mayor of the palace left Aquitaine to Odo's son Hunald, who paid homage to him. Besides establishing a certain unity in Gaul, Charles saved it from a very great peril. In 711 the Arabs had conquered Spain. In 720 they crossed the Pyrenees, seized Narbonensis, a dependency of the kingdom of the Visigoths, and advanced on Gaul. By his able policy Odo succeeded in arresting their progress for some years; but a new vali, Abdur Rahman, a member of an extremely fanatical sect, resumed the attack, reached Poitiers, and advanced on Tours, the holy town of Gaul. In October 732—just 100 years after the death of Mahomet—Charles gained a brilliant victory over Abdur Rahman, who was called back to Africa by the revolts of the Berbers and had to give up the struggle. This was the last of the great Arab invasions of Europe. After his victory Charles took the offensive, and endeavoured to wrest Narbonensis from the Mussulmans. Although he was not successful in his attempt to recover Narbonne (737), he destroyed the fortresses of Agde, Béziers and Maguelonne, and set fire to the amphitheatre at Nîmes. He subdued also the Germanic tribes; annexed Frisia, where Christianity was beginning to make progress; put an end to the duchy of Alemannia; intervened in the internal affairs of the dukes of Bavaria; made expeditions into Saxony; and in 738 compelled some of the Saxon tribes to pay him tribute.

[1] Or "The Hammer."

He also gave St Boniface a safe conduct for his missions in Thuringia, Alemannia and Bavaria.

During the government of Charles Martel important changes appear to have been made in the internal administration. Under him began the great assemblies of nobles known as the *champs de Mars*. To attach his *leudes* Charles had to give them church lands as *precarium*, and this had a very great influence in the development of the feudal system. It was from the *precarium*, or ecclesiastical benefice, that the feudal fief originated. Vassalage, too, acquired a greater consistency at this period, and its rules began to crystallize. Under Charles occurred the first attempt at reconciliation between the papacy and the Franks. Pope Gregory III., menaced by the Lombards, invoked the aid of Charles (739), sent him a deputation with the keys of the Holy Sepulchre and the chains of St Peter, and offered to break with the emperor and Constantinople, and to give Charles the Roman consulate (*ut a partibus imperatoris recederet et Romanum consulatum Carolo sanciret*). This proposal, though unsuccessful, was the starting-point of a new papal policy. Since the death of Theuderich IV. in 737 there had been no king of the Franks. In 741 Charles divided the kingdom between his two sons, as though he were himself master of the realm. To the elder, Carloman, he gave Austrasia, Alemannia and Thuringia, with suzerainty over Bavaria; the younger, Pippin, received Neustria, Burgundy and Provence. Shortly after this division of the kingdom Charles died at Quierzy on the 22nd of October 741, and was buried at St Denis. The characters of Charles Martel and his grandson Charlemagne offer many striking points of resemblance. Both were men of courage and activity, and the two men are often confused in the *chansons de geste*.

See T. Breysig, *Jahrbücher d. fränk. Reichs, 714–741; die Zeit Karl Martells* (Leipzig, 1869); A. A. Beugnot, "Sur la spoliation des biens du clergé attribuée à Charles Martel," in the *Mém. de l'Acad. des Inscr. et Belles-Lettres*, vol. xix. (Paris, 1853); Ulysse Chevalier, *Bio-bibliographie* (2nd ed., Paris, 1904). (C. Pf.)

CHARLESTON, a city and the county-seat of Coles county, Illinois, U.S.A., in the E. part of the state, about 45 m. W. of Terre Haute, Indiana. Pop. (1900) 5488; (1910) 5884. It is served by the Cleveland, Cincinnati, Chicago & St Louis, and the Toledo, St Louis & Western railways, and by interurban electric lines. It is the seat of the Eastern Illinois state normal school (opened in 1899). The city is situated in an important broom-corn raising district, and has broom factories, a tile factory and planing mills. The water-works are owned and operated by the municipality. Charleston was settled about 1835, was incorporated in 1839, and was reincorporated in 1865. One of the Lincoln-Douglas debates was held here in 1858.

CHARLESTON, the largest city of South Carolina, U.S.A., the county-seat of Charleston county, a port of entry, and an important South Atlantic seaport, on a narrow peninsula formed by the Cooper river on the E. and the Ashley on the W. and S.W., and within sight of the ocean about 7 m. distant. Pop. (1890) 54,955; (1900) 55,807, of whom 31,522 were of negro descent and 2592 were foreign-born; (1910 census) 58,833. It is served by the Atlantic Coast Line and the Southern railways, the Clyde Steamship Line to New York, Boston and Jacksonville, the Baltimore & Carolina Steamship Co. to Baltimore and Georgetown, and a branch of the North German Lloyd Steamship Co., which brings immigrants from Europe direct to the Southern states; there are freight boat lines to ports in the West Indies, Central America and other foreign countries.

The city extends over 3.76 sq. m. of surface, nowhere rising more than 8 or 10 ft. above the rivers, and has about 9 m. of water front. In the middle of the harbour, on a small island near its entrance, is the famous Fort Sumter; a little to the north-east, on Sullivan's Island, is the scarcely less historic Fort Moultrie, as well as extensive modern fortifications; on James Island, opposite, is Fort Johnson, now the United States Quarantine Station, and farther up, on the other islands, are Fort Ripley and Castle Pinckney (now the United States buoy station). Viewed from any of these forts, Charleston's spires and public buildings seem to rise out of the sea. The streets are shaded with the live oak and the linden, and are ornamented with the palmetto; and the quaint specimens of colonial architecture, numerous pillared porticoes, spacious verandas—both upper and lower—and flower gardens made beautiful with magnolias, palmettoes, azaleas, jessamines, camelias and roses, give the city a peculiarly picturesque character.

King Street, running north and south through the middle of the peninsula, and Market Street, crossing it about 1 m. from its lower end, are lined with stores, shops or stalls; on Broad Street are many of the office buildings and banks; the wholesale houses are for the most part on Meeting Street, the first thoroughfare east of King; nearly all of the wharves are on the east side; the finest residences are at the lower end of the peninsula on East Battery and South Battery, on Meeting Street below Broad, on Legare Street, on Broad Street and on Rutledge Avenue to the west of King. At the south-east corner of Broad and Meeting streets is Saint Michael's (built in 1752–1761), the oldest church edifice in the city, and a fine specimen of colonial ecclesiastical architecture; in its tower is an excellent chime of eight bells. Beneath the vestry room lie the remains of Charles Cotesworth Pinckney, and in the churchyard are the graves of John Rutledge, James Louis Petigru (1789–1863), and Robert Young Hayne. At the intersection of the same streets are also the massive United States post office building (Italian Renaissance in style), with walls of granite; the county court house, the city hall and Washington Square—in which stand a statue of William Pitt (one arm of which was broken off by a cannon shot during the British bombardment in 1780), and a monument to the memory of Henry Timrod (1829–1867), the poet. At the foot of Broad Street is the Colonial Exchange in which the South Carolina convention organized a new government during the War of Independence; and at the foot of Market Street is the large modern custom house of white marble, built in the Roman-Corinthian style. Saint Philip's church, with admirable architectural proportions, has a steeple nearly 200 ft. in height, from which a beacon light shines for the guidance of mariners far out at sea. In the west cemetery of this church are the tombs of John C. Calhoun, and of Robert James Turnbull (1775–1833), who was prominent locally as a nullifier and under the name of "Brutus" wrote ably on behalf of nullification, free trade and state's rights. The French Protestant Church, though small, is an attractive specimen of Gothic architecture; and the Unitarian, which is in the Perpendicular style and is modelled after the chapel of Edward VI. in Westminster, has a beautiful fan-tracery ceiling.

Of the few small city squares, gardens or parks, the White Point Garden at the lower end of the peninsula is most frequented; it is shaded with beautiful live oaks, is adorned with palmettoes and commands a fine view of the harbour. About 1½ m. north of this on Meeting Street is Marion Square, with a tall graceful monument to the memory of John C. Calhoun on the south side, and the South Carolina Military Academy along the north border. The largest park in Charleston is Hampton Park, named in honour of General Wade Hampton. It is situated in the north-west part of the city and is beautifully laid out. The Isle of Palms, to the north of Sullivan's Island, has a large pavilion and a wide sandy beach with a fine surf for bathing, and is the most popular resort for visitors. The Magnolia Gardens are about 8 m. up the Ashley. Twenty-two miles beyond is the town of Summerville (pop. in 1900, 2420), a health resort in the pine lands, with one of the largest tea farms in the country. Magnolia Cemetery, the principal burial-place, is a short distance north of the city limits; in it are the graves of William Washington (1732–1810) and Hugh Swinton Legaré. Charleston was the home of the Pinckneys, the Rutledges, the Gadsdens, the Laurenses, and, in a later generation, of W. G. Simms. A trace of the early social organization of the brilliant colonial town remains in the St Cecilia Society, first formed in 1737 as an amateur concert society.

Charleston has an excellent system of public schools. Foremost among the educational institutions is the college of Charleston, chartered in 1785 and again in 1791, and opened in 1790;

it is supported by the city and by funds of its own, ranks high within the state, and has a large and well-equipped museum of natural history, probably founded as early as 1777 and transferred to the college in 1850. Here, too, are the Medical College of the state of South Carolina, which includes a department of pharmacy; the South Carolina Military Academy (opened in 1843), which is a branch of the University of South Carolina; the Porter Military Academy (Protestant Episcopal), the Confederate home school for young women, the Charleston University School, and the Avery Normal Institute (Congregationalist) for coloured students. In the Charleston library (about 25,000 volumes), founded in 1748, are important collections of rare books and manuscripts; the rooms of the South Carolina Historical Society are in the same building. The Charleston *News and Courier*, published first as the *Courier* in 1803 and combined with the *Daily News* (1865) in 1873, is one of the most influential newspapers in the South. The charitable institutions of the city include the Roper hospital, the Charleston Orphan Asylum (founded in 1792), the William Euston home for the aged, and a home for the widows of Confederate soldiers.

In 1878 the United States government began the construction of jetties to remove the bar at the entrance to Charleston harbour, which was otherwise deep and spacious and well protected, and by means of these jetties the bar has been so far removed as to admit vessels drawing about 30 ft. of water. The result has been not only the promotion of the city's commerce, but the removal of the United States naval station and navy yard from Port Royal to what was formerly Chicora Park on the left bank of the Cooper river, a short distance above the city limits. The city's commerce consists largely in the export of cotton,[1] rice, fertilizers, fruits, lumber and naval stores; the value of its exports, $10,794,000 in 1897, decreased to $2,196,596 in 1907 ($3,164,089 in 1908), while that of the import trade ($1,255,483 in 1897) increased to $3,840,585 in 1907 ($3,323,844 in 1908). The principal industries are the preparation of fertilizers—largely from the extensive beds of phosphate rock along the banks of the Ashley river and from cotton-seed meal—cotton compressing, rice cleaning, canning oysters, fruits and vegetables, and the manufacture of cotton bagging, of lumber, of cooperage goods, clothing and carriages and wagons. Between 1880 and 1890 the industrial development of the city was very rapid, the manufactures in 1890 showing an increase of 229·6% over those of 1880; the increase between 1890 and 1900 was only 6·2%. In 1900 the total value of the city's manufactures, 16·3% (in value) of the product of the entire state, was $9,562,387, the value of the fertilizer product alone, much the most important, being $3,697,090.[2]

History.—The first English settlement in South Carolina, established at Albemarle Point on the west bank of the Ashley river in 1670, was named Charles Town in honour of Charles II. The location proving undesirable, a new Charles Town on the site of the present city was begun about 1672, and the seat of government was removed to it in 1680. The name Charles Town became Charlestown about 1719 and Charleston in 1783. Among the early settlers were English Churchmen, New England Congregationalists, Scotch and Irish Presbyterians, Dutch and German Lutherans, Huguenots (especially in 1680–1688) from France and Switzerland, and a few Quakers; later the French element of the population was augmented by settlers from Acadia (1755) and from San Domingo (1793). Although it soon became the largest and the wealthiest settlement south of Philadelphia, Charleston did not receive a charter until 1783, and did not have even a township government. Local ordinances were passed by the provincial legislature and enforced partly by provincial officials and partly by the church wardens. It was, however, the political and social centre of the province, being not only the headquarters of the governor, council and colonial officials, but also the only place at which courts of justice were held until the complaints of the Up Country people led to the establishment of circuit courts in 1772. After the American War of Independence it continued to be the capital of South Carolina until 1790. The charter of 1783, though frequently amended and altered, is still in force. By an act of the state legislature passed in 1837 the terms "mayor" and "alderman" superseded the older terms "intendant" and "wardens." The city was the heart of the nullification movement of 1832–1833; and in St Andrew's Hall, in Broad Street, on the 20th of December 1860, a convention called by the state legislature passed an ordinance of secession from the Union.

Charleston has several times been attacked by naval forces and has suffered from many storms. Hurricane and epidemic together devastated the town both in 1699 and in 1854; the older and more thickly settled part of the town was burnt in 1740, and a hurricane did great damage in 1752. In 1706, during the War of the Spanish Succession, a combined fleet of Spanish and French under Captain Le Feboure was repulsed by the forces of Governor Nathaniel Johnson (d. 1713) and Colonel William Rhett (1666–1721). During the War of Independence Charleston withstood the attack of Sir Peter Parker and Sir Henry Clinton in 1776, and that of General Augustus Prevost in 1779, but shortly afterwards became the objective of a more formidable attack by Sir Henry Clinton, the commander-in-chief of the British forces in America. In the later years of the contest the British turned their attention to the reduction of the colonies in the south, and the prominent point and best base of operations in that section was the city of Charleston, which was occupied in the latter part of 1779 by an American force under General Benjamin Lincoln. In December of that year Sir Henry Clinton embarked from New York with 8000 British troops and proceeded to invest Charleston by land. He entrenched himself west of the city between the Cooper and Ashley rivers, which bound it north and south, and thus hemmed Lincoln in a *cul-de-sac*. The latter made the mistake of attempting to defend the city with an inferior force. Delays had occurred in the British operations and Clinton was not prepared to summon the Americans to surrender until the 10th of April 1780. Lincoln refused, and Clinton advanced his trenches to the third parallel, rendering his enemy's works untenable. On the 12th of May Lincoln capitulated. About 2000 American Continentals were made prisoners, and an equal number of militia and armed citizens. This success was regarded by the British as an offset against the loss of Burgoyne's army in 1777, and Charleston at once became the base of active operations in the Carolinas, which Clinton left Cornwallis to conduct. Thencefprward Charleston was under military rule until evacuated by the British on the 14th of December 1782.

The bombardment and capture of Fort Sumter (garrisoned by Federal troops) by the South Carolinians, on the 12th and 13th of April 1861, marked the actual beginning of the American Civil War. From 1862 onwards Charleston was more or less under siege by the Federal naval and military forces until 1865. The Confederates repulsed a naval attack made by the Federals under Admiral S. F. Du Pont in April 1863, and a land attack under General Q. A. Gillmore in June of the same year. They were compelled to evacuate the city on the 17th of February 1865, after having burned a considerable amount of cotton and other supplies to prevent them from falling into the hands of the enemy. After the Civil War the wealth and the population steadily increased, in spite of the destruction wrought by the earthquake of 31st August 1886 (see EARTHQUAKE). In that catastrophe 27 persons were killed, many more were injured and died subsequently, 90% of the buildings were injured, and property to the value of more than $5,000,000 was destroyed. The South Carolina Interstate and West Indian Exposition, held

[1] At an early date cotton became an important article in Charleston's commerce; some was shipped so early as 1747. At the outbreak of the Civil War Charleston was one of the three most important cotton-shipping ports in the United States, being exceeded in importance only by New Orleans and New York.

[2] The special census of 1905 dealt only with the factory product, that of 1905 ($6,007,094) showing an increase of 5·1% over that of 1900 ($5,713,315). In 1905 the (factory) fertilizer product of Charleston was $1,291,859, which represented more than 35% of the (factory) fertilizer product of the whole state.

here from the 1st of December 1901 to the 1st of June 1902, called the attention of investors to the resources of the city and state, but was not successful financially, and Congress appropriated $160,000 to make good the deficit.

Much information concerning Charleston may be obtained in A. S. Salley's *A Guide and Historical Sketch of Charleston* (Charleston, 1903), and in Mrs St Julien Ravenel's *Charleston; The Place and the People* (New York, 1906). The best history of Charleston is William A. Courtenay's *Charleston, S.C.: The Centennial of Incorporation* (Charleston, 1884). There is also a good sketch by Yates Snowden in L. P. Powell's *Historic Towns of the Southern States* (New York, 1900). For the earthquake see the account by Carl McKinley in the *Charleston Year-Book* for 1886. See also SOUTH CAROLINA.

CHARLESTON, the capital of West Virginia, U.S.A., and the county-seat of Kanawha county, situated near the centre of the state, on the N. bank of the Kanawha river, at the mouth of the Elk river, about 200 m. E. of Cincinnati, Ohio, and about 130 m. S.W. of Wheeling. Pop. (1890) 6742; (1900) 11,099, of whom 1787 were negroes, and 353 were foreign-born; (1910 census) 22,996. It is served by the Chesapeake & Ohio, the Toledo & Ohio Central, the Coal & Coke, and the Kanawha & West Virginia (39 m. to Blakeley) railways, and by several river transportation lines on the Kanawha river (navigable throughout the year by means of movable locks) connecting with Ohio and Mississippi river ports. The city is attractively built on high level land, above the river; in addition to a fine customs house, court house and high school, it contains the West Virginia state capitol, erected in 1880. The libraries include the state law library, with 14,000 volumes in 1908, and the library of the state Department of Archives and History, with about 11,000 volumes. Charleston is in the midst of a region rich in bituminous coal, the shipment of which by river and rail constitutes one of its principal industries. Oil wells in the vicinity also furnish an important product for export, and there are iron and salt mines near. An ample supply of natural gas is utilized by its manufacturing establishments; and among its manufactures are axes, lumber, foundry and machine shop products, furniture, boilers, woollen goods, glass and chemical fire-engines. The value of the city's factory products increased from $1,261,815 in 1900 to $2,728,074 in 1905, or 116.2%, a greater rate of increase than that of any other city (with 8000 or more inhabitants) in the state during this period. The first permanent white settlement at Charleston was made soon after the close of the War of Independence; it was one of the places through which the streams of immigrants entered the Ohio Valley, and it became of considerable importance as a centre of transfer and shipment, but it was not until the development of the coal-mining region that it became industrially important. Charleston was incorporated in 1794, and was chartered as a city in 1870. Since the latter year it has been the seat of government of West Virginia, with the exception of the decade 1875–1885, when Wheeling was the capital.

CHARLESTOWN, formerly a separate city of Middlesex county, Massachusetts, U.S.A., but since 1874 a part of the city of Boston, with which it had long before been in many respects practically one. It is situated on a small peninsula on Boston harbour, between the mouths of the Mystic and Charles rivers; the first bridge across the Charles, built in 1786, connected Charlestown and Boston. A United States navy yard (1800), occupying about 87 acres, and the Massachusetts state prison (1805) are here; the old burying-ground contains the grave of John Harvard and that of Thomas Beecher, the first American member of the famous Beecher family; and there is a soldiers' and sailors' monument (1872), designed by Martin Milmore. Charlestown was founded in 1628 or 1629, being the oldest part of Boston, and soon rose into importance; it was organized as a township in 1630, and was chartered as a city in 1847. Within its limits was fought, on the 17th of June 1775, the battle of Bunker Hill (*q.v.*), when Charlestown was almost completely destroyed by the British. The Bunker Hill Monument commemorates the battle; and the navy yard at Moulton's Point was the landing-place of the attacking British troops. Little was done toward the rebuilding of Charlestown until 1783. The original territory of the township was very large, and from parts of it were formed Woburn (1642), Malden (1649), Stoneham (1725), and Somerville (1842); other parts were annexed to Cambridge, to Medford and to Arlington. S. F. B. Morse, the inventor of the electric telegraph, was born here; and Charlestown was the birthplace and home of Nathaniel Gorham (1738–1796), a member of the Continental Congress in 1782–1783 and 1785–1787, and its president in 1786; and was the home of Loammi Baldwin (1780–1838), a well-known civil engineer; of Samuel Dexter (1761–1816), an eminent lawyer, secretary of war and for a short time secretary of the treasury in the cabinet of President John Adams; and of Oliver Holden (1765–1831), a composer of hymn-tunes, including "Coronation."

See R. Frothingham, *History of Charlestown* (Boston, 1845), covering 1629–1775; J. F. Hunnewell, *A Century of Town Life . . . 1775–1887* (Boston, 1888); and Timothy T. Sawyer, *Old Charlestown* (1902).

CHARLET, NICOLAS TOUSSAINT (1792–1845), French designer and painter, more especially of military subjects, was born in Paris on the 20th of December 1792. He was the son of a dragoon in the Republican army, whose death in the ranks left the widow and orphan in very poor circumstances. Madame Charlet, however, a woman of determined spirit and an extreme Napoleonist, managed to give her boy a moderate education at the Lycée Napoléon, and was repaid by his lifelong affection. His first employment was in a Parisian mairie, where he had to register recruits: he served in the National Guard in 1814, fought bravely at the Barrière de Clichy, and, being thus unacceptable to the Bourbon party, was dismissed from the mairie in 1816. He then, having from a very early age had a propensity for drawing, entered the atelier of the distinguished painter Baron Gros, and soon began issuing the first of those lithographed designs which eventually brought him renown. His "Grenadier de Waterloo," 1817, with the motto "La Garde meurt et ne se rend pas" (a famous phrase frequently attributed to Cambronne, but which he never uttered, and which cannot, perhaps, be traced farther than to this lithograph by Charlet), was particularly popular. It was only towards 1822, however, that he began to be successful in a professional sense. Lithographs (about 2000 altogether), water-colours, sepia-drawings, numerous oil sketches, and a few etchings followed one another rapidly; there were also three exhibited oil pictures, the first of which was especially admired—"Episode in the Campaign of Russia" (1836), the "Passage of the Rhine by Moreau" (1837), "Wounded Soldiers Halting in a Ravine" (1843). Besides the military subjects in which he peculiarly delighted, and which found an energetic response in the popular heart, and kept alive a feeling of regret for the recent past of the French nation and discontent with the present,—a feeling which increased upon the artist himself towards the close of his career,—Charlet designed many subjects of town life and peasant life, the ways of children, &c., with much wit and whim in the descriptive mottoes. One of the most famous sets is the "Vie civile, politique, et militaire du Caporal Valentin," 50 lithographs, dating from 1838 to 1842. In 1838 his health began to fail owing to an affection of the chest. He died in Paris on the 30th of October 1845. Charlet was an uncommonly tall man, with an expressive face, bantering and good natured; his character corresponded, full of boyish fun and high spirits, with manly independence, and a vein of religious feeling, and he was a hearty favourite among his intimates, one of whom was the painter Géricault. Charlet married in 1824, and two sons survived him.

A life of Charlet was published in 1856 by a military friend, De la Combe. (W. M. R.)

CHARLEVILLE, a town of north-eastern France, in the department of Ardennes, 151 m. N.E. of Paris on the Eastern railway. Pop. (1906) 19,693. Charleville is situated within a bend of the Meuse on its left bank, opposite Mézières, with which it is united by a suspension bridge. The town was founded in 1606 by Charles III. (Gonzaga), duke of Nevers, afterwards duke of Mantua, and is laid out on a uniform plan. Its central and most interesting portion is the Place Ducale, a large square

surrounded by old houses with high-pitched roofs, the porches being arranged so as to form a continuous arcade; in the centre there is a fountain surmounted by a statue of the duke Charles. A handsome church in the Romanesque style and the other public buildings date from the 19th century. An old mill, standing on the bank of the river, dates from the early years of the town's existence. On the right bank of the Meuse is Mont Olympe, with the ruins of a fortress dismantled under Louis XIV. Charleville, which shares with Mézières the administrative institutions of the department of Ardennes, has tribunals of first instance and of commerce, a chamber of commerce, a board of trade-arbitrators and lycées and training colleges for both sexes. Its chief industries are metal-founding and the manufacture of nails, anvils, tools and other iron goods, and brush-making; leather-working and sugar-refining, and the making of bricks and clay pipes are also carried on.

CHARLEVOIX, PIERRE FRANÇOIS XAVIER DE (1682–1761), French Jesuit traveller and historian, was born at St Quentin on the 29th of October 1682. At the age of sixteen he entered the Society of Jesus; and at the age of twenty-three was sent to Canada, where he remained for four years as professor at Quebec. He then returned and became professor of belles lettres at home, and travelled on the errands of his society in various countries. In 1720–1722, under orders from the regent, he visited America for the second time, and went along the Great Lakes and down the Mississippi. In later years (1733–1755) he was one of the directors of the *Journal de Trévoux*. He died at La Flèche on the 1st of February 1761. His works, enumerated in the *Bibliographie des Prèrs de la Compagnie de Jésus* (by Carlos Sommervogel), fall into two groups. The first contains his *Histoire de l'établissement, du progrès et de la décadence du Christianisme dans l'empire du Japon* (Rouen, 1715; English trans. *History of the Church of Japan*, 1715), and his *Histoire et description générale du Japon* (1736), a compilation chiefly from Kämpfer. The second group includes his historical work on America: *Histoire de l'Isle Espagnole ou de Saint Domingue* (1730), based on manuscript memoirs of P. Jean-Baptiste Le Pers and original sources; *Histoire de Paraguay* (1756); *Vie de la Mère Marie de l'Incarnation, institutrice et première supérieure des Urselines de la Nouvelle-France* (1724); *Histoire et description générale de la Nouvelle-France* (1744; in English 1769; tr. J. G. Shea, 1866–1872), a work of capital importance for Canadian history.

CHARLEVOIX, a village and the county-seat of Charlevoix county, Michigan, U.S.A., 16 m. E.S.E. of Petoskey, on Lake Michigan and Pine Lake, which are connected by Pine river and Round Lake. Pop. (1890) 1496; (1900) 2079; (1904) 2395; (1910) 2420. It is on the main line of the Père Marquette railway, and during the summer season is served by lake steamers. The village is best known as a summer resort; it is built on bluffs and on a series of terraces rising from Round and Pine lakes and affording extensive views; and there are a number of attractive summer residences. Charlevoix is an important hardwood lumber port, and the principal industries are the manufacture of lumber and of cement; fishing (especially for lake trout and white fish); the raising of sugar beets; and the manufacture of rustic and fancy wood-work. Charlevoix was settled about 1866, and was incorporated as a village in 1879.

CHARLOTTE, a city and the county-seat of Mecklenburg county, North Carolina, U.S.A., situated on Sugar Creek, in the south-west part of the state, about 175 m. south-west of Raleigh. Pop. (1890) 11,557; (1900) 18,091, of whom 7151 were negroes; (1910 census) 34,014. It is served by the Seaboard Air Line and the Southern railways. Among the public buildings are a fine city hall, court-house, Federal and Young Men's Christian Association buildings, and a Carnegie library; several hospitals: St Peter's (Episcopal) for whites, Good Samaritan (Episcopal) for negroes, Mercy General (Roman Catholic) and a Presbyterian. The city is the seat of Elizabeth College and Conservatory of Music (1897), a non-sectarian institution for women, of the Presbyterian College for women, and of Biddle University (Presbyterian) for negroes, established in 1867. There is a United States assay office, established as a branch mint in 1837, during the days of North Carolina's great importance as a gold producing state, and closed from 1861 to 1869. The city has large cotton, clothing, and knitting mills, and manufactories of cotton-seed oil, tools, machinery, fertilizers and furniture. The total value of its factory products was $4,849,630 in 1905. There are large electric power plants in and near the city. Printing and publishing are of some importance: Charlotte is the publication headquarters of the African Methodist Episcopal Zion Church; and several textile trade journals and two medical periodicals are published here. The water-works are owned by the municipality. Charlotte was settled about 1750 and was incorporated in 1768. Here in May 1775 was adopted the "Mecklenburg Declaration of Independence" (see NORTH CAROLINA), and in honour of its signers there is a monument in front of the court-house. Charlotte was occupied in September 1780 by Cornwallis, who left it after learning of the battle of King's Mountain, and subsequently it became the principal base and rendezvous of General Greene.

CHARLOTTENBURG, a town of Germany, in the kingdom of Prussia, on the Spree, lying immediately west of Berlin, of which it forms practically the entire western suburb. The earlier name of the town was Lietzenburg. Pop. (1890) 76,859; (1900) 189,290; (1905) 237,231. It is governed by a council of 94 members. The central part of the town is connected with Berlin by a magnificent avenue, the Charlottenburger Chaussee, which runs from the Brandenburger Tor through the whole length of the Tiergarten. Although retaining its own municipal government, Charlottenburg, together with the adjacent suburban towns of Schöneberg and Rixdorf, was included in 1900 in the police district of the capital. The Schloss, built in 1696 for the electress Sophie Charlotte, queen of the elector Frederick, afterwards King Frederick I., after whom the town was named, contains a collection of antiquities and paintings. In the grounds stands a granite mausoleum, the work of Karl Friedrich Schinkel, with beautiful white marble recumbent statues of Frederick William III. and his queen Louise by Christian Daniel Rauch, and also those of the emperor William I. and the empress Augusta by Erdmann Encke. It was in the Schloss that the emperor Frederick III. took over the reins of government in 1888, and here he resided for nearly the whole of his three months' reign. The town contains an equestrian statue of Frederick. Of public buildings, the famous technical academy and the Kaiser Wilhelm memorial church are referred to in the article BERLIN. In Charlottenburg is the Physikalisch-technische Reichsanstalt, a state institution for the carrying out of scientific experiments and measurements, and for testing instruments of precision, materials, &c. It was established in 1886 with money provided by Ernst Werner Siemens. In addition to the famous royal porcelain manufactory, Charlottenburg has many flourishing industries, notably iron-works grouped along the banks of the Spree. Its main thoroughfares are laid out on a spacious plan, while there are many quiet streets containing pretty villas.

See F. Schultz, *Chronik von Charlottenburg* (Charlottenburg, 1888).

CHARLOTTESVILLE, a city and the county-seat of Albemarle county, Virginia, U.S.A., picturesquely situated on the Rivanna river, 96 m. (by rail) N.W. of Richmond in the beautiful Piedmont region. Pop. (1890) 5591; (1900) 6449 (2613 being negroes); (1910) 6765. The city is served by the Chesapeake & Ohio, and the Southern railways, and is best known as the seat of the University of Virginia (*q.v.*), which was founded by Thomas Jefferson. Here are also the Rawlings Institute for girls, founded as the Albemarle Female Institute in 1857, and a University school. Monticello, Jefferson's home, is still standing about 2 m. south-east of the city on a fine hill, called Little Mountain until Jefferson Italianised the name. The south pavilion of the present house is the original brick building, one and a half storeys high, first occupied by Jefferson in 1770. He was buried near the house, which was sold by his daughter some years after his death. George Rogers Clark was born near Monticello. Charlottesville is a trade centre for the surrounding country; among its manufactures are woollen goods, overalls, agricultural implements and

cigars and tobacco. The city owns its water-supply system and owns and operates its gas plant; an electric plant, privately owned, lights the streets and many houses. The site of the city was a part of the Castle Hill estate of Thomas Walker (1715–1794), an intimate friend of George Washington. The act establishing the town of Charlottesville was passed by the Assembly of Virginia in November 1762, when the name Charlottesville (in honour of Queen Charlotte, wife of George III.) first appeared. In 1779–1780 about 4000 of Burgoyne's troops, surrendered under the "Convention" of Saratoga, were quartered here; in October 1780 part of them were sent to Lancaster, Pa., and later the rest were sent north. In June 1781 Tarleton raided Charlottesville and the vicinity, nearly captured Thomas Jefferson, and destroyed the public records and some arms and ammunition. In 1888 Charlottesville was chartered as a city administratively independent of the county.

CHARLOTTETOWN, a city of Canada, the capital of Prince Edward Island, situated in Queen's county, on Hillsborough river. Pop. (1901) 12,080. It has a good harbour, and the river is navigable by large vessels for several miles. The export trade of the island centres here, and the city has regular communication by steamer with the chief American and Canadian ports. Besides the government buildings and the court-house, it contains numerous churches, the Prince of Wales College, supported by the province, the Roman Catholic college of St Dunstan's and a normal school; among its manufactures are woollen goods, lumber, canned goods, and foundry products. The head office and workshops of the Prince Edward Island railway are situated here. The town was founded in 1750 by the French under the name of Port la Joie, but under British rule changed its name in honour of the queen of George III.

CHARM (through the Fr. from the Lat. *carmen*, a song), an incantation, verses sung with supposed magical results, hence anything possessing powers of bringing good luck or averting evil, particularly articles worn with that purpose, such as an amulet. It is thus used of small trinkets attached to bracelets or chains. The word is also used, figuratively, of fascinating qualities of feature, voice or character.

CHARNAY, (CLAUDE JOSEPH) DÉSIRÉ (1828–), French traveller and archaeologist, was born in Fleurie (Rhône), on the 2nd of May 1828. He studied at the Lycée Charlemagne, in 1850 became a teacher in New Orleans, Louisiana, and there became acquainted with John Lloyd Stephens's books of travel in Yucatan. He travelled in Mexico, under a commission from the French ministry of education, in 1857–1861; in Madagascar in 1863; in South America, particularly Chile and Argentina, in 1875; and in Java and Australia in 1878. In 1880–1883 he again visited the ruined cities of Mexico. Pierre Lorillard of New York contributed to defray the expense of this expedition, and Charnay named a great ruined city near the Guatemalan boundary line Ville Lorillard in his honour. Charnay went to Yucatan in 1886. The more important of his publications are *Le Mexique, souvenirs et impressions de voyage* (1863), being his personal report on the expedition of 1857–61, of which the official report is to be found in Viollet-le-Duc's *Cités et ruines américaines: Mitla, Palenqué, Izamal, Chichen-Itza, Uxmal* (1863), vol. 19 of *Recueil des voyages et des documents*; *Les Anciennes Villes du Nouveau Monde* (1885; English translation, *The Ancient Cities of the New World*, 1887, by Mmes. Gonino and Conant); a romance, *Une Princesse indienne avant la conquête* (1888); *À travers les forêts vierges* (1890); and *Manuscrit Ramirez: Histoire de l'origine des Indiens qui habitent la Nouvelle Espagne selon leurs traditions* (1903). He translated Cortez's letters into French, under the title *Lettres de Fernand Cortes à Charles-quint sur la découverte et la conquête du Mexique* (1896). He elaborated a theory of Toltec migrations and considered the prehistoric Mexican to be of Asiatic origin, because of observed similarities to Japanese architecture, Chinese decoration, Malaysian language and Cambodian dress, &c.

CHARNEL HOUSE (Med. Lat. *carnarium*), a place for depositing the bones which might be thrown up in digging graves. Sometimes, as at Gloucester, Hythe and Ripon, it was a portion of the crypt; sometimes, as at Old St Paul's and Worcester (both now destroyed), it was a separate building in the churchyard; sometimes chantry chapels were attached to these buildings. Viollet-le-Duc has given two very curious examples of such *ossuaires* (as the French call them)—one from Fleurance (Gers), the other from Faouët (Finistère).

CHARNOCK, JOB (d. 1693), English founder of Calcutta, went out to India in 1655 or 1656, apparently not in the East India Company's service, but soon joined it. He was stationed at Cossimbazar, and subsequently at Patna. In 1685 he became chief agent at Hugli. Being besieged there by the Mogul viceroy of Bengal, he put the company's goods and servants on board his light vessels and dropped down the river 27 m. to the village of Sutanati, a place well chosen for the purpose of defence, which occupied the site of what is now Calcutta. It was only, however, at the third attempt that Charnock finally settled down at this spot, and the selection of the future capital of India was entirely due to his stubborn resolution. He was a silent morose man, not popular among his contemporaries, but "always a faithfull Man to the Company." He is said to have married a Hindu widow.

CHARNOCK (or CHERNOCK), **ROBERT** (*c.*1663–1696), English conspirator, belonged to a Warwickshire family, and was educated at Magdalen College, Oxford, becoming a fellow of his college and a Roman Catholic priest. When in 1687 the dispute arose between James II. and the fellows of Magdalen over the election of a president Charnock favoured the first royal nominee, Anthony Farmer, and also the succeeding one, Samuel Parker, bishop of Oxford. Almost alone among the fellows he was not driven out in November 1687, and he became dean and then vice-president of the college under the new régime, but was expelled in October 1688. Residing at the court of the Stuarts in France, or conspiring in England, Charnock and Sir George Barclay appear to have arranged the details of the unsuccessful attempt to kill William III. near Turnham Green in February 1696. Barclay escaped, but Charnock was arrested, was tried and found guilty, and was hanged on the 18th of March 1696.

CHARNOCKITE, a series of foliated igneous rocks of wide distribution and great importance in India, Ceylon, Madagascar and Africa. The name was given by Dr T. H. Holland from the fact that the tombstone of Job Charnock, the founder of Calcutta, is made of a block of this rock. The charnockite series includes rocks of many different types, some being acid and rich in quartz and microcline, others basic and full of pyroxene and olivine, while there are also intermediate varieties corresponding mineralogically to norites, quartz-norites and diorites. A special feature, recurring in many members of the group, is the presence of strongly pleochroic, reddish or green hypersthene. Many of the minerals of these rocks are "schillerized," as they contain minute platy or rod-shaped enclosures, disposed parallel to certain crystallographic planes or axes. The reflection of light from the surfaces of these enclosures gives the minerals often a peculiar appearance, *e.g.* the quartz is blue and opalescent, the felspar has a milky shimmer like moonshine, the hypersthene has a bronzy metalloidal gleam. Very often the different rock types occur in close association as one set forms bands alternating with another set, or veins traversing it, and where one facies appears the others also usually are found. The term charnockite consequently is not the name of a rock, but of an assemblage of rock types, connected in their origin because arising by differentiation of the same parent magma. The banded structure which these rocks commonly present in the field is only in a small measure due to crushing, but is to a large extent original, and has been produced by fluxion in a viscous crystallizing intrusive magma, together with differentiation or segregation of the mass into bands of different chemical and mineralogical composition. There have also been, of course, earth movements acting on the solid rock at a later time and injection of dikes both parallel to and across the primary foliation. In fact, the history of the structures of the charnockite series is the history of the most primitive gneisses in all parts of the world, for which we cannot pretend to have as yet any thoroughly satisfactory explanations to offer. A striking fact is the very wide distribution of rocks of this group

in the southern hemisphere; but they also, or rocks very similar to them, occur in Norway, France, Germany, Scotland and North America, though in these countries they have been mostly described as pyroxene granulites, pyroxene gneisses, anorthosites, &c. They are usually regarded as being of Archean age (pre-Cambrian), and in most cases this can be definitely proved, though not in all. It is astonishing to find that in spite of their great age their minerals are often in excellent preservation. In India they form the Nilgiri Hills, the Shevaroys and part of the Western Ghats, extending southward to Cape Comorin and re-appearing in Ceylon. Although they are certainly for the most part igneous gneisses (or orthogneisses), rocks occur along with them, such as marbles, scapolite limestones, and corundum rocks, which were probably of sedimentary origin. (J. S. F.)

CHARNWOOD FOREST, an upland tract in the N.-W. of Leicestershire, England. It is undulating, rocky, picturesque, and in great part barren, though there are some extensive tracts of woodland; its elevation is generally 600 ft. and upwards, the area exceeding this height being about 6100 acres. The loftiest point, Bardon Hill, is 912 ft. On its western flank lies a coalfield, with Coalville and other mining towns, and granite and hone-stones are worked.

CHAROLLES, a town of east-central France, capital of an arrondissement in the department of Saône-et-Loire, situated at the confluence of the Semence and the Arconce, 39 m. W.N.W. of Mâcon on the Paris-Lyon railway. Pop. (1906) 3228. It has a sub-prefecture, tribunals of primary instance and commerce, and a communal college. There are stone quarries in the vicinity; the town manufactures pottery, and is the centre for trade in the famous breed of Charolais cattle and in agricultural products. The ruins of the castle of the counts of Charolais occupy the summit of a hill in the immediate vicinity of the town. Charolles was the capital of Charolais, an old division of France, which from the early 14th century gave the title of count to its possessors. In 1327 the countship passed by marriage to the house of Armagnac, and in 1390 it was sold to Philip of Burgundy. After the death of Charles the Bold, who in his youth had borne the title of count of Charolais, it was seized by Louis XI. of France, but in 1493 it was ceded by Charles VIII. to Maximilian of Austria, the representative of the Burgundian family. Ultimately passing to the Spanish kings, it became for a considerable period an object of dispute between France and Spain, until at length in 1684 it was assigned to the great Condé, a creditor of the king of Spain. It was united to the French crown in 1771.

CHARON, in Greek mythology, the son of Erebus and Nyx (Night). It was his duty to ferry over the Styx (or Acheron) those souls of the deceased who had duly received the rites of burial, in payment for which service he received an obol, which was placed in the mouth of the corpse. It was only exceptionally that he carried living passengers (*Aeneid*, vi. 295 ff.). As ferryman of the dead he is not mentioned in Homer or Hesiod, and in this character is probably of Egyptian origin. He is represented as a morose and grisly old man in a black sailor's cape. By the Etruscans he was also supposed to be a kind of executioner of the powers of the nether world, who, armed with an enormous hammer, was associated with Mars in the slaughter of battle. Finally he came to be regarded as the image of death and the world below. As such he survives in the Charos or Charontas of the modern Greeks—a black bird which darts down upon its prey, or a winged horseman who fastens his victims to the saddle and bears them away to the realms of the dead.

See J. A. Ambrosch, *De Charonte Etrusco* (1837), a learned and exhaustive monograph; B. Schmidt, *Volksleben der Neugriechen* (1871), i. 222-251; O. Waser, *Charon, Charun, Charos, mythologisch-archäologische Monographie* (1898); S. Rocco, "Sull' origine del Mito di Caronte," in *Rivista di storia antica*, ii. (1897), who considers Charon to be an old name for the sun-god Helios embarking during the night for the East.

CHARONDAS, a celebrated lawgiver of Catina in Sicily. His date is uncertain. Some make him a pupil of Pythagoras (*c.* 580–504 B.C.); but all that can be said is that he was earlier than Anaxilaus of Rhegium (494–476), since his laws were in use amongst the Rhegians until they were abolished by that tyrant. His laws, originally written in verse, were adopted by the other Chalcidic colonies in Sicily and Italy. According to Aristotle there was nothing special about these laws, except that Charondas introduced actions for perjury; but he speaks highly of the precision with which they were drawn up (*Politics*, ii. 12). The story that Charondas killed himself because he entered the public assembly wearing a sword, which was a violation of his own law, is also told of Diocles and Zaleucus (Diod. Sic. xii. 11-19). The fragments of laws attributed to him by Stobaeus and Diodorus are of late (neo-Pythagorean) origin.

See Bentley, *On Phalaris*, which (according to B. Niese *s.v.* in Pauly, *Realencyclopädie*) contains what is even now the best account of Charondas; A. Holm, *Geschichte Siciliens*, i.; F. D. Gerlach, *Zaleukos, Charondas, und Pythagoras* (1858); also art. GREEK LAW.

CHARPENTIER, FRANÇOIS (1620–1702), French archaeologist and man of letters, was born in Paris on the 15th of February 1620. He was intended for the bar, but was employed by Colbert, who had determined on the foundation of a French East India Company, to draw up an explanatory account of the project for Louis XIV. Charpentier regarded as absurd the use of Latin in monumental inscriptions, and to him was entrusted the task of supplying the paintings of Lebrun in the Versailles Gallery with appropriate legends. His verses were so indifferent that they had to be replaced by others, the work of Racine and Boileau, both enemies of his. Charpentier in his *Excellence de la langue française* (1683) had anticipated Perrault in the famous academical dispute concerning the relative merit of the ancients and moderns. He is credited with a share in the production of the magnificent series of medals that commemorate the principal events of the age of Louis XIV. Charpentier, who was long in receipt of a pension of 1200 livres from Colbert, was erudite and ingenious, but he was always heavy and commonplace. His other works include a *Vie de Socrate* (1650), a translation of the *Cyropaedia* of Xenophon (1658), and the *Traité de la peinture parlante* (1684).

CHARRIÈRE, AGNÈS ISABELLE ÉMILIE DE (1740–1805), Swiss author, was Dutch by birth, her maiden name being van Tuyll van Seeroskerken van Zuylen. She married in 1771 her brother's tutor, M. de Charrière, and settled with him at Colombier, near Lausanne. She made her name by the publication of her *Lettres neuchâteloises* (Amsterdam, 1784), offering a simple and attractive picture of French manners. This, with *Caliste, ou lettres écrites de Lausanne* (2 vols. Geneva, 1785–1788), was analysed and highly praised by Sainte-Beuve in his *Portraits de femmes* and in vol. iii of his *Portraits littéraires*. She wrote a number of other novels, and some political tracts; but is perhaps best remembered by her liaison with Benjamin Constant between 1787 and 1796.

Her letters to Constant were printed in the *Revue suisse* (April 1844), her *Lettres-Mémoires* by E. H. Gaullieur in the same review in 1857, and all the available material is utilized in a monograph on her and her work by P. Godet, *Madame de Charrière et ses amis* (2 vols., Geneva, 1906).

CHARRON, PIERRE (1541–1603), French philosopher, born in Paris, was one of the twenty-five children of a bookseller. After studying law he practised at Paris as an advocate, but, having met with no great success, entered the church, and soon gained the highest popularity as a preacher, rising to the dignity of canon, and being appointed preacher in ordinary to Marguerite, wife of Henry IV. of Navarre. About 1588, he determined to fulfil a vow which he had once made to enter a cloister; but being rejected by the Carthusians and the Celestines, he held himself absolved, and continued to follow his old profession. He delivered a course of sermons at Angers, and in the next year passed to Bordeaux, where he formed a famous friendship with Montaigne. At the death of Montaigne, in 1592, Charron was requested in his will to bear the Montaigne arms.

In 1594 Charron published (at first anonymously, afterwards under the name of "Benoit Vaillant, Advocate of the Holy Faith," and also, in 1594, in his own name) *Les Trois Vérités*, in which by methodical and orthodox arguments, he seeks to prove that there is a God and a true religion, that the true religion is the Christian, and that the true church is the Roman Catholic.

The last book (which is three-fourths of the whole work) is chiefly an answer to the famous Protestant work entitled *Le Traité de l'Église* by Du Plessis Mornay; and in the second edition (1595) there is an elaborate reply to an attack made on the third *Vérité* by a Protestant writer. *Les Trois Vérités* ran through several editions, and obtained for its author the favour of the bishop of Cahors, who appointed him grand vicar and theological canon. It also led to his being chosen deputy to the general assembly of the clergy, of which body he became chief secretary. It was followed in 1600 by *Discours chrestiens*, a book of sermons, similar in tone, half of which treat of the Eucharist. In 1601 Charron published at Bordeaux his third and most remarkable work—the famous *De la sagesse*, a complete popular system of moral philosophy. Usually, and so far correctly, it is coupled with the Essays of Montaigne, to which the author is under very extensive obligations. There is, however, distinct individuality in the book. It is specially interesting from the time when it appeared, and the man by whom it was written. Conspicuous as a champion of orthodoxy against atheists, Jews and Protestants—without resigning this position, and still upholding practical orthodoxy—Charron suddenly stood forth as the representative of the most complete intellectual scepticism. The *De la sagesse*, which represented a considerable advance on the standpoint of the *Trois Vérités*, brought upon its author the most violent attacks, the chief being by the Jesuit François Garasse (1585–1631), who described him as a "brutal atheist." It received, however, the warm support of Henry IV. and of the president Pierre Jeannin (1540–1622). A second edition was soon called for. In 1603, notwithstanding much opposition, it began to appear; but only a few pages had been printed when Charron died suddenly in the street of apoplexy. His death was regarded as a judgment for his impiety.

Charron's psychology is sensationalist. With sense all our knowledge commences, and into sense all may be resolved. The soul, located in the ventricles of the brain, is affected by the temperament of the individual; the dry temperament produces acute intelligence; the moist, memory; the hot, imagination. Dividing the intelligent soul into these three faculties, he shows—after the manner which Francis Bacon subsequently adopted—what branches of science correspond with each. With regard to the nature of the soul he merely quotes opinions. The belief in its immortality, he says, is the most universal of beliefs, but the most feebly supported by reason. As to man's power of attaining truth his scepticism is decided; and he plainly declares that none of our faculties enable us to distinguish truth from error. In comparing man with the lower animals, Charron insists that there are no breaks in nature. The latter have reason; nay, they have virtue; and, though inferior in some respects, in others they are superior. The estimate formed of man is not, indeed, flattering. His most essential qualities are vanity, weakness, inconstancy, presumption. Upon this view of human nature and the human lot Charron founds his moral system. Equally sceptical with Montaigne, and decidedly more cynical, he is distinguished by a deeper and sterner tone. Man comes into the world to endure; let him endure then, and that in silence. Our compassion should be like that of God, who succours the suffering without sharing in their pain. Avoid vulgar errors; cherish universal sympathy. Let no passion or attachment become too powerful for restraint. Follow the customs and laws which surround you. Morality has no connexion with religion. Reason is the ultimate criterion.

Special interest attaches to Charron's treatment of religion. He insists on the diversities in religions; he dwells also on what would indicate a common origin. All grow from small beginnings and increase by a sort of popular contagion; all teach that God is to be appeased by prayers, presents, vows, but especially, and most irrationally, by human suffering. Each is said by its devotees to have been given by inspiration. In fact, however, a man is a Christian, Jew, or Mahommedan, before he knows he is a man. One religion is built upon another. But while he openly declares religion to be "strange to common sense," the practical result at which Charron arrives is that one is not to sit in judgment on his faith, but to be "simple and obedient," and to allow himself to be led by public authority. This is one rule of wisdom with regard to religion; and another equally important is to avoid superstition, which he boldly defines as the belief that God is like a hard judge who, eager to find fault, narrowly examines our slightest act, that He is revengeful and hard to appease, and that therefore He must be flattered and importuned, and won over by pain and sacrifice. True piety, which is the first of duties, is, on the other hand, the knowledge of God and of one's self, the latter knowledge being necessary to the former. It is the abasing of man, the exalting of God,—the belief that what He sends is all good, and that all the bad is from ourselves. It leads to spiritual worship; for external ceremony is merely for our advantage, not for His glory. Charron is thus the founder of modern secularism. His political views are neither original nor independent. He pours much hackneyed scorn on the common herd, declares the sovereign to be the source of law, and asserts that popular freedom is dangerous.

A summary and defence of the *Sagesse*, written shortly before his death, appeared in 1606. In 1604 his friend Michel de la Roche-maillet prefixed to an edition of the *Sagesse* a Life, which depicts Charron as a most amiable man of purest character. His complete works, with this Life, were published in 1635. An excellent abridgment of the *Sagesse* is given in Tennemann's *Philosophie*, vol. ix.; an edition with notes by A. Duval appeared in 1820.

See Liebscher, *Charron u. sein Werk, De la sagesse* (Leipzig, 1890); H. T. Buckle, *Introd. to History of Civilization in England*, vol. ii. 19; Abbé Lezat, *De la prédication sous Henri IV.* c. vi.; J. M. Robertson, *Short History of Free Thought* (London, 1906), vol. ii. p. 19; J. Owen, *Skeptics of the French Renaissance* (1893); Lecky, *Rationalism in Europe* (1865).

CHARRUA, a tribe of South American Indians, wild and warlike, formerly ranging over Uruguay and part of S. Brazil. They were dark and heavily built, fought on horses and used the bolas or weighted lasso. They were always at war with the Spaniards, and Juan Diaz de Solis was killed by them in 1516. As a tribe they are now almost extinct, but the modern Gauchos of Uruguay have much Charrua blood in them.

CHART (from Lat. *carta*, *charta*, a map). A chart is a marine map intended specially for the use of seamen (for history, see MAP), though the word is also used loosely for other varieties of graphical representation. The marine or nautical chart is constructed for the purpose of ascertaining the position of a ship with reference to the land, of finding the direction in which she has to steer, the distance to sail or steam, and the hidden dangers to avoid. The surface of the sea on charts is studded with numerous small figures. These are known as the *soundings*, indicating in fathoms or in feet (as shown upon the title of the chart), at low water of ordinary spring tides, the least depth of water through which the ship may be sailing. Charts show the nature of the unseen bottom of the sea—with the irregularities in its character in the shape of hidden rocks or sand-banks, and give information of the greatest importance to the mariner. No matter how well the land may be surveyed or finely delineated, unless the soundings are shown a chart is of little use.

The British admiralty charts are compiled, drawn and issued by the hydrographic office. This department of the admiralty was established under Earl Spencer by an order in council in 1795, consisting of the hydrographer, one assistant and a draughtsman. The first hydrographer was Alexander Dalrymple, a gentleman in the East India Company's civil service. From this small beginning arose the important department which is now the main source of the supply of hydrographical information to the whole of the maritime world. The charts prepared by the officers and draughtsmen of the hydrographic office, and published by order of the lords commissioners of the admiralty, are compiled chiefly from the labours of British naval officers employed in the surveying service; and also from valuable contributions received from time to time from officers of the royal navy and mercantile marine. In addition to the work of British sailors, the labours of other nations have been collected and utilized. Charts of the coasts of Europe have naturally been taken from the surveys made by the various nations, and in charts of other quarters of the world considerable assistance has

been received from the labours of French, Spanish, Dutch and American surveyors. Important work is done by the Hydrographic Office of the American navy, and the U.S. Coast and Geodetic Survey. The admiralty charts are published with the view of meeting the wants of the sailor in all parts of the world. They may be classed under five heads, viz. ocean, general, and coast charts, harbour plans and physical charts; for instance, the Indian Ocean, the Mediterranean, approaches to Plymouth, Plymouth Sound and wind and current charts. The harbour plans and coast sheets are constructed on the simple principles of plane trigonometry by the surveying officers. (See SURVEYING: *Nautical.*) That important feature, the depth of the sea, is obtained by the ordinary sounding line or wire; all soundings are reduced to low water of ordinary spring tides. The times and heights of the tides, with the direction and velocity of the tidal streams, are also ascertained. These MS. charts are forwarded to the admiralty, and form the foundation of the hydrography of the world. The ocean and general charts are compiled and drawn at the hydrographic office, and as originals, existing charts, latest surveys and maps, have to be consulted, their compilation requires considerable experience and is a painstaking work, for the compiler has to decide what to omit, what to insert, and to arrange the necessary names in such a manner that while full information is given, the features of the coast are not interfered with. As a very slight error in the position of a light or buoy, dot, cross or figure, might lead to grave disaster, every symbol on the admiralty chart has been delineated with great care and consideration, and no pains are spared in the effort to lay before the public the labours of the nautical surveyors and explorers not only of England, but of the maritime world; reducing their various styles into a comprehensive system furnishing the intelligent seaman with an intelligible guide, which common industry will soon enable him to appreciate and take full advantage of.

As certain abbreviations are used in the charts, attention is called to the "signs and abbreviations adopted in the charts published by the admiralty." Certain parts of the world are still unsurveyed, or not surveyed in sufficient detail for the requirements that steamships now demand. Charts of these localities are therefore drawn in a light hair-line and unfinished manner, so that the experienced seaman sees at a glance that less trust is to be reposed upon charts drawn in this manner. The charts given to the public are only correct up to the time of their actual publication. They have to be kept up to date. Recent publications by foreign governments, newly reported dangers, changes in character or position of lights and buoys, are as soon as practicable inserted on the charts and due notice given of such insertions in the admiralty "Notices to Mariners."

The charts are supplemented by the *Admiralty Pilots*, or books of sailing directions, with tide tables, and lists of lighthouses, light vessels, &c., for the coasts to which a ship may be bound. The physical charts are the continuation of the work so ably begun by Maury of the United States and FitzRoy of the British navy, and give the sailor a good general idea of the world's ocean winds and currents at the different periods of the year; the probable tracks and seasons of the tropical revolving or cyclonic storms; the coastal winds; the extent or months of the rainy seasons; localities and times where ice may be fallen in with; and, lastly, the direction and force of the stream and drift currents of the oceans. (T. A. H.)

CHARTER (Lat. *charta*, *carta*, from Gr. χάρτης, originally for *papyrus*, material for writing, thence transferred to paper and from this material to the document, in O. Eng. *boc*, book), a written instrument, contract or convention by which cessions of sales of property or of rights and privileges are confirmed and held, and which may be produced by the grantees in proof of lawful possession. The use of the word for any written document is obsolete in England, but is preserved in France, *e.g.* the École des Chartes at Paris. In feudal times charters of privileges were granted, not only by the crown, but by mesne lords both lay and ecclesiastical, as well to communities, such as boroughs, gilds and religious foundations, as to individuals. In modern usage grants by charter have become all but obsolete, though in England this form is still used in the incorporation by the crown of such societies as the British Academy.

The grant of the Great Charter by King John in 1215 (see MAGNA CARTA), which guaranteed the preservation of English liberties, led to a special association of the word with constitutional privileges, and so in modern times it has been applied to constitutions granted by sovereigns to their subjects, in contradistinction to those based on "the will of the people." Such was the Charter (*Charte*) granted by Louis XVIII. to France in 1814. In Portugal the constitution granted by Dom Pedro in 1826 was called by the French party the "Charter," while that devised by the Cortes in 1821 was known as the "Constitution." Magna Carta also suggested to the English radicals in 1838 the name "People's Charter," which they gave to their published programme of reforms (see CHARTISM). This association of the idea of liberty with the word charter led to its figurative use in the sense of freedom or licence. This is, however, rare; the most common use being in the phrase "chartered libertine" (Shakespeare, *Henry V.* Act i. Sc. 1) from the derivative verb "to charter," *e.g.* to grant a charter. The common colloquialism "to charter," in the sense of to take, or hire, is derived from the special use of "to charter" as to hire (a ship) by charter-party.

CHARTERED COMPANIES. A chartered company is a trading corporation enjoying certain rights and privileges, and bound by certain obligations under a special charter granted to it by the sovereign authority of the state, such charter defining and limiting those rights, privileges and obligations, and the localities in which they are to be exercised. Such companies existed in early times, but have undergone changes and modifications in accordance with the developments which have taken place in the economic history of the states where they have existed. In Great Britain the first trading charters were granted, not to English companies, which were then non-existent, but to branches of the Hanseatic League (*q.v.*), and it was not till 1597 that England was finally relieved from the presence of a foreign chartered company. In that year Queen Elizabeth closed the steel-yard where Teutons had been established for 700 years.

The origin of all English trading companies is to be sought in the Merchants of the Staple. They lingered on into the 18th century, but only as a name, for their business was solely to export English products which, as English manufactures grew, were wanted at home. Of all early English chartered companies, the "Merchant Adventurers" conducted its operations the most widely. Itself a development of very early trading gilds, at the height of its prosperity it employed as many as 50,000 persons in the Netherlands, and the enormous influence it was able to exercise undoubtedly saved Antwerp from the institution of the Inquisition within its walls in the time of Charles V. In the reign of Elizabeth British trade with the Netherlands reached in one year 12,000,000 ducats, and in that of James I. the company's yearly commerce with Germany and the Netherlands was as much as £1,000,000. Hamburg afterwards was its principal depot, and it became known as the "Hamburg Company." In the "Merchant Adventurers'" enterprises is to be seen the germ of the trading companies which had so remarkable a development in the 16th and 17th centuries. These old regulated trade gilds passed gradually into joint-stock associations, which were capable of far greater extension, both as to the number of members and amount of stock, each member being only accountable for the amount of his own stock, and being able to transfer it at will to any other person.

It was in the age of Elizabeth and the early Stuarts that the chartered company, in the modern sense of the term, had its rise. The discovery of the New World, and the opening out of fresh trading routes to the Indies, gave an extraordinary impulse to shipping, commerce and industrial enterprise throughout western Europe. The English, French and Dutch governments were ready to assist trade by the granting of charters to trading associations. It is to the "Russia Company," which received its first charter in 1554, that Great Britain owed its first intercourse with an empire then almost unknown. The first recorded instance of a purely chartered company annexing territory is to be found in the action of this company in setting

up a cross at Spitzbergen in 1613 with King James's arms upon it. Among other associations trading to the continent of Europe, receiving charters at this time, were the Turkey Company (Levant Co.) and the Eastland Company. Both the Russia and Turkey Companies had an important effect upon British relations with those empires. They maintained British influence in those countries, and even paid the expenses of the embassies which were sent out by the English government to their courts. The Russia Company carried on a large trade with Persia through Russian territory; but from various causes their business gradually declined, though the Turkey Company existed in name until 1825.

The chartered companies which were formed during this period for trade with the Indies and the New World have had a more wide-reaching influence in history. The extraordinary career of the East India Company (*q.v.*) is dealt with elsewhere.

Charters were given to companies trading to Guinea, Morocco, Guiana and the Canaries, but none of these enjoyed a very long or prosperous existence, principally owing to the difficulties caused by foreign competition. It is when we turn to North America that the importance of the chartered company, as a colonizing rather than a trading agency, is seen in its full development. The "Hudson's Bay Company," which still exists as a commercial concern, is dealt with under its own heading, but most of the thirteen British North American colonies were in their inception chartered companies very much in the modern acceptation of the term. The history of these companies will be found under the heading of the different colonies of which they were the origin. It is necessary, however, to bear in mind that two classes of charters are to be found in force among the early American colonies: (1) Those granted to trading associations, which were often useful when the colony was first founded, but which formed a serious obstacle to its progress when the country had become settled and was looking forward to commercial expansion; the existence of these charters then often led to serious conflicts between the grantees of the charter and the colonies; ultimately elective assemblies everywhere superseded control of trading companies. (2) The second class of charters were those granted to the settlers themselves, to protect them against the oppressions of the crown and the provincial governors. These were highly prized by the colonists.

In France and Holland, no less than in England, the institution of chartered companies became a settled principle of the governments of those countries during the whole of the period in question. In France from 1599 to 1789, more than 70 of such companies came into existence, but after 1770, when the great *Compagnie des Indes orientales* went into liquidation, they were almost abandoned, and finally perished in the general sweeping away of privileges which followed on the outbreak of the Revolution.

If we inquire into the economic ideas which induced the granting of charters to these earlier companies and animated their promoters, we shall find that they were entirely consistent with the general principles of government at the time and what were then held to be sound commercial views. Under the old régime everything was a matter of monopoly and privilege, and to this state of things the constitution of the old companies corresponded, the sovereign rights accorded to them being also quite in accordance with the views of the time. It would have been thought impossible then that private individuals could have found the funds or maintained the magnitude of such enterprises. It was only this necessity which induced statesmen like Colbert to countenance them, and Montesquieu took the same view (*Esprit des lois*, t. xx. c. 10). John de Witt's view was that such companies were not useful for colonization properly so called, because they want quick returns to pay their dividends. So, even in France and Holland, opinion was by no means settled as to their utility. In England historic protests were made against such monopolies, but the chartered companies were less exclusive in England than in either France or Holland, the governors of provinces almost always allowing strangers to trade on receiving some pecuniary inducement. French commercial companies were more privileged, exclusive and artificial than those in Holland and England. Those of Holland may be said to have been national enterprises. French companies rested more than did their rivals on false principles; they were more fettered by the royal power, and had less initiative of their own, and therefore had less chance of surviving. As an example of the kind of rules which prevented the growth of the French companies, it may be pointed out that no Protestants were allowed to take part in them. State subventions, rather than commerce or colonization, were often their object; but that has been a characteristic of French colonial enterprise at all times.

Such companies, however, under the old commercial system could hardly have come into existence without exclusive privileges. Their existence might have been prolonged had the whole people in time been allowed the chance of participating in them.

To sum up the causes of failure of the old chartered companies, they are to be attributed to (1) bad administration; (2) want of capital and credit; (3) bad economic organization; (4) distribution of dividends made prematurely or fictitiously. But those survived the longest which extended the most widely their privileges to outsiders. According to contemporary protests, they had a most injurious effect on the commerce of the countries where they had their rise. They were monopolies, and therefore, of course, obnoxious; and it is undoubted that the colonies they founded only became prosperous when they had escaped from their yoke.

On the other hand, it must not be forgotten that they contributed in no small degree to the commercial progress of their own states. They gave colonies to the mother country, and an impulse to the development of its fleet. In the case of England and Holland, the enterprise of the companies saved them from suffering from the monopolies of Spain and Portugal, and the wars of the English, and those of the Dutch in the Indies with Spain and Portugal, were paid for by the companies. They furnished the mother country with luxuries which, by the 18th century, had become necessaries. They offered a career for the younger sons of good families, and sometimes greatly assisted large and useful enterprises.

During the last twenty years of the 19th century there was a great revival of the system of chartered companies in Great Britain. It is a feature of the general growth of interest in colonial expansion and commercial development which has made itself felt almost universally among European nations. Great Britain, however, alone has succeeded in establishing such companies as have materially contributed to the growth of her empire. These companies succeed or fail for reasons different from those which affected the chartered companies of former days, though there are points in common. Apart from causes inherent in the particular case of each company, which necessitates their being examined separately, recent experience leads us to lay down certain general principles regarding them. The modern companies are not like those of the 16th and 17th centuries. They are not privileged in the sense that those companies were. They are not monopolists; they have only a limited sovereignty, always being subject to the control of the home government. It is true that they have certain advantages given them, for without these advantages no capital would risk itself in the lands where they carry on their operations. They often have very heavy corresponding obligations, as will be seen in the case of one (the East Africa) where the obligations were too onerous for the company to discharge, though they were inseparable from its position. The charters of modern companies differ in two points strongly from those of the old: they contain clauses prohibiting any monopoly of trade, and they generally confer some special political rights directly under the control of the secretary of state. The political freedom of the old companies was much greater. In these charters state control has been made a distinguishing feature. It is to be exercised in almost all directions in which the companies may come into contact with matters political. Of course, it is inevitable in all disputes of the companies with foreign powers,

and is extended over all decrees of the company regarding the administration of its territories, the taxation of natives, and mining regulations. In all cases of dispute between the companies and the natives the secretary of state is *ex officio* the judge, and to the secretary of state (in the case of the South Africa Company) the accounts of administration have to be submitted for his approbation. It is deserving of notice that the British character of the company is insisted upon in each case in the charter which calls it into life. The crown always retains complete control over the company by reserving to itself the power of revoking the charter in case of the neglect of its stipulations. Special clauses were inserted in the charters of the British East Africa and South Africa Companies enabling the government to forfeit their charters if they did not promote the objects alleged as reasons for demanding a charter. This bound them still more strongly; and in the case of the South Africa Company the duration of the charter was fixed at twenty-five years.

The chartered company of these days is therefore very strongly fixed within limits imposed by law on its political action. As a whole, however, very remarkable results have been achieved. This may be attributed in no small degree to the personality of the men who have had the supreme direction at home and abroad, and who have, by their social position and personal qualities, acquired the confidence of the public. With the exception of the Royal Niger Company, it would be incorrect to say that they have been financially successful, but in the domain of government generally it may be said that they have added vast territories to the British empire (in Africa about 1,700,000 sq. m.), and in these territories they have acted as a civilizing force. They have made roads, opened facilities for trade, enforced peace, and laid at all events the foundation of settled administration. It is not too much to say that they have often acted unselfishly for the benefit of the mother country and even humanity. We may instance the anti-slavery and anti-alcohol campaigns which have been carried on, the latter certainly being against the immediate pecuniary interests of the companies themselves. It must, of course, be recognized that to a certain extent this has been done under the influence of the home government. The occupation of Uganda certainly, and of the Nigerian territory and Rhodesia probably, will prove to have been rather for the benefit of posterity than of the companies which effected it. In the two cases where the companies have been bought out by the state, they have had no compensation for much that they have expended. In fact, it would have been impossible to take into account actual expenditure day by day, and the cost of wars. To use the expression of Sir William Mackinnon, the shareholders have been compelled in some cases to "take out their dividends in philanthropy."

The existence of such companies to-day is justified in certain political and economic conditions only. It may be highly desirable for the government to occupy certain territories, but political exigencies at home will not permit it to incur the expenditure, or international relations may make such an undertaking inexpedient at the time. In such a case the formation of a chartered company may be the best way out of the difficulty. But it has been demonstrated again and again that, directly the company's interests begin to clash with those of foreign powers, the home government must assume a protectorate over its territories in order to simplify the situation and save perhaps disastrous collisions. So long as the political relations of such a company are with savages or semi-savages, it may be left free to act, but directly it becomes involved with a civilized power the state has (if it wishes to retain the territory) to acquire by purchase the political rights of the company, and it is obviously much easier to induce a popular assembly to grant money for the purpose of maintaining rights already existing than to acquire new ones. With the strict system of government supervision enforced by modern charters it is not easy for the state to be involved against its will in foreign complications. Economically such companies are also justifiable up to a certain point. When there is no other means of entering into commercial relations with remote and savage races save by enterprise of such magnitude that private individuals could not incur the risk involved, then a company may be well entrusted with special privileges for the purpose, as an inventor is accorded a certain protection by law by means of a patent which enables him to bring out his invention at a profit if there is anything in it. But such privileges should not be continued longer than is necessary for the purpose of reasonably recompensing the adventurers. A successful company, even when it has lost monopoly or privileges, has, by its command of capital and general resources, established so strong a position that private individuals or new companies can rarely compete with it successfully. That this is so is clearly shown in the case of the Hudson's Bay Company as at present constituted. In colonizing new lands these companies often act successfully. They have proved more potent than the direct action of governments. This may be seen in Africa, where France and England have of late acquired vast areas, but have developed them with very different results, acting from the opposite principles of private and state promotion of colonization. Apart from national characteristics, the individual has far more to gain under the British system of private enterprise. A strong point in favour of some of the British companies has been that their undertakings have been practically extensions of existing British colonies rather than entirely isolated ventures. But a chartered company can never be anything but a transition stage of colonization; sooner or later the state must take the lead. A company may act beneficially so long as a country is undeveloped, but as soon as it becomes even semi-civilized its conflicts with private interests become so frequent and serious that its authority has to make way for that of the central government.

The companies which have been formed in France during recent years do not yet afford material for profitable study, for they have been subject to so much vexatious interference from home owing to lack of a fixed system of control sanctioned by government, that they have not been able, like the British, to develop along their own lines.

See also BORNEO; NIGERIA; BRIT. EAST AFRICA; RHODESIA; &c.
The following works deal with the subject of chartered companies generally: Bonnassieux, *Les Grandes Compagnies de commerce* (Paris, 1892); Chailly-Bert, *Les Compagnies de colonisation sous l'ancien régime* (Paris, 1898); Cawston and Keane, *The Early Chartered Companies* (London, 1896); W. Cunningham, *A History of British Industry and Commerce* (Cambridge, 1890, 1892); Egerton, *A Short History of British Colonial Policy* (London, 1897); J. Scott Keltie, *The Partition of Africa* (London, 1895); Leroy-Beaulieu, *De la colonisation chez les peuples modernes* (Paris, 1898); *Les Nouvelles Sociétés anglo-saxonnes* (Paris, 1897); MacDonald, *Select Charters illustrative of American History, 1606–1775* (New York, 1899); B. P. Poore, *Federal and State Constitutions*, &c (Washington, 1877; a more complete collection of American colonial charters); H. L. Osgood, *American Colonies in the 17th Cent.* (1904-7); Carton de Wiart, *Les Grandes Compagnies coloniales anglaises au 19me siècle* (Paris, 1899). Also see articles "Compagnies de Charte," "Colonies," "Privilège," in *Nouveau Dictionnaire d'économie politique* (Paris, 1892); and article "Companies, Chartered," in *Encyclopaedia of the Laws of England*, edited by A. Wood Renton (London, 1907-1909). (W. B. Du.)

CHARTERHOUSE. This name is an English corruption of the French *maison chartreuse*, a religious house of the Carthusian order. As such it occurs not uncommonly in England, in various places (*e.g.* Charterhouse-on-Mendip, Charterhouse Hinton) where the Carthusians were established. It is most familiar, however, in its application to the Charterhouse, London. On a site near the old city wall, west of the modern thoroughfare of Aldersgate, a Carthusian monastery was founded in 1371 by Sir Walter de Manny, a knight of French birth. After its dissolution in 1535 the property passed through various hands. In 1558, while in the possession of Lord North, it was occupied by Queen Elizabeth during the preparations for her coronation, and James I. held court here on his first entrance into London. The Charterhouse was then in the hands of Thomas Howard, earl of Suffolk, but in May 1611 it came into those of Thomas Sutton (1532–1611) of Snaith, Lincolnshire. He acquired a fortune by the discovery of coal on two estates which he had leased near Newcastle-on-Tyne, and afterwards, removing to London, he carried on a commercial career. In the year of his death, which took place on the 12th of December 1611, he

endowed a hospital on the site of the Charterhouse, calling it the hospital of King James; and in his will he bequeathed moneys to maintain a chapel, hospital (almshouse) and school. The will was hotly contested but upheld in court, and the foundation was finally constituted to afford a home for eighty male pensioners (" gentlemen by descent and in poverty, soldiers that have borne arms by sea or land, merchants decayed by piracy or shipwreck, or servants in household to the King or Queen's Majesty "), and to educate forty boys. The school developed beyond the original intentions of its founder, and now ranks among the most eminent public schools in England. In 1872 it was removed, during the headmastership (1863–1897) of the Rev. William Haig-Brown (d. 1907), to new buildings near Godalming in Surrey, which were opened on the 18th of June in that year. The number of foundation scholarships is increased to sixty. The scholars are not now distinguished by wearing a special dress or by forming a separate house, though one house is known as Gownboys, preserving the former title of the scholars. The land on which the old school buildings stood in London was sold for new buildings to accommodate the Merchant Taylors' school, but the pensioners still occupy their picturesque home, themselves picturesque figures in the black gowns designed for them under the foundation. The buildings, of mellowed red brick, include a panelled chapel, in which is the founder's tomb, a fine dining-hall, governors' room with ornate ceiling and tapestried walls, the old library, and the beautiful great staircase.

CHARTER-PARTY (Lat. *charta partita*, a legal paper or instrument, " divided," *i.e.* written in duplicate so that each party retains half), a written, or partly written and partly printed, contract between merchant and shipowner, by which a ship is let or hired for the conveyance of goods on a specified voyage, or for a definite period. (See AFFREIGHTMENT.)

CHARTERS TOWERS, a mining town of Devonport county, Queensland, Australia, 82 m. by rail S.W. of Townsville and 820 m. direct N.N.W. of Brisbane. It is the centre of an important gold-field, the reefs of which improve at the lower depths, the deepest shaft on the field being 2558 ft. below the surface-level. The gold is of a very fine quality. An abundant water-supply is obtained from the Burdekin river, some 8 m. distant. The population of the town in 1901 was 5523; but within a 5 m. radius it was 20,976. Charters Towers became a municipality in 1877.

CHARTIER, ALAIN (*c.* 1392–*c.*1430), French poet and political writer, was born at Bayeux about 1392. Chartier belonged to a family marked by considerable ability. His eldest brother Guillaume became bishop of Paris; and Thomas became notary to the king. Jean Chartier, a monk of St Denis, whose history of Charles VII. is printed in vol. iii. of *Les Grands Chroniques de Saint-Denis* (1477), was not, as is sometimes stated, also a brother of the poet Alain studied, as his elder brother had done, at the university of Paris. His earliest poem is the *Livre des quatre dames*, written after the battle of Agincourt. This was followed by the *Débat du réveille-matin*, *La Belle Dame sans merci*, and others. None of these poems show any very patriotic feeling, though Chartier's prose is evidence that he was not indifferent to the misfortunes of his country. He followed the fortunes of the dauphin, afterwards Charles VII., acting in the triple capacity of clerk, notary and financial secretary. In 1422 he wrote the famous *Quadrilogue-invectif*. The interlocutors in this dialogue are France herself and the three orders of the state. Chartier lays bare the abuses of the feudal army and the sufferings of the peasants. He rendered an immense service to his country by maintaining that the cause of France, though desperate to all appearance, was not yet lost if the contending factions could lay aside their differences in the face of the common enemy. In 1424 Chartier was sent on an embassy to Germany, and three years later he accompanied to Scotland the mission sent to negotiate the marriage of Margaret of Scotland, then not four years old, with the dauphin, afterwards Louis XI. In 1429 he wrote the *Livre d'espérance*, which contains a fierce attack on the nobility and clergy. He was the author of a diatribe on the courtiers of Charles VII. entitled *Le Curial*, translated into English (*Here foloweth the copy of a lettre whyche maistre A. Charetier wrote to his brother*) by Caxton about 1484. The date of his death is to be placed about 1430. A Latin epitaph, discovered in the 18th century, says, however, that he was archdeacon of Paris, and declares that he died in the city of Avignon in 1449. This is obviously not authentic, for Alain described himself as a *simple clerc* and certainly died long before 1449. The story of the famous kiss bestowed by Margaret of Scotland on *la précieuse bouche de laquelle sont issus et sortis tant de bons mots et vertueuses paroles* is mythical, for Margaret did not come to France till 1436, after the poet's death; but the story, first told by Guillaume Bouchet in his *Annales d'Aquitaine* (1524), is interesting, if only as a proof of the high degree of estimation in which the ugliest man of his day was held. Jean de Masles, who annotated a portion of his verse, has recorded how the pages and young gentlemen of that epoch were required daily to learn by heart passages of his *Bréviaire des nobles*. John Lydgate studied him affectionately. His *Belle Dame sans merci* was translated into English by Sir Richard Ros about 1640, with an introduction of his own; and Clément Marot and Octavien de Saint-Gelais, writing fifty years after his death, find many fair words for the old poet, their master and predecessor.

See Mancel, *Alain Chartier, étude bibliographique et littéraire*, 8vo (Paris, 1849); D. Delaunay's *Étude sur Alain Chartier* (1876), with considerable extracts from his writings. His works were edited by A. Duchesne (Paris, 1617). On Jean Chartier see Vallet de Viriville, " Essais critiques sur les historiens originaux du règne de Charles VIII," in the *Bibl. de l'École des Chartes* (July–August 1857).

CHARTISM, the name given to a movement for political reform in England, from the so-called " People's Charter " or " National Charter," the document in which in 1838 the scheme of reforms was embodied. The movement itself may be traced to the latter years of the 18th century. Checked for a while by the reaction due to the excesses of the French Revolution, it received a fresh impetus from the awful misery that followed the Napoleonic wars and the economic changes due to the introduction of machinery. The Six Acts of 1819 were directed, not only against agrarian and industrial rioting, but against the political movement of which Sir Francis Burdett was the spokesman in the House of Commons, which demanded manhood suffrage, the ballot, annual parliaments, the abolition of the property qualification for members of parliament and their payment. The movement was checked for a while by the Reform Bill of 1832; but it was soon discovered that, though the middle classes had been enfranchised, the economic and political grievances of the labouring population remained unredressed. Two separate movements now developed: one socialistic, associated with the name of Robert Owen; the other radical, aiming at the enfranchisement of the " masses " as the first step to the amelioration of their condition. The latter was represented in the Working Men's Association, by which in 1838 the " People's Charter " was drawn up. It embodied exactly the same programme as that of the radical reformers mentioned above, with the addition of a demand for equal electoral districts.

In support of this programme a vigorous agitation began, the principal leader of which was Feargus O'Connor, whose irresponsible and erratic oratory produced a vast effect. Monster meetings were held, at which seditious language was occasionally used, and slight collisions with the military took place. Petitions of enormous size, signed in great part with fictitious names, were presented to parliament; and a great many newspapers were started, of which the *Northern Star*, conducted by Feargus O'Connor, had a circulation of 50,000. In November 1839 a Chartist mob consisting of miners and others made an attack on Newport, Mon. The rising was a total failure; the leaders, John Frost and two others, were seized, were found guilty of high treason, and were condemned to death. The sentence, however, was changed to one of transportation, and Frost spent over fourteen years in Van Diemen's Land. In 1854 he was pardoned, and from 1856 until his death on the 29th of July 1877 he lived in England. In 1840 the Chartist movement was still further organized by the inauguration at Manchester of the National

Charter Association, which rapidly became powerful, being the head of about 400 sister societies, which are said to have numbered 40,000 members. Some time after, efforts were made towards a coalition with the more moderate radicals, but these failed; and a land scheme was started by O'Connor, which prospered for a few years. In 1844 the uncompromising spirit of some of the leaders was well illustrated by their hostile attitude towards the Anti-Corn-Law League. O'Connor, especially, entered into a public controversy with Cobden and Bright, in which he was worsted. But it was not till 1848, during a season of great suffering among the working classes, and under the influence of the revolution at Paris, that the real strength of the Chartist movement was discovered and the prevalent discontent became known. Early in March disturbances occurred in Glasgow which required the intervention of the military, while in the manufacturing districts all over the west of Scotland the operatives were ready to rise in the event of the main movement succeeding. Some agitation, too, took place in Edinburgh and in Manchester, but of a milder nature; in fact, while there was a real and widespread discontent, men were indisposed to resort to decided measures.

The principal scene of intended Chartist demonstration was London. An enormous gathering of half a million was announced for the 10th of April on Kennington Common, from which they were to march to the Houses of Parliament to present a petition signed by nearly six million names, in order by this imposing display of numbers to secure the enactment of the six points. Probably some of the more violent members of the party thought to imitate the Parisian mob by taking power entirely into their own hands. The announcement of the procession excited great alarm, and the most decided measures were taken by the authorities to prevent a rising. The procession was forbidden. The military were called out under the command of the duke of Wellington, and by him concealed near the bridges and other points where the procession might attempt to force its way. Even the Bank of England and other public buildings were put in a state of defence, and special constables, to the number, it is said, of 170,000, were enrolled, one of whom was destined shortly after to be the emperor of the French. After all these gigantic preparations on both sides the Chartist demonstration proved to be a very insignificant affair. Instead of half a million, only about 50,000 assembled on Kennington Common, and their leaders, Feargus O'Connor and Ernest Charles Jones, shrank from the responsibility of braving the authorities by conducting the procession to the Houses of Parliament. The monster petition was duly presented, and scrutinized, with the result that the number of signatures was found to have been grossly exaggerated, and that the most unheard-of falsification of names had been resorted to. Thereafter the movement specially called Chartism soon died out. It became merged, so far as its political programme is concerned, with the advancing radicalism of the general democratic movement.

CHARTRES, a city of north-western France, capital of the department of Eure-et-Loir, 55 m. S.W. of Paris on the railway to Le Mans. Pop. (1906) 19,433. Chartres is built on the left bank of the Eure, on a hill crowned by its famous cathedral, the spires of which are a landmark in the surrounding country. To the south-east stretches the fruitful plain of Beauce, "the granary of France," of which the town is the commercial centre. The Eure, which at this point divides into three branches, is crossed by several bridges, some of them ancient, and is fringed in places by remains of the old fortifications, of which the Porte Guillaume (14th century), a gateway flanked by towers, is the most complete specimen. The steep, narrow streets of the old town contrast with the wide, shady boulevards which encircle it and divide it from the suburbs. The Clos St Jean, a pleasant park, lies to the north-west, and squares and open spaces are numerous. The cathedral of Notre-Dame (see ARCHITECTURE: *Romanesque and Gothic Architecture in France*; and CATHEDRAL), one of the finest Gothic churches in France, was founded in the 11th century by Bishop Fulbert on the site of an earlier church destroyed by fire. In 1194 another conflagration laid waste the new building then hardly completed; but clergy and people set zealously to work, and the main part of the present structure was finished by 1240. Though there have been numerous minor additions and alterations since that time, the general character of the cathedral is unimpaired. The upper woodwork was consumed by fire in 1836, but the rest of the building was saved. The statuary of the lateral portals, the stained glass of the 13th century, and the choir-screen of the Renaissance are all unique from the artistic standpoint. The cathedral is also renowned for the beauty and perfect proportions of its western towers. That to the south, the Clocher Vieux (351 ft. high), dates from the 12th century; its upper portion is lower and less rich in design than that of the Clocher Neuf (377 ft.), which was not completed till the 16th century. In length the cathedral measures 440 ft., its choir measures 150 ft. across, and the height of the vaulting is 121 ft. The abbey church of St Pierre, dating chiefly from the 13th century, contains, besides some fine stained glass, twelve representations of the apostles in enamel, executed about 1547 by Léonard Limosin. Of the other churches of Chartres the chief are St Aignan (13th, 16th and 17th centuries) and St Martin-au-Val (12th century). The hôtel de ville, a building of the 17th century, containing a museum and library, an older hôtel de ville of the 13th century, and several medieval and Renaissance houses, are of interest. There is a statue of General F. S. Marceau-Desgraviers (b. 1769), a native of the town.

The town is the seat of a bishop, a prefecture, a court of assizes, and has tribunals of first instance and of commerce, a chamber of commerce, training colleges, a lycée for boys, a communal college for girls, and a branch of the Bank of France. Its trade is carried on chiefly on market-days, when the peasants of the Beauce bring their crops and live-stock to be sold and make their purchases. The game-pies and other delicacies of Chartres are well known, and the industries also include flour-milling, brewing, distilling, iron-founding, leather manufacture, dyeing, and the manufacture of stained glass, billiard requisites, hosiery, &c.

Chartres was one of the principal towns of the Carnutes, and by the Romans was called *Autricum*, from the river *Autura* (Eure), and afterwards *civitas Carnutum*. It was burnt by the Normans in 858, and unsuccessfully besieged by them in 911. In 1417 it fell into the hands of the English, from whom it was recovered in 1432. It was attacked unsuccessfully by the Protestants in 1568, and was taken in 1591 by Henry IV., who was crowned there three years afterwards. In the Franco-German War it was seized by the Germans on the 21st of October 1870, and continued during the rest of the campaign an important centre of operations. During the middle ages it was the chief town of the district of Beauce, and gave its name to a countship which was held by the counts of Blois and Champagne and afterwards by the house of Châtillon, a member of which in 1286 sold it to the crown. It was raised to the rank of a duchy in 1528 by Francis I. After the time of Louis XIV. the title of duke of Chartres was hereditary in the family of Orleans.

See M. T. Bulteau, *Monographie de la cathédrale de Chartres* (1887); A. Plerval, *Chartres, sa cathédrale, ses monuments* (1896); H. J. L. J. Massé, *Chartres: its Cathedral and Churches* (1900).

CHARTREUSE, a liqueur, so called from having been made at the famous Carthusian monastery, La Grande Chartreuse, at Grenoble (see below). In consequence of the Associations Law, the Chartreux monks left France in 1904, and now continue the manufacture of this liqueur in Spain. There are two main varieties of Chartreuse, the green and the yellow. The green contains about 57, the yellow about 43% of alcohol. There are other differences due to the varying nature and quantity of the flavouring matters employed, but the secrets of manufacture are jealously guarded. The genuine liqueur is undoubtedly produced by means of a distillation process.

CHARTREUSE, LA GRANDE, the mother house of the very severe order of Carthusian monks (see CARTHUSIANS). It is situated in the French department of the Isère, about 12½ m. N. of Grenoble, at a height of 3205 ft. above the sea, in the heart of a group of limestone mountains, and not far from the source

of the Guiers Mort. The original settlement here was founded by St Bruno about 1084, and derived its name from the small village to the S.E., formerly known as Cartusia, and now as St Pierre de Chartreuse. The first convent on the present site was built between 1132 and 1137, but the actual buildings date only from about 1676, the older ones having been often burnt. The convent stands in a very picturesque position in a large meadow, sloping to the S.W., and watered by a tiny tributary of the Guiers Mort. On the north, fine forests extend to the Col de la Ruchère, and on the west rise well-wooded heights, while on the east tower white limestone ridges, culminating in the Grand Som (6670 ft.). One of the most famous of the early Carthusian monks was St Hugh of Lincoln, who lived here from 1160 to 1181, when he went to England to found the first Carthusian house at Witham in Somerset; in 1186 he became bishop of Lincoln, and before his death in 1200 had built the angel choir and other portions of the wonderful cathedral there.

The principal approach to the convent is from St Laurent du Pont, a village situated on the Guiers Mort, and largely built by the monks—it is connected by steam tramways with Voiron (for Grenoble) and St Béron (for Chambéry). Among the other routes may be mentioned those from Grenoble by Le Sappey, or by the Col de la Charmette, or from Chambéry by the Col de Couz and the village of Les Échelles. St Laurent is about 5½ m. from the convent. The road mounts along the Guiers Mort and soon reaches the hamlet of Fourvoirie, so called from *forata via*, as about 1510 the road was first pierced hence towards the convent. Here are iron forges, and here was formerly the chief centre of the manufacture of the famed Chartreuse liqueur. Beyond, the road enters the "Désert" and passes through most delightful scenery. Some way farther the Guiers Mort is crossed by the modern bridge of St Bruno, the older bridge of Parant being still visible higher up the stream. Here begins the splendid carriage road, constructed by M. E. Viaud between 1854 and 1856. It soon passes beneath the bold pinnacle of the Ocillette or Aiguillette, beyond which formerly women were not allowed to penetrate. After passing through four tunnels the road bends north (leaving the Guiers Mort which flows past St Pierre de Chartreuse), and the valley soon opens to form the upland hollow in which are the buildings of the convent. These are not very striking, the high roofs of dark slate, the cross-surmounted turrets and the lofty clock-tower being the chief features. But the situation is one of ideal peace and repose. Women were formerly lodged in the old infirmary, close to the main gate, which is now a hôtel. Within the conventual buildings are four halls formerly used for the reception of the priors of the various branch houses in France, Italy, Burgundy and Germany. The very plain and unadorned chapel dates from the 15th century, but the cloisters, around which cluster the thirty-six small houses for the fully professed monks, are of later date. The library contained before the Revolution a very fine collection of books and MSS., now mostly in the town library at Grenoble.

The monks were expelled in 1793, but allowed to return in 1816, but then they had to pay rent for the use of the buildings and the forests around, though both one and the other were due to the industry of their predecessors. They were again expelled in 1904, and are dispersed in various houses in England, at Pinerolo (Italy) and at Tarragona (Spain). It is at the last-named spot that the various pharmaceutical preparations are now manufactured for which they are famous (though sold only since about 1840)—the *Elixir*, the *Boule d'acier* (a mineral paste or salve), and the celebrated *liqueur*. The magnificent revenues derived from the profits of this manufacture were devoted by the monks to various purposes of benevolence, especially in the neighbouring villages, which owe to this source their churches, schools, hospitals, &c., &c., built and maintained at the expense of the monks.

See *La Grande Chartreuse par un Chartreux* (Grenoble, 1898); H. Ferrand, *Guide à la Grande Chartreuse* (1889); and *Les Montagnes de la Chartreuse* (1899). (W. A. B. C.)

CHARWOMAN, one who is hired to do occasional household work. "Char" or "chare," which forms the first part of the word, is common, in many forms, to Teutonic languages, meaning a "turn," and, in this original sense, is seen in "ajar," properly "on char," of a door "on the turn" in the act of closing. It is thus applied to a "turn of work," an odd job, and is so used, in the form "chore," in America, and in dialects of the south-west of England.

CHASE, SALMON PORTLAND (1808–1873), American statesman and jurist, was born in Cornish township, New Hampshire, on the 13th of January 1808. His father died in 1817, and the son passed several years (1820–1824) in Ohio with his uncle, Bishop Philander Chase (1775–1852), the foremost pioneer of the Protestant Episcopal Church in the West, the first bishop of Ohio (1819–1831), and after 1835 bishop of Illinois. He graduated at Dartmouth College in 1826, and after studying law under William Wirt, attorney-general of the United States, in Washington, D.C., was admitted to the bar in 1829, and removed to Cincinnati, Ohio, in 1830. Here he soon gained a position of prominence at the bar, and published an annotated edition, which long remained standard, of the laws of Ohio. At a time when public opinion in Cincinnati was largely dominated by Southern business connexions, Chase, influenced probably by James G. Birney, associated himself after about 1836 with the anti-slavery movement, and became recognized as the leader of the political reformers as opposed to the Garrisonian abolitionists. To the cause he freely gave his services as a lawyer, and was particularly conspicuous as counsel for fugitive slaves seized in Ohio for rendition to slavery under the Fugitive Slave Law of 1793—indeed, he came to be known as the "attorney-general of fugitive slaves." His argument (1847) in the famous Van Zandt case before the United States Supreme Court attracted particular attention, though in this as in other cases of the kind the judgment was against him. In brief he contended that slavery was "local, not national," that it could exist only by virtue of positive State Law, that the Federal government was not empowered by the Constitution to create slavery anywhere, and that "when a slave leaves the jurisdiction of a state he ceases to be a slave, because he continues to be a man and leaves behind him the law which made him a slave." In 1841 he abandoned the Whig party, with which he had previously been affiliated, and for seven years was the undisputed leader of the Liberty party in Ohio; he was remarkably skilful in drafting platforms and addresses, and it was he who prepared the national Liberty platform of 1843 and the Liberty address of 1845. Realizing in time that a third party movement could not succeed, he took the lead during the campaign of 1848 in combining the Liberty party with the Barnburners or Van Buren Democrats of New York to form the Free-Soilers. He drafted the famous Free-Soil platform, and it was largely through his influence that Van Buren was nominated for the presidency. His object, however, was not to establish a permanent new party organization, but to bring pressure to bear upon Northern Democrats to force them to adopt a policy opposed to the further extension of slavery.

In 1849 he was elected to the United States Senate as the result of a coalition between the Democrats and a small group of Free-Soilers in the state legislature; and for some years thereafter, except in 1852, when he rejoined the Free-Soilers, he classed himself as an Independent Democrat, though he was out of harmony with the leaders of the Democratic party. During his service in the Senate (1849–1855) he was pre-eminently the champion of anti-slavery in that body, and no one spoke more ably than he did against the Compromise Measures of 1850 and the Kansas-Nebraska Bill of 1854. The Kansas-Nebraska legislation, and the subsequent troubles in Kansas, having convinced him of the futility of trying to influence the Democrats, he assumed the leadership in the North-west of the movement to form a new party to oppose the extension of slavery. The "Appeal of the Independent Democrats in Congress to the People of the United States," written by Chase and Giddings, and published in the New York *Times* of the 24th of January 1854, may be regarded as the earliest draft of the Republican party creed. He was the first Republican governor of Ohio,

serving from 1855 to 1859. Although, with the exception of Seward, he was the most prominent Republican in the country, and had done more against slavery than any other Republican, he failed to secure the nomination for the presidency in 1860, partly because his views on the question of protection were not orthodox from a Republican point of view, and partly because the old line Whig element could not forgive his coalition with the Democrats in the senatorial campaign of 1849; his uncompromising and conspicuous anti-slavery record, too, was against him from the point of view of "availability." As secretary of the treasury in President Lincoln's cabinet in 1861–1864, during the first three years of the Civil War, he rendered services of the greatest value. That period of crisis witnessed two great changes in American financial policy, the establishment of a national banking system and the issue of a legal tender paper currency. The former was Chase's own particular measure. He suggested the idea, worked out all of the important principles and many of the details, and induced Congress to accept them. The success of that system alone warrants his being placed in the first rank of American financiers. It not only secured an immediate market for government bonds, but it also provided a permanent uniform national currency, which, though inelastic, is absolutely stable. The issue of legal tenders, the greatest financial blunder of the war, was made contrary to his wishes, although he did not, as he perhaps ought to have done, push his opposition to the point of resigning.

Perhaps Chase's chief defect as a statesman was an insatiable desire for supreme office. It was partly this ambition, and also temperamental differences from the president, which led him to retire from the cabinet in June 1864. A few months later (December 6, 1864) he was appointed chief justice of the United States Supreme Court to succeed Judge Taney, a position which he held until his death in 1873. Among his most important decisions were *Texas* v. *White* (7 Wallace, 700), 1869, in which he asserted that the Constitution provided for an "indestructible union composed of indestructible states," *Veazie Bank* v. *Fenno* (8 Wallace, 533), 1869, in defence of that part of the banking legislation of the Civil War which imposed a tax of 10% on state bank-notes, and *Hepburn* v. *Griswold* (8 Wallace, 603), 1869, which declared certain parts of the legal tender acts to be unconstitutional. When the legal tender decision was reversed after the appointment of new judges, 1871-1872 (Legal Tender Cases, 12 Wallace, 457), Chase prepared a very able dissenting opinion. Toward the end of his life he gradually drifted back toward his old Democratic position, and made an unsuccessful effort to secure the nomination of the Democratic party for the presidency in 1872. He died in New York city on the 7th of May 1873. Chase was one of the ablest political leaders of the Civil War period, and deserves to be placed in the front rank of American statesmen.

The standard biography is A. B. Hart's *Salmon Portland Chase* in the "American Statesmen Series" (1899). Less philosophical, but containing a greater wealth of detail, is J. W. Shuckers' *Life and Public Services of Salmon Portland Chase* (New York, 1874). R. B. Warden's *Account of the Private Life and Public Services of Salmon Portland Chase* (Cincinnati, 1874) deals more fully with Chase's private life.

CHASE, SAMUEL (1741–1811), American jurist, was born in Somerset county, Maryland, on the 17th of April 1741. He was admitted to the bar at Annapolis in 1761, and for more than twenty years was a member of the Maryland legislature. He took an active part in the resistance to the Stamp Act, and from 1774 to 1778 and 1784 to 1785 was a member of the Continental Congress. With Benjamin Franklin and Charles Carroll he was sent by Congress in 1776 to win over the Canadians to the side of the revolting colonies, and after his return did much to persuade Maryland to advocate a formal separation of the thirteen colonies from Great Britain, he himself being one of those who signed the Declaration of Independence on the 2nd of August 1776. In this year he was also a member of the convention which framed the first constitution for the state of Maryland. After serving in the Maryland convention which ratified for that state the Federal Constitution, and there vigorously opposing ratification, though afterwards he was an ardent Federalist, he became in 1791 chief judge of the Maryland general court, which position he resigned in 1796 for that of an associate justice of the Supreme Court of the United States. His radical Federalism, however, led him to continue active in politics, and he took advantage of every opportunity, on the bench and off, to promote the cause of his party. His overbearing conduct while presiding at the trials of John Fries for treason, and of James Thompson Callender (d. 1813) for seditious libel in 1800, drove the lawyers for the defence from the court, and evoked the wrath of the Republicans, who were stirred to action by a political harangue on the evil tendencies of democracy which he delivered as a charge to a grand jury at Baltimore in 1803. The House of Representatives adopted a resolution of impeachment in March 1804, and on the 7th of December 1804 the House managers, chief among whom were John Randolph, Joseph H. Nicholson (1770–1817), and Caesar A. Rodney (1772–1824), laid their articles of impeachment before the Senate. The trial, with frequent interruptions and delays, lasted from the 2nd of January to the 1st of March 1805. Judge Chase was defended by the ablest lawyers in the country, including Luther Martin, Robert Goodloe Harper (1765–1825), Philip Barton Key (1757–1815), Charles Lee (1758–1815), and Joseph Hopkinson (1770–1842). The indictment, in eight articles, dealt with his conduct in the Fries and Callender trials, with his treatment of a Delaware grand jury, and (in article viii.) with his making "highly indecent, extra-judicial" reflections upon the national administration, probably the greatest offence in Republican eyes. On only three articles was there a majority against Judge Chase, the largest, on article viii., being four short of the necessary two-thirds to convict. "The case," says Henry Adams, "proved impeachment to be an impracticable thing for partisan purposes, and it decided the permanence of those lines of constitutional development which were a reflection of the common law." Judge Chase resumed his seat on the bench, and occupied it until his death on the 19th of June 1811.

See *The Trial of Samuel Chase* (2 vols., Washington, 1805), reported by Samuel H. Smith and Thomas Lloyd; an article in *The American Law Review*, vol. xxxiii. (St Louis, Mo., 1899); and Henry Adams's *History of the United States*, vol. ii. (New York, 1889).

CHASE, WILLIAM MERRITT (1849–), American painter, was born at Franklin, Indiana, on the 1st of November 1849. He was a pupil of B. F. Hays at Indianapolis, of J. O. Eaton in New York, and subsequently of A. Wagner and Piloty in Munich. In New York he established a school of his own, after teaching with success for some years at the Art Students' League. A worker in all mediums—oils, water-colour, pastel and etching—painting with distinction the figure, landscape and still-life, he is perhaps best known by his portraits, his sitters numbering some of the most important men and women of his time. Mr Chase won many honours at home and abroad, became a member of the National Academy of Design, New York, and for ten years was president of the Society of American Artists. Among his important canvases are "Ready for the Ride" (Union League Club, N.Y.), "The Apprentice," "Court Jester," and portraits of the painters Whistler and Duveneck; of General Webb and of Peter Cooper.

CHASE. (1) (Fr. *chasse*, from Lat. *captare*, frequentative of *capere*, to take), the pursuit of wild animals for food or sport (see HUNTING). The word is used of the pursuit of anything, and also of the thing pursued, as, in naval warfare, of a ship. A transferred meaning is that of park land reserved for the breeding and hunting of wild animals, in which sense it appears in various place-names in England, as Cannock Chase. It is also a term for a stroke in tennis (*q.v.*). (2) (Fr. *châsse*, Lat. *capsa*, a box, cf. *caisse*, and "chest"), an enclosure, such as the muzzle-end of a gun in front of the trunnions, a groove cut to hold a pipe, and, in typography, the frame enclosing the "forme."

CHASING, or ENCHASING, the art of producing figures and ornamental patterns, either raised or indented, on metallic surfaces by means of steel tools or punches. It is practised

extensively for the ornamentation of goldsmith and silversmith work, electro-plate and similar objects, being employed to produce bold flutings and bosses, and in another manner utilized for imitating engraved surfaces. Minute work can be produced by this method, perfect examples of which may be seen in the watch-cases chased by G. M. Moser, R.A. (1704–1783). The chaser first outlines the pattern on the surface he is to ornament, after which, if the work involves bold or high embossments, these are blocked out by a process termed "snarling." The snarling iron is a long iron tool turned up at the end, and made so that when securely fastened in a vise the upturned end can reach and press against any portion of the interior of the vase or other object to be chased. The part to be raised being held firmly against the upturned point of the snarling iron, the workman gives the shoulder or opposite end of the iron a sharp blow, which causes the point applied to the work to give it a percussive stroke, and thus throw up the surface of the metal held against the tool. When the blocking out from the interior is finished, or when no such embossing is required, the object to be chased is filled with molten pitch, which is allowed to harden. It is then fastened to a sandbag, and with hammer and a multitude of small punches of different outline the whole details of the pattern, lined, smooth or "matt," are worked out. Embossing and stamping from steel dies and rolled ornaments have long since taken the place of chased ornamentations in the cheaper kinds of plated works. (See EMBOSSING.)

CHASLES, VICTOR EUPHÉMIEN PHILARÈTE (1798–1873), French critic and man of letters, was born at Mainvilliers (Eure et Loir) on the 8th of October 1798. His father, Pierre Jacques Michel Chasles (1754–1826), was a member of the Convention, and was one of those who voted the death of Louis XVI. He brought up his son according to the principles of Rousseau's *Émile*, and the boy, after a régime of outdoor life, followed by some years' classical study, was apprenticed to a printer, so that he might make acquaintance with manual labour. His master was involved in one of the plots of 1815, and Philarète suffered two months' imprisonment. On his release he was sent to London, where he worked for the printer Valpy on editions of classical authors. He wrote articles for the English reviews, and on his return to France did much to popularize the study of English authors. He was also one of the earliest to draw attention in France to Scandinavian and Russian literature. He contributed to the *Revue des deux mondes*, until he had a violent quarrel, terminating in a lawsuit, with François Buloz, who won his case. He became librarian of the Bibliothèque Mazarine, and from 1841 was professor of comparative literature at the Collège de France. During his active life he produced some fifty volumes of literary history and criticism, and of social history, much of which is extremely valuable. He died at Venice on the 18th of July 1873. His son, Émile Chasles (b. 1827), was a philologist of some reputation.

Among his best critical works is *Dix-huitième Siècle en Angleterre . . .* (1846), one of a series of 20 vols. of *Études de littérature comparée* (1846–1875), which he called later *Trente ans de critique*. An account of his strenuous boyhood is given in his *Maison de mon père*. His *Mémoires* (1876–1877) did not fulfil the expectations based on his brilliant talk.

CHASSE (from the Fr., in full *chasse-café*, or "coffee-chaser"), a draught of spirit or liqueur, taken with or after coffee, &c.

CHASSÉ (Fr. for "chased"), a gliding step in dancing, so called since one foot is brought up behind or chases the other. The *chassé croisé* is a double variety of the step.

CHASSELOUP-LAUBAT, FRANÇOIS, MARQUIS DE (1754–1833), French general and military engineer, was born at St Sernin (Lower Charente) on the 18th of August 1754, of a noble family, and entered the French engineers in 1774. He was still a subaltern at the outbreak of the Revolution, becoming captain in 1791. His ability as a military engineer was recognized in the campaigns of 1792 and 1793. In the following year he won distinction in various actions and was promoted successively *chef de bataillon* and colonel. He was chief of engineers at the siege of Mainz in 1796, after which he was sent to Italy. He there conducted the first siege of Mantua, and reconnoitred the positions and lines of advance of the army of Bonaparte. He was promoted general of brigade before the close of the campaign, and was subsequently employed in fortifying the new Rhine frontier of France. His work as chief of engineers in the army of Italy (1799) was conspicuously successful, and after the battle of Novi he was made general of division. When Napoleon took the field in 1800 to retrieve the disasters of 1799, he again selected Chasseloup as his engineer general. During the peace of 1801–1805 he was chiefly employed in reconstructing the defences of northern Italy, and in particular the afterwards famous Quadrilateral. His *chef-d'œuvre* was the great fortress of Alessandria on the Tanaro. In 1805 he remained in Italy with Masséna, but at the end of 1806 Napoleon, then engaged in the Polish campaign, called him to the *Grande Armée*, with which he served in the campaign of 1806–07, directing the sieges of Colberg, Danzig and Stralsund. During the Napoleonic domination in Germany, Chasseloup reconstructed many fortresses, in particular Magdeburg. In the campaign of 1809 he again served in Italy. In 1810 Napoleon made him a councillor of state. His last campaign was that of 1812 in Russia. He retired from active service soon afterwards, though in 1814 he was occasionally engaged in the inspection and construction of fortifications. Louis XVIII. made him a peer of France and a knight of St Louis. He refused to join Napoleon in the Hundred Days, but after the second Restoration he voted in the chamber of peers against the condemnation of Marshal Ney. In politics he belonged to the constitutional party. The king created him a marquis. Chasseloup's later years were employed chiefly in putting in order his manuscripts, a task which he had to abandon owing to the failure of his sight. His only published work was *Correspondance d'un général français, &c. sur divers sujets* (Paris, 1801, republished Milan, 1805 and 1811, under the title *Correspondance de deux généraux, &c., essais sur quelques parties d'artillerie et de fortification*). The most important of his papers are in manuscript in the Depôt of Fortifications, Paris.

As an engineer Chasseloup was an adherent, though of advanced views, of the old bastioned system. He followed in many respects the engineer Bousmard, whose work was published in 1797 and who fell, as a Prussian officer, in the defence of Danzig in 1807 against Chasseloup's own attack. His front was applied to Alessandria, as has been stated, and contains many elaborations of the bastion trace, with, in particular, masked flanks in the tenaille, which served as extra flanks of the bastions. The bastion itself was carefully and minutely retrenched. The ordinary ravelin he replaced by a heavy casemated caponier after the example of Montalembert, and, like Bousmard's, his own ravelin was a large and powerful work pushed out beyond the glacis.

CHASSEPOT, officially "fusil modèle 1866," a military breech-loading rifle, famous as the arm of the French forces in the Franco-German War of 1870–71. It was so called after its inventor, Antoine Alphonse Chassepot (1833–1905), who, from 1857 onwards, had constructed various experimental forms of breech-loader, and it became the French service weapon in 1866. In the following year it made its first appearance on the battlefield at Mentana (November 3rd, 1867), where it inflicted severe losses upon Garibaldi's troops. In the war of 1870 it proved very greatly superior to the German needle-gun. The breech was closed by a bolt very similar to those of more modern rifles, and amongst the technical features of interest were the method of obturation, which was similar in principle to the de Bange obturator for heavy guns (see ORDNANCE), and the retention of the paper cartridge. The principal details of the chassepot are:—weight of rifle, 9 lb 5 oz.; length with bayonet, 6 ft. 2 in.; calibre, ·433 in.; weight of bullet (lead), 386 grains; weight of charge (black powder), 86·4 grains; muzzle velocity, 1328 f.s.; sighted to 1312 yds. (1200 m.). The chassepot was replaced in 1874 by the Gras rifle, which had a metal cartridge, and all rifles of the older model remaining in store were converted to take the same ammunition (fusil modèle 1866/74).

CHASSÉRIAU, THÉODORE (1819–1856), French painter, was born in the Antilles, and studied under Ingres at Paris and

at Rome, subsequently falling under the influence of Paul Delaroche. He was a well-known painter of portraits and historical pieces, his "Tepidarium at Pompeii" (1853) being now in the Louvre.

CHASSIS (Fr. *châssis*, a frame, from the Late. Lat. *capsum*, an enclosed space), properly a window-frame, from which is derived the word "sash"; also the movable traversing frame of a gun, and more particularly that part of a motor vehicle consisting of the wheels, frame and machinery, on which the body or carriage part rests.

CHASTELARD, PIERRE DE BOCSOZEL DE (1540–1563), French poet, was born in Dauphiné, a scion of the house of Bayard. His name is inseparably connected with Mary, queen of Scots. From the service of the Constable Montmorency, Chastelard, then a page, passed to the household of Marshal Damville, whom he accompanied in his journey to Scotland in escort of Mary (1561). He returned to Paris in the marshal's train, but left for Scotland again shortly afterward, bearing letters of recommendation to Mary from his old protector, Montmorency, and the *Regrets* addressed to the ex-queen of France by Pierre Ronsard, his master in the art of song. He undertook to transmit to the poet the service of plate with which Mary rewarded him. But he had fallen in love with the queen, who is said to have encouraged his passion. Copies of verse passed between them; she lost no occasion of showing herself partial to his person and conversation. The young man hid himself under her bed, where he was discovered by her maids of honour. Mary pardoned the offence, and the old familiar terms between them were resumed. Chastelard was so rash as again to violate her privacy. He was discovered a second time, seized, sentenced and hanged the next morning. He met his fate valiantly and consistently, reading, on his way to the scaffold, his master's noble *Hymne de la mort*, and turning at the instant of doom towards the palace of Holyrood, to address to his unseen mistress the famous farewell—"Adieu, toi si belle et si cruelle, qui me tues et que je ne puis cesser d'aimer." This at least is the version of the *Mêmoires* of Brantôme, who is, however, notoriously untrustworthy. But for his madness of love, it is possible that Chastelard would have left no shadow or shred of himself behind. As it is, his life and death are of interest as illustrating the wild days in which his lot was cast.

CHASTELLAIN, GEORGES (d. 1475), Burgundian chronicler, was a native of Alost in Flanders. He derived his surname from the fact that his ancestors were burgraves or châtelains of the town; his parents, who belonged to illustrious Flemish families, were probably the Jean Chastellain and his wife Marie de Masmines mentioned in the town records in 1425 and 1432. A copy of an epitaph originally at Valenciennes states that he died on the 20th of March 1474-5 aged seventy. But since he states that he was so young a child in 1430 that he could not recollect the details of events in that year, and since he was "*écolier*" at Louvain in 1430, his birth may probably be placed nearer 1415 than 1405. He saw active service in the Anglo-French wars and probably elsewhere, winning the surname of *L'adventureux*. In 1434 he received a gift from Philip the Good, duke of Burgundy, for his military services, but on the conclusion of the peace of Arras in the next year he abandoned soldiering for diplomacy. The next ten years were spent in France, where he was connected with Georges de la Trémoille, and afterwards entered the household of Pierre de Brézé, at that time seneschal of Poitou, by whom he was employed on missions to the duke of Burgundy, in an attempt to establish better relations between Charles VII. and the duke. During these years Chastellain had ample opportunity of obtaining an intimate knowledge of French affairs, but on the further breach between the two princes, Chastellain left the French service to enter Philip's household. He was at first pantler, then carver, titles which are misleading as to the nature of his services, which were those of a diplomatist; and in 1457 he became a member of the ducal council. He was continually employed on diplomatic errands until 1455, when, owing apparently to ill-health, he received apartments in the palace of the counts of Hainaut at Salle-le-Comte, Valenciennes, with a considerable pension, on condition that the recipient should put in writing "*choses nouvelles et morales*," and a chronicle of notable events. That is to say, he was appointed Burgundian historiographer with a recommendation to write also on other subjects not strictly within the scope of a chronicler. From this time he worked hard at his *Chronique*, with occasional interruptions in his retreat to fulfil missions in France, or to visit the Burgundian court. He was assisted, from about 1463 onwards, by his disciple and continuator, Jean Molinet, whose rhetorical and redundant style may be fairly traced in some passages of the *Chronique*. Charles the Bold maintained the traditions of his house as a patron of literature, and showed special favour to Chastellain, who, after being constituted *indiciaire* or chronicler of the order of the Golden Fleece, was himself made a knight of the order on the 2nd of May 1473. He died at Valenciennes on the 13th of February (according to the treasury accounts), or on the 20th of March (according to his epitaph) 1475. He left an illegitimate son, to whom was paid in 1524 one hundred and twenty livres for a copy of the *Chronique* intended for Charles V.'s sister Mary, queen of Hungary. Only about one-third of the whole work, which extended from 1419 to 1474, is known to be in existence, but MSS. carried by the Habsburgs to Vienna or Madrid may possibly yet be discovered.

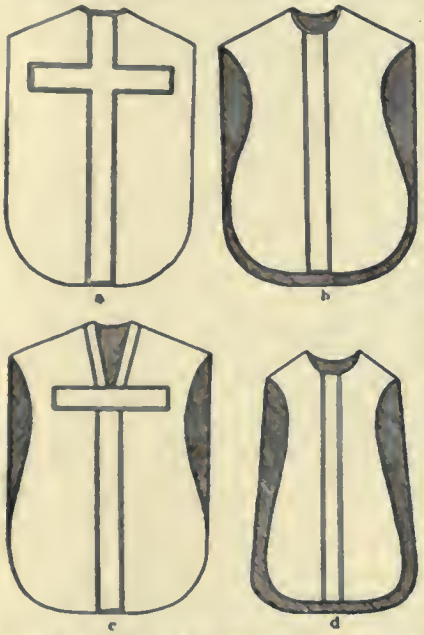
Among his contemporaries Chastellain acquired a great reputation by his poems and occasional pieces now little considered. The unfinished state of his *Chronique* at the time of his death, coupled with political considerations, may possibly account for the fact that it remained unprinted during the century that followed his death, and his historical work was only disinterred from the libraries of Arras, Paris and Brussels by the painstaking researches of M. Buchon in 1825. Chastellain was constantly engaged during the earlier part of his career in negotiations between the French and Burgundian courts, and thus had personal knowledge of the persons and events dealt with in his history. A partisan element in writing of French affairs was inevitable in a Burgundian chronicle. This defect appears most strongly in his treatment of Joan of Arc; and the attack on Agnes Sorel seems to have been dictated by the dauphin (afterwards Louis XI.), then a refugee in Burgundy, of whom he was afterwards to become a severe critic. He was not, however, misled, as his more picturesque predecessor Froissart had been, by feudal and chivalric tradition into misconception of the radical injustice of the English cause in France; and except in isolated instances where Burgundian interests were at stake, he did full justice to the patriotism of Frenchmen. Among his most sympathetic portraits are those of his friend Pierre de Brézé and of Jacques Cœur. His French style, based partly on his Latin reading, has, together with its undeniable vigour and picturesqueness, the characteristic redundance and rhetorical quality of the Burgundian school. Chastellain was no mere annalist, but proposed to fuse and shape his vast material to his own conclusions, in accordance with his political experience. The most interesting feature of his work is the skill with which he pictures the leading figures of his time. His "characters" are the fruit of acute and experienced observation, and abound in satirical traits, although the 42nd chapter of his second book, devoted expressly to portraiture, is headed "*Comment Georges escrit et mentionne les louanges vertueuses des princes de son temps.*"

The known extant fragments of Chastellain's *Chroniques* with his other works were edited by Kervyn de Lettenhove for the Brussels Academy in 1863–1866 (8 vols., Brussels) as *Œuvres de Georges Chastellain*. This edition includes all that had been already published by Buchon in his *Collection de chroniques* and *Choix de chroniques* (material subsequently incorporated in the *Panthéon littéraire*), and portions printed by Renard in his *Trésor national*, vol. i. and by Quicherat in the *Procès de la Pucelle* vol. iv. Kervyn de Lettenhove's text includes the portions of the chronicle covering the periods September 1419, October 1422, January 1430 to December 1431, 1451–1452, July 1454 to October 1458, July 1461 to July 1463, and, with omissions, June 1467 to September 1470; and three volumes of minor pieces of considerable interest, especially *Le Temple de Boccace*, dedicated to Margaret of Anjou, and the *Déprécation* for Pierre Brézé, imprisoned by Louis XI. In the case of these minor works the attribution to Chastellain is in some cases erroneous, notably in the case of the *Livre des faits de Jacques de Lalain*, which

is the work of Lefèbvre de Saint-Remi, herald of the Golden Fleece. In the allegorical *Oultré d'amour* it has been thought a real romance between Brézé and a lady of the royal house is concealed.

See A. Molinier, *Les Sources de l'histoire de France*; as well as notices by Kervyn de Lettenhove prefixed to the *Œuvres* and in the *Biographie nationale de Belgique*; and an article (three parts) by Vallet de Viriville in the *Journal des savants* (1867).

CHASUBLE (Fr. *chasuble*, Ger. *Kasel*, Span. *casulla*; Late Lat. *casula*, a little house, hut, from *casa*), a liturgical vestment of the Catholic Church. It is the outermost garment worn by bishops and priests at the celebration of the Mass, forming with the alb (*q.v.*) the most essential part of the eucharistic vestments. Since it is only used at the Mass, or rarely for functions intimately connected with the sacrament of the altar, it may be regarded as the Mass vestment *par excellence*. The chasuble is thus in a special sense the sacerdotal vestment, and at the ordination of priests, according to the Roman rite, the bishop places on the candidate a chasuble rolled up at the back (*planeta plicata*), with the words, "Take the sacerdotal robe, the symbol of love," &c.; at the end of the ordination Mass the vestment is unrolled. The chasuble or *planeta* (as it is called in the Roman missal), according to the prevailing model in the Roman Catholic Church, is a scapular-like cloak, with a hole in the middle for the head, falling down over breast and back, and leaving the arms uncovered at the sides. Its shape and size, however, differ considerably in various countries (see fig. 1), while some churches —*e.g.* those of certain monastic orders— have retained or reverted to the earlier "Gothic" forms to be described later. According to the decisions of the Congregation of Rites chasubles must not be of linen, cotton or woollen stuffs, but of silk; though a mixture of wool (or linen and cotton) and silk is allowed if the silk completely cover the other material on the outer side; spun glass thread, as a substitute for gold or silver thread, is also forbidden, owing to the possible danger to the priest's health through broken fragments falling into the chalice.



From Braun's *Liturgische Gewandung*, by permission of the publisher, B. Herder.

FIG. 1.—Comparative shape and size of Chasubles as now in use in various countries. *a*, *b*, German. *c*, Roman. *d*, Spanish.

The chasuble, like the kindred vestments (the φελόνιον, &c.) in the Eastern Churches, is derived from the Roman *paenula* or *planeta*, a cloak worn by all classes and both sexes in the Graeco-Roman world (see VESTMENTS). Though early used in the celebration of the liturgy it had for several centuries no specifically liturgical character, the first clear instances of its ritual use being in a letter of St Germanus of Paris (d. 576), and the next in the twenty-eighth canon of the Council of Toledo (633). Much later than this, however, it was still an article of everyday clerical dress, and as such was prescribed by the German council convened by Carloman and presided over by St Boniface in 742. Amalarius of Metz, in his *De ecclesiasticis officiis* (ii. 19), tells us in 816 that the *casula* is the *generale indumentum sacrorum ducum* and "is proper generally to all the clergy." It was not until the 11th century, when the cope (*q.v.*) had become established as a liturgical vestment, that the chasuble began to be reserved as special to the sacrifice of the Mass. As illustrating this process Father Braun (p. 170) cites an interesting correspondence between Archbishop Lanfranc of Canterbury and John of Avranches, archbishop of Rouen, as to the propriety of a bishop wearing a chasuble at the consecration of a church, Lanfranc maintaining as an established principle that the vestment should be reserved for the Mass. By the 13th century, with the final development of the ritual of the Mass, the chasuble became definitely fixed as the vestment of the celebrating priest; though to this day in the Roman Church relics of the earlier general use of the chasuble survive in the *planeta plicata* worn by deacons and subdeacons in Lent and Advent, and other penitential seasons.

At the Reformation the chasuble was rejected with the other vestments by the more extreme Protestants. Its use, however, survived in the Lutheran churches; and though in those of Germany it is no longer worn, it still forms part of the liturgical costume of the Scandinavian Evangelical churches. In the Church of England, though it was prescribed alternatively with the cope in the First Prayer-Book of Edward VI., it was ultimately discarded, with the other "Mass vestments," the cope being substituted for it at the celebration of the Holy Communion in cathedral and collegiate churches; its use has, however, during the last fifty years been widely revived in connexion with the reactionary movement in the direction of the pre-Reformation doctrine of the eucharist. The difficult question of its legality is discussed in the article VESTMENTS.

Form.—The chasuble was originally a tent-like robe which fell in loose folds below the knee (see Plate I. fig. 4). Its obvious inconvenience for celebrating the holy mysteries, however, caused its gradual modification. The object of the change was primarily to leave the hands of the celebrant freer for the careful performance of the manual acts, and to this end a process of cutting away at the sides of the vestment began, which continued until the tent-shaped chasuble of the 12th century had developed in the 16th into the scapular-like vestment at present in use. This process was, moreover, hastened by the substitution of costly and elaborately embroidered materials for the simple stuffs of which the vestment had originally been composed; for, as it became heavier and stiffer, it necessarily had to be made smaller. For the extremely exiguous proportions of some chasubles actually in use, which have been robbed of all the beauty of form they ever possessed, less respectable motives have sometimes been responsible, viz. the desire of their makers to save on the materials. The most beautiful form of the chasuble is undoubtedly the "Gothic" (see the figure of Bishop Johannes of Lübeck in the article VESTMENTS), which is the form most affected by the Anglican clergy, as being that worn in the English Church before the Reformation.

Decoration.—Though *planetae* decorated with narrow orphreys are occasionally met with in the monuments of the early centuries, these vestments were until the 10th century generally quite plain, and even at the close of this century, when the custom of decorating the chasuble with orphreys had become common, there was no definite rule as to their disposition; sometimes they were merely embroidered borders to the neck-opening or hem, sometimes a vertical strip down the back, less often a forked cross, the arms of which turned upwards over the shoulders. From this time onward, however, the embroidery became ever more and more elaborate, and with this tendency the orphreys were broadened to allow of their being decorated with figures. About the middle of the 13th century, the cross with horizontal arms begins to appear on the back of the vestment, and by the 15th this had become the most usual form, though the forked cross also survived—*e.g.* in England, where it is now considered distinctive of the chasuble as worn in the Anglican Church. Where the forked cross is used it is placed both on the back and front of the vestment; the horizontal-armed cross, on the other hand, is placed only on the back, the front being decorated with a vertical strip extending to the lower hem (fig. 1, *b*, *d*). Sometimes the back of the chasuble has no cross, but only a vertical orphrey, and in this case the front, besides the vertical stripe, has a horizontal orphrey just below

the neck opening (see Plate I. fig. 2). This latter is the type used in the local Roman Church, which has been adopted in certain dioceses in South Germany and Switzerland, and of late years in the Roman Catholic churches in England, *e.g.* Westminster cathedral (see Plate I. figs. 3 and 5).

It has been widely held that the forked cross was a conscious imitation of the archiepiscopal pallium (F. Bock, *Gesch. der liturg. Gewänder*, ii. 107), and that the chasuble so decorated is proper to archbishops. Father Braun, however, makes it quite clear that this was not the case, and gives proof that this decoration was not even originally conceived as a cross at all, citing early instances of its having been worn by laymen and even by non-Christians (p. 210). It was not until the 13th century that the symbolical meaning of the cross began to be elaborated, and this was still further accentuated from the 14th century onward by the increasingly widespread custom of adding to it the figure of the crucified Christ and other symbols of the Passion. This, however, did not represent any definite rule; and the orphreys of chasubles were decorated with a great variety of pictorial subjects, scriptural or drawn from the stories of the saints, while the rest of the vestment was either left plain or, if embroidered, most usually decorated with arabesque patterns of foliage or animals. The local Roman Church, true to its ancient traditions, adhered to the simpler forms. The modern Roman chasuble pictured in Plate I. fig. 5, besides the conventional arabesque pattern, is decorated, according to rule, with the arms of the archbishop and his see.

The Eastern Church.—The original equivalent of the chasuble is the phelonion (φελόνιον, φελόνης, φαινόλιον, from *paenula*). It is a full vestment of the type of the Western bell chasuble; but, instead of being cut away at the sides, it is for convenience' sake either gathered up or cut short in front. In the Armenian, Syrian, Chaldaean and Coptic rites it is cope-shaped. There is some difference of opinion as to the derivation of the vestment in the latter case; the Five Bishops (Report to Convocation, 1908) deriving it, like the cope, from the *birrus*, while Father Braun considers it, as well as the cope, to be a modification of the *paenula*.[1] The phelonion (Arm. *shurtshar*, Syr. *phaina*, Chald. *maaphra* or *phaina*, Copt. *burnos*, *felonion*, *kuklion*) is confined to the priests in the Armenian, Syrian, Chaldacan and Coptic rites; in the Greek rite it is worn also by the lectors. It is not in the East so specifically a eucharistic vestment as in the West, but is worn at other solemn functions besides the liturgy, *e.g.* marriages, processions, &c.

Until the 11th century the phelonion is always pictured as a perfectly plain dark robe, but at this period the custom arose of decorating the patriarchal phelonion with a number of crosses, whence its name of πολυσταύριον. By the 14th century the use of these polystauria had been extended to metropolitans and later still to all bishops. The purple or black phelonion, however, remained plain in all cases. The Greeks and Greek Melchite metropolitans now wear the *sakkos* instead of the phelonion; and in the Russian, Ruthenian, Bulgarian and Italo-Greek churches this vestment has superseded the phelonion in the case of all bishops (see DALMATIC and VESTMENTS).

See J. Braun, S.J., *Die liturgische Gewandung* (Freiburg im Breisgau, 1907), pp. 149-247, and the bibliography to the article VESTMENTS. (W. A. P.)

[1] The writer is indebted to the courtesy of Father Braun for the following note:—"That the Syrian *phaina* was formerly a closed mantle of the type of the bell chasuble is clearly proved by the evidence of the miniatures of a Syrian pontifical (dated 1239) in the Bibliothèque Nationale at Paris (cf. Bild 16, 112, 284, in *Die liturgische Gewandung*). The liturgical vestments of the Armenians are derived, like their rite, from the Greek rite; so that in this case also there can be no doubt that the *shurtshar* was originally closed. The Coptic rite is in the same relation to the Syrian. Moreover, it would be further necessary to prove that the *birrus*, in contradistinction to the *paenula*, was always open in front; whereas, *per contra*, the *paenula*, both as worn by soldiers and in ordinary life, was, like the modern Arab *burnus*, often slit up the front to the neck. For the rest, it is obvious that if the Syrian *phaina* was still quite closed in the 13th century, and was only provided with a slit since that time, the same is very probable in the case of the Armenian chasuble. The absence of the hood might also be taken as additional proof of the derivation of the *phaina* from the *paenula*, but I should not lay particular stress upon it. The question is settled by the above-mentioned miniatures."

CHÂTEAU (from Lat. *castellum*, fortress, through O. Fr. *chastel*, *chasteau*), the French word for castle (*q.v.*). The development of the medieval castle, in the 15th and 16th centuries, into houses arranged rather for residence than defence led to a corresponding widening of the meaning of the term *château*, which came to be applied to any seigniorial residence and so generally to all houses, especially country houses, of any pretensions (cf. the Ger. *Schloss*). The French distinguish the fortified castle from the residential mansion by describing the former as the *château fort*, the latter as the *château de plaisance*. The development of the one into the other is admirably illustrated by surviving buildings in France, especially in the *châteaux* scattered along the Loire. Of these Langeais, still in perfect preservation, is a fine type of the *château fort*, with its 10th-century keep and 13th-century walls. Amboise (1490), Blois (1500–1540), Chambord (begun 1526), Chenonceaux (1515–1560), Azay-le-Rideau (1521), may be taken as typical examples of the *château de plaisance* of the transition period, all retaining in greater or less degree some of the architectural characteristics of the medieval castle. Some description of these is given under their several headings. In English the word *château* is often used to translate foreign words (*e.g. Schloss*) meaning country house or mansion.

For the Loire châteaux see Theodore Andrea Cook, *Old Touraine* (1892).

CHATEAUBRIAND, FRANÇOIS RENÉ, VICOMTE DE (1768–1848), French author, youngest son of René Auguste de Chateaubriand, comte de Combourg,[2] was born at St Malo on the 4th of September 1768. He was a brilliant representative of the reaction against the ideas of the French Revolution, and the most conspicuous figure in French literature during the First Empire. His naturally poetical temperament was fostered in childhood by picturesque influences, the mysterious reserve of his morose father, the ardent piety of his mother, the traditions of his ancient family, the legends and antiquated customs of the sequestered Breton district, above all, the vagueness and solemnity of the neighbouring ocean. His closest friend was his sister Lucile,[3] a passionate-hearted girl, divided between her devotion to him and to religion. François received his education at Dol and Rennes, where Jean Victor Moreau was among his fellow-students. From Rennes he proceeded to the College of Dinan, and passed some years in desultory study in preparation for the priesthood. He finally decided, after a year's holiday at the family château of Combourg, that he had no vocation for the Church, and was on the point of proceeding to try his fortune in India when he received (1786) a commission in the army. After a short visit to Paris he joined his regiment at Cambrai, and early in the following year was presented at court. In 1788 he received the tonsure in order to enter the order of the Knights of Malta. In Paris (1787–1789) he made acquaintance with the Parisian men of letters. He met la Harpe, Évariste Parny, "Pindare" Lebrun, Nicolas Chamfort, Pierre Louis Ginguené, and others, of whom he has left portraits in his memoirs.

Chateaubriand was not unfavourable to the Revolution in its first stages, but he was disturbed by its early excesses; moreover, his regiment was disbanded, and his family belonged to the party of reaction. His political impartiality, he says, pleased no one. These causes and the restlessness of his spirit induced him to take part in a romantic scheme for the discovery of the North-West Passage, in pursuance of which he departed for America in the spring of 1791. The passage was not found or even attempted, but the adventurer returned enriched with the—to him—more important discovery of his own powers and vocation, conscious of his marvellous faculty for the delineation of nature, and stored with the new ideas and new imagery,

[2] For full details of the Chateaubriand family see R. Kerviler, *Essai d'une bio-bibliographie de Chateaubriand et de sa famille* (Vannes, 1895).

[3] Her *Œuvres* were edited in 1879, with a memoir, by Anatole France.

FIG. 2.—Chasuble of Pope Calixtus III. (15th century) preserved at Valencia.

From a photograph by Father J. L. Braun in *Die liturg. Gewandung*, by permission of the publisher, B. Herder.

FIG. 3.—Chasuble of Pope Pius V. (late 15th century) at S. Maria Maggiore at Rome.

From a photograph by Father J. L. Braun in *Die liturg. Gewandung*.

FIG. 4.—Chasuble dedicated by St. Stephen of Hungary (997–1038) and his wife Gisela, used as the Hungarian Coronation Robe.

(From Braun, *Die liturg. Gewandung*.)

FIG. 5.—Modern Roman Chasuble of Archbishop Bourne of Westminster.

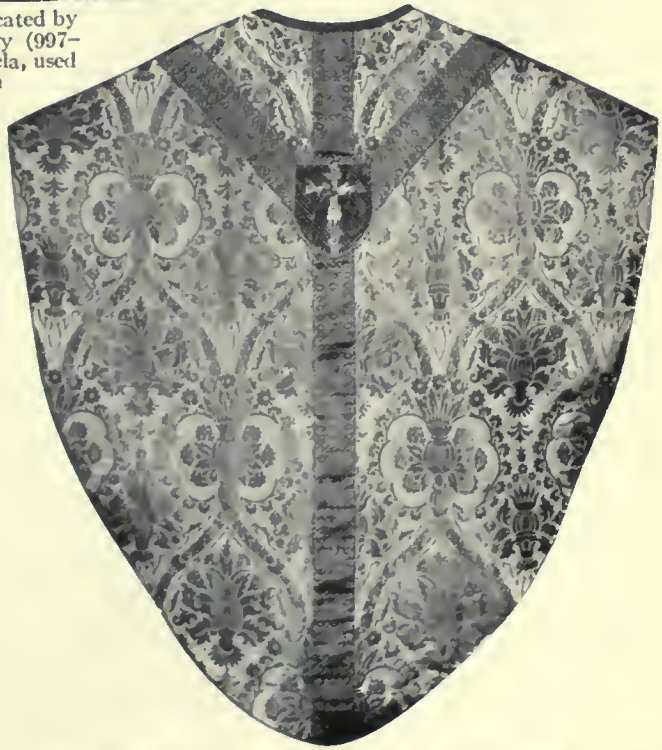


FIG. 6.—Modern English Chasuble, used at St. Paul's Church, Knightsbridge, London.

CHASUBLE

FIG. 7.—Back of a Chasuble of Italian Brocaded Damask (Red) with Embroidered Orphreys. The Vestment is of the early 16th century, the Orphreys of the late 14th century. (English. In the Victoria and Albert Museum.)

derived from the virgin forests and magnificent scenery of the western continent. That he actually lived among the Indians, however, is shown by Bedier to be doubtful, and the same critic has exposed the untrustworthiness of the autobiographical details of his American trip. His knowledge of America was mainly derived from the books of Charlevoix and others.

The news of the arrest of Louis XVI. at Varennes in June 1791 recalled him to France. In 1792 he married Mlle Céleste Buisson de Lavigne, a girl of seventeen, who brought him a small fortune. This enabled him to join the ranks of the emigrants, a course practically imposed on him by his birth and his profession as a soldier. After the failure of the duke of Brunswick's invasion he contrived to reach Brussels, where he was left wounded and apparently dying in the street. His brother succeeded in obtaining some shelter for him, and sent him to Jersey. The captain of the boat in which he travelled left him on the beach in Guernsey. He was once more rescued from death, this time by some fishermen. After spending some time in the Channel Islands under the care of an emigrant uncle, the comte de Bédée, he made his way to London. In England he lived obscurely for several years, gaining an intimate acquaintance with English literature and a practical acquaintance with poverty. His own account of this period has been exposed by A. le Braz, *Au pays d'exil de Chateaubriand* (1909), and by E. Dick, *Revue d'histoire littéraire de la France* (1908), i. From his English exile dates the *Natchez* (first printed in his *Œuvres complètes*, 1826–1831), a prose epic designed to portray the life of the Red Indians. Two brilliant episodes originally designed for this work, *Atala* and *René*, are among his most famous productions. Chateaubriand's first publication, however, was the *Essai historique, politique et moral sur les révolutions* . . . (London, 1797), which the author subsequently retracted, but took care not to suppress. In this volume he appears as a mediator between royalist and revolutionary ideas, a free-thinker in religion, and a philosopher imbued with the spirit of Rousseau. A great change in his views was, however, at hand, induced, according to his own statement, by a letter from his sister Julie (Mme de Farcy), telling him of the grief his views had caused his mother, who had died soon after her release from the Conciergerie in the same year. His brother had perished on the scaffold in April 1794, and both his sisters, Lucile and Julie, and his wife had been imprisoned at Rennes. Mme de Farcy did not long survive her imprisonment.

Chateaubriand's thoughts turned to religion, and on his return to France in 1800 the *Génie du christianisme* was already in an advanced state. Louis de Fontanes had been a fellow-exile with Chateaubriand in London, and he now introduced him to the society of Mme de Staël, Mme Récamier, Benjamin Constant, Lucien Bonaparte and others. But Chateaubriand's favourite resort was the salon of Pauline de Beaumont, who was destined to fill a great place in his life, and gave him some help in the preparation of his work on Christianity, part of the book being written at her house at Savigny. *Atala, ou les amours de deux sauvages dans le désert*, used as an episode in the *Génie du christianisme*, appeared separately in 1801 and immediately made his reputation. Exquisite style, impassioned eloquence and glowing descriptions of nature gained indulgence for the incongruity between the rudeness of the personages and the refinement of the sentiments, and for the distasteful blending of prudery with sensuousness. Alike in its merits and defects the piece is a more emphatic and highly coloured *Paul et Virginie*; it has been justly said that Bernardin Saint-Pierre models in marble and Chateaubriand in bronze. Encouraged by his success the author resumed his *Génie du christianisme, ou beautés de la religion chrétienne*, which appeared in 1802, just upon the eve of Napoleon's re-establishment of the Catholic religion in France, for which it thus seemed almost to have prepared the way. No coincidence could have been more opportune, and Chateaubriand came to esteem himself the counterpart of Napoleon in the intellectual order. In composing his work he had borne in mind the admonition of his friend Joseph Joubert, that the public would care very little for his erudition and very much for his eloquence. It is consequently an inefficient production from the point of view of serious argument. The considerations derived from natural theology are but commonplaces rendered dazzling by the magic of style; and the parallels between Christianity and antiquity, especially in arts and letters, are at best ingenious sophistries. The less polemical passages, however, where the author depicts the glories of the Catholic liturgy and its accessories, or expounds its symbolical significance, are splendid instances of the effect produced by the accumulation and judicious distribution of particulars gorgeous in the mass, and treated with the utmost refinement of detail. The work is a masterpiece of literary art, and its influence in French literature was immense. The *Éloa* of Alfred de Vigny, the *Harmonies* of Lamartine and even the *Légende des siècles* of Victor Hugo may be said to have been inspired by the *Génie du christianisme*. Its immediate effect was very considerable. It admirably subserved the statecraft of Napoleon, and Talleyrand in 1803 appointed the writer *attaché* to the French legation at Rome, whither he was followed by Mme de Beaumont, who died there.

When his insubordinate and intriguing spirit compelled his recall he was transferred as envoy to the canton of the Valais. The murder of the duke of Enghien (21st of March 1804) took place before he took up this appointment. Chateaubriand, who was in Paris at the time, showed his courage and independence by immediately resigning his post. In 1807 he gave great offence to Napoleon by an article in the *Mercure de France* (4th of July), containing allusions to Nero which were rightly taken to refer to the emperor. The *Mercure*, of which he had become proprietor, was temporarily suppressed, and was in the next year amalgamated with the *Décade*. Chateaubriand states in his *Mémoires* that his life was threatened, but it is more than possible that he exaggerated the danger. Before this, in 1806, he made a pilgrimage to Jerusalem, undertaken, as he subsequently acknowledged, less in a devotional spirit than in quest of new imagery. He returned by way of Tunis, Carthage, Cadiz and Granada. At Granada he met Mme de Mouchy, and the place and the meeting apparently suggested the romantic tale of *Le Dernier Abencérage*, which, for political reasons, remained unprinted until the publication of the *Œuvres complètes* (1826–1831). The journey also produced *L'Itinéraire de Paris à Jérusalem* . . . (3 vols., 1811), a record of travel distinguished by the writer's habitual picturesqueness; and inspired his prose epic, *Les Martyrs, ou le triomphe de la religion chrétienne* (2 vols., 1809). This work may be regarded as the argument of the *Génie du christianisme* thrown into an objective form. As in the *Epicurean* of Thomas Moore, the professed design is the contrast between Paganism and Christianity, which fails of its purpose partly from the absence of real insight into the genius of antiquity, and partly because the heathen are the most interesting characters after all. *René* had appeared in 1802 as an episode of the *Génie du christianisme*, and was published separately at Leipzig without its author's consent in the same year. It was perhaps Chateaubriand's most characteristic production. The connecting link in European literature between *Werther* and *Childe Harold*, it paints the misery of a morbid and dissatisfied soul. The representation is mainly from the life. Chateaubriand betrayed amazing egotism in describing his sister Lucile in the Amélie of the story, and much is obviously descriptive of his own early surroundings. With *Les Natchez* his career as an imaginative writer is closed. In 1831 he published his *Études ou discours historiques* . . . (4 vols.) dealing with the fall of the Roman Empire.

As a politician Chateaubriand was equally formidable to his antagonists when in opposition and to his friends when in office. His poetical receptivity and impressionableness rendered him no doubt honestly inconsistent with himself; his vanity and ambition, too morbidly acute to be restrained by the ties of party allegiance, made him dangerous and untrustworthy as a political associate. He was forbidden to deliver the address he had prepared (1811) for his reception to the Academy on M. J. Chénier on account of the bitter allusions to Napoleon contained in it. From this date until 1814 Chateaubriand lived in seclusion at

the Vallée-aux-loups, an estate he had bought in 1807 at Aulnay. His pamphlet *De Bonaparte, des Bourbons, et de la nécessité de se rallier à nos princes légitimes*, published on the 31st of March 1814, the day of the entrance of the allies into Paris, was as opportune in the moment of its appearance as the *Génie du christianisme*, and produced a hardly less signal effect. Louis XVIII. declared that it had been worth a hundred thousand men to him. Chateaubriand, as minister of the interior, accompanied him to Ghent during the Hundred Days, and for a time associated himself with the excesses of the royalist reaction. Political bigotry, however, was not among his faults; he rapidly drifted into liberalism and opposition, and was disgraced in September 1816 for his pamphlet *De la monarchie selon la charte*. He had to sell his library and his house of the Vallée-aux-loups.

After the fall of his opponent, the duc Decazes, Chateaubriand obtained the Berlin embassy (1821), from which he was transferred to London (1822), and he also acted as French plenipotentiary at the Congress of Verona (1822). He here made himself mainly responsible for the iniquitous invasion of Spain—an expedition undertaken, as he himself admits, with the idea of restoring French prestige by a military parade. He next received the portfolio of foreign affairs, which he soon lost by his desertion of his colleagues on the question of a reduction of the interest on the national debt. After another interlude of effective pamphleteering in opposition, he accepted the embassy to Rome in 1827, under the Martignac administration, but resigned it at Prince Polignac's accession to office. On the downfall of the elder branch of the Bourbons, he made a brilliant but inevitably fruitless protest from the tribune in defence of the principle of legitimacy. During the first half of Louis Philippe's reign he was still politically active with his pen, and published a *Mémoire sur la captivité de madame la duchesse de Berry* (1833) and other pamphlets in which he made himself the champion of the exiled dynasty; but as years increased upon him, and the prospect of his again performing a conspicuous part diminished, he relapsed into an attitude of complete discouragement. His *Congrès de Vérone* (1838), *Vie de Rancé* (1844), and his translation of Milton, *Le Paradis perdu de Milton* (1836), belong to the writings of these later days. He died on the 4th of July 1848, wholly exhausted and thoroughly discontented with himself and the world, but affectionately tended by his old friend Madame Récamier, herself deprived of sight. For the last fifteen years of his life he had been engaged on his *Mémoires*, and his chief distraction had been his daily visit to Madame Récamier, at whose house he met the European celebrities. He was buried in the Grand Bé, an islet in the bay of St Malo. Shortly after his death his memory was revived, and at the same time exposed to much adverse criticism, by the publication, with sundry mutilations as has been suspected, of his celebrated *Mémoires d'outre-tombe* (12 vols., 1849–1850). These memoirs undoubtedly reveal his vanity, his egotism, the frequent hollowness of his professed convictions, and his incapacity for sincere attachment, except, perhaps, in the case of Madame Récamier. Though the book must be read with the greatest caution, especially in regard to persons with whom Chateaubriand came into collision, it is perhaps now the most read of all his works.

Chateaubriand ranks rather as a great rhetorician than as a great poet. Something of affectation or unreality commonly interferes with the enjoyment of his finest works. The *Génie du christianisme* is a brilliant piece of special pleading; *Atala* is marred by its unfaithfulness to the truth of uncivilized human nature, *René* by the perversion of sentiment which solicits sympathy for a contemptible character. Chateaubriand is chiefly significant as marking the transition from the old classical to the modern romantic school. The fertility of ideas, vehemence of expression and luxury of natural description, which he shares with the romanticists, are controlled by a discipline learnt in the school of their predecessors. His palette, always brilliant, is never gaudy; he is not merely a painter but an artist. He is also a master of epigrammatic and incisive sayings. Perhaps, however, the most truly characteristic feature of his genius is the peculiar magical touch which Matthew Arnold indicated as a note of Celtic extraction, which reveals some occult quality in a familiar object, or tinges it, one knows not how, with "the light that never was on sea or land." This incommunicable gift supplies an element of sincerity to Chateaubriand's writings which goes far to redeem the artificial effect of his calculated sophistry and set declamation. It is also fortunate for his fame that so large a part of his writings should directly or indirectly refer to himself, for on this theme he always writes well. Egotism was his master-passion, and beyond his intrepidity and the loftiness of his intellectual carriage his character presents little to admire. He is a signal instance of the compatibility of genuine poetic emotion, of sympathy with the grander aspects both of man and nature, and of munificence in pecuniary matters, with absorption in self and general sterility of heart.

BIBLIOGRAPHY.—The *Œuvres complètes* of Chateaubriand were printed in 28 vols., 1826–1831; in 20 vols., 1829–1831; and in many later editions, notably in 1858–1861, in 20 volumes, with an introductory study by Sainte-Beuve. The principal authority for Chateaubriand's biography is the *Mémoires d'outre-tombe* (1849–1850), of which there is an English translation, *The Memoirs of . . . Chateaubriand* (6 vols., 1902), by A. Teixeira de Mattos, based on the admirable edition (4 vols., 1899–1901) of Edmond Biré. This work should be supplemented by the *Souvenirs et correspondances tirés des papiers de Mme Récamier* (2 vols., 1859, ed. Mme Ch. Lenormant). See also Comte de Marcellus, *Chateaubriand et son temps* (1859); the same editor's *Souvenirs diplomatiques; correspondance intime de Chateaubriand* (1858); C. A. Sainte-Beuve, *Chateaubriand et son groupe littéraire sous l'empire* (2 vols., 1861, new and revised ed., 3 vols., 1872); other articles by Sainte-Beuve, who was in this case a somewhat prejudiced critic, in the *Portraits contemporains*, vols. i. and ii..; *Causeries du lundi*, vols. i., ii. and x.; *Nouveaux Lundis*, vol. iii.; *Premiers Lundis*, vol. iii.; A. Vinet, *Études sur la litt. française au XIXe siècle* (1849); M. de Lescure, *Chateaubriand* (1892) in the *Grands écrivains français*; Émile Faguet, *Études littéraires sur le XIXe siècle* (1887); and *Essai d'une bio-bibliographie de Chateaubriand et de sa famille* (Vannes, 1896), by René Kerviler. Joseph Bedier, in *Études critiques* (1903), deals with the American writings. Some correspondence with Sainte-Beuve was edited by Louis Thomas in 1904, and some letters to Mme de Staël appeared in the *Revue des deux mondes* (Oct. 1903).

CHÂTEAUBRIANT, a town of western France, capital of an arrondissement in the department of Loire-Inférieure, on the left bank of the Chère, 40 m. N.N.E. of Nantes by rail. Pop. (1906) 5969. Châteaubriant takes its name from a castle founded in the 11th century by Brient, count of Penthièvre, remains of which, consisting of a square donjon and four towers, still exist. Adjoining it is another castle, built in the first half of the 16th century by Jean de Laval, and famous in history as the residence of Françoise de Foix, mistress of Francis I. Of this the most beautiful feature is the colonnade running at right angles to the main building, and connecting it with a graceful pavilion. It is occupied by a small museum and some of the public offices. There is also an interesting Romanesque church dedicated to St Jean de Béré. Châteaubriant is the seat of a subprefect and has a tribunal of first instance. It is an important centre on the Ouest-État railway, and has trade in agricultural products. The manufacture of leather, agricultural implements and preserved angelica are carried on. In 1551 Henry II. signed an edict against the reformed religion at Châteaubriant.

CHÂTEAUDUN, a town of north central France, capital of an arrondissement in the department of Eure-et-Loir, 28 m. S.S.W. of Chartres by rail. Pop. (1906) 5805. It stands on an eminence near the left bank of the Loire. The streets, which are straight and regular, radiate from a central square, a uniformity due to the reconstruction of the town after fires in 1723 and 1870. The château, the most remarkable building in the town, was built in great part by Jean, count of Dunois, and his descendants. Founded in the 10th century, and rebuilt in the 12th and 15th centuries, it consists of a principal wing with a fine staircase of the 16th century, and, at right angles, a smaller wing adjoined by a chapel. To the left of the courtyard thus formed rises a lofty keep of the 12th century. The fine apartments and huge kitchens of the château are in keeping with its imposing exterior. The church of La Madeleine dates from the 12th century; the buildings of the abbey to which it belonged are occupied by the subprefecture, the law court and the hospital. The medieval churches of St Valérien and St Jean

and the ruined chapel of Notre-Dame du Champdé, of which the façade in the Renaissance style now forms the entrance to the cemetery, are other notable buildings. The public institutions include a tribunal of first instance and a communal college. Flour-milling, tanning and leather-dressing, and the manufacture of blankets, silver jewelry, nails and machinery are the prominent industries. Trade is in cattle, grain, wool and hemp. Châteaudun (*Castrodunum*), which dates from the Gallo-Roman period, was in the middle ages the capital of the countship of Dunois.

CHÂTEAU-GONTIER, a town of western France, capital of an arrondissement in the department of Mayenne, on the Mayenne, 18 m. S. by E. of Laval by road. Pop. (1906) 6871. Of its churches, that of St Jean, a relic of the castle, dates from the 11th century. Château-Gontier is the seat of a sub-prefect and has a tribunal of first instance, a communal college for boys and a small museum. It carries on wool- and cotton-spinning, the manufacture of serge, flannel and oil, and is an agricultural market. There are chalybeate springs close to the town. Château-Gontier owes its origin and its name to a castle erected in the first half of the 11th century by Gunther, the steward of Fulk Nerra of Anjou, on the site of a farm belonging to the monks of St Aubin d'Angers. On the extinction of the family, the lordship was assigned by Louis XI. to Philippe de Comines. The town suffered severely during the wars of the League. In 1793 it was occupied by the Vendeans.

CHÂTEAUNEUF, LA BELLE, the name popularly given to RENÉE DE RIEUX, daughter of Jean de Rieux, seigneur de Châteauneuf, who was descended from one of the greatest families of Brittany. The dates both of her birth and death are not known. She was maid of honour to the queen-mother Catherine de' Medici, and inspired an ardent passion in the duke of Anjou, brother of Charles IX. This intrigue deterred the duke from the marriage which it was desired to arrange for him with Elizabeth of England; but he soon abandoned La Belle Châteauneuf for Marie of Cleves (1571). The court then wished to find a husband for Renée de Rieux, whose singular beauty gave her an influence which the queen-mother feared, and matches were in turn suggested with the voivode of Transylvania, the earl of Leicester, with Du Prat, provost of Paris, and with the count of Brienne, all of which came to nothing. Ultimately, on the ground that she had been lacking in respect towards the queen, Louise of Lorraine-Vaudémont, Renée was banished from the court. She married a Florentine named Antinotti, whom she stabbed in a fit of jealousy (1577); then she remarried, her husband being Philip Altoviti, who in 1586 was killed in a duel by the Grand Prior Henry of Angoulême, who was himself mortally wounded.

CHÂTEAU-RENAULT, FRANÇOIS LOUIS DE ROUSSELET, MARQUIS DE (1637–1716), French admiral, was the fourth son of the third marquis of Château-Renault. The family was of Breton origin, but had been long settled near Blois. He entered the army in 1658, but in 1661 was transferred to the navy, which Louis XIV. was eager to raise to a high level of strength. After a short apprenticeship he was made captain in 1666. His early services were mostly performed in cruises against the Barbary pirates (1672). In 1673 he was named *chef d'escadre*, and he was promoted *lieutenant général des armées navales* in 1687. During the wars up to this date he had few chances of distinction, but he had been wounded in action with the pirates, and had been on a cruise to the West Indies. When war broke out between England and France after the revolution of 1688, he was in command at Brest, and was chosen to carry the troops and stores sent by the French king to the aid of James II. in Ireland. Although he was watched by Admiral Herbert (Lord Torrington, *q.v.*), with whom he fought an indecisive action in Bantry Bay, he executed his mission with success. Château-Renault commanded a squadron under Tourville at the battle of Beachy Head in 1690. He was with Tourville in the attack of the Smyrna convoy in 1693, and was named grand cross of the order of Saint Louis in the same year. Though in constant service, the reduced state of the French navy (owing to the financial embarrassments of the treasury) gave him few openings for fighting at sea during the rest of the war.

On the death of Tourville in 1701 he was named to the vacant post of vice-admiral of France. On the outbreak of the War of the Spanish Succession he was named for the difficult task of protecting the Spanish ships which were to bring the treasure from America. It was a duty of extreme delicacy, for the Spaniards were unwilling to obey a foreigner, and the French king was anxious that the bullion should be brought to one of his own ports, a scheme which the Spanish officials were sure to resent if they were allowed to discover what was meant. With the utmost difficulty Château-Renault was able to bring the galleons as far as Vigo, to which port he steered when he learnt that a powerful English and Dutch armament was on the Spanish coast, and had to recognize that the Spanish officers would not consent to make for a French harbour or for Passages, which they thought too near France. His fleet of fifteen French and three Spanish war-ships, having under their care twelve galleons, had anchored on the 22nd of September in Vigo Bay. Obstacles, some of an official character, and others due to the poverty of the Spanish government in resources, arose to delay the landing of the treasure. There was no adequate garrison in the town, and the local militia was untrustworthy. Knowing that he would probably be attacked, Château-Renault strove to protect his fleet by means of a boom. The order to land the treasure was delayed, and until it came from Madrid nothing could be done, since according to law it should have been landed at Cadiz, which had a monopoly of the trade with America. At last the order came, and the bullion was landed under the care of the Gallician militia which was ordered to escort it to Lugo. A very large part, if not the whole, was plundered by the militiamen and the farmers whose carts had been commandeered for the service. But the bulk of the merchandise was on board of the galleons when the allied fleet appeared outside of the bay on the 22nd of October 1702. Sir George Rooke and his colleagues resolved to attack. The fleet was carrying a body of troops which had been sent out to make a landing at Cadiz, and had been beaten off. The fortifications of Vigo were weak on the sea side, and on the land side there were none. There was therefore nothing to offer a serious resistance to the allies when they landed soldiers. The fleet of twenty-four sail was steered at the boom and broke through it, while the troops turned the forts and had no difficulty in scattering the Gallician militia. In the bay the action was utterly disastrous to the French and Spaniards. Their ships were all taken or destroyed. The booty gained was far less than the allies hoped, but the damage done to the French and Spanish governments was great.

Château-Renault suffered no loss of his master's favour by his failure to save the treasure. The king considered him free from blame, and must indeed have known that the admiral had been trusted with too many secrets to make it safe to inflict a public rebuke. The Spanish government declined to give him the rank of grandee which was to have been the reward for bringing home the bullion safe. But in 1703 he was made a marshal of France, and shortly afterwards lieutenant-general of Brittany. The fight in Vigo Bay was the last piece of active service performed by Château-Renault. In 1708 on the death of his nephew he inherited the marquisate, and on the 15th of November 1716 he died in Paris. He married in 1684 Marie-Anne-Renée de la Porte, daughter and heiress of the count of Crozon. His eldest son was killed at the battle of Malaga 1704, and another, also a naval officer, was killed by accident in 1708. A third son, who too was a naval officer, succeeded him in the title.

A life of Château-Renault was published in 1903 by M. Calmon-Maison. There is a French as well as an English account of the part played by him at Bantry Bay and Beachy Head, and the controversy still continues. For the French history of the navy under Louis XIV. see Léon Guérin, *Histoire maritime de la France* (1863), vols. iii., iv.; and his *Les Marins illustres* (1861). Also the naval history by Charles Bouzel de la Roncière. (D. H.)

CHÂTEAUROUX, MARIE ANNE DE MAILLY-NESLE, DUCHESSE DE (1717–1744), mistress of Louis XV. of France, was the fourth daughter of Louis, marquis de Nesle, a descendant

of a niece of Mazarin. In 1740, upon the death of her husband, the marquis de la Tournelle, she attracted the attention of Louis XV.; and by the aid of the duc de Richelieu, who, dominated by Madame de Tencin, hoped to rule both the king and the state, she supplanted her sister, Madame de Mailly, as titular mistress in 1742. Directed by Richelieu, she tried to arouse the king, dragging him off to the armies, and negotiated the alliance with Frederick II. of Prussia, in 1744. Her political rôle, however, has been exaggerated. Her triumph after the passing disgrace provoked by the king's illness at Metz did not last long, for she died on the 8th of December 1744.

See Ed. and J. de Goncourt, *La Duchesse de Châteauroux et ses sœurs* (Paris, 1879).

CHÂTEAUROUX, a town of central France, capital of the department of Indre, situated in a plain on the left bank of the Indre, 88 m.S. of Orleans on the main line of the Orleans railway. Pop. (1906) 21,048. The old town, close to the river, forms a nucleus round which a newer and more extensive quarter, bordered by boulevards, has grown up; the suburbs of St Christophe and Déols (*q.v.*) lie on the right bank of the Indre. The principal buildings of Châteauroux are the handsome modern church of St André, in the Gothic style, and the Château Raoul, of the 14th and 15th centuries; the latter now forms part of the prefecture. The hôtel de ville contains a library and a museum which possesses a collection of paintings of the Flemish school and some interesting souvenirs of Napoleon I. A statue of General Henri Bertrand (1773–1844) stands in one of the principal squares. Châteauroux is the seat of a prefect and of a court of assizes. It has tribunals of first instance and of commerce, a board of trade-arbitrators, a branch of the Bank of France, a chamber of commerce, a lycée, a college for girls and training colleges. The manufacture of coarse woollens for military clothing and other purposes, and a state tobacco-factory, occupy large numbers of the inhabitants. Wool-spinning, iron-founding, brewing, tanning, and the manufacture of agricultural implements are also carried on. Trade is in wool, iron, grain, sheep, lithographic stone and leather. The castle from which Châteauroux takes its name was founded about the middle of the 10th century by Raoul, prince of Déols, and during the middle ages was the seat of a seigniory, which was raised to the rank of countship in 1497, and in 1616, when it was held by Henry II., prince of Condé, to that of duchy. In 1736 it returned to the crown, and was given by Louis XV. in 1744 to his mistress, Marie Anne de Mailly-Nesle, duchess of Châteauroux.

CHÂTEAU-THIERRY, a town of northern France, capital of an arrondissement in the department of Aisne, 59 m. E.N.E. of Paris on the Eastern railway to Nancy. Pop. (1906) 6872. Château-Thierry is built on rising ground on the right bank of the Marne, over which a fine stone bridge leads to the suburb of Marne. On the quay stands a marble statue erected to the memory of La Fontaine, who was born in the town in 1621; his house is still preserved in the street that bears his name. On the top of a hill are the ruins of a castle, which is said to have been built by Charles Martel for the Frankish king, Thierry IV., and is plainly the origin of the name of the town. The chief relic is a gateway flanked by massive round towers, known as the Porte Saint-Pierre. A belfry of the 15th century and the church of St Crépin of the same period are of some interest. The town is the seat of a sub-prefect and has a tribunal of first instance and a communal college. The distinctive industry is the manufacture of mathematical and musical instruments. There is trade in the white wine of the neighbourhood, and in sheep, cattle and agricultural products. Gypsum, millstone and paving-stone are quarried in the vicinity. Château-Thierry was formerly the capital of the district of Brie Pouilleuse, and received the title of duchy from Charles IX. in 1566. It was captured by the English in 1421, by Charles V. in 1544, and sacked by the Spanish in 1591. During the wars of the Fronde it was pillaged in 1652; and in the campaign of 1814 it suffered severely. On the 12th of February of the latter year the Russo-Prussian forces were beaten by Napoleon in the neighbourhood.

CHÂTELAIN (Med. Lat. *castellanus*, from *castellum*, a castle), in France originally merely the equivalent of the English castellan, *i.e.* the commander of a castle. With the growth of the feudal system, however, the title gained in France a special significance which it never acquired in England, as implying the jurisdiction of which the castle became the centre. The *châtelain* was originally, in Carolingian times, an official of the count; with the development of feudalism the office became a fief, and so ultimately hereditary. In this as in other respects the châtelain was the equivalent of the viscount (*q.v.*); sometimes the two titles were combined, but more usually in those provinces where there were châtelains there were no viscounts, and vice versa. The title châtelain continued also to be applied to the inferior officer, or *concierge châtelain*, who was merely a castellan in the English sense. The power and status of châtelains necessarily varied greatly at different periods and places. Usually their rank in the feudal hierarchy was equivalent to that of the simple *sire* (*dominus*), between the baron and the *chevalier*; but occasionally they were great nobles with an extensive jurisdiction, as in the Low Countries (see Burgrave). This variation was most marked in the cities, where in the struggle for power that of the châtelain depended on the success with which he could assert himself against his feudal superior, lay or ecclesiastical, or, from the 12th century onwards, against the rising power of the communes. The *châtellenie* (*castellania*), or jurisdiction of the châtelain, as a territorial division for certain judicial and administrative purposes, survived the disappearance of the title and office of the châtelain in France, and continued till the Revolution.

See Achille Luchaire, *Manuel des institutions françaises* (Paris, 1892); Du Cange, *Glossarium*, *s.* "Castellanus."

CHATELAINE (Fr. *châtelaine*, the feminine form of *châtelain*, a keeper of a castle), the mistress of a castle. From the custom of a chatelaine to carry the keys of the castle suspended from her girdle, the word is now applied to the collection of short chains, often worn by ladies, to which are attached various small articles of domestic and toilet use, as keys, penknife, needlecase, scissors, &c.

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